ORIGINAL ARTICLE

Volume 18 No. 3 2026

DOI: 10.21315/eimj2026.18.3.16

ARTICLE INFO

Submitted: 15-08-2025
Accepted: 08-02-2026
Online: 30-09-2026

Intention to Adopt Artificial Intelligence in Healthcare: Insights from Health Science Students through the Technology Acceptance Model

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To cite this article: Thuy LT, Giang NH, Hoai NTY, My TT, Trinh LH, Oanh TTH. Intention to adopt artificial intelligence in healthcare: insights from health science students through the technology acceptance model. Education in Medicine Journal. 2026;18(3):237–248. https://doi.org/10.21315/eimj2026.18.3.16

To link to this article: https://doi.org/10.21315/eimj2026.18.3.16

ABSTRACT

This study aimed to evaluate health science students' intentions to adopt artificial intelligence (AI) in healthcare and to identify key predictors of these intentions using the Technology Acceptance Model (TAM). A cross-sectional survey was conducted among 967 students enrolled in various health-related disciplines at a university. Data were collected through a self-administered online questionnaire comprising five sections: demographic information, information technology (IT) skills, perceptions of AI in medicine, attitudes towards AI and intentions to adopt AI in healthcare. Approximately half of the participants reported high intentions to integrate AI into their future medical practice. Linear regression analyses confirmed the applicability of the TAM in predicting AI adoption intentions and identified the following three significant predictors: attitudes towards AI, perceptions of AI in medicine and IT skills. Among these, attitudes towards AI emerged as the strongest predictor ($\beta = 0.563$, $t = 17.687$, $p < 0.001$). These findings underscore the importance of fostering students' IT competencies and positive perceptions and attitudes to facilitate the effective integration of AI into medical education and practice. Future research should employ longitudinal designs to examine changes in students' perceptions and attitudes over time, thereby providing insights for curriculum development that better aligns with students' evolving learning needs and ensures professional readiness.

Keywords: *Artificial intelligence, Education, Health science, Intention, Students*

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INTRODUCTION

Artificial intelligence (AI) is a branch of computer science that focuses on developing systems capable of performing tasks that traditionally required human intelligence, such as visual perception, speech recognition, decision-making and language translation (1,2). In recent years, AI has emerged as a transformative force across various sectors, including finance, education and, most prominently, healthcare (3). Within the latter, AI applications

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have demonstrated substantial potential to enhance service quality and operational efficiency through their roles in diagnostics, medical imaging, data analytics and treatment planning. These advancements enable more accurate, timely and personalised care, thereby transforming healthcare into a more intelligent and data-driven ecosystem (4).

Healthcare professionals play a pivotal role in the successful implementation of AI in clinical practice, as their acceptance and engagement are crucial for achieving optimal patient outcomes (5). As future healthcare practitioners, undergraduate students in health science disciplines must be adequately equipped to navigate an AI-integrated clinical environment. Their perceptions, attitudes and intentions towards AI adoption provide valuable insights into workforce readiness and reveal potential barriers to effective technology integration (6). Although most university students are aware of AI and its expanding applications, many have limited direct exposure to AI systems, which may foster uncertainty or anxiety about AI's implications for their future professional roles. Research findings on this topic are mixed. While one study reported that 73.4% of medical students were unaware of AI applications in medicine (7), another multi-institutional study in Pakistan found that most medical students held favourable attitudes towards AI (8). Despite reporting limited preparedness for engaging with advanced technologies, students increasingly recognise the importance of AI and express a strong desire for formal training in this field (9).

Several factors influence students' intentions to adopt AI in healthcare, including their knowledge, attitudes and overall perceptions of AI (1). Individuals with a greater understanding and awareness of AI tend to demonstrate higher levels of trust, confidence and readiness to adopt it in clinical practice. In particular, positive attitudes towards AI are strongly linked to increased willingness to integrate AI into healthcare delivery and increased self-efficacy in that process (2). To explain such behavioural tendencies, previous studies have frequently employed the Technology Acceptance Model (TAM), which provides a robust framework for understanding the determinants of technology adoption and user acceptance in healthcare and educational contexts.

