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STUDENTS' KNOWLEDGE AND ATTITUDE IN PRACTICING ARTIFICIAL INTELLIGENCE (AI) TOOLS FOR ACADEMIC PURPOSES

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Abstract:

The increasing integration of Artificial Intelligence (AI) into higher education has transformed how students learn, conduct research, and complete academic tasks. In the era of rapid technological advancement, AI has become an essential element in education, transforming the way students learn, research, and complete academic tasks. However, the extent to which students understand and utilize AI tools effectively remains uncertain. Therefore, this study investigates the factors influencing knowledge and attitude in the use of AI tools for academic purposes among students in the Diploma in Mathematical Sciences program at Universiti Teknologi MARA (UiTM) Arau, Perlis. Data were collected using an online questionnaire comprising four sections covering demographic profiles, knowledge, attitudes, and practices related to AI tool use. A sample of 61 students was selected using convenience sampling, and data analysis was conducted using the Statistical Package for the Social Sciences (SPSS), employing frequency, reliability, correlation, and regression analyses. The Pearson correlation results revealed a moderate positive relationship between students' knowledge and AI tool use, and a weak positive relationship between attitude and AI tool use. Meanwhile, the regression analysis indicated that knowledge was a significant predictor of AI tool usage. The overall model was significant, suggesting that knowledge plays a more substantial role than attitude in predicting AI use for academic purposes. The study concludes that enhancing students' knowledge and digital literacy is crucial to encourage the responsible and effective use of AI in education. Institutions should focus on integrating AI literacy,

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ethical guidelines, and practical training into the curriculum to strengthen students' academic engagement with AI tools.

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Keyword:

Academic Purposes, Artificial Intelligence (AI), Attitude, Knowledge, Regression Analysis

Introduction

The rapid growth of Artificial Intelligence (AI) is transforming various fields, and education is no exception. Students are increasingly turning to AI-powered tools such as ChatGPT, Canva, QuillBot, Google Translate, and Photomath to support their academic needs (Chuyen & Vinh, 2023). These tools help make learning easier, simplify content creation, and solve problems more efficiently, offering students a better academic experience. However, while these tools are widely available, there is still limited insight into how students perceive and use them, especially within specific academic programs (Galindo-Domínguez et al., 2024).

In recent years, schools and universities have started incorporating AI into teaching and learning. Tools such as ChatGPT provide conversational responses that feel almost human, making them great for answering questions and generating content. Canva allows students to create eye-catching designs for presentations and projects, while QuillBot helps with writing by summarizing, paraphrasing, and improving grammar. Moreover, Google Translate makes it easier to overcome language barriers, offering translations for over 100 languages. For students struggling with math, Photomath breaks down complex problems into easy-to-follow steps (Barbas et al., 2024; Mohammad et al., 2023).

Despite the many advantages these tools offer, challenges remain. Students' knowledge, attitudes, and practices around the ethical use of AI tools are not always clear. The decision to use these tools often depends on factors such as age, gender, field of study, and how familiar students are with what these tools can do. Concerns about academic integrity and ethical use also play a role, making some students hesitant to fully embrace these technologies. Much of the existing research has focused on what these tools can do. However, there is a lack of understanding of how students actually use them and of the impact they have on learning outcomes (Dr. Frederick Edward T. Fabella, 2023).

The increasing adoption of AI-powered tools in academic environments has introduced new opportunities and challenges for students in higher education (Nazaretsky et al., 2022). However, limited research exists on how these tools are perceived and utilized by specific student populations, such as those enrolled in the Diploma of Mathematical Sciences at UiTM Arau. Therefore, understanding the demographic characteristics, knowledge, attitudes, and practices of these students toward AI-powered tools is critical for identifying gaps in awareness and promoting their effective use for academic purposes. Furthermore, it is essential to examine the relationship between the use of AI tools and students' perceptions of their utility in enhancing learning outcomes, maintaining academic integrity, and addressing ethical concerns. This study aims to provide insights into these aspects to guide the development of educational strategies and policies tailored to this student group.

