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Postgraduate Students' Attitude Toward Using ChatGPT in Enhancing Their Master's Thesis: A Mixed Method Study

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Abstract
Despite a growing body of research exploring Artificial Intelligence (AI) tools in educational settings, there is a significant gap in their utilization as aids in Master's theses regarding attitude, content, and structure. Therefore, this research aimed to investigate postgraduate students' attitudes toward using ChatGPT to enhance the quality of their Master's thesis and identify the aspects of thesis writing where ChatGPT is most beneficial from postgraduates' perspectives. A mixed-method design was implemented using semi-structured interviews and a questionnaire; it includes a sample of 31 postgraduate students, 21 (68 %) females and 10 (32%) males. The findings revealed that postgraduate EFL learners demonstrate a highly positive attitude toward using ChatGPT as an AI assistant tool to improve the quality of their Master's thesis. Moreover, the findings of the analysis of the interviews revealed that students found ChatGPT to be a source of information, an idea generation and analyzing tool, proofreading support, grammar correction, sentence structure improvement, thesis structure and APA style citation, and a source of instant feedback improving students' thesis writing. This study is significant because these students turned to ChatGPT as an alternative solution to bridge the gap and improve the overall quality of their thesis writing. This study highlights crucial pedagogical implications for supervisors and teachers to be aware of the potential advantages, ethical issues, and limitations of using ChatGPT to enhance thesis writing and to maintain their role in offering students support and detailed feedback.

Keywords: ChatGPT, enhancing, master's thesis, postgraduate, postgraduates' attitude, thesis structure

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Introduction

The integration of AI-driven writing tools has significantly changed the landscape of writing (Marzuki et al., 2023; Raheem et al., 2023). These tools provide ways to enhance the quality and organization of writing, giving researchers and students new opportunities to improve their writing skills. The use of AI writing tools in ESL studies has implications and promising advantages (Ajlouni et al., 2023; Marzuki et al., 2023; Moussa & Belhiah, 2024; Raheem et al., 2023). ChatGPT can be a resource for researchers during the article-writing process. ChatGPT is seen as a tool that promotes inclusive learning, assessment, and teaching methods aligning with an approach to knowledge (Strzelecki, 2023). It can provide ideas, support organization, and assist in writing. This tool goes beyond being software.

Postgraduate students often encounter challenges in developing a research proposal, primarily due to the limitations of supervision time and the one-way nature of feedback provided by supervisors (Qunayeer, 2020). Despite a growing body of research exploring the application of artificial intelligence (AI) technologies in various educational settings, there exists a significant gap in the literature concerning the attitudes of postgraduate EFL students. Specifically, there is a lack of investigation into their perspectives on utilizing ChatGPT to enhance the quality of their Master's theses. Supervisory guidance is instrumental in advancing and supporting postgraduate students (Deshpande, 2017). Notably, studies have indicated that MA students encounter challenges in thesis writing (Fitria, 2022). Building on this, additional research (Marzuki et al., 2023; Qunayeer, 2020) reveals that some postgraduate students face difficulties obtaining the necessary assistance from their supervisors. Consequently, these students turn to ChatGPT as an alternative solution to bridge the gap and improve the overall quality of their thesis writing. Thus, this research aims to explore postgraduate EFL students' attitudes toward using ChatGPT in enhancing their master's thesis. Additionally, this research seeks to determine the aspects of thesis writing where ChatGPT is most beneficial from postgraduate EFL students' perspectives. The present study aimed to address the following research questions:

RQ1.What are postgraduate EFL students' attitudes toward using ChatGPT to enhance their master's thesis?

RQ2.What are the aspects of thesis writing where ChatGPT is most beneficial from postgraduates' perspectives?

Literature review

Utilizing AI Tools for English Language Learning in Higher Education

This study draws upon the Technology Acceptance Model (TAM), an established framework that explains individuals' acceptance and adoption of new technologies (Davis, 1989). TAM provides insights into how users perceive the usefulness and ease of use associated with technologies. Previous studies on technology acceptance have extensively utilized TAM as their framework (Al Gahtani, 2014; Lee et al., 2014). ChatGPT, a software developed by OpenAI, has truly revolutionized how we communicate with machines and each other. It is an AI-powered

language model that effectively generates sounding responses to prompts or inputs using artificial intelligence techniques (Dergaa et al., 2023; Kalla & Smith, 2023).