TAM was developed by Davis in 1989. It provides a widely recognised framework for explaining how individuals adopt and use new technologies. According to the model, two primary factors, perceived usefulness and perceived ease of use, shape an individual's behavioural intention to adopt a technology (10). Beyond its two core constructs, the TAM also recognises the role of external variables, such as individual characteristics, technological competence and contextual factors, which may directly or indirectly influence behavioural intention. In educational and healthcare settings, simplified or adapted versions of the TAM have been widely used to focus on key predictors of intention, particularly when the research objective is exploratory rather than theoretical.

In this study, the TAM was adapted to the context of AI adoption in healthcare education. Specifically, perceived usefulness was operationalised as students' perceptions of AI in medicine, reflecting their beliefs about its benefits and applicability in clinical practice. Attitude towards use was represented by students' overall attitudes towards AI, while behavioural intention corresponded to their intentions to adopt AI in future professional practice. Although conceptually related to the perceived ease of use component of the original TAM, information technology (IT) skills were examined as an independent predictor representing students' confidence and familiarity with digital technologies. Rather than testing the full mediation pathways proposed in the original TAM, this study focused on examining the direct relationships among these factors and students' intentions to adopt AI, with the TAM serving as the overarching theoretical framework (Figure 1).

Despite growing global interest in AI integration, limited research has applied the TAM to explore AI adoption intention among undergraduate health science students, particularly in low- and middle-income countries, such as Vietnam. Educational and healthcare systems in these contexts face unique challenges, including constrained infrastructure, uneven levels of technological literacy and limited opportunities for AI-related training. These contextual factors may significantly shape students' readiness and willingness to engage with AI in healthcare education and practice.

Addressing this gap, the present study contributes to the limited body of evidence on technology acceptance in healthcare education in Southeast Asia. By identifying key predictors of AI adoption intention among Vietnamese health science students, this research offers context-specific insights that can inform curriculum reform, digital literacy initiatives and institutional policies aimed at equipping future healthcare professionals for AI-enabled practice. Accordingly, this study pursued two main objectives: (a) to assess health science students' intentions to adopt AI in healthcare in Vietnam; and (b) to examine the predictors of adoption intention based on the TAM framework. The findings are expected to generate empirical evidence to inform future strategies in education, training, and policy, thereby supporting the effective integration of AI into healthcare education and workforce development.

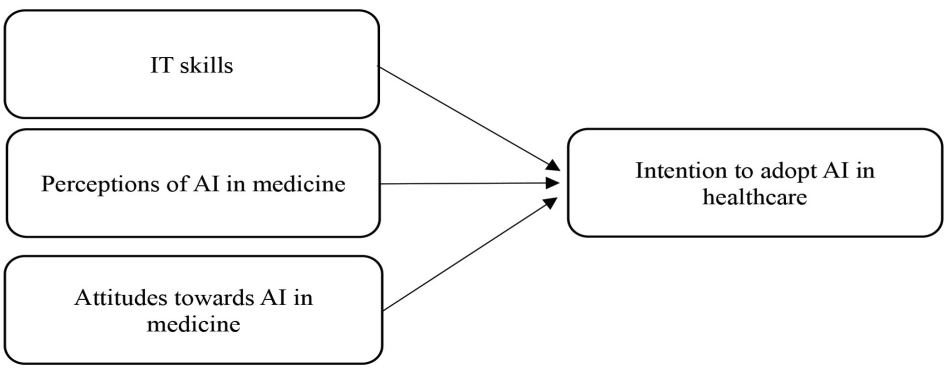

Figure 1: Conceptual framework based on an adapted TAM for AI adoption in healthcare.