This study aims to fill that gap by exploring how Diploma in Mathematical Sciences students at UiTM Arau understand and feel about using AI tools for their studies. By examining their knowledge, attitudes, and practices, the research aims to identify the barriers that prevent students from using these tools effectively. The findings could help educators, policymakers, and AI developers create better strategies, tools, and policies to ensure AI tools are used responsibly and effectively in academic settings. It is essential to note, however, that this study relies on self-reported data, which may not always be entirely accurate due to over- or under-reporting of AI tool use. Additionally, since the research focuses on a single institution, the findings may not apply to all contexts. Broader research will be needed to confirm these insights across different settings. Nevertheless, this study aims to provide a deeper understanding of how AI tools influence students' academic experiences and their potential to improve educational outcomes.

Literature Review

Artificial Intelligence (AI) refers to the simulation of human intelligence processes by machines, particularly computer systems, which can perform tasks such as learning, reasoning, and problem-solving (Mirdad et al., 2024). It encompasses a range of technologies that enable machines to perform tasks that typically require human intelligence, such as understanding natural language, recognizing patterns, and making decisions (Ab Hamid et al., 2023). AI is a key technology with the potential to fundamentally change entire markets, industries, business activities, and business models (von Garrel & Mayer, 2023). Moreover, Amdan et al. (2024) stated that AI technologies have attracted the attention of academics and practitioners due to their potential to create new possibilities in educational processes, particularly with advances in computing and information processing techniques. The development of AI, especially Large Language Models (LLMs), has transformed education and industries by offering tools for efficient task automation, personalized learning, and problem-solving (Sundkvist & Kulset, 2024). Additionally, AI systems, such as ChatGPT, utilize statistical models to predict and generate human-like text, enhancing user interactions and educational experiences (Bubinger & Dinneen, 2024). Overall, AI represents a multifaceted field that integrates various technologies and methodologies, significantly impacting both technology and society.

The increasing reliance on AI can be attributed to its ability to enhance efficiency, provide personalized experiences, and facilitate data-driven decision-making across sectors, including education (Mirdad et al., 2024). Moreover, people are increasingly using AI due to its ability to automate repetitive tasks and improve productivity, which are significant factors driving its adoption across sectors (Ab Hamid et al., 2023). In addition, individuals and organizations

adopt AI technologies for their ability to provide data-driven insights that facilitate better decision-making (Ou et al., 2024). Furthermore, factors such as accessibility, convenience, and the ability to handle large datasets are major reasons why institutions and individuals integrate AI into their workflows (Bubinger & Dinneen, 2024). Additionally, ease of use, trust in the system, and perceived usefulness influence AI adoption, particularly among students who value tools such as ChatGPT for their rapid and coherent responses, which enhance learning efficiency (Sundkvist & Kulset, 2024). Overall, the widespread adoption of AI can be attributed to its efficiency, accuracy, and ability to automate tasks, ultimately improving productivity and decision-making across various contexts (Bogoslov et al., 2024).

The integration of Artificial Intelligence (AI) in education requires both understanding its potential benefits and addressing ethical concerns. Mirdad et al. (2024) highlighted the need for educators and students to understand how AI can enhance learning while being mindful of challenges such as over-reliance on technology and ethical issues. Wong et al. (2023) emphasized the importance of establishing ethical guidelines to address concerns such as privacy and data security. Zeng (2023) stressed the necessity of critical evaluation of AI-generated content to ensure its responsible use.

Despite AI in education offering various opportunities, it also presents challenges. Students must have a basic understanding of AI technologies to use them effectively, especially in language learning. Positive attitudes toward AI are essential for its successful adoption (Chen et al., 2021). While AI tools can facilitate learning, concerns about cheating and the replacement of traditional methods must be considered (Emdad et al., 2024).