Previous research has investigated ChatGPT's effects in various areas, such as the impact of ChatGPT on Academic Writing Self-Efficacy among postgraduates (e.g., Bouzar et al., 2023), AI and teaching staff perceptions of the research writing process (Mudawy, 2024), AI Chatbots and Essay Writing (Pitychoutis, 2024), and ChatGPT as a tool for learning postgraduate students (AbuSa'aleek & Alenizi, 2024). Other studies explore timely feedback provision in postgraduate thesis supervision (AbuSa'aleek & Alharbi, 2025). Effective supervisory feedback on supervisees' research proposals (AbuSa'aleek & Alenizi, 2024).

A study by Dizon and Gayed (2021) laid the foundation for investigations into the benefits of AI in education by examining how AI apps and tools affect students' learning abilities. Lee and Hwang's (2022) meta-analysis represented a shift in research as they explored the use of AI chatbots in English as a Second Language contexts. Taking a different approach, Kim (2019) conducted a study to investigate how AI chatbots can improve Korean undergraduate students' grammar skills. In another groundbreaking study, Han (2020) examined the impact of voice-based AI chatbots on EFL students speaking abilities. The positive results emphasized the potential of these chatbots to enhance speaking skills and further underscored their role in improving English language proficiency. In a study conducted by Junaidi (2020), an additional aspect was explored, specifically looking at how AI applications can benefit EFL learners. The results showed improvements in the speaking skills of seventh-grade students, further supporting the idea that AI has the potential to enhance language proficiency.

ChatGPT as AI Academic Writing Tool

When it comes to AI writing tools, ChatGPT stands out as a game changer, providing a range of features that greatly enhance the writing skills of students and researchers (Chen et al., 2020; Marzuki et al., 2023). While previous research has explored how AI writing programs such as Grammarly, QuillBot, Wordtune, and Jenni improve writing by detecting and correcting grammar, punctuation, and syntax errors (Marzuki et al., 2023), ChatGPT takes its impact further into the realm of research with its unique and advanced capabilities. A study by Chen et al. (2020) highlighted the potential of AI technologies, such as ChatGPT, in research and educational practices.

ChatGPT makes it easy for researchers to access information and data, streamlining their research process. They can quickly retrieve details, adding depth and richness to their work (Lee & Hwang, 2022). ChatGPT goes beyond grammar-checking programs by automating repetitive tasks like data entry and formatting. This automation frees up researchers from time-consuming activities, enabling them to focus on higher-level tasks such as analysis and interpretation (Junaidi, 2020; Kooli, 2023). ChatGPT enhances the writing process by improving accuracy and efficiency. Its sophisticated algorithms do not surface-level errors but also contribute to refining clarity and style, resulting in a polished and professional output. ChatGPT stands out as an AI writing tool

that surpasses the limitations of grammar checkers. Its distinct characteristics enable researchers to effectively navigate the intricacies of writing, offering convenience, productivity, and accuracy. This represents progress in incorporating AI tools into the domain. In addition, Woo and Guo (2023) have developed an AI tool called Text Generator to explore its impact on enhancing students' creativity in writing. Based on a rubric that assesses elaboration, flexibility, and originality, the research discovered an impact on students' creativity. Elaboration, in particular, stood out as being influenced by AI technology, highlighting its potential to foster elements in writing.

Previous studies on the attitudes of students toward using ChatGPT

Research exploring the integration of AI tools like chatbots and Plot Generator in language classrooms indicates that students recognize their usefulness in acquiring language skills. These tools provide assistance with grammar, generating ideas, and communicating in the target language (Bailey et al., 2021; Sumakul et al., 2022). For instance, a study implemented an AI tool called AI ChatGPT, which is based on the GPT 2 language model during English lessons with students. The findings revealed that it was user-friendly and effective in helping students express themselves in English (Gayed et al., 2022).

Furthermore, the incorporation of AI-powered chatbots for support has shown effects on student's academic performance, self-confidence, attitude toward learning, and motivation (Essel et al., 2022; Lee et al., 2022). Within the education field, chatbots have received feedback from students who appreciate their promptness, interactive nature, and confidential assistance in learning (Chen et al., 2023). Additionally, students from disciplines have acknowledged the impact of AI on their academic endeavours and future careers. They are interested in integrating AI into their learning experiences and future professional practice (Bisdas et al., 2021; Gong et al., 2019). Recognizing its importance, students perceive the integration of AI as a component within university curricula (Bisdas et al., 2021; Gong et al., 2019).