METHODS

Study Design and Participants

This study employed a descriptive, cross-sectional design utilising the Appraisal tool for Cross-Sectional Studies tool (AXIS), which aids evaluation of the quality and risk of bias in cross-sectional studies (11).

The target population consisted of full-time undergraduate health science students enrolled at the university who voluntarily participated in the study. Incomplete survey responses were excluded from the final analysis. The study used convenience sampling, and data were collected via a self-administered online questionnaire distributed via Google Forms over a 4-week period in December 2024. A total of 988 students completed the survey, of which 21 responses were excluded due to missing data, resulting in a final sample of 967 participants.

As individual participants could not be tracked, it was not possible to report certain metrics, such as site visitors, view rates or participation rates.

Measurement and Data Collection

Data were collected using a self-administered questionnaire consisting of five sections: (a) demographic information; (b) IT skills; (c) the perceptions of AI in medicine scale, (d) the attitudes towards AI in healthcare scale; and (e) the intention to use AI technology scale. The demographic section included items on age, gender, academic programme, academic year, grade point average (GPA) and prior participation in webinars or courses related to AI. IT skills were assessed using a single self-report item in which participants rated their overall IT proficiency on a five-point Likert scale ranging from 1 (excellent) to 5 (poor).

The perceptions of AI in medicine scale, developed by Mehta et al. (12), was employed to assess participants' perceptions of AI applications in healthcare. This 16-item instrument comprises three dimensions: (a) individual patient care (11 items); (b) healthcare system (3 items); and (c) population health (2 items). Each item was rated on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The total score was computed by summing item responses and ranged from 16 to 80, with higher scores indicating more favourable perceptions of AI in medicine (12). The scale demonstrated acceptable internal consistency, with a Cronbach's alpha of 0.60 (13).

The 16-item attitudes towards AI in healthcare scale has been used in the Vietnamese context by prior researchers (9). Originally designed for medical and pharmacy students, the wording of several items was adapted to ensure relevance across all health science disciplines. The scale utilises a five-point Likert response format ranging from 1 (strongly disagree) to 5 (strongly agree). For scoring, responses of 'agree' or 'strongly agree' were assigned a value of 1, while all other responses were coded as 0. Higher cumulative scores indicated more positive attitudes towards AI in healthcare. The scale demonstrated acceptable internal consistency, with a Cronbach's alpha of 0.67 (9). In descriptive analyses, participants' attitudes were dichotomised as positive (total score > 8) or negative (total score ≤ 8); however, in multivariable regression analyses, the total attitude score was treated as a continuous variable to preserve statistical power and capture the full range of attitudinal variation.

At the time of data collection, there were limited validated instruments available to assess perceptions and attitudes towards AI in healthcare and medical education contexts. Despite the modest Cronbach's alpha values reported for the two scales, they were selected based on their strong conceptual relevance and comprehensive coverage of the key dimensions of AI in medicine. Such internal consistency values are considered acceptable for exploratory research and for instruments adapted to new educational and cultural contexts.

The intention to use AI technology scale was employed to assess participants' intentions to adopt AI in healthcare. This three-item instrument uses a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree), with higher mean scores reflecting a stronger intention to adopt AI in healthcare. Mean scores were further categorised into three levels of intention: low (1.00–2.33), moderate (2.34–3.66) and high (3.67–5.00) (14).

Following permission from the original authors, the perceptions of AI in medicine scale and the intention to use AI technology scale were translated from English into Vietnamese. The translation process followed the standardised procedure outlined by Cruchinho et al. (15).

Content validity was evaluated by a panel of five healthcare experts, yielding content validity indices of 0.96 for the Perceptions of AI in medicine scale and 0.93 for the intention to use AI technology scale. Reliability testing with a pilot sample of 30 undergraduate students demonstrated excellent internal consistency, with Cronbach's alpha coefficients of 0.96 and 0.92, respectively.

