Biblios
ISSN 1562-4730 (online)

Forecasting Ghanaian Medical Library Users' Artificial Intelligence (AI) Technology's Acceptance and Use

Previsión de la aceptación y el uso de la tecnología de Inteligencia Artificial (IA) por parte de los usuarios de la biblioteca médica de Ghana

Previsão da aceitação e uso da tecnologia de Inteligência Artificial (IA) pelos usuários da biblioteca de medicina em Gana

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ORIGINAL

Abstract

Objective. This study investigated the behavioural intentions of medical students in an academic library regarding the use of AI-assisted technologies for research and learning. **Method.** Employing a survey research design and a quantitative approach, the study sampled 302 respondents using Krejcie and Morgan's published table. Statistical analyses were conducted using the Statistical Package for Social Sciences (SPSS) version 26, with linear and multiple linear regressions utilised to establish relationships between variables. **Results.** The results of the study indicate that perceived usefulness, perceived ease of use, and self-efficacy within the extended Technology Acceptance Model (TAM) significantly influence the behavioural intention to utilise AI in an academic library in Ghana. Additionally, the results suggest that perceived usefulness plays a more significant role in influencing behavioural intention compared to perceived ease of use. Furthermore, the study reveals a direct relationship between behavioural intention and use behaviour within TAM. **Conclusion.** This study underscores the critical factors within the extended Technology Acceptance Model that drive the adoption of AI in academic libraries in Ghana. The results highlight the paramount importance of perceived usefulness in shaping behavioural intention, surpassing the impact of perceived ease of use. Moreover, the direct link between behavioural intention and actual use behaviour reaffirms the model's applicability in predicting technology adoption. These insights provide a valuable foundation for developing strategies to enhance AI integration in academic libraries, ultimately improving their operational efficiency and service delivery.

Keywords: Behavioural Intentions, AI-assisted technologies, academic library, Perceived Usefulness, Technology Acceptance Model (TAM), Ghana

Resumen

Objetivo. Este estudio investigó las intenciones de comportamiento de los estudiantes de medicina de una biblioteca académica en relación con el uso de tecnologías asistidas por IA para la investigación y el aprendizaje. **Método.** Empleando un diseño de investigación por encuesta y un enfoque cuantitativo, el estudio tomó una muestra de 302 encuestados utilizando la tabla publicada de Krejcie y Morgan. Los análisis estadísticos se realizaron con el paquete estadístico Statistical Package for Social Sciences (SPSS) versión 26, y se utilizaron regresiones lineales y lineales múltiples para establecer las relaciones entre las variables. **Resultados.** Los resultados del estudio indican que la utilidad percibida, la facilidad de uso percibida y la autoeficacia dentro del Modelo de Aceptación de la Tecnología (TAM) ampliado influyen significativamente en la intención conductual de utilizar la IA en una biblioteca académica de Ghana. Además, los resultados sugieren que la utilidad percibida desempeña un papel más significativo a la hora de influir en la intención de comportamiento que la facilidad de uso percibida. Además, el estudio

revela una relación directa entre la intención conductual y el comportamiento de uso dentro del TAM. **Conclusiones.** Este estudio subraya los factores críticos dentro del Modelo de Aceptación de la Tecnología ampliado que impulsan la adopción de la IA en las bibliotecas académicas de Ghana. Los resultados ponen de relieve la importancia primordial de la utilidad percibida en la formación de la intención de comportamiento, superando el impacto de la facilidad de uso percibida. Además, la relación directa entre la intención de comportamiento y el comportamiento de uso real reafirma la aplicabilidad del modelo para predecir la adopción de la tecnología. Estos datos proporcionan una base valiosa para desarrollar estrategias que mejoren la integración de la IA en las bibliotecas académicas y, en última instancia, mejoren su eficiencia operativa y la prestación de servicios.

Palabras clave: Intenciones de Comportamiento, tecnologías asistidas por IA, biblioteca académica, Utilidad Percibida, Modelo de Aceptación de la Tecnología (TAM), Ghana

Resumo

Objetivo. Este estudo investigou as intenções comportamentais de estudantes de medicina em uma biblioteca acadêmica em relação ao uso de tecnologias assistidas por IA para pesquisa e aprendizado. **Método.** Empregando um projeto de pesquisa de levantamento e uma abordagem quantitativa, o estudo incluiu uma amostra de 302 respondentes usando a tabela publicada por Krejcie e Morgan. As análises estatísticas foram conduzidas usando o Statistical Package for Social Sciences (SPSS) versão 26, com regressões lineares e lineares múltiplas utilizadas para estabelecer relações entre as variáveis. **Resultados.** Os resultados do estudo indicam que a utilidade percebida, a facilidade de uso percebida e a autoeficácia dentro do Modelo de Aceitação de Tecnologia (TAM) estendido influenciam significativamente a intenção comportamental de utilizar a IA em uma biblioteca acadêmica em Gana. Além disso, os resultados sugerem que a utilidade percebida desempenha um papel mais significativo na influência da intenção comportamental em comparação com a facilidade de uso percebida. Além disso, o estudo revela uma relação direta entre a intenção comportamental e o comportamento de uso no TAM. **Conclusão.** Este estudo ressalta os fatores críticos do Modelo de Aceitação de Tecnologia estendido que impulsionam a adoção da IA nas bibliotecas acadêmicas de Gana. Os resultados destacam a importância primordial da utilidade percebida na formação da intenção comportamental, superando o impacto da facilidade de uso percebida. Além disso, a ligação direta entre a intenção comportamental e o comportamento de uso real reafirma a aplicabilidade do modelo na previsão da adoção da tecnologia. Essas percepções fornecem uma base valiosa para o desenvolvimento de estratégias para aprimorar a integração da IA em bibliotecas acadêmicas, melhorando, em última análise, sua eficiência operacional e a prestação de serviços.