However, it is important to note that students' perspectives on AI vary based on their level of understanding. While Dahmash et al.'s (2020) study suggests that students with comprehension of AI tend to experience levels of anxiety, Jeffreys's (2020) research reveals conflicting beliefs. Many students who have an understanding of AI and are optimistic about its benefits have also expressed concerns about how it will affect job opportunities for humans. The decision to pursue a career in radiology, for example, is influenced by students considering the impact of AI, as discussed in studies by Dahmash et al. (2020). When it comes to concerns and drawbacks related to the use of AI, students have pointed out issues such as interaction, potential incorrect data, lack of emotional connection, ethical issues, and potential impacts on job opportunities and practices. These concerns have been discussed in studies by (Bisdas et al., 2021; Chen et al., 2023; Essel et al., 2022; Gong et al., 2019).

Methodology

Research Design

The present study utilized a mixed-method research design to collect data that contributed to our comprehension and provided deep insights into postgraduate students' attitudes toward using ChatGPT to enhance their Master's thesis in the Applied Linguistics program at Majmaah University.

Participants

The population for this study comprised all Master of Arts postgraduate students presently registered in the Master of Applied Linguistics program at Majmaah University, Kingdom of Saudi Arabia. Therefore, this research includes a sample of 31 postgraduate students, 21 (68 %) females and 10 (32%) males. These 31 students represent the final-year group actively engaged in writing their theses. The deliberate selection of participants at this stage allows a close examination of their experiences using ChatGPT during this phase of thesis composition.

Measurement scale, Semi-structured Interview, Data Analysis

This study employed a questionnaire as a research scale. The questionnaire is adopted from Strzelecki's (2023), which focused on understanding students' acceptance and use of ChatGPT. It consists of seven sections. These sections cover aspects such as "Social Influence," "Hedonic Motivation," "Habit," and "Behavioural Intention." It also explores users' beliefs regarding the benefits, ease of use, and availability of ChatGPT through sections like "Performance Expectancy," "Effort Expectancy," and " Facilitating Condition." Each section has four items that are rated on a five-point Likert scale ranging from 5 "strongly agree" to 1 "strongly disagree." The average Cronbach-alpha of all the questionnaire sub-scales was found to be $\alpha = 0.886$, indicating that the questionnaire is a valid and reliable measure to collect responses from the study sample.

The data was collected via administered e-questionnaires from 31 postgraduate students in the applied linguistics program. The questionnaire included items to which the participants provided their responses. The e-questionnaire was distributed to the postgraduate students via department WhatsApp groups.

A semi-structured interview was utilized as another tool in this study to incorporate the findings obtained from the survey. The participant-centered approach of these interviews allows for personalized responses, enabling a profound exploration of participants' perspectives and experiences. This method aims to gather data that captures various viewpoints, uncovering variations and common themes among participants. This study adhered to the ethical guidelines established by Majmaah University. The postgraduate students were informed about the study's objective. Additionally, participants were informed that they had the right to withdraw without facing any consequences. The questionnaire responses were analyzed using SPSS Statistical Data Software to get Descriptive statistics, such as percentage, mean, and standard deviation. The interpretation of the findings was based on the following mean distribution. The means were categorized as High (3.67–5), moderate (2.34–3.66), and low (1–2.33). Simultaneously, the

interview data followed the thematic analysis approach; the researchers labeled data to identify codes, and then the data was organized into themes.

Findings

This section illustrates the quantitative findings about the overall attitudes of postgraduate EFL students toward using ChatGPT to enhance their Master's thesis through an analysis of seven questionnaire subscales: effort expectancy, hedonic motivation, behavioral intention, facilitating conditions, performance expectancy, habit, and social influence. The second section contains the qualitative analysis of the semi-structured interviews to answer the second research question related to the aspects of thesis writing where ChatGPT is most beneficial from postgraduates' perspectives.

The overall attitudes of postgraduate EFL students toward using ChatGPT to enhance their Master's thesis

Table one shows the quantitative data findings about the overall mean score and standard deviation for postgraduates' attitudes toward using ChatGPT to enhance their Master's thesis. The findings indicate that the postgraduate students had a positive attitude toward using ChatGPT as an AI writing assistant tool to improve the quality of their thesis (M 4.14, SD 0.475). This suggests that, on average, postgraduate EFL students tend to agree or have positive attitudes toward using ChatGPT as a tool in their writing journey and to enhance their Master's thesis. Furthermore, Table 1 presents the quantitative data findings about the overall attitudes of postgraduate EFL students toward using ChatGPT to enhance their Master's thesis through an analysis of seven questionnaire subscales: seven questionnaire subscales: effort expectancy, hedonic motivation, behavioral intention, facilitating conditions, performance expectancy, habit, and social influence.