AI tools, such as generative models, offer personalized, interactive learning experiences. However, the success of AI integration often depends on students' knowledge and attitudes (Nadler, 2024). Ethical issues, such as privacy risks and algorithmic bias, underscore the need for responsible AI usage in education (Abas et al., 2023). Addressing these concerns will help institutions maximize AI's potential while minimizing its risks.

The integration of Artificial Intelligence (AI) into education has the potential to enhance learning, though it also presents significant challenges that require awareness and responsible usage. Mirdad et al. (2024) argued that both educators and students must understand AI's capabilities and limitations to ensure its effective use. Students' knowledge and attitudes toward AI play a pivotal role in its adoption, as positive attitudes increase the likelihood of effective usage (Chen et al., 2021). AI tools, such as language teaching systems and generative models, can enhance engagement by providing personalized learning experiences (Nadler, 2024; Youssef et al., 2024). However, concerns about cheating and plagiarism necessitate evaluating the perspectives of both students and educators (Emdad et al., 2024). Furthermore, the ethical implications of AI tools, including the risk of algorithmic bias and data security, require attention (Abas et al., 2023). To ensure AI's responsible integration, institutions must foster awareness and provide clear ethical guidelines. By addressing these concerns and promoting transparency, AI can be used to support learning while minimizing potential risks. This requires technical knowledge and a deep understanding of AI's broader societal impact.

According to George Pallivathukal et al. (2024), students with higher knowledge and attitudes towards AI were significantly more likely to use AI tools. Furthermore, Kuleto et al. (2021) stated that students generally have a positive attitude towards AI. A positive attitude towards AI is often linked to higher levels of AI-specific knowledge. Intermediate to advanced

knowledge reduces fear and increases openness to AI, while basic knowledge may lead to apprehension (Huisman et al. 2021). Students' intention to use AI tools or the practice of AI tools is influenced by perceived ease of use and usefulness, with attitude and self-efficacy acting as mediators. A positive attitude and confidence in using AI tools encourage their adoption (Osman et al., 2024). However, in professional settings, factors such as cost, resource constraints, and limited experience can hinder AI adoption. Conversely, a supportive environment and advanced knowledge facilitate AI integration. Other than that, gender, seniority, and educational background can affect attitudes towards AI. For instance, senior students and those with higher degrees tend to have more knowledge and a positive attitude towards AI (Alsobhi et al., 2022).

A study by D. Bation and C. Pudan, EnP (2024), mentioned that there is a significant relationship between students' attitudes toward AI and their knowledge. This underscores the significance of considering attitudes in understanding students' knowledge. In addition, students' practice with AI tools in education is also important. This can be strengthened with the help of educational institutions in facilitating AI-based resources for students. There is a positive association of students' practice in using AI tools when there is effort expectancy from institutions to use them. Similarly, the role of the social environment in shaping students' perceptions of the implementation of technology is called social influence. It directly influences the intention to use technology, specifically AI tools (Krishnan et al., 2023).

The integration of AI tools into academic settings has significantly transformed academic practices. These tools offer a range of functionalities, from generating text and code to analyzing data and providing feedback. According to Ab Hamid et al. (2023), people are increasingly utilizing AI due to its ability to enhance efficiency and productivity, automate repetitive tasks, and provide personalized experiences, all of which are significant factors driving its adoption across sectors. Additionally, AI systems are often used to process vast amounts of data quickly, identify patterns, and provide insights or solutions in areas where human analysis would be time-consuming or prone to error. Moreover, including generative AI in class activities and assignments could increase engagement and motivation among students and "facilitates interactive learning environments" (Nadler, 2024). It can create a more personalized educational experience for students, providing feedback through "intelligent tutoring systems, automated rating systems and tailored learning platforms." For example, using generative AI technologies such as ChatGPT can significantly improve problem-solving tasks, including essay writing, case study analysis, decision-making, engineering design challenges, and complex scientific experiments (Youssef et al., 2024). Furthermore, AI-powered tools like chatbots and automated indexing are used to improve service delivery and user experience (Altamimi et al., 2023).

Students' knowledge and familiarity with AI tools vary significantly across different fields of study and levels of technological exposure. According to von Garrel and Mayer (2023), 63.4% of students reported using AI tools during their studies compared to engineering and natural sciences students who demonstrated higher usage rates (75.3% and 71.9%, respectively). Moreover, Ab Hamid et al. (2023) stated that students' familiarity with AI tools is crucial, as it influences their ability to effectively integrate these technologies into their learning processes and enhances their overall educational experience. There is growing awareness and exposure among students to AI tools, particularly those that enhance academic and professional skills such as AI-driven study assistants, learning platforms, and research tools that automate notetaking, provide feedback, and analyze large datasets. However, knowledge levels can vary

widely depending on exposure, educational context, and accessibility to advanced technology. Overall, research on AI education regards basic AI knowledge as a necessary factor in studying students' behavioural intentions. As Chen et al. (2021) noted, students' knowledge of AI language applications can be a critical factor influencing their behaviour and intention to use AI for language learning.

Students hold varying attitudes toward the use of AI tools in education. Some view these tools positively, appreciating their potential to enhance learning experiences and foster greater engagement. However, others express concerns regarding the effectiveness of AI and the risk of becoming overly dependent on technology. These differing perspectives reflect both optimism and skepticism about the role of AI in academic settings (Mirdad et al., 2024). Students exhibit diverse attitudes toward AI in education, with some perceiving it as a valuable resource that can enhance learning experiences. This optimistic view highlights the potential of AI to support educational goals. However, others express skepticism, raising concerns about its implications for learning and the possibility of AI replacing traditional educational methods. These differing perspectives underscore the varied ways students engage with and evaluate AI technologies in academic contexts (Mohammadkarimi, 2023; Ab Hamid et al., 2023). Students hold diverse perceptions of AI in education. Some regard it as a beneficial tool that can enhance learning experiences, appreciating its potential to support academic growth. In contrast, others voice concerns about its reliability and fear that it might undermine traditional educational methods. These contrasting views highlight the complex attitudes students have toward the integration of AI into learning environments (Lai, 2021;Ou et al., 2024). Students generally perceive AI tools positively, recognizing their potential to facilitate and enhance learning. This optimistic outlook reflects an appreciation for the role of AI in supporting educational activities. However, there are also significant concerns about the accuracy and reliability of the information produced by these systems, suggesting caution among students when engaging with AI tools (von Garrel & Mayer, 2023).

The use of AI in education raises important ethical and privacy concerns. A key issue is safeguarding student data, as integrating AI systems often involves collecting and processing sensitive personal information. Additionally, there is concern about the potential for digital segregation, where unequal access to AI technologies could exacerbate disparities among socio-economic groups. These challenges highlight the need to carefully consider ethical practices and data privacy when implementing AI in educational settings (Mirdad et al., 2024). The integration of AI across various sectors presents significant ethical and privacy concerns. Key issues include data security, as AI often oversees sensitive information, and algorithmic bias, which can lead to unfair or discriminatory outcomes. Additionally, there are concerns about the implications of surveillance, as AI-powered systems may infringe on individual freedoms. These challenges underscore the significance of addressing ethical considerations and safeguarding privacy in the deployment of AI technologies (Ou et al., 2024). The deployment of AI tools introduces significant ethical and privacy concerns. Key issues include data security, as sensitive information may be vulnerable to breaches, and the risk of misinformation arising from inaccuracies in AI-generated outputs. Additionally, there are ethical implications of relying on automated systems for academic tasks, as this may compromise the integrity and authenticity of educational practices. These concerns underscore the need for responsible, transparent use of AI technologies in academic settings (von Garrel & Mayer, 2023).