Palavras-chave: Intenções Comportamentais, tecnologias assistidas por IA, biblioteca acadêmica, Utilidade Percebida, Modelo de Aceitação de Tecnologia (TAM), Gana

1 Introduction

The advent of artificial intelligence (AI) technologies has impacted all aspects of life from education to health, finance, personal and professional life, and so on (Bohr & Memarzadeh, 2020; Dwivedi et al., 2021). In education, the use of high-speed sophisticated computers to do complex analyses of large data, 3D imaging of the human body, and modelling prototypes of jet engines, buildings, bridges, and robots, to mention a few are being made possible using AI technologies (Dimitriadou & Lanitis, 2023; Dwivedi et al., 2021; Gupta et al., 2024).

Many educational institutions like universities are using AI technologies to provide valuable information to students on admissions, enrolment, financial aid, course registration, and career counselling (Crompton & Burke, 2023; Meotti & Magliozzi, 2024). Again, complex, and sophisticated research and data analyses are being done by these institutions using AI technologies (Gandomi et al., 2023). Universities are also using AI technologies to predict the performance of students, faculty members, and other employees to know personalised support that can be provided to improve it (Kashyap, 2023; Rodway & Schepman, 2023). Moreover, university students use AI technologies to retrieve information, perform data analysis, write reports, translate information from one language to another, and summarise and correct grammatical errors in written documents easily and efficiently (Malik et al., 2023).

In medical education, AI technologies assist medical students in interpreting medical images like X-rays, Magnetic Resonance Imaging (MRIs), and Computed Tomography (CT) scans (Pinto-Coelho, 2023). Furthermore, AI-based educational platforms provide interactive learning environments for medical students with clinical decision-support resources that help them analyse patient data, medical histories, and symptoms to make accurate diagnoses and treatment recommendations (Mir et al., 2023).

In recent years, the United Nations (UN) launched and publicised the Sustainable Development Goals (SDGs) also known as Global Goals to address various global challenges and promote sustainable development across economic, social, and environmental dimensions. Among these SDGs, Goals 4, 5, and 9 are to ensure there is equity and to prevent the technology divide among its members (United Nations, 2023). Additionally, the Government of Ghana (GoG) has implemented policies in education to help increase the adoption of technology among students. As an example, the Ministry of Education has launched the "ICT in Education Reform" program aimed at fostering students' desire and skills in utilising Information and Communication Technologies (ICTs), as well as bolstering tertiary education through technology-centric training (Ministry of Education, 2021). Consequently, the integration of emerging technologies like AI can aid the government in realising its objective of mitigating the digital gap and advancing nation-building efforts.

In a contextual context, the University of Ghana (UG) holds the position of the leading educational institution in Ghana, boasting four colleges: the College of Humanities (CoH), the College of Basic and Applied Sciences (CBAS), the College of Education (CoE), and the College of Health Sciences (CHS) (University of Ghana, 2024c). Within the CHS, there are seven schools and institutes. Among these, the University of Ghana Medical School (UGMS) stands as one of the oldest establishments within the college, situated in Korle Bu, Accra. Since its establishment in 1969, UGMS has been graduating medical students. As part of their curriculum, students undergo training in basic sciences and other sciences courses, including medical information literacy (University of Ghana, 2024b). This training aims to equip students with essential digital technological knowledge and skills necessary for their studies and research endeavours (University of Ghana, 2024b). These skills encompass a spectrum from basic computer utilisation, electronic database searching, and clinical decision tools to proficient referencing and use of learning management tools (Aggrey, 2009; Ankamah et al., 2021). The acquisition of these competencies is anticipated to facilitate students' progression through medical programs and foster their development as lifelong learners and professionals.

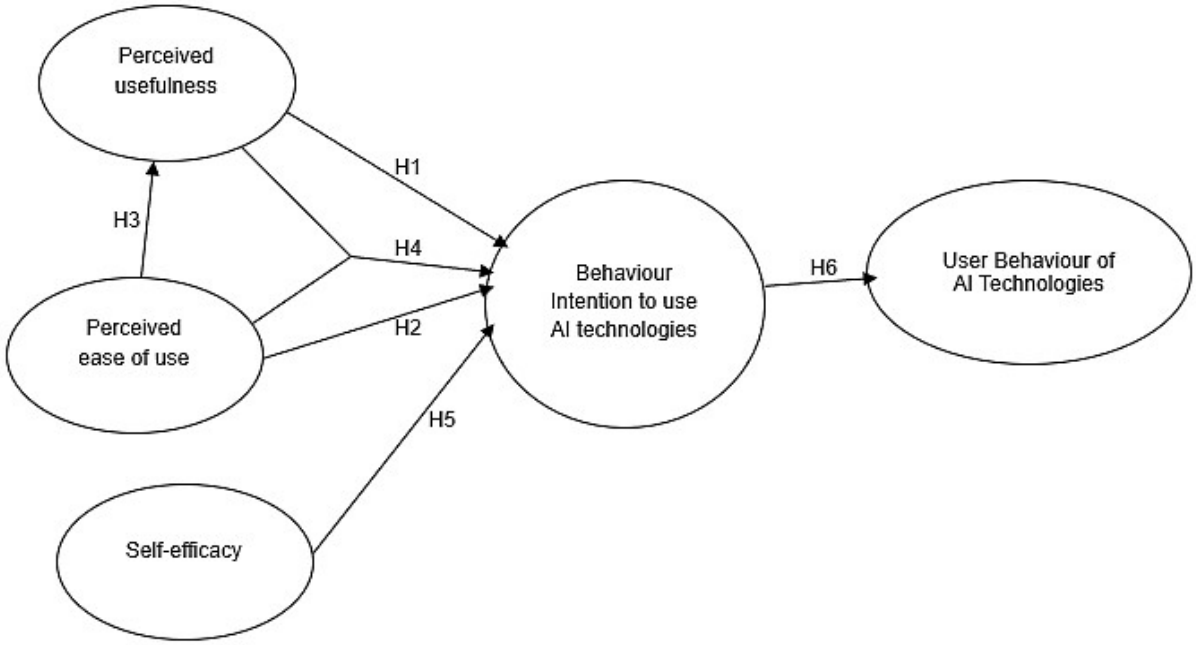
Moreover, at the University of Ghana (UG), the Vice-Chancellor shared her vision dubbed "the digitalisation initiatives" to provide students with laptops, technology-enabled environments like hotspot comfort zones and classroom modernisations so that no students will be left out of the use of advanced technologies like AI tools (University of Ghana, 2024d). The University of Ghana Library Systems (UGLS), which encompasses all libraries in UG including the Emmanuel Quaye Archampong (EQA) library of CHS Korle Bu Campus, shares this vision and serves as an essential hub in UG for fostering learning, research, and innovation in AI, facilitating access to resources, expertise, and collaborative opportunities for students, faculty, and researchers. For instance, UGLS provide access to various AI-related resources such as books, journals, research papers, and online databases, enabling students, faculty members and researchers to stay updated with the latest developments and findings in AI (University of Ghana, 2024a). Moreover, the library organises workshops, training sessions, and seminars on AI topics, helping library staff, students and faculty members enhance their knowledge and skills in using AI technologies effectively (University of Ghana, 2024a).

Ideally, the goals, targets, policies, and visions were made to help improve the adoption of advanced technologies such as AI among the population, young people, and students. The implementation of these projects has brought about the investment of huge financial and other limited resources by the UN, the GoG, the University and its stakeholders. However, there has been no evidence published on the intention to use and use of advanced technologies particularly AI technologies among university students, especially in resource-limited settings like Ghana. Moreover, the researcher, who holds dual roles as a lecturer and librarian, has observed that certain medical students hold the belief that the integration of AI into their studies and research can result in academic dishonesty or plagiarism. Consequently, this perception has deterred some students from using AI tools. Nonetheless, the avoidance or limited adoption of emerging technologies like AI may yield adverse consequences, including exacerbated gender inequality, diminished innovation, compromised educational quality, and the wastage of funds and investments. This study, therefore, aims to find out the behavioural intention to use and the use of AI technologies among medical students at the University of Ghana.

The study incorporated the Technology Acceptance Model (TAM) which explains that users come to accept and use new technologies (Kowalska-Pyzalska, 2024; Venkatesh et al., 2003). It posits that perceived usefulness and perceived ease of use are primary factors influencing an individual's attitude towards using technology. Based on TAM, the researchers developed a conceptual framework and explored the relationship between factors such as perceived usefulness, perceived ease of use, self-efficacy, behavioural intention and use behaviour of AI technologies that affect medical students at the University of Ghana. The conceptual framework is presented in Figure 1.

Figure 1

Conceptual framework



Note. Source: Kowalska-Pyzalska (2024) and Venkatesh et al. (2003)

Research hypotheses

The researchers developed the following hypotheses for the study:

a) H1: Perceived Usefulness has a significant relationship with the Behavioural intention to use AI technologies.

b) H2: Perceived Ease of Use has a significant relationship with the Behavioural Intention to use AI technologies.

c) H3: Perceived Ease of Use has a significant relationship with Perceived Usefulness to use AI technologies.

d) H4: Perceived Ease of Use and Perceived Usefulness have a significant relationship with to Intention to use AI technologies.

e) H5: Self-efficacy has a significant relationship with the Behavioural Intention to use AI technologies.

f) H6: Behavioural Intention has a significant relationship with the Use Behaviour of AI technologies.

2 Literature Review

Perceived Usefulness (PU) and the Behavioural Intention to Use AI Technologies

Behavioural intention is one of the factors that impact the adoption of AI technologies (Priya et al., 2018). User expectations should be met by the anticipated usefulness and benefits derived from information systems (Mishra et al., 2023). In associating AI technologies and PU, users' perception of how AI can positively have an impact on

their work or activities is a precursor for the adoption of such new technologies. When users perceive AI technologies to be beneficial and able to improve their productivity, they are more likely to adopt and use those technologies. For example, suppose medical practitioners are convinced that they are using AI-powered technology that supports the diagnosis, analysis, and treatment of patients' ailments within the shortest period. In that case, they are more likely to find the technology useful. In a study that examined factors that matter to people in the acceptance of a digital mental care content called MyMentalPocket, it was indicated that peoples' levels of depression, perceived usefulness, and parasocial interactions were positively related to the intentions to use MyMentalPocket (Park & Kim, 2023). According to Galavi et al., (2023), the relationship between the rate of usage and the perceived usefulness of e-health services that come in mobile apps was positive. In effect, the behavioural intention of the usefulness of any technology has a positive impact on its use.

Perceived Ease of Use (PEOU) and the Behavioural Intention to use AI Technologies

PEOU, in the context of AI technologies, would be user perceptions of how user-friendly and intuitive AI technologies are. When it is perceived that AI technologies are easy to understand, navigate, and integrate into daily activities, they are more likely to be embraced and adopted. In medical school, if students find AI-powered virtual assistants that they can interact with and understand, they are more likely to adopt these technologies to perform various tasks. In Gani et al. (2024), findings revealed that the association between the perception females have about smart healthcare technology and their intention to use the technology is significantly mediated by perceived ease of use. Ahmer et al. (2023), the study revealed the knowledge and perception of medical students regarding the utility and application of artificial intelligence in medicine, it was concluded that medical students were found to have a good understanding of the usage and application of artificial intelligence regardless of age and year of studies, which implies a positive ease of use.

Perceived Ease of Use and Perceived Usefulness to use AI technologies

Several studies support the association between perceived ease of use and perceived usefulness in the adoption of AI technologies among medical students. According to Park and Kim (2023), the perceived ease of use of digital mental healthcare content has a considerable impact on its perceived usefulness. In a similar vein, Buchholz et al. (2016) and, Rago and Zucchi (2020), also discovered that medical students' and physicians' adoption of technology is significantly influenced by perceived ease of use. These findings from the studies indicate that perceived ease of use plays a significant role in the perceived usefulness of AI technology adoption among medical students.

Perceived Ease of Use and Perceived Usefulness of AI Technologies

Extensive research over the past decade has provided evidence that perceived ease of use and perceived usefulness have a significant influence on behavioural intention to use technologies. For instance, Rono (2014) indicated that perceived ease of use has a direct effect on perceived usefulness, and both determine the consumers' toward use, which leads to behavioural intention to use and actual use of the technology. In a similar vein, Panergayo and Aliazas (2021) found that students' intention to use a learning management system and online learning self-efficacy characteristics were significantly influenced by perceived usefulness and perceived ease of use. Wicaksono and Maharani (2020) also found that there was a significant effect of perceived ease of use and perceived usefulness on behavioural intention to use. Finally, Venkatesh et al. (2003) proposed the TAM theory indicating in their studies that the consistently prominent factors in explaining and predicting consumer behaviour in a variety of adoption models are perceived usefulness and perceived ease of use. However, Ibrahim (2018) indicated that perceived usefulness has a significant relationship with behavioural intention whereas perceived ease of use has no significant relationship with behavioural intention.

Self-efficacy and the behavioural intention of AI Technologies

Self-efficacy indicates a process of decision, belief, or reward in performing a particular task or behaviour required to achieve the desired result by estimating the extent of its ability. It relates to how certain someone is doing his or

her job with skills that a person possesses no matter how great. Self-efficacy can grow through four things: experience of success, experience of others, verbal persuasion, and physiological conditions Rahmawati (2019). Many studies have looked at the influence of self-efficacy on the behavioural intention to use technologies. For example, Wu et al. (2007) indicated that the self-efficacy of mobile health systems has a very strong influence on the behavioural intention to adopt a new technology. Similarly, Aggelidis and Chatzoglou (2009) also found that computer self-efficacy is important for predicting behavioural intention to adopt hospital information systems. Also, De Veer et al. (2015) indicated that self-efficacy positively impacted one's intention to adopt e-health applications. Further, Gow et al. (2019) found that there was no significant relationship between perceived self-efficacy and behavioural intention in adopting technology. Finally, Li et al. (2022) concluded that behavioural intention is significantly predicted by perceived self-efficacy, subjective norm, and personal importance.

Behavioural Intention and the Use Behaviour of AI Technologies

Medical students across different countries have demonstrated a favourable attitude toward the application of AI technologies in healthcare, with a strong belief in their significance (Al Saad et al., 2022; Buabbas et al., 2023; Sit et al., 2020). However, there is a need for frequent comprehensive education and training in AI, as many students lack confidence and understanding in its use (Kansal et al., 2022; Sit et al., 2020). To understand medical students' perceptions and intentions toward adopting AI practice in healthcare, a useful framework called the theory of planned behaviour has been proposed by Li et al. (2022). A few studies have found a significant relationship between behavioural intention and the use of AI technologies among medical students. Kwak et al. (2022) found that AI knowledge, perception, and acceptance attitude positively influenced nursing students' intention to use AI-based healthcare technologies. These studies collectively suggest that the intention to use AI technologies is influenced positively by a range of factors, including perceived usefulness, ease of use, education, and social influence.

3 Methodology

The study used the survey research design and hence employed the quantitative approach. This means that this study collected quantitative data from medical students at the University of Ghana Medical School.

The total number of respondents in this study was 1366, consisting of 656 pre-clinical year students and 710 clinical year students. With a total population of 1366, Krejcie and Morgan's published table was employed to select the study sample size of 302 (Krejcie & Morgan, 1970). The convenience sampling technique was employed to select the respondents. The questionnaire was sent to the target groups using existing WhatsApp platforms. The WhatsApp groups comprised solely pre-clinical and clinical year students. Respondents who were available on the platform and willing to participate in the study completed the questionnaire.

The research instrument used for data collection in this study was a questionnaire consisting of a series of structured questions developed on Google Forms. The researchers shared the link to the questionnaire with the group administrators, who subsequently distributed it to the group members. The questionnaire consisted of two sections. The first section focuses on background information such as age group, gender, level, and years of using AI-assisted technologies, while the second section measures the research constructs such as perceived usefulness, perceived ease of use, self-efficacy, behavioural intention, and use of AI technologies. The statements in the questionnaire were adapted from relevant scales based on existing literature and validated using the TAM model, measured on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree) and were adapted to the objectives of the study. Each respondent was required to complete the questionnaire indicating his or her agreement or disagreement with each statement that built those variables. To check the reliability, the questionnaire was pilot-tested with 10 respondents (medical students who had completed school). The data were collected from September 13 to October 20, 2023, after which the link to the questionnaire was closed (Gyesi, Ankamah, Amponsah, 2025). Data was analysed using Statistical Package for Social Sciences (SPSS, version 26). The results of the questionnaire were analysed descriptively, and multiple and linear regression were presented in the results. The study did not undergo a formal review by an ethics committee due to its minimal-risk nature. Participants were assured of confidentiality, anonymity, and privacy throughout the research process. No personal identifiers were collected, and data was securely stored to ensure participant protection. The survey was voluntary, and participants could withdraw at any time without penalty. The final sample size of 134 respondents

was considered adequate for the analyses conducted, as supported by statistical significance in the results. While the convenience sampling method via WhatsApp was practical for reaching the target population, it may have introduced selection bias, limiting the generalisability of the findings. Future studies could employ stratified random sampling to improve representativeness across different demographic and academic groups.

4 Results

This section presents the analysis and discussion of the results of the use of AI-assisted technologies among medical students in an academic library in Ghana. It covers background information, the relationship between perceived usefulness and behavioural intention, and perceived ease of use and behavioural intention. Also, this section establishes the relationship between perceived ease of use and perceived usefulness, self-efficacy and behavioural intention, and behavioural intention and use behaviour in using AI-assisted technologies. The questionnaire was prepared using Google Forms and sent to respondents using WhatsApp. Out of a total of 302 respondents who were sent the questionnaire, 134 participated in the study, resulting in a response rate of 44.37%.

Background information of respondents

The study collected background information from respondents. Table 1 indicates background information, including age group, gender, level, and years of using AI-assisted technologies.

Table 1

Background information of the respondents (N=134)

Background	Variables	Frequency	Per cent	Mean	Standard Deviation
Age Group	Below 20 years	54	40.3	1.60	0.492
	20 years and above	80	59.7		
Gender	Male	72	53.7	1.46	0.500
	Female	62	46.3		
Level	Level 100-300 / preclinical years	97	72.4	1.28	0.449
	Level 400-600/clinical years	37	27.6		
Years of using AI-assisted technologies	Less than 1 year	56	41.8	2.49	1.635
	1 year	30	22.4		
	2 years	5	3.7		
	3 years	12	9.0		
	Over 3 years	31	23.1		

Note. Source: Field Data (2023)

It can be seen in Table 1 that 80 representing 59.7% of the respondents were 20 years and above as against 54 representing 40.3% of them below 20 years with a mean of 1.60 and a standard deviation of 0.492. In addition, 72 (53.7%) were males and 62 (46.3%) were females with a mean and standard deviation of 1.46 and 0.449, respectively. Also, 97 (72.4%) were in level 100-300/preclinical years whilst 37 (27.6%) were in level 400-600/clinical years with a mean score of 1.28 and a standard deviation of 0.449. Moreover, 56 respondents constituting 41.8% had used AI for less than 1 year as compared to 23.1% of them having used AI for over 3 years. Also, 30 (22.4%) respondents had used AI for 1 year while 12 (9.0%) had used AI for 3 years. Finally, 5 (3.7%) was the least used AI for 2 years with a mean score of 2.49 and a standard deviation of 1.635.

Relationship between Perceived Usefulness and Behavioural Intention

The first hypothesis was computed to test the relationship between perceived usefulness on behavioural intention. Table 2 shows a linear regression between perceived usefulness and the behavioural intention to use AI.

Table 2

Regression test results of perceived usefulness and behavioural intention to use AI technologies

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.817[a]	.667	.664	.57105	.667	264.333	1	132	.000

a. Predictors: (Constant), Perceived Usefulness

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig. (ρ)
	B	Std. Error	Beta (β)		
Constant	.445	.198		2.248	.026
Perceived Usefulness	.846	.052	.817	16.258	.000

a. Dependent Variable: Behavioural intention

Note. Source: Field Data (2023)

The Table 2 analysis showed a significant model summary [F (1,132) = 264.33, p = 0.000]. The results from the linear regression table examine perceived usefulness as against behavioural intention to use AI technologies. It shows that there is a significant relationship between perceived usefulness and behavioural intention to use AI technologies (β = .817, t = 16.258, ρ = .000). Thus, H1 was supported, implying that medical students see perceived usefulness as affecting their behavioural intention to use AI technologies.

The present research outcome which is based on the use of AI technology in academic libraries in Ghana is consistent with the TAM theory which proposed that behavioural intention to use technology affects perceived usefulness as well as previous findings (Marikyan et al., 2023; Venkatesh et al., 2003; Venkatesh & Bala, 2008). Also, the results are in tandem with those of Park and Kim (2023), and Galavi et al. (2023), in which it was revealed that perceived usefulness and parasocial interactions were positively related to the intentions to use. This means that if medical students believe that using AI technologies improves their academic work, then they are more likely to adopt and use AI technologies. Thus, if medical practitioners perceive that using AI technology supports the diagnosis, analysis, and treatment of patients' ailments, they are more likely to find the technology useful.

Relationship between Perceived Ease of Use and Behavioural Intention

The second hypothesis was to establish the relationship between perceived ease of use and behavioural intention. A linear regression was computed to test the relationship between perceived ease of use and behavioural intention to use AI.

Table 3

Summary of regression analysis of perceived ease of use and behavioural intention to use AI technologies

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change

1	.663[a]	.440	.436	.74045	.440	103.730	1	132	.000

a. Predictors: (Constant), Perceived Ease of Use

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig. (ρ)
	B	Std. Error	Beta (β)		
Constant	1.182	.242		4.880	.000
Perceived Ease of Use	.700	.069	.663	10.185	.000

a. Dependent Variable: Behavioural intention

Note. Source: Field Data (2023)

It was observed from Table 3 that the model summary was statistically significant [F (1,132) = 103.73, p = 0.000]. It can be seen from Table 3 that perceived ease of use was found to be positively and significantly related to behavioural intention to use AI technologies (β = .663, t = 10.185, ρ = .000). Thus, H2 was supported, implying that perceived ease of use affects behavioural intention to use AI technologies. As such, medical students perceived ease of use as affecting their behavioural intention to use AI technologies.

The results corroborate with that of Gani et al. (2024), where it was revealed that the association between the perception females have about smart healthcare technology and their intention to use the technology is significantly mediated by perceived ease of use. Also, the results support the findings Ahmer et al. (2023), where it was concluded that medical students were found to have a good understanding of the usage and application of artificial intelligence regardless of age and year of studies, which implies a positive ease of use. Further, the results are in line with the TAM model where it was indicated that behavioural intention to use technology influences the perceived ease of use (Marikyan et al., 2023; Venkatesh et al., 2003; Venkatesh & Bala, 2008). It can therefore be established that if medical students perceived AI technologies as easy to use for their academic work, they are more likely to adopt and use these technologies.

Relationship between Perceived Ease of Use and Perceived Usefulness

The third hypothesis was to establish the relationship between perceived ease of use and perceived usefulness. A linear regression was computed to test the relationship between perceived ease of use and perceived usefulness.

Table 4

Summary of regression analysis of perceived ease of use and perceived usefulness

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.716[a]	.513	.5.9	.66686	.513	138.776	1	132	.000

a. Predictors: (Constant), Perceived Ease of Use

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig. (ρ)
	B	Std. Error	Beta (β)		
Constant	1.204	.218		5.523	.000
Perceived Ease of Use	.729	.062	.716	11.780	.000

a. Dependent Variable: Perceived Usefulness

Note. Source: Field Data (2023)

It was observed that the model summary was statistically significant [F (1,132) = 138.78, p = 0.000]. It can be seen from Table 4 that perceived ease of use was found to be positively and significantly related to behavioural intention to use AI technologies (β = .716, t = 11.780, ρ = .000). Thus, H3 was accepted, implying that perceived ease of use affects perceived usefulness implying that medical students see perceived ease of use as influencing perceived usefulness. This also suggests that medical students in academic libraries who perceived AI as easy to use also perceived it as useful. The results concur with those of Buchholz et al. (2016) and, Rago and Zucchi (2020). They discovered that medical students' and physicians' adoption of technology is significantly influenced by perceived ease of use. Also, the results support Park and Kim (2023), where it was revealed that the perceived ease of use of digital mental healthcare content considerably impacts its perceived usefulness. It can therefore be concluded that if medical students in academic libraries find AI technologies easy to use, they might consider it as a useful learning and research tool.

Relationship between Perceived Ease of Use and Perceived Usefulness on Behavioural Intention to Use AI Technologies

The fourth hypothesis was to establish the relationship between perceived ease of use and perceived usefulness on behavioural intention to use AI technologies. A multiple linear regression was used to establish the relationship between perceived ease of use and perceived usefulness and behavioural intention to use of AI technologies.

Table 5

Regression test results of perceived ease of use and perceived usefulness on behavioural intention to use AI technologies

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.824[a]	.680	.675	.56219	.680	138.966	2	131	.000

a. Predictors: (Constant), Perceived Ease of Use Perceived Usefulness

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig. (ρ)
	B	Std. Error	Beta (β)		
Constant	.307	.204		1.504	.135
Perceived Usefulness	.726	0.73	.701	9.899	.000
Perceived Ease of Use	.170	.075	.161	2.279	.024

a. Dependent Variable: Behavioural intention

Note. Source: Field Data (2023)

It can be seen from Table 5 that the model summary was statistically significant [F (2,131) = 138.966, p = 0.000]. The analysis shows that perceived usefulness had a positive impact on behavioural intention to use AI technologies (β = .701, t = 9.899, ρ = .000). This implies that perceived usefulness affects behavioural intention to use AI technologies. On the other hand, the analysis revealed that there is no significant relationship between perceived ease of use and behavioural intention to use AI technologies (β = .161, t = 2.279, ρ = .024). Thus, H4 was rejected, implying that perceived usefulness affects the behavioural intention to use AI technologies, but perceived ease of

use does not. The results agree with the findings by (Ibrahim, 2018), where it was indicated that perceived usefulness has a significant relationship with behavioural intention whereas perceived ease of use has no significant relationship with behavioural intention. The results disagree with those of Rono (2014) and, Wicaksono and Maharani (2020), where it was concluded that there was a significant effect of perceived ease of use and perceived usefulness on behavioural intention to use technologies. Also, the results support those of Panergayo and Aliazas (2021), where it was found that students' intention to use a learning management system and online learning self-efficacy characteristics were significantly influenced by perceived usefulness and perceived ease of use. Finally, the results disagree with the TAM model where it was indicated that the consistently prominent factors in explaining and predicting consumer behaviour in a variety of adoption models are perceived usefulness and perceived ease of use (Venkatesh et al., 2003). It is obvious from the results that medical students in academic libraries have accepted the use of AI in their learning and research despite all the possible challenges.

Relationship between self-efficacy and Behavioural Intention

The fifth hypothesis was used to establish the relationship between self-efficacy and behavioural intention. Table 6 shows a linear regression establishing the relationship between self-efficacy and behavioural intention of the use of AI.

Table 6

Summary of regression analysis of self-efficacy and behavioural intention to use AI technologies

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.676[a]	.457	.453	.72905	.457	111.164	1	132	.000

a. Predictors: (Constant), Self-Efficacy

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig. (ρ)
	B	Std. Error	Beta (β)		
Constant	1.173	.235		4.992	.000
Self-Efficacy	.695	.066	.676	10.543	.000

a. Dependent Variable: Behavioural intention

Note. Source: Field Data (2023)

Table 6 shows that the model summary was statistically significant [F (1,132) = 111.164, p = 0.000]. It can be realised that self-efficacy (β = .676, t = 10.543, ρ = .000) is significantly associated with behavioural intention to use AI technologies. Thus, H5 was supported, indicating that self-efficacy influences behavioural intention to use AI technologies. Thus, behavioural intention is significantly predicted by perceived self-efficacy (Li et al., 2022). The results are consistent with the studies done by Aggelidis and Chatzoglou (2009), De Veer et al. (2015) and, Wu et al. (2007). Generally, these studies revealed that self-efficacy has a very strong influence on the behavioural intention to adopt medical technologies. The result is inconsistent with the findings Gow et al. (2019), where it was found that there is no significant relationship between perceived self-efficacy and behavioural intention in adopting technology. This means that the previous study did not see perceived self-efficacy as an important factor determining the intention to adopt mobile health applications. This current study suggests that AI technology is used by medical students in their daily academic work. It can therefore be established that self-efficacy is an important factor in determining behaviour intention, as the use of AI-assisted technologies is paramount to improving medical students' academic work.

Relationship between Behavioural Intention and Use Behaviour

The sixth hypothesis was to determine the relationship between behavioural intention and use behaviour. A linear regression established the relationship between the two variables.

Table 7

Regression test results of behavioural intention and use behaviour of AI technologies.

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.853[a]	.727	.725	.48195	.727	351.660	1	132	.000

a. Predictors: (Constant), Behavioural Intention

Coefficients

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta (β)		(ρ)
Constant	.625	.157		3.995	.000
Behavioural Intention	.795	.042	.853	18.753	.000

a. Dependent variable: use behaviour

Note. Source: Field Data (2023)

It can be established from Table 7 that the model summary was statistically significant [F (1,132) = 351.660, p = 0.000]. It can be established from Table 7 that behavioural intention and use behaviour of AI technologies (β = .853, t = 18.753, ρ = .000) are significant. Thus, H6 was accepted, this implies that behavioural intention has a significant impact on the use behaviour of AI technologies. The results are consistent with Kwak et al., (2022), where it was revealed that AI knowledge, perception, and acceptance attitude positively influenced nursing students' intention to use AI-based healthcare technologies. This indicates that the intention to use AI technologies affects a range of factors, including perceived usefulness, ease of use, education, and social influence. Therefore, it is obvious from the findings that medical students have demonstrated a favourable attitude toward the application of AI technologies in healthcare, with a strong belief in its significance (Al Saad et al., 2022; Buabbas et al., 2023; Sit et al., 2020).

5 Study limitations, future work, and contextual discussion

Study limitations

This study encountered certain limitations that should be considered when interpreting the findings. Firstly, the reliance on self-reported data through questionnaires may have introduced response bias, as participants could have provided socially desirable answers rather than accurate reflections of their behavioural intentions. Secondly, using a convenience sampling method limits the generalizability of the results beyond the sampled population of medical students at the University of Ghana. Additionally, data scarcity on adopting AI technologies in resource-limited settings such as Ghana posed challenges in contextualising the findings within a broader regional framework. Finally, the study's focus on quantitative methods restricted deeper exploration of the subjective experiences of participants, which could have enriched the understanding of their behavioural intentions.

Future research could build on this study by employing mixed methods approaches to incorporate qualitative insights, such as interviews or focus groups, to provide a more comprehensive understanding of behavioural intentions and use behaviour. Expanding the study to include other universities or healthcare institutions across

Ghana or West Africa would enhance the generalizability of the findings. Furthermore, investigating the long-term impact of AI adoption on academic performance and professional development among medical students could offer valuable insights into the practical benefits of these technologies. Lastly, exploring interventions or training programs to mitigate perceived barriers, such as concerns about academic dishonesty, could facilitate greater adoption of AI tools in academic and professional settings.

The findings of this study contribute significantly to the understanding of AI adoption in academic libraries in Ghana. By confirming the extended Technology Acceptance Model's applicability, the study highlights the critical roles of perceived usefulness, perceived ease of use, and self-efficacy in shaping behavioural intentions. In particular, the strong influence of perceived usefulness underscores the need for AI tools to demonstrate clear academic or research benefits to users. Additionally, the results align with broader regional efforts to bridge the digital divide, as outlined in Ghana's ICT in Education Reform program, supporting the integration of advanced technologies in higher education. These insights provide a foundation for developing strategies that not only enhance the adoption of AI tools in academic settings but also promote a culture of innovation and digital literacy within the region.

6 Conclusion

This study investigated the behavioural intention of medical students in academic libraries to use AI-assisted technologies for research and learning. The proposed theory was based on Davis' Technology Acceptance Model (TAM) and was composed of constructs such as perceived usefulness, perceived ease of use, self-efficacy, behavioural intention, and use behaviour.

The Model summary was statistically significant, and the results showed that all the constructs, directly and indirectly, influenced medical students' use of AI-assisted technologies in academic libraries for learning and research. The results revealed that perceived usefulness directly influenced behavioural intention, while perceived ease of use indirectly impacted behavioural intention through perceived usefulness. Also, self-efficacy emerged as a good indicator of behavioural intention. Ultimately, behavioural intention was found to influence user behaviour.

Practical implications of the study

This study has made several theoretical contributions to the research field on the use of AI-assisted technologies among medical students in academic libraries. This study contributes to the body of knowledge aimed at a better understanding of behavioural intention when using AI technologies. Additionally, this study provides practical implications for designers in using AI technologies. Thus, it will assist designers in understanding various constructs and their relationships to use AI technologies.

Also, they will have a better understanding and insight into the factors (perceived usefulness, perceived ease of use, and self-efficacy) that influence the behavioural intention of medical students in academic libraries to use AI technologies. By understanding these factors, stakeholders can develop interventions to improve learning outcomes and equip future professionals with the tools they need to succeed in a technology-driven healthcare environment. The perceived ease of use will improve because it does not influence the behaviour intention to use AI technology when combined with perceived usefulness. This study will aid academic libraries and school management in training medical students to use AI technologies for their learning and research with ease.

Finally, the University of Ghana's policy on Artificial Intelligence emphasizes the responsible use of AI technologies to foster a culture of academic excellence, integrity, and innovations among its faculty, staff, and students. Thus, the university encourages the use of AI to improve teaching, learning, and research while maintaining the integrity of academic work. The university is integrating AI into the plagiarism policy signals in addressing contemporary challenges in academic ethics.

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Publication data

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I declare that this manuscript is original and has not been submitted for review or publication elsewhere. If I decide to withdraw the submission, I will promptly inform the Biblios Magazine editorial team so that the manuscript can be archived accordingly.

Preprints
This manuscript has not been submitted to any preprint platform.

Information about the job
Research Project: this manuscript is part of the research project titled *'Use of Artificial Intelligence among Medical Students in Ghana'*.
Coordinator(s): Samuel Ankamah.
Research Group: Evidence-Based Librarians.
University: University of Ghana.
Department/Faculty: University of Ghana Library System.

Acknowledgements
We would like to express our sincere gratitude to our colleagues and peers who provided valuable insights and feedback during the development of this manuscript. We also appreciate the support of the University of Ghana for providing access to research resources. Special thanks to the University of Ghana Medical Students for their contributions during this research process.

Authors' contribution
Manuscript conception and preparation: K Gyesi, V Amponsah, S Ankamah.
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Data analysis: K Gyesi, V Amponsah, S Ankamah.
Discussion of the results: K Gyesi, V Amponsah, S Ankamah.
Review and approval: K Gyesi, V Amponsah, S Ankamah.

Use of artificial intelligence
Not applicable

Financing
Not applicable.

Permission to use images
Not applicable

Research Ethics Committee Approval
Not applicable

Conflict of interest
Not applicable

Data Availability Declaration
This study is based on questionnaire survey data. The dataset, including participants' responses, has been deposited in Zenodo to ensure transparency, reproducibility, and accessibility. The dataset can be accessed at the following link: https://doi.org/10.5281/zenodo.15063943

Editor
Published by the *University Library System of the University of Pittsburgh*. Responsibility shared with the partner universities. The ideas expressed in this article are those of the authors and do not necessarily represent the opinions of the editors or the university.

Editors
Lúcia da Silveira, Fabiano Couto Corrêa da Silva

Historical
Received: 27-07-2024 – Approved: 21-03-2025 – Published: 11-03-2025.