Table 1. *Descriptive statistics of questionnaire subscales*

Rank	Subscales	Mean	Standard Deviation	Percentage %	Level
1.	Effort expectancy	4.38	0.53	88%	High
2.	Hedonic motivation	4.33	0.57	87%	High
3.	Behavioral intention	4.28	0.66	86%	High
4.	Facilitating conditions	4.28	0.60	86%	High
5.	Performance expectancy	4.24	0.56	85%	High
6.	Habit	3.84	0.86	77%	High
7.	Social influence	3.63	1.03	73%	Moderate
Total		4.14	0.475	83%	High

The earlier table shows that the overall postgraduates' attitudes gained a high score on all subscales. These mean scores ranged between (M 4.38 and M 3.84), except the social influence mean was moderate (M 3.63, SD 1.03). Table two shows the average score, mean, and standard deviation of the effort expectancy subscale of attitudes postgraduates' perspectives toward using ChatGPT to enhance their Master's thesis. Overall, postgraduates' attitudes gained a high score (M 4.38, SD 0.53); postgraduates' attitudes were reported as being highly positive toward using ChatGPT to enhance the quality of their Master's thesis.

Further, the average score of responses to the four items regarding the effort expectancy subscale attitudes ranged from (4.59 to 4.13). This finding reveals that participants generally find ChatGPT easy to use and understand. Similarly, postgraduate students perceive ChatGPT as simple and user-friendly. Overall, the findings reflect a positive perception of ChatGPT's ease of use and accessibility among postgraduate students.

Table 2. *Mean and SD of postgraduates' responses on the effort expectancy subscale.*

	Percentage of Rating					M	SD	R
Items	S/D	D	N	A	S/A			
"Learning how to use ChatGPT is easy for me."	-	-	12.50	34.38	53.13	4.41	0.712	2
"My interaction with ChatGPT is clear and understandable."	-	-	6.25	28.13	65.63	4.59	0.615	1
"I find ChatGPT easy to use."	-	3.13	12.50	25.00	59.38	4.41	0.837	3
"It is easy for me to become skillful at using ChatGPT."	-	3.13	18.75	40.63	37.50	4.13	0.833	4
Total						4.38	0.53	

Table three shows the average score, mean, and standard deviation of the hedonic motivation subscale of attitudes postgraduates' perspectives toward using ChatGPT to enhance their Master's thesis. Overall, postgraduates' attitudes gained a high score (M 4.33, SD 0.57), and participants generally found positive hedonic motivation associated with using ChatGPT. Further, the average score of responses to the three items regarding the hedonic motivation subscale attitudes ranged from 4.56 to 4.03. This finding reveals that participants generally find ChatGPT fun, enjoyable, and entertaining to use.

Table 3. *Mean and SD of postgraduates' responses on the Hedonic Motivation subscale.*

	Percentage of Rating					M	SD	R
Items	S/D	D	N	A	S/A			
"Using Chat GPT is fun."	-	-	6.25	31.25	62.50	4.56	0.619	1
"Using ChatGPT is enjoyable."	-	-	3.13	53.13	43.75	4.41	0.560	2
"Using ChatGPT is very entertaining."	-	6.25	25.00	28.13	40.63	4.03	0.967	3
Total						4.33	0.57	

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Table four displays the average score, mean, and standard deviation of the behavioral intentions subscale of attitudes toward using ChatGPT to enhance their Master's thesis. Overall, postgraduates' attitudes gained a high score (M 4.28, SD 0.66); postgraduates' attitudes were reported as having strong behavioral intentions to continue using ChatGPT in the future.

Further, the average score of responses to the three items regarding the behavioral intentions subscale attitudes ranged from (4.44 to 4.06). This finding reveals that participants generally commit to using ChatGPT for their studies and perceive it as a valuable tool they intend to continue utilizing. Similarly, postgraduate students' Responses indicate high levels of agreement that they will continue using ChatGPT in the future. Overall, the findings reflect a firm intention among participants to persistently use ChatGPT as a valuable resource for their academic endeavors.