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Methodology

This study employed a non-experimental, exploratory research design to investigate students' knowledge, attitudes, and practices regarding the use of Artificial Intelligence (AI) tools for academic purposes. The research focused on students enrolled in the Diploma in Mathematical Sciences (CDCS143) program at Universiti Teknologi MARA (UiTM) Arau, Perlis, during the October 2024 to February 2025 academic session. An online questionnaire was employed as the primary data collection instrument to gain insights into students' understanding, perceptions, and utilization of AI tools in their studies. The questionnaire includes three parts. Part 1 includes Section A, which covers the demographic profile, collecting data on gender, current semester and AI tools frequently used. Part 2 consists of Sections B and C, focusing on independent variables such as students' knowledge and attitudes towards using AI tools for academic purposes. In Section B, respondents must answer questions about their knowledge of AI tools and their academic uses. Section C prepared questions about attitudes towards using AI tools for academic purposes. Lastly, Part 3 consists of Section D, which explains the dependent variable and asks respondents to answer questions about the practice of using AI tools for academic purposes. Respondents provided feedback on the perceived advantages, challenges, and ethical considerations of AI integration in education. This design facilitated the identification of trends and relationships between students' knowledge, attitudes, and practices. The population consisted of 440 students from the Diploma in Mathematical Sciences program. A non-probability convenience sampling technique was applied, yielding a sample of 61 respondents from semesters 1, 3, and 5. Convenience sampling was chosen to ensure efficient data collection from readily available participants through accessible online platforms. The data collection process involved drafting, pilot testing, and refining the instrument to enhance validity and clarity. SPSS software was used to conduct frequency analysis, reliability analysis, correlation analysis and regression analysis.

Table 1: Instruments Of Sections In The Questionnaire

Section	Title
A	Demographic
B	Knowledge of AI tools
C	Respondent Attitudes towards AI used
D	Actual Practices related to AI in academic tasks

Results and Discussions

Frequency Analysis

In the fields of statistics and data science, a process known as descriptive analysis is utilized to summarize and organize data. Table 2 explains and summarizes the demographic profile of the students. The sample consisted of 61 participants (63.9% female, 36.1% male). Students ranged in semester from 1, 3, and 5 (semester 1 = 1, semester 3 = 2, semester 5 = 3). Most students were in semester 1 (4.9%), followed by semester 3 (21.3%) and semester 5 (73.8%).

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Table 2: Demographic Profile of The Respondent

Variable		Frequency	Percent
Gender	Female	39	63.90
	Male	22	36.10
	Total	**61**	**100.00**
Semester	1	3	4.9
	2	13	21.3
	3	45	73.8
	Total	**61**	**100.0**