Data collection was conducted using Google Forms. The online survey, accompanied by an invitation letter, was distributed to students via class e-mail lists and a quick response (QR) code. An informed consent form was displayed on the first page of the survey. Participants were required to click the 'Yes' button to indicate their consent before proceeding to the questionnaire.

Data Analysis

The data were managed and analysed using Microsoft Excel and the Statistical Package for the Social Sciences (SPSS) version 26.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to summarise the dataset. Specifically, categorical variables were presented as frequencies and percentages, while continuous variables were summarised using means, standard deviations and ranges. To identify factors predicting students' intentions to adopt AI, the authors conducted univariate analyses, including one-way analysis of variance and Pearson's product-moment correlation. Subsequently, variables exhibiting statistically significant associations with AI adoption intention were entered into a multiple linear regression model. The level of statistical significance was set at $p < 0.05$.

Prior to performing multiple linear regression, the authors evaluated the four key assumptions – normality, homoscedasticity, multicollinearity and autocorrelation. The normality of residuals was assessed using a histogram and a normal P–P plot. Homoscedasticity was verified via a scatter plot of standardised residuals. Correlation coefficients among independent variables ranged from –0.165 to 0.724, tolerance values ranged from 0.474 to 0.984, and variance inflation factor values ranged from 1.017 to 2.108, collectively indicating no evidence of multicollinearity (16). The Durbin–Watson statistic was 2.020, suggesting the absence of autocorrelation among residuals (17).

RESULTS

Demographic Characteristics

A total of 967 students participated in the study. The majority were female (78.5%), with a mean age of 19.55 years (SD = 1.48). Approximately one-third of the participants were enrolled in nursing programmes (34.9%), and most were in their first academic year (34.6%). More than half of the students (57.0%) reported a fair GPA (2.5–3.1 on a 4-point scale). Additionally, 59.0% of participants indicated that they were either unaware of or had not attended webinars or courses on AI (see Table 1).

Table 1: Demographic characteristics of the participants (N = 967)

Characteristic	Frequency (n)	%
Age*	19.55 ± 1.48 (18–25 years)	
Gender		
Female	759	78.5
Male	208	21.5
Academic programme		
Nursing	337	34.9
Pharmacy	162	16.8
Medicine	160	16.5
Medical laboratory technology	142	14.7
Rehabilitation	100	10.3
Medical image technology	59	6.1
Public health	7	0.7
Academic year		
1st	335	34.6
2nd	255	26.4
3rd	134	13.9
4th	183	18.9
5th	36	3.7
6th	24	2.5
Grade point average		
Excellent (3.6–4.0)	51	5.3
Good (3.2–3.5)	209	21.6
Fair (2.5–3.1)	551	57.0
Average (2.0–2.4)	143	14.8
Weak (1.0–1.9)	13	1.3
Heard of or taken any webinars/courses related to artificial intelligence?		
Yes	396	41.0
No	571	59.0

Note: *Mean ± standard deviation (range)

Information Technology Skills

As shown in Table 2, most participants rated their IT skills as fair (55.4%) or good (18.9%), indicating a generally moderate level of digital proficiency across the sample.

Table 2: Information technology skills of the participants (N = 967)

Level of information technology skills	Frequency (n)	%
Excellent	14	1.4
Good	183	18.9
Fair	535	55.4
Average	221	22.9
Poor	14	1.4

Perceptions and Attitudes Towards AI in Medicine

Participants demonstrated a moderate overall perception of AI in medicine, with a mean total score of 54.80 (SD = 10.20). Additionally, nearly half of the participants (47.5%) reported positive attitudes towards AI in medicine (Table 3).

Table 3: Participants' perceptions and attitudes towards AI in medicine (N = 967)

Item	Mean ± SD	Range	Frequency (%)
Perceptions of AI in medicine	54.80 ± 10.20	27–80	
Attitudes towards AI in medicine	55.24 ± 10.22	28–80	
Positive attitude			459 (47.5)
Negative attitude			508 (52.5)

Intention to Adopt AI in Healthcare

The mean intention score was 3.49 (SD = 0.75), reflecting a moderate-to-high tendency among students. More than half of the respondents (50.7%) reported a high level of intention, suggesting a generally positive outlook and readiness to integrate AI into future clinical practice (Table 4).

Table 4: Classification of intention to adopt AI in healthcare (N = 967)

Adoption intention	Mean ± SD	Range	Frequency (%)
Intention to adopt AI in healthcare	3.49 ± 0.75	1–5	
Low intention			88 (9.1)
Moderate intention			389 (40.2)
High intention			490 (50.7)

Predictors of Intention to Adopt AI in Healthcare

Multiple regression analysis identified three variables that significantly predicted participants' intentions to adopt AI in healthcare. Together, these predictors explained 53.4% of the variance in AI adoption intention. Among them, attitudes towards AI applications emerged as the strongest predictor, followed by perceptions of AI in medicine and IT skills. Although the regression coefficient for IT skills was negative, this reflects the variable's coding direction, in which higher scores indicate lower proficiency levels. Thus, the negative coefficient should be interpreted as a positive association between IT competence and the intention to adopt AI in healthcare. In summary, participants with more positive attitudes towards AI, more favourable perceptions of its applications in medicine and higher self-reported IT skills demonstrated a greater intention to adopt AI in healthcare (Table 5).

Table 5: Factors predicting adoption intention of AI-assisted healthcare (N = 967)

Predictors	b	SE (b)	Beta	t	*p*-value
(Constant)	0.668	0.126		5.305	< 0.001
1. IT skills	−0.080	0.023	−0.078	−3.539	< 0.001
2. Perceptions of AI in medicine	0.014	0.002	0.197	6.189	< 0.001
3. Attitudes towards AI in medicine	0.041	0.002	0.563	17.687	< 0.001
$R = 0.732$, $R^2 = 0.536$, adjusted $R^2 = 0.534$, $F_{(3, 963)} = 370.727$, $p < 0.001$					

Notes: b = unstandardised regression coefficient; Beta = standardised regression coefficient; SE = standard error; R^2 = coefficient of determination.

DISCUSSION

The rapid advancement of AI is profoundly reshaping healthcare, underscoring the need for medical education programmes that prepare students to integrate AI technologies into clinical practice (18) effectively. In this study, most health science students self-rated their IT skills as fair or good, indicating moderate digital competence. This finding is consistent with Raghunathan et al. (19), who reported that fewer than half of nursing students in Australia achieved a competent level of informatics proficiency (19). Similarly, Kleib et al. (20) found that Canadian nursing students were confident in basic IT use but less prepared for advanced digital health applications (20). In contrast, Aydınlar et al. (21) observed slightly higher digital literacy levels among Turkish health science students, likely reflecting greater institutional exposure to digital learning (21). These findings highlight a global trend in which healthcare students possess foundational digital skills yet lack specialised informatics competencies, reinforcing the need to integrate structured digital health and informatics training into health science curricula.

AI perception involves an individual's cognitive understanding and emotional evaluation of AI technologies, while attitude reflects the individual's overall favourability towards AI use in a given context (10,22). In the current study, students demonstrated moderate levels of both perception and attitude towards AI in medicine, with 47.5% expressing positive attitudes towards its implementation. This moderate endorsement suggests cautious optimism among health science students, possibly due to limited exposure to AI applications during their training. Comparable findings have been reported in studies from the United Kingdom and Saudi Arabia (23,24), whereas higher positivity rates were observed among students in South Korea and Pakistan (25,26), where more comprehensive curricular integration and public discourse on AI in healthcare may have contributed to greater acceptance.

In the context of this study, intention to adopt AI refers to a student's willingness to integrate AI technologies into healthcare practice (27). The mean intention score was 3.49 (SD = 0.75) out of 5, indicating a moderate-to-high level of intention among participants. This finding is comparable to results from Korea, where nursing students reported a mean score of 3.59 (SD = 0.66) (28). In contrast, Chinese students reported a lower mean score (3.26), while nursing students in the Philippines showed slightly higher intention levels (mean = 3.67, SD = 0.57) (14,29). Overall, these findings consistently suggest that health science students across different contexts exhibit moderate-to-high willingness to adopt AI in healthcare, reflecting growing awareness and acceptance of AI's potential role in future clinical practice (30).

The present study demonstrated that attitudes towards AI, perceptions of AI in medicine and IT skills significantly predicted students' intentions to adopt AI, collectively explaining 53.4% of the variance. Within the TAM, this finding reinforces that positive attitude, reflecting perceived usefulness of and trust in AI, plays a central role in shaping behavioural intention (10). Similar patterns have been reported in studies from the Philippines and Korea, where favourable attitudes were strong determinants of students' willingness to engage with AI technologies (14,30). The influence of AI perception observed in this study further emphasises the importance of students' awareness of AI's benefits and limitations, consistent with evidence from the Philippines (14). A recent systematic review also confirmed that favourable perceptions of and positive attitudes towards AI significantly predict behavioural intention to use AI among nursing students (31).

Although TAM provides a robust theoretical framework, its simplicity may limit its ability to capture complex user–technology interactions and individual differences (22). Expanding TAM with additional contextual factors can enhance its explanatory power. In this study, IT skills were incorporated as a relevant external variable influencing students' confidence in adopting AI. This aligns with the findings of El Arab et al. (32), who reported that stronger computer skills, serving as a proxy for digital competence, were positively associated with the intention to adopt AI among nursing students (32). Therefore, modern health science curricula should prioritise the development of digital competencies, emphasising software literacy, data analysis, and familiarity with AI applications relevant to healthcare.

Limitations

This study has certain limitations that should be acknowledged. First, the survey sample was drawn from a single university, which may limit external validity and restrict the generalisability of the findings. Second, using an online questionnaire introduced potential sampling bias and may have affected the authenticity of self-reported responses. Third, the cross-sectional design captured participants' perceptions and attitudes at a single point in time, which may not reflect future changes.

Future research should include participants from multiple institutions, use mixed data collection approaches (e.g., combining face-to-face and online methods), and employ longitudinal designs to examine changes in students' perceptions and intentions over time. Such methodological refinements would enhance the robustness and generalisability of the findings, contributing to a more comprehensive understanding of the factors influencing AI adoption and supporting its effective integration into future healthcare practice.

CONCLUSION

This study with 967 health science students found that nearly half of the participants reported high intentions to integrate AI into their future clinical practice. Drawing on the TAM, attitudes towards AI, perceptions of AI in medicine and IT skills were identified as significant predictors of adoption intention, with attitudes acting as the strongest determinant. To better prepare future healthcare professionals and enhance AI acceptance within medical education and clinical contexts, health science curricula should incorporate AI literacy, ethical awareness and digital competency development. Future research involving more diverse student cohorts and longitudinal designs is warranted to capture

changes in perceptions and attitudes over time, thereby guiding curriculum innovations that promote the confident, informed and responsible integration of AI technologies in healthcare practice.

ACKNOWLEDGEMENTS

The authors sincerely thank all participating students for their time, cooperation and valuable contributions to this study. Editorial assistance was provided by ChatGPT (OpenAI, San Francisco, CA, USA) for language refinement and technical proofreading. The authors retain full responsibility for the study's content, data interpretation and conclusions. The authors declare that this research did not receive any specific grant from funding agencies in the public, commercial or not-for-profit sectors.

ETHICAL APPROVAL

Ethical approval was granted by the Ethics Committee in Biomedical Research at Da Nang University of Medical Technology and Pharmacy (reference #630/QĐ-ĐHKTYDĐN dated 10 October 2024). Written informed consent was obtained from all participants prior to data collection.

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