Table 4. *Mean and SD of postgraduates' responses on the Behavioral Intention subscale.*

	Percentage of Rating					M	SD	R
Items	S/D	D	N	A	S/A			
"I intend to continue using ChatGPT in the future."	-	-	12.50	40.63	46.88	4.34	0.701	2
"I will always try to use ChatGPT in my studies."	-	-	18.75	18.75	62.50	4.44	0.801	1
"I plan to continue to use ChatGPT frequently."	-	6.25	18.75	37.50	37.50	4.06	0.914	3
Total						4.28	0.66	

Table five reveals the average score, mean, and standard deviation of the facilitative conditions subscale of attitudes toward using ChatGPT to enhance their Master's thesis. Overall, postgraduates' attitudes gained a high score (M 4.28, SD 0.60); postgraduates' attitudes were reported as having generally perceived facilitative conditions for using ChatGPT positively. They report that the resources necessary for using ChatGPT are available, and they feel knowledgeable enough to use it effectively. Additionally, postgraduate students find that other technology tools they use are compatible with ChatGPT, which enhances their overall experience.

Moreover, postgraduate students expressed confidence in their ability to seek assistance from others when facing difficulties with ChatGPT. Further, the average score of responses to the four items regarding the facilitative conditions' subscale attitudes ranged from (4.41 to 4.19). This finding reveals that the mean for these items suggests a high agreement level among postgraduate students, with standard deviations indicating relatively low response variability.

Table 5. *Mean and SD of postgraduates' responses on the Facilitating conditions subscale.*

	Percentage of Rating					M	SD	R
Items	S/D	D	N	A	S/A			
"I have the resources necessary to use Chat."	-	-	18.75	43.75	37.50	4.19	0.738	4
"I have the knowledge necessary to use ChatGPT."	-	3.13	9.38	31.25	56.25	4.41	0.798	1

"ChatGPT is compatible with technologies I use."	-	3.13	12.50	37.50	43.75	4.26	0.815	3
"I can get help from others when I have difficulties using ChatGPT."		3.13	12.50	28.13	53.13	4.35	0.839	2
Total						4.28	0.60	

Table six demonstrates the average score, mean, and standard deviation of the performance expectancy subscale of attitudes toward using ChatGPT to enhance their Master's thesis. Overall, postgraduates' attitudes gained a high score (M 4.24, SD 0.56); postgraduates' attitudes were reported as having generally perceived performance expectancy for using ChatGPT positively. They report that ChatGPT is a valuable tool for thesis writing. They agree that it increases productivity, expedites the writing process, and enhances their chances of achieving important goals. Further, the average score of responses to the four items regarding the facilitative condition's subscale attitudes ranged from 4.50 to 3.97. This finding reveals that the mean for these items suggests a high agreement level among postgraduate students. Overall, postgraduate students perceive ChatGPT as beneficial to their thesis writing endeavors.

Table 6. *Mean and SD of postgraduates' responses on the performance expectancy subscale.*

	Percentage of Rating					M	SD	R
Items	S/D	D	N	A	S/A			
"I believe that ChatGPT is useful in my studies."	-	-	9.38	31.25	59.38	4.50	0.67	1
"Using ChatGPT increases your chances of achieving important things in your studies."	3.13	9.38	6.25	50.00	31.25	3.97	1.03	4
"Using ChatGPT helps you get tasks and projects done faster in your studies."	-	3.13	18.75	34.38	43.75	4.19	0.86	3
"Using ChatGPT increases your productivity in your studies."	-	-	9.38	50.00	40.63	4.31	0.64	2
Total						4.24	0.56	

Table seven demonstrates the average score, mean, and standard deviation of the habit subscale of attitudes toward using ChatGPT to enhance their Master's thesis. Overall, postgraduates' attitudes gained a high score (M 3.84, SD 0.86); postgraduates' attitudes had varying levels of habitual engagement with ChatGPT. Some respondents report that using ChatGPT has become a habit for them, while others indicate that they have become addicted to its use. Additionally, some participants express that they feel it's essential to use ChatGPT, while others think using it has become a natural part of their routine. Further, the average score of responses to the four items regarding the habit subscale attitudes ranged from 4.03 to 3.59. This finding reveals that the mean for these items suggests a high agreement level among postgraduate students. Overall, postgraduate students perceive that using ChatGPT has become habitual, with varying degrees of perceived importance and naturalness.