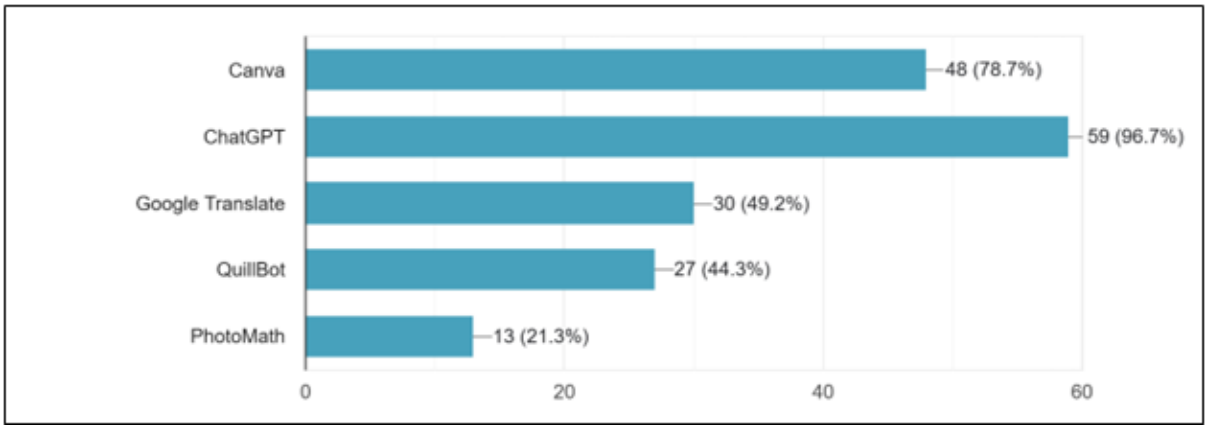

Figure 1: Bar Chart of The Preferred AI Tools

A descriptive analysis was conducted to examine the preferred AI tools used for education by the students. The sample consisted of 61 participants, with preferences varying across different tools. The most preferred tool was ChatGPT, with 59 participants (96.7%) indicating its use. This was followed by Canva, used by 48 participants (78.7%). Google Translate was chosen by 30 participants (49.2%), while QuillBot had 27 users (44.3%). The least preferred tool was PhotoMath, used by only 13 participants (21.3%).

Reliability Analysis

The consistency and dependability of a system or process can be evaluated using a technique known as reliability analysis, which is used in engineering, statistics, and other domains. It is used to determine the likelihood that a system or process will perform correctly over a specified period of time under established conditions. Cronbach's Alpha is used to measure the reliability and validity of the items, and the level was outlined in Table 3 (Sheakh, 2014). Table 4 indicates that Cronbach's Alpha for all variables was higher than 0.7. This suggests that all the items were reliable and valid. The Cronbach's Alpha value for Knowledge is 0.836, which was very good for the study. Meanwhile, the Cronbach's Alpha for Knowledge and Practices were 0.700 and 0.744, respectively, which were considered good for the study.

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Table 3: The Cronbach's Alpha Reliability Levels

Cronbach's Alpha	Internal Consistency
Less than 0.6	Poor
0.6-0.7	Moderate
0.7-0.8	Good
0.8-0.9	Very Good
0.9 and above	Excellent

Table 4: The Result of Reliability Analysis

Variable	No of item	Cronbach's Alpha	Strength Of Association
Knowledge	8	.836	Very good
Attitude	8	.700	Good
Practices	7	.744	Good

Pearson's Correlation Analysis

The Pearson correlation analysis was conducted to assess the strength of the relationship between the independent and dependent variables. The correlation coefficient (r) runs from -1 to 1, with -1 indicating a perfect negative correlation, 0 indicating no correlation, and 1 indicating a perfect positive correlation. A positive correlation indicates that as one variable increases, the other increases, whereas a negative correlation indicates that as one variable increases, the other decreases (Mondal & Mondal, 2017).

The correlation analysis revealed that students' knowledge of Artificial Intelligence (AI) tools was moderately and positively correlated with their use of these tools for academic purposes (r = 0.376). This finding indicates that students with greater knowledge about AI tools are more likely to apply them effectively in their learning activities. Such a relationship aligns with previous research suggesting that adequate knowledge enhances students' confidence and motivation to integrate technology into academic tasks (Villegas-Ch et al., 2021; Ajani et al., 2022). It implies that knowledge serves as a foundational factor influencing the extent to which students engage with AI technologies in education.

In contrast, students' attitudes toward AI tools demonstrated only a weak positive correlation with their use of these tools (r = 0.203). Students generally perceive AI positively. Their favorable attitudes alone may not directly translate into actual practice. This aligns with studies by Kim and Lee (2024) which emphasize that positive attitudes must be complemented by sufficient knowledge and perceived usefulness before technology adoption becomes significant. Hence, while attitude is an important psychological factor, it appears to play a smaller role compared to knowledge in determining students' active engagement with AI tools. Overall, the findings suggest that enhancing students' understanding and awareness of AI tools may be more effective in promoting meaningful use than only fostering positive perceptions. For educators and institutions, this highlights the importance of providing structured training and exposure to AI applications in academic settings. This ensures that students are both knowledgeable and confident in integrating AI responsibly and effectively in their studies.

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Table 5: Pearson's Correlation Analysis

Variables	Pearson Correlation
Knowledge	0.376
Attitude	0.203

Regression Analysis

Regression analysis was used to determine whether there was a significant relationship between the dependent and independent variables and to test the hypothesis regarding the factors that influence the use of AI tools for academic purposes. Table 6 presents the regression results for the independent variables, knowledge and attitude, and the dependent variable, the practice of artificial intelligence tools for academic purposes.

Table 6: Regression Analysis

Independent variable	β	t	ρ-value
(Constant)	1.585	0.869	.388
Knowledge	.575	2.955	.050
Attitude	.169	1.329	.189
F-value	5.806	5.806	0.005

The overall regression model was statistically significant, $F = 5.806$, $p = 0.005$, indicating that at least one of the predictors is significantly related to practice in attitude and knowledge. The model, therefore, provides a meaningful explanation of the dependent variable.

Among the predictors, knowledge demonstrated a statistically significant positive effect on the use of AI tools ($\beta = 0.575$, $t = 2.955$, $p = 0.05$). This suggests that students with higher knowledge of AI tools are more likely to utilize them effectively in academic activities. In contrast, attitude was not a significant predictor ($\beta = 0.169$, $t = 1.329$, $p = 0.189$), implying that while students generally hold positive perceptions of AI tools, attitude alone does not strongly influence their actual use.

The regression analysis results reinforce the earlier correlation findings, highlighting knowledge as the most influential factor in students' use of AI tools in academic contexts. This finding is consistent with prior studies that emphasize the role of digital literacy and awareness in determining technology adoption among students (Soeprijanto et al., 2022; Aydınlar et al., 2024; H. W. Kim, 2023). When students have adequate knowledge of how AI tool's function and how to apply them effectively, they are more confident and capable of integrating them into their learning routines.

On the other hand, attitude, while positively related to AI tool use, did not emerge as a significant predictor in the regression model. This may suggest that positive attitudes alone are insufficient to drive behavioural adoption unless they are supported by relevant skills and knowledge. This observation aligns with the Technology Acceptance Model (TAM) by Abuhassna et al. (2023), which suggests that perceived ease of use and usefulness have stronger direct effects on technology use compared to attitude alone.

Overall, the regression results suggest that developing students' knowledge and competencies in AI tools should be prioritized over only cultivating positive perceptions. Educational institutions can enhance students' effective use of AI for academic purposes by incorporating hands-on training, guided practice, and curriculum integration of AI-related learning modules.

Conclusion

This study aimed to examine students' knowledge and attitudes toward the use of Artificial Intelligence (AI) tools for academic purposes. Specifically, it investigated the relationships between knowledge, attitude, and the use of AI tools, and determined which factor most significantly predicts students' actual usage behaviour. The findings revealed that students generally have moderate knowledge and positive attitudes toward AI tools. The correlation results indicated a moderate positive relationship between knowledge and the use of AI tools, and a weak positive relationship between attitude and AI tool use. Furthermore, the regression analysis confirmed that knowledge is a significant predictor of AI tool usage, while attitude does not significantly influence students' actual use. These results suggest that while students may view AI tools favourably, their practical knowledge and familiarity with the tools are more critical in determining whether they effectively apply AI in their studies. Moreover, the findings support the existing literature, which emphasizes that digital competence and understanding are stronger drivers of technology adoption than attitude alone (Aydınlar et al., 2024; H. W. Kim, 2023). In conclusion, the study highlights both knowledge and attitudes that play a significant role towards students' practice in using AI tools. This underscores the importance of equipping students with the knowledge and skills to use AI tools effectively, while also fostering positive perceptions of these technologies. Additionally, students with more knowledge about AI tools were more likely to use them effectively in their academic routines. Therefore, by addressing both factors, educational institutions can help students leverage AI tools responsibly and enhance their academic performance, preparing them for a technology-driven future. To further our understanding in this area, future studies can examine larger, more varied student populations and evaluate the long-term effects of AI tools on academic performance.

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