

7th ICOL

International Conference on Libraries
2025

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“Towards Sustainable Future Libraries”



**23 - 24
September 2025**



**Plenitude Grand Ballroom
Ascott Gurney Penang
Malaysia**

Proceedings



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The logo features the number '7' in a large, bold, black font. To its right is the acronym 'ICOL' in a large, bold, dark blue font. The 'O' in 'ICOL' is replaced by an orange circle containing a white icon of three interconnected nodes. The text 'International Conference on Libraries' and '2025' are in a smaller, black, sans-serif font below the acronym. The tagline 'Celebrating 20th Years...' is written in a cursive, orange font with a small sunburst icon above the 'Y'.

7th International Conference on Libraries (ICOL)
2025

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Perpustakaan Universiti Sains Malaysia

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A Study on the Awareness of Artificial Intelligence as an Essential Research Tools among IIUM Postgraduate

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ABSTRACT

This study investigates AI awareness and adoption in academic research among IIUM postgraduate students. Using purposive sampling, data from 203 students were collected through a K.A.P (Knowledge, Attitude, Practice) model questionnaire and analysed with SPSS. Results show students have a moderately high awareness of AI in research (mean: 3.63). Major challenges include privacy concerns, unclear plagiarism guidelines, and lack of funding for AI tools (mean scores above 4.00). Suggested solutions include free access to AI tools via the library, clear usage and plagiarism guidelines, and AI literacy workshops and tutorials. Understanding students' AI awareness is crucial to address their challenges and improving support. The findings help guide university libraries and policymakers in supporting effective AI use. This study also highlights the need to teach AI skills in higher education, supporting research innovation and aligning with SDG 9: Industry, Innovation, and Infrastructure.

Keywords: Artificial Intelligence (AI), AI Awareness, Postgraduate Students, Academic Research, KAP Model (Knowledge, Attitude And Practice), AI Adoption Challenges

1 INTRODUCTION

The Global AI Index ranked Malaysia 44th out of 62 countries, highlighting a gap in AI adoption compared to countries like Singapore, which ranks in the top three due to strong infrastructure and talent development (Yeoh, 2023). Singapore's government strategy earned it over 80 points in infrastructure and education, while Malaysia scored 48.1 in government strategy, indicating progress but also a need to improve talent development and practical AI integration in research (Yeoh, 2023).

To address this, the Malaysian government calls for collaboration among researchers, developers, and policymakers to position Malaysia among the top 20 AI-advanced nations (Bernama, 2024). The *AI untuk Rakyat* initiative supports this by promoting national AI literacy as part of the digital transformation agenda (Tech for Good Institute, 2024). While this program targets the general public, there is a growing need to enhance AI literacy specifically for postgraduate students in academic research (Hornberger et al., 2023).

Several studies highlight the benefits of AI tools like ChatGPT in research. These tools can improve writing (Jeyaraj et al., 2020; Li, 2023; Khalifa & Albadawy, 2024), speed up processes like literature reviews and data analysis (Burger et al., 2023), and support student autonomy in supervision (Cowling et al., 2023). They also enhance research quality, skill development, and productivity (Aguirre-Aguilar et al., 2024).

Despite these benefits, barriers remain. These include a lack of structured resources, weak university support, and unclear ethical guidelines (Holmes et al., 2021; Dai et al., 2023; Cowling et al., 2023). Raising awareness of AI tools is essential to increase accessibility and adoption (Lai et al., 2023), as awareness strongly influences AI usage (Lee et al., 2021; Dai et al., 2020).

This study is driven by the need to support Malaysia's digital goals by improving AI awareness among postgraduates. Understanding their Knowledge, Attitude, and Practice (KAP) helps identify gaps and challenges, align university support with national strategies, and strengthen AI-related initiatives like *AI untuk Rakyat* and contribute to SDG 9 by fostering innovation and enhancing research infrastructure through AI adoption in academia.

This study aims to address the following research questions:

1. What is the awareness level of IIUM postgraduate students towards AI in research activity?
 - 1.1 What is the knowledge level of postgraduate students on artificial intelligence technology in research?
 - 1.2 What is the attitude level of postgraduate students on artificial intelligence technology in their research?
 - 1.3 What is the application level of postgraduate students of artificial intelligence technology in their research?
2. What are the challenges faced by postgraduate students while using artificial intelligence technology in their research activities?
 - 2.1 What are potential strategies for library in enhancing the artificial intelligence usage among postgraduate students in their academic research?

Hypotheses:

H1: Postgraduates with higher level knowledge of AI have a higher level awareness of AI in research.

H2: Postgraduates with positive attitude towards AI have higher level awareness of AI in research.

H3: Postgraduates who frequently practice AI have higher level awareness of AI in research.

2 METHODOLOGY

This chapter explains the research approach, design, sampling strategy, data collection and analysis. A quantitative approach based on the Knowledge, Attitude, and Practice (K.A.P) model is used to assess AI awareness in research, challenges, and support strategies among postgraduate students.

2.1 Research Design

This study uses a cross-sectional descriptive design to assess AI awareness in research among IIUM postgraduate students. A structured e-survey with closed-ended and scale questions will be distributed to 196 IIUM postgraduate students.

2.2 Research Approach

This study adopts a quantitative approach using a structured e-survey to assess AI knowledge, attitudes, and practices among IIUM postgraduate students. The survey will use fixed-response and Likert-scale questions to collect numerical data for statistical analysis, allowing clear patterns and relationships to be identified. The study is guided by the Knowledge, Attitude, and Practice (KAP) model, which is widely used in technology and health research. This model helps assess how students' knowledge and attitudes influence their use of AI in academic research. It also helps identify specific gaps and barriers to adoption, making it suitable for evaluating AI awareness in research. By applying this approach, the study aims to generate actionable insights that support AI literacy development and guide institutional support for postgraduate students.

2.3 Population Sample

The sample size of 196 IIUM postgraduate students is determined using the Krejcie and Morgan Table, based on a total population of around 400 students. Participants are from diverse academic backgrounds. The survey uses fixed-response Likert-scale questions to measure trends in AI knowledge, attitudes, and practices. This format allows for effective statistical analysis of agreement levels, knowledge, and usage patterns.

2.3.1 Sampling Method

A purposive sampling strategy was employed (Etikan, Musa, & Alkassim, 2016) to assess AI awareness in research and the challenges faced by postgraduate students in academic research who are currently an active student in IIUM.

2.4 Data Collection

Data collection begins after finalizing the questionnaire, which is adapted from validated instruments to ensure reliability and relevancy (Alam et al., 2024; Swed et al., 2022; Carolus et al., 2023; Chatterjee & Bhattacharjee, 2020; Ali & Naeem, 2020; Owolabi et al., 2022; Pence, 2022). Adjustments are made to suit the IIUM context. The finalized e-survey, titled "A Study on the Awareness of Artificial Intelligence as an Essential Research Tool among IIUM Postgraduates," is distributed via social media platforms to ensure broad accessibility. To prevent duplicate responses and maintain data accuracy, email addresses are collected and the Google Form is set to allow only one submission per respondent. Data collection is conducted over a period of three weeks, as shown in the figure below:

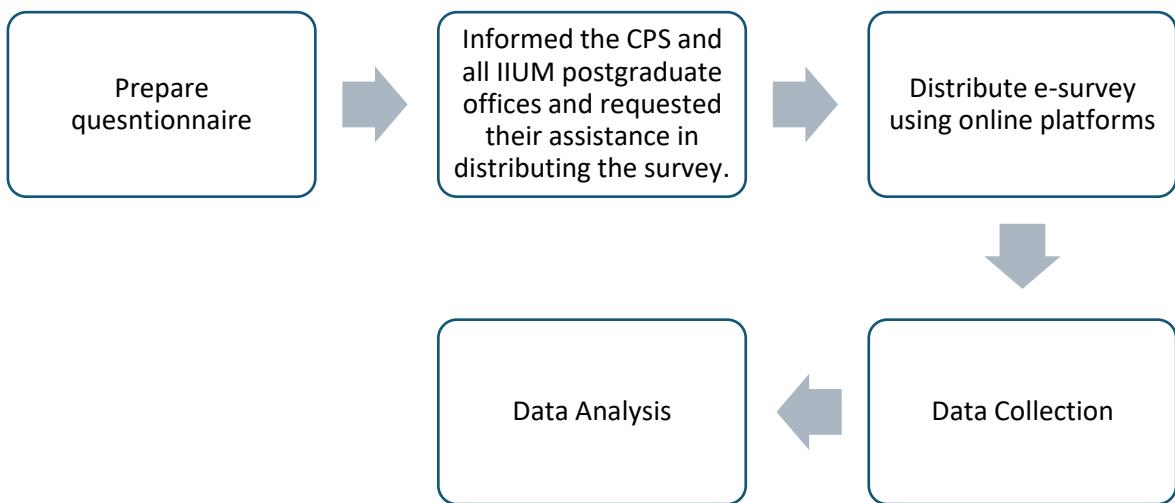


Figure 1: Data Collection Flow

2.5 Data Analysis

Data is analyzed using SPSS (Statistical Package for the Social Sciences). Frequency analysis is used for demographic data, while descriptive statistics are applied to address the research questions as below (Pallant, 2020):

2.5.1 Frequency Analysis for Demographic Questions

Frequency analysis in SPSS is used to calculate percentages for demographic variables; age, gender, academic program, level of study, nationality, and faculty, providing a clear overview of respondent characteristics.

2.5.2 Descriptive Statistics for Individual Questions

To answer the first research question on AI awareness based on knowledge, attitude, and practice scores, Descriptive Statistics in SPSS is used to calculate the mean, median, and standard deviation. These measures summarize patterns in participants' knowledge, attitude and practice towards AI.

2.5.3 Aggregate Mean Calculation for Sections

The study calculates the mean for each Knowledge, Attitude, and Practice section to assess overall awareness. A new variable is created in SPSS to represent the aggregated mean, allowing comparison across sections.

2.5.4 Ranking Challenges and Solutions by Mean Scores

To answer the second research question, Descriptive Statistics is used to rank challenges and strategies by mean scores. Higher mean scores indicate the most significant challenges and preferred strategies.

2.5.5 Chi-Square Test for hypotheses

The study uses the Chi-Square test to the relationship between AI knowledge, attitude, and practice with AI awareness in research. Likert-scale mean scores are categorized into Low, Moderate, and High. Chi-Square is used instead of correlation or regression to test group differences, as it suits categorical data and identifies significant influences on AI awareness.

3 RESULTS AND DISCUSSION

This study uses SPSS and the K.A.P model to analyze AI awareness, challenges, and strategies among postgraduate students. Frequency analysis identifies response patterns, while descriptive statistics highlight key trends. The findings show students' AI awareness levels in research, main challenges, and strategies to support AI use in research.

3.1 Demographics Information

Table 1: Current Academic Program

Academic Program	Frequency	Percent (%)
Master	133	65.5
PhD	70	34.5
Total	203	100.0

Based on **Table 4.3.1**, 65.5% of respondents are Master's students (133), and 34.5% are PhD students (70), with a total of 203 participants.

Table 2: Year of Study

Year of Study	Frequency	Percent (%)
Year 1	99	48.8
Year 2	74	36.5
Year 3	19	9.4
Year 4 and above	11	5.4
Total	203	100.0

Year 1 students make up the largest group with 99 respondents (48.8%). Year 3 and Year 4+ have 19 (9.4%) and 11 (5.4%) respondents, respectively. Over 85% are in Year 1 or 2, reflecting the majority are early-stage Master's students.

Table 3: Gender

Gender	Frequency	Percent (%)
Female	137	67.5
Male	66	32.5
Total	203	100.0

Most respondents are female with 137 participants (67.5%), while male make up 32.5% with 66 participants.

Table 4: Age

Age	Frequency	Percent (%)
20-30	120	59.1
31-40	59	29.1
41-50	18	8.9
51-60	6	3.0
Total	203	100.0

The largest age group is 20–30 with 120 participants (59.1%), followed by 31–40 with 59 participants (29.1%), 41–50 with 18 participants (8.9%), and 51–60 with 6 participants (3%). Most respondents are under 40, showing a younger postgraduate population.

Table 5: Nationality

Nationality	Frequency	Percent (%)
International	57	28.1
Malaysian	146	71.9
Total	203	100.0

Malaysians make up 71.9% (146), while international students account for 28.1% (57). The data mainly reflects local student perspectives.

Table 6: Faculties

Faculties	Frequency	Percent (%)
Kulliyyah of Islamic Revealed Knowledge and Human Sciences	44	21.7
Kulliyyah of Education	33	16.3
Kulliyyah of Economics and Management Sciences	25	12.3
Institute of Islamic Banking and Finance (IiBF)	15	7.4
Kulliyyah of Information and Communication Technology	14	6.9
Kulliyyah of Allied Health Sciences	12	5.9
Kulliyyah of Medicine	11	5.4
Kulliyyah of Engineering	10	4.9
Kulliyyah of Law (Ahmad Ibrahim Kulliyyah of Laws)	8	3.9
ISTAC	6	3.0
Kulliyyah of Architecture and Environmental Design	6	3.0
International Institute for Halal Research and Training (INHART)	5	2.5
Kulliyyah of Dentistry	4	2.0
Kulliyyah of Languages and Management (Pagoh Campus)	3	1.5
Kulliyyah of Nursing	3	1.5
Kulliyyah of Pharmacy	2	1.0
Kulliyyah of Science	2	1.0
Total	203	100.0

The highest participation comes from IRKHS (21.7%), Education (16.3%), and Economics (12.3%), totaling 50.3%, showing a focus on humanities and social sciences. ICT (6.9%) and Allied Health (5.9%) show moderate representation. Pharmacy, Science, and Pagoh-based faculties have the lowest (1%–1.5%).

Table 7: Prior Experience with AI

Prior experience with AI technology	Frequency	Percent (%)
Yes	186	91.6
No	17	8.4
Total	203	100.0

91.6% of respondents have prior AI experience, while 8.4% do not, indicating high exposure of AI among participants. Overall, most respondents are young, with 59.1% aged 20–30, and majority are women in the early stage of postgraduate studies. Out of 203, 186 (91.6%) have AI experience, showing high familiarity. However, the 17 students reported have the least exposure to AI mostly are older respondents (51–60) with 50% (3 out of 6) lacking AI experience. Only 5.8% of 20–30-year-olds, 10.2% of 31–40, and 5.6% of 41–50 reported no AI experience. The 17 postgraduate students who claimed no AI experience may not realize they're already using AI in tools like Google, WhatsApp, or smartphones, pointing to a gap in AI awareness. The findings may be more reflective of younger, non-technical users, and may not fully represent older or STEM students.

3.2 The Awareness Level of IIUM Postgraduate Students towards AI in Research Activity

3.2.1 Knowledge level of postgraduate students on artificial intelligence technology in research

Table 8: Knowledge towards AI

Questions	Mean	Std. Deviation
I can assess the advantages of the use of an artificial intelligence	4.01	.829
I can imagine possible future uses of AI	4.00	.931
I have a good understanding of what AI is	3.86	.817
I can assess the disadvantages of the use of an artificial intelligence	3.84	.904
I know how AI is being used in research	3.76	.882
I can distinguish if I interact with an AI or a 'real human'	3.71	1.061
I am confident that I can explain AI to my friend	3.65	.923
I can tell if the application I'm using is based on artificial intelligence output	3.50	1.045
I know what machine learning is	3.40	1.092
I have been taught about AI in university	3.06	1.286
I know what natural language processing is	2.87	1.078

The second section measures participants' AI knowledge. The highest mean scores are for recognizing the advantages of using AI (4.01), imagining future uses (4.00) showing strong awareness of AI's benefits and potential. Students also show a good understanding of AI (3.86) and its disadvantages (mean 3.84), understanding of AI use in research (mean 3.76), ability to distinguish AI from humans (mean 3.71), and confidence in explaining AI (mean 3.65) reflect moderate competence. The ability to recognize AI-generated outputs (3.50), showing moderate awareness. While familiarity with machine learning (3.40) and natural language processing (2.87) is low. A 3.06 mean score for formal education shows limited academic exposure. Overall, participants demonstrate a moderate level of AI knowledge, with weaker understanding in technical areas.

Table 9: Overall Mean Score of Knowledge towards AI

	Total students	Range	Minimum	Maximum	Mean	Std. Deviation
Knowledge_Score	203	3.64	1.36	5.00	3.6068	.61924

The data was analysed using SPSS, showed the average AI knowledge score of 3.61, indicating a moderate understanding among IIUM postgraduate students. The low standard deviation (0.62) suggested that most students had similar levels of knowledge. While respondents showed a general awareness of AI, their understanding of technical areas like machine learning and natural language processing was limited. These findings were consistent with previous studies by Swed et al. (2022), who found moderate AI knowledge among Syrian medical students; Alghamdi and Alashban (2023), who reported similar findings among radiologists; Al-Qerem et al. (2023), who studied health profession students; and Hasan et al. (2024), who noted that only 39.5% of pharmacy students had a strong grasp of AI concepts. These studies suggest that limited exposure to formal AI education contributes to the moderate levels of AI literacy observed. However, unlike those studies that focused on medical or technical students, most participants in this study were from social sciences, which may have influenced how they perceived and understood AI. The low mean score (3.06) for the item "I have been taught about AI in university" supported the lack of formal exposure. This echoed earlier findings and highlighted the need for institutions to integrate AI-focused modules or workshops into academic programs to improve AI literacy.

3.2.2 Attitude towards AI

Table 10: Attitude towards AI

Questions	Mean	Std. Deviation
I am willing to learn more about AI and its potential application in research	4.56	.690
I believe that AI has potential to improve my research skills	4.52	.706
I am interested in learning more about the ethical implications of AI	4.52	.692
I consider ethics when deciding whether to use data from an AI	4.42	.763
I believe that AI will bring new challenges in conducting research	4.39	.803
I am optimistic about the future of AI in research	4.33	.871
I understand the consequences of using AI for society	4.27	.763
I know AI-based applications for their ethical implications	3.89	1.004
I feel that AI tools are not directly beneficial or necessary for my specific research area (Reversed code)	3.64	1.069
I am concerned that using AI tools might reduce valuable human interaction and feedback from supervisors (Reversed code)	2.51	1.287
I am sceptical about the accuracy and reliability of AI tools in producing research insights (Reversed code)	2.42	1.093
I worry that using AI tools might reduce my critical thinking or hinder the development of my research skills. (Reversed code)	2.24	1.221
I am concerned about the risk of AI to be used for malicious purposes (Reversed code)	1.60	.779

The third section measured students' attitudes toward using AI in research. The highest mean score (4.56) reflects strong willingness to learn more about AI and its research applications. Respondents viewed AI as useful for enhancing research skills (4.52). Participants consider ethics when using AI (4.42) and want to learn more about the ethical implications of AI (4.52). They were aware of AI's societal impact (4.27) and its ethical implications (3.89), and believed AI benefits their research field (3.64). However, lower scores showed concern about reduced human interaction (2.51) and critical thinking (2.24). The lowest score (1.60) highlighted strong worry about AI misuse. Overall, students had a positive but cautious attitude toward AI in research.

Table 11: Overall Mean Score of Attitude towards AI

	Total students	Range	Minimum	Maximum	Mean	Std. Deviation
Attitude_Score	203	2.31	2.38	4.69	3.6393	.43195

The attitude towards AI mean score of 3.64 suggests that IIUM postgraduate students generally have a positive view of AI, with low standard deviation (0.43) and narrow range (2.31). This reflects their belief that AI can improve research efficiency and accuracy. The findings align with previous studies by Swed et al. (2022), Hasan et al. (2024), Al-Qerem et al. (2023), and Alghamdi and Alashban (2023), which reported positive attitudes toward AI among students and professionals. However, these studies also noted issues, like limited hands-on experience, limited training, and gaps in formal AI education. Despite the overall positive attitude, students raised concerns about reduced human interaction (2.51), doubts over AI's accuracy (2.42), and its effect on critical thinking (2.24). The biggest concern was AI misuse (1.60). These findings highlight the need for better training, ethical awareness, and support for responsible AI use in research.

3.2.3 Practice towards AI

Table 12: Practice towards AI

Questions	Mean	Std. Deviation
Do you think AI should be included in the curriculum for postgraduate students in IIUM?	4.17	.924
Do you believe AI is essential in conducting research	3.85	.960
I will use AI applications to make my everyday life easier	3.82	.922
Do you think there should be a budget for subscribing AI for research?	3.78	1.179
Do you use AI to search articles for your research?	3.71	1.218
Do you believe AI would be a burden for researcher? (reversed code)	3.55	1.118
I prefer using AI applications in everyday life	3.48	1.040
Do you believe the usage of AI in research will lose the researcher credibility and integrity? (reversed code)	2.88	1.210

The fourth section assessed AI practice among postgraduate students. The highest mean score (4.17) showed strong agreement that AI should be included in the IIUM curriculum. Participants also viewed AI is important for research (3.85), and used it in daily life (3.82), showing its relevance beyond academics. A mean of 3.78 supports allocating budgets for AI tools, indicating the need for institutional support. Students frequently use AI to find articles (3.71). The reversed-coded item on AI being a burden scores 3.55, suggesting most found AI as helpful. AI is moderately used in daily life (3.48), slightly less than for academic purposes. The lowest score (2.88), from the reversed-coded statement about AI undermining researcher credibility, indicates ethical concerns. This may reflect limited understanding of responsible AI use, as noted in the Knowledge section.

Table 13: Overall Mean Score of Practice towards AI

	N	Range	Minimum	Maximum	Mean	Std. Deviation
Practice_Score	203	3.00	2.00	5.00	3.6539	.64041

The mean score of 3.65 indicates moderate AI use among IIUM postgraduate students. However, the higher standard deviation (0.64) shows varied usage levels, likely due to limited access and lack of training, as noted by Al-Qerem et al. (2023) and Ahmed et al. (2022). To improve, institutions should provide resource allocation, practical training, and mentorship programs to support more consistent and effective AI usage in research. Despite the increased use of AI, concerns remain. A low mean score of 2.88 reflects worries about AI affecting research credibility. Some students fear that AI use may reduce originality and ethical value by automating tasks typically done by researchers.

The mean scores were categorized into three levels to interpret respondents' level of Knowledge, Attitude and Practice towards AI in research as below:

Table 14: Category of Mean Score

Mean Score	Category
1.00-2.33	Low
2.34 -3.67	Medium
3.68-5.00	High

Table 15: Overall Awareness Mean Score

Awareness_Score	
Mean	3.6333
Median	3.6200
Mode	3.31 ^a
Std. Deviation	.43534
Range	2.20

The overall average awareness of AI in research among respondents is 3.63, indicating a medium level of awareness. The low standard deviation (0.44) and narrow range (2.20) show consistent awareness across the sample. While this suggests a promising level of AI awareness in research among IIUM postgraduate students, strategies are needed to improve knowledge, attitude, and practice to enhance AI adoption in research.

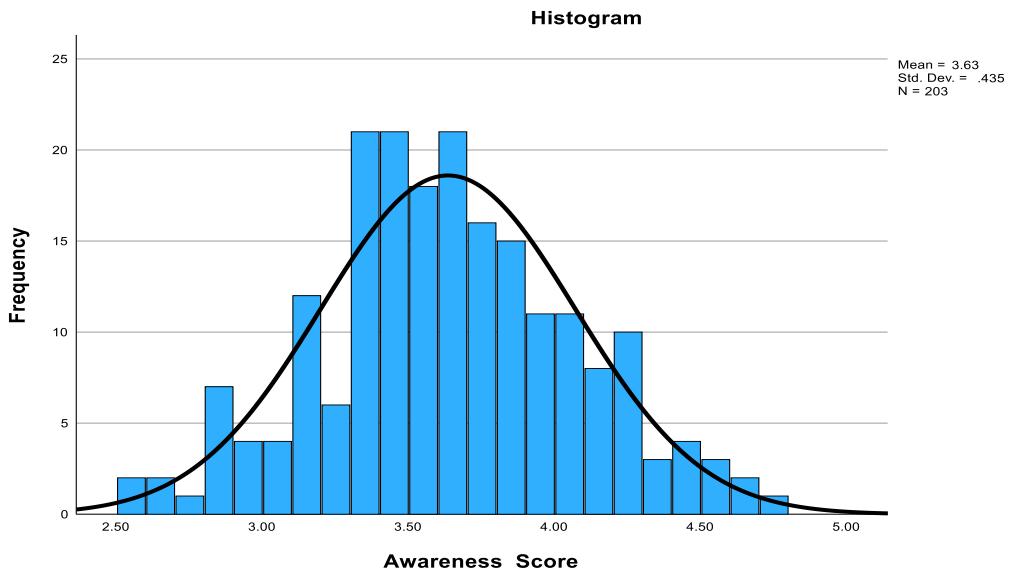


Figure 2: Histogram of Overall Awareness Score

The histogram shows a near-normal distribution of AI awareness in research among IIUM postgraduate students, with a mean of 3.63 and a low standard deviation (0.435), indicating consistent awareness. Few students scored the maximum (5.00), suggesting a need for targeted training. Further analysis using hypothesis testing, such as the Chi-Square Test, can determine if AI knowledge, attitude, and practice significantly influence AI awareness in research. This helps guide strategies to improve AI adoption in research.

3.2.4 Hypothesis Testing Results (Chi Square-Test)

- Hypothesis 1: Postgraduates with higher level knowledge of AI have a higher level awareness of AI in research.**

Table 16: Crosstab Knowledge and Awareness

Knowledge Towards AI	AI Awareness Level in Research			Total Students
	Low (1)	Medium (2)	High (3)	
Basic (1)	0	7	1	8
Moderate (2)	0	62	37	99
Advance (3)	0	12	84	96
Total students	0	81	122	203

The crosstab table shows the relationship between AI Knowledge Level and AI Awareness Level in research. Among students with Basic AI Knowledge, 7 students have Medium AI Awareness in Research, and only 1 student has High AI Awareness in Research. For those with Moderate AI Knowledge, 62 have Medium AI Awareness in Research, while 37 have High AI Awareness in Research. Among students with Advanced AI Knowledge, 12 have Medium AI Awareness in Research, and the majority, 84 students, have High AI Awareness in Research. These results show that as AI Knowledge increases, AI Awareness in Research also increases. Only 1 out of 8 students

with Basic AI Knowledge has High AI Awareness in Research. 37 out of 99 students with Moderate AI Knowledge have High AI Awareness in Research. 84 out of 96 students with Advance AI Knowledge have High AI Awareness in research. Therefore, the hypothesis that postgraduate students with higher AI Knowledge have higher AI Awareness in research is supported.

ii. Hypothesis 2: Postgraduates with positive attitude towards AI have higher level awareness of AI in research.

Table 17: Crosstab Attitude and Awareness

Attitude Towards AI	AI Awareness Level in Research			Total Students
	Low (1)	Medium (2)	High (3)	
Negative (1)	0	0	0	0
Neutral (2)	0	70	38	108
Positive (3)	0	11	84	95
Total students	0	81	122	203

The crosstab table shows the relationship between Attitude towards AI and AI Awareness Level in Research. There are no students with negative attitude towards AI. Among students with a Neutral Attitude, 70 have Medium AI Awareness in Research, and 38 have High AI Awareness in Research. Among those with a Positive Attitude, 11 have Medium AI Awareness in Research, while the majority, 84 students, have High AI Awareness in Research. This shows that a positive attitude towards AI is linked to a higher level of AI awareness in research. Most students with a Positive Attitude are in the High AI Awareness category. Therefore, the hypothesis that postgraduates with a positive attitude towards AI have higher AI awareness in research is supported.

iii. Hypothesis 3: Postgraduates who frequently practice AI have higher level awareness of AI in research.

Table 18: Crosstab Practice and Awareness

Practice Towards AI	AI Awareness Level in Research			Total Students
	Low (1)	Medium (2)	High (3)	
Rarely (1)	0	6	0	6
Occasionally (2)	0	63	36	99
Frequently (3)	0	12	86	98
Total students	0	81	122	203

The crosstab table shows the relationship between AI Practice Level and AI Awareness Level in research. Among students who Rarely use AI, 6 students have Medium AI Awareness in Research. For those who Occasionally use AI, 63 students have Medium AI Awareness in Research, and 36 have High AI Awareness in Research. Among students who Frequently use AI, 12 students have Medium AI Awareness in Research, while the majority, 86 students, have High AI Awareness in Research. This indicates that students who use AI more often tend to have higher AI awareness in research. Therefore, the hypothesis is supported. Postgraduates who frequently use AI have a higher level of AI awareness in research.

The findings of this study support all three hypotheses: postgraduate students with higher AI knowledge, positive attitudes towards AI, and frequent AI usage show greater awareness of AI in research. These results align with Qin et al. (2024), who found that medical students with strong AI knowledge had more positive attitudes and better recognition of AI's role in medicine. Similarly, Kharroubi et al. (2024) reported that 43% of participants had high AI knowledge, 97.2% were familiar with AI, and those with moderate to high knowledge were more likely to have positive attitudes and greater awareness. Their study also found that 75% of students actively used AI during university, showing that frequent use improves awareness. Atalla et al. (2024) further

support these findings, noting that nurses with 1–5 years of experience scored highest in AI-related areas, and frequent use was linked to higher awareness. Their research also found that a positive attitude correlates with stronger ethical awareness, reinforcing that attitude plays a key role in AI understanding. Overall, the results clearly show that knowledge, attitude, and practice all contribute significantly to AI awareness in research.

3.3 The Challenges Faced By Postgraduate Students While Using Artificial Intelligence Technology in Their Research Activities

Table 19: The Challenges

Questions	Mean	Std. Deviation
I am concerned about the privacy and security of my data when using AI tools in research	3.97	1.017
I find it challenging to use AI tools in research due to unclear guidelines about plagiarism	3.64	1.150
Budget constraints are a significant barrier to adopting AI tools for my research	3.63	1.159
I face challenges in accessing essential AI tools for research due to insufficient fund	3.43	1.226
I find it hard to find free AI tools that is available for research.	3.34	1.210
I feel that my limited technical knowledge makes it challenging to use AI tools effectively in my research	3.27	1.155
I face challenges in using AI tools effectively for research due to limited training or guidance.	3.22	1.213
I struggle to find AI resources that align with my specific research needs	3.22	1.140
I am hesitant to use AI tools due to unclear guidelines around ethics and plagiarism	3.20	1.204
I lack awareness of how to use AI tools ethically in my research	3.01	1.274
I face difficulties using AI tools in my research due to a lack of institutional training	2.84	1.177
I face difficulties using AI tools in my research due to a lack of institutional funding for subscription of AI applications	2.52	1.204
I am not aware of the available AI tools for research	2.35	1.219

The fifth section explores the challenges postgraduates face in adopting AI for research. The biggest concern is privacy and security (mean = 3.97). Other major challenges include unclear plagiarism guidelines (3.64), ethical concerns (3.20), lack of funds for AI tools (3.34), and limited resources aligning research needs (3.22). Technical knowledge gaps (3.27) and lack of training or institutional support (2.84) also hinder AI adoption. The lowest mean (2.35) shows most students are aware of AI tools, meaning awareness is not the main barrier to AI adoption.

3.3.1 Potential Strategies for Library in Enhancing the Artificial Intelligence Usage among Postgraduate Students in Their Academic Research

Table 20: Potential Strategies

Questions	Mean	Std. Deviation
Do you think the library should provide free access to AI tools and software for research purposes?	4.56	.704
Having clear guidelines on AI usage and how it relates to plagiarism would help me use AI tools more confidently in my research.	4.54	.677
Online tutorials and resources about AI should be made available from library website"	4.47	.810
Workshops on AI literacy and ethical use of AI in research would address my concerns about using AI responsibly.	4.47	.740
Librarians should educate themselves on AI tools and applications to provide effective learning opportunities for students	4.46	.654
Strengthening university policies on data privacy and security for AI use in research would make me feel more comfortable in using AI tools	4.45	.732
In general, do you think the university subscription to certain AI applications such as Chatgpt, Bing Copilot, Quilbot, Consensus, Elicit, Scite.ai, Research Rabbit, ChatPDF, Scholarly etc, contribute to the IIUM postgraduate students to conduct their res	4.44	.814
Integrating AI literacy and usage skills into the research curriculum would improve my ability to use AI effectively in my research	4.44	.745
Providing free or discounted access to essential AI tools would increase my interest to use AI in my research.	4.42	.795
University partnerships with AI tool providers, offering better access or training, would improve my AI adoption in research.	4.36	.805
I think the university should encourage postgraduate students to collaborate on AI projects to build confidence and practical skills	4.36	.805
Do you think university should integrate AI in Research Methods Courses?	4.35	.828
Funding opportunities specifically for research using AI tools would encourage me to adopt AI in my research	4.34	.744
I believe that regular training programs specifically focused on AI tools for research would support my effective use of AI in research.	4.30	.720

The sixth section addresses strategies for libraries to enhance AI usage among postgraduates in research. Students strongly support free access to AI tools (4.56) and online resources or tutorials (4.47). They stress the need for AI-literate librarians (4.46) and clear guidelines on AI and plagiarism (4.54) to enhance responsible usage. There's also strong support for AI literacy to be included in research curricula (4.44) and research methods courses (4.35). Students value workshops on AI and ethics (4.47), collaborative AI projects (4.36), and partnerships with AI tool providers (4.36). Funding opportunities for AI research (4.34) and stronger data privacy policies (4.45) are also seen as key supports. Overall, students call for a comprehensive support system such as free AI access, training, ethical guidance, and funding to boost AI literacy and research efficiency.

Which AI tool(s) is commonly used for your research? You may select more than ONE options.
203 responses

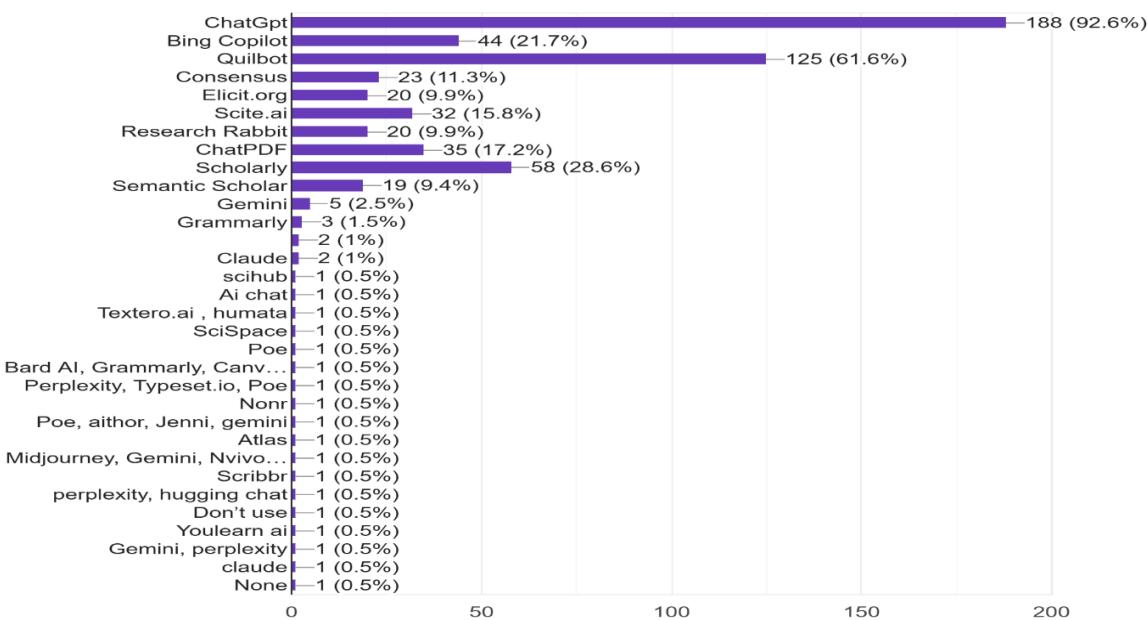


Figure 3: AI Tools Commonly used for Research

The chart shows clear preferences in AI tool usage for research. ChatGPT is the most used tool, with 92.6%, 188 of students relying on it, highlighting its versatility. 125 students prefer Quillbot with 61.6% for writing and paraphrasing support. Scholarly (28.6%), Bing Copilot (21.7%), and ChatPDF (17.2%) show moderate use for tasks like summarization and PDF analysis. Tools like Consensus (11.3%), Elicit (9.9%), Scite.ai (15.8%), Research Rabbit (9.9%), and Semantic Scholar (9.4%) have low usage, likely due to limited awareness or perceived relevance. Emerging tools such as Claude (1%), Grammarly (15%), and Gemini (25%) also show minimal adoption. The high use of ChatGPT suggests students prefer user-friendly, multi-purpose tools. Lower usage of specialized tools signals a need for awareness, training, and access. Libraries and universities should bridge this gap through workshops and free access to improve research productivity.

4 CONCLUSION

To position Malaysia among the top 20 AI-advanced nations, improving AI knowledge, adoption, and usage across sectors especially in academic research is crucial. This study aimed to assess AI awareness among postgraduate students in research and to explore the challenges and strategies for AI adoption to enhance research efficiency. The findings show that postgraduates generally have a moderate level of AI awareness in research. Data analysis confirms that knowledge, attitude, and practice towards AI significantly impact their AI awareness in research. The main challenges identified are concerns about data privacy and security, and unclear guidelines around AI use, particularly regarding plagiarism and ethical issues. The most preferred AI tool among students is ChatGPT. These challenges can be addressed through targeted workshops or library training sessions on data protection and ethical AI usage, especially with tools like ChatGPT. This research offers valuable insights for university libraries and policymakers to better support postgraduate students in AI adoption. Although this study limited to postgraduates at IIUM, the study provides a general overview of student awareness and does not explore in-depth reasons behind tool preferences or the effectiveness of existing initiatives. Future research should expand to diverse fields and institutions, and include qualitative methods to gain deeper insights into students' challenges and inform more effective strategies.

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