Table 7. *Mean and SD of postgraduates' responses on the Habit subscale.*

	Percentage of Rating					M	SD	R
Items	S/D	D	N	A	S/A			
"The use of ChatGPT has become a habit for me."		12.50	18.75	21.88	46.88	4.03	1.092	1
"I am addicted to using ChatGPT."	3.13	15.63	21.88	37.50	21.88	3.59	1.103	4
"I must use ChatGPT."		25.00	9.38	31.25	34.38	3.75	1.191	3
"Using ChatGPT has become natural for me."		3.13	18.75	56.25	21.88	3.97	0.740	2
Total						3.84	0.86	

Table eight presents the average score, mean, and standard deviation of the Social Influence subscale of attitudes toward using ChatGPT to enhance their Master's thesis. Overall, postgraduates' attitudes gained a moderate score (M 3.63, SD 1.03); postgraduates' attitudes had varying levels of external encouragement of social influence to use ChatGPT. While some postgraduate students report that the people who matter to them believe they should use ChatGPT, others indicate receiving encouragement from individuals who influence their behavior. However, opinions are more divided regarding whether people whose opinions they deeply respect prefer that they use ChatGPT. Further, the average score of responses to the four items regarding the Social Influence subscale attitudes ranged from (3.75 to 3.53). This finding reveals that the mean for these items suggests a moderate level of agreement across the items, with some variability in responses, as indicated by the standard deviations. Overall, postgraduate students perceive that external social influences influence their willingness to use ChatGPT, albeit to differing extents depending on the source of influence.

Table 8. *Mean and SD of postgraduates' responses on the Social Influence subscale.*

	Percentage of Rating					M	SD	R
Items	S/D	D	N	A	S/A			
"People who are important to me think I should use ChatGPT."	-	15.63	25.00	28.13	31.25	3.75	1.078	1
"People who influence my behavior believe that I should use ChatGPT."	3.13	21.88	12.50	31.25	28.13	3.61	1.230	2
"People whose opinions I value prefer me to use ChatGPT."	-	25.00	28.13	15.63	31.25	3.53	1.191	3
Total						3.63	1.03	

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Findings of the qualitative analysis of the interview

The following section provides an analysis of the semi-structured interview following a thematic analysis approach to identify the aspects of thesis writing where ChatGPT is most beneficial from postgraduates' perspectives. The analysis led to the emergence of five themes: Usage Frequency of ChatGPT in the thesis writing. Second: Source of information, idea generation, and analyzing tool. Third: Language use, proofreading support, and coherence enhancement. Fourth: Impact on thesis structure and APA style citation. Fifth: Source of Instant Feedback**.**

Usage Frequency of ChatGPT in the thesis writing

The first theme that emerged from the interviews and was commonly shared among most participants is their usage patterns and how frequently they utilize ChatGPT in their thesis writing process. Most participants shared that they use it often throughout all of their thesis writing stages, and they have expressed that using ChatGPT is an essential step in their process. Here is two quotations reinforce this stance. "According to (S1), she mentioned: *"I use it very frequently because it provides many benefits to me.."* while another (S2) stated, *"I use it almost every day, I often ask for examples and explanations of the main points in any paper…".*

Notably, it is crucial to recognize that their patterns of usage vary, contingent upon their specific requirements for assistance. Further, (S1) elaborated on this point, stating: *"I use it from time to time, but at the beginning, I use it much more. I would say in the maybe initial stages, I could use it much more than in other stages.*

While it is evident that participants vary when it comes to the frequency of using ChatGPT, they all have expressed and agreed on the importance of ChatGPT in overcoming challenges in their writing process. Some participants rely on ChatGPT to kickstart their writing or generate ideas during the initial stages, while others integrate it into every stage of their writing process on a daily basis. Consequently, this high frequency of usage highlighted the significance and benefits of utilizing ChatGPT as an aid for their thesis writing.

Source of information, idea generation and analyzing tool

The second theme that was merged from the interview is the impact of ChatGPT on enhancing the content of the postgraduate's thesis writings. The participants explained their experience with ChatGPT and how it helped them as source of information, idea generation and analyzing tool. In addition, the participants highlighted the features that they found to be most beneficial in helping them overcome the challenges they encountered. A male student (S4) stated that: *"I could actually ask the bot itself, what can I actually talk about more? Can you provide me with some other studies that actually can help me to, you know…enhance my thinking abilities?"*

Many students struggle to generate ideas and explore alternative perspectives. Another student (S5) supported and elaborated on this point: *" I used ChatGPT to help me organize my*

ideas for the thesis and I also used it to assist me in my data analysis like what kind of analysis would be perfect for my thesis and my data and so on."

The input-output feature of ChatGPT, as he elaborated when he mentioned, *" like what kind of analysis would be perfect for my thesis,"* provides great guidance. Another student (S6) also shared his experience regarding this point, stating, *"It also provided me with all the research designs that are suitable for my study."* He further explained, *"Also, I can upload papers and ask to summarize the main points or ask to provide me with the methodology used or any kind of information that I needed, this feature has helped me save a lot of time."*

Language use, proofreading support, and coherence enhancement

Furthermore, students explained how ChatGPT helped them enhance their academic writing by providing them with proofreading support, grammar correction, and sentence structure improvement to enhance clarity within a text and improve sentence flow for a logical connection between ideas, According to (S4) *"So I think grammar is the most important thing that ChatGPT has helped me with because sometimes if I have to write academically, it would be kind of difficult to be correct 100% grammatically"*. Moreover, (S6) explained how ChatGPT assists him with language refinement by providing alternative word choices, suitable expressions, and more sophisticated vocabulary that enhances the overall quality of academic writing: *"One challenge I faced is writing academically, most of my vocabulary is words that are informal or just not the most appropriate word to use that can deliver the meaning effectively, so I asked ChatGPT to provide me with more formal words that best suit the sentence to make it clearer."*

Impact on thesis structure and APA style citation

As previously discussed, they found the feature of ChatGPT providing them with related studies to their topic to be beneficial; they specifically expressed how this feature helped them develop specific sections in their thesis. A female (S4) stated that, *"ChatGPT helped me a lot in framing the structure of my literature review suggested me the proposed subheadings and the theories related to my theoretical framework of my topic."* Further, (S1) stated that *"ChatGPT suggest me the suitable research methodology of my research I used to ask the bot questions related to the research design and the suitable procedures for data collection and the structure of the chapter three methodology of the study."*

Another feature that he found most useful is how ChatGPT helped him correctly cite related studies by offering guidance on properly formatting citations for different types of resources. Most students expressed how challenging it could be to precisely follow the correct APA format due to the complexity and detailed guidelines. According to (S2): *"Umm, sometimes when you have so many tasks to complete, you forget a few details in following APA style, so for example, I ask ChatGPT to provide me with an example of an accurate APA Style citation that I can follow."*

Source of instant feedback

One of the features of ChatGPT is providing instant feedback to students by correcting certain aspects of the text and providing more accurate suggestions and highlights areas that need to be improved; students have shared their experience regarding ChatGPT's feedback and to what extent they rely on it to enhance their academic writing. According to (S3): *"I think the feedback ChatGPT provided to me has helped me a lot in various ways, but I don't depend on it entirely as I don't believe that the feedback is 100% accurate."* Another student (S2) shared: *"The feedback I received from ChatGPT. I would say I'm satisfied to some point, it is very helpful as it provides instant feedback but definitely I cannot rely on ChatGPT fully."*

Their experience with ChatGPT's feedback has been viewed as beneficial, and they acknowledged its benefits in various ways. However, they expressed how cautious they are about relying entirely on ChatGPT's feedback. They believe it is not 100% accurate and should be reviewed and evaluated as they are aware of its limitations.

According to (S5): *"I think you need to be aware of how dangerous it could be using ChatGPT's feedback and suggesting, you don't need to depend on it fully because it's not going to be me who ends up writing the paper so I need to be careful in using it."*

This perspective can be viewed as a positive aspect, as they acknowledge their responsibility and demonstrate a commitment to maintaining the integrity of their own writing rather than relying on the AI model; this encourages independence and personal growth and development of writing skills, which is essential for academic success. These shared experiences highlighted the importance of human feedback to ensure the accuracy of their thesis, which indicates that a balance between ChatGPT's feedback and supervisory feedback may yield the most favorable results in improving students' thesis writing.

Discussion

This study aimed to examine the attitudes of postgraduates regarding utilizing ChatGPT as a tool to enhance the quality of their master's thesis, focusing on understanding how postgraduates perceive the role of ChatGPT as an assistant in their thesis writing process. Additionally, this study aims to identify the specific aspects of thesis writing where ChatGPT is most beneficial from a postgraduate perspective. The following section provides a comprehensive discussion of the study's findings.

The study's findings revealed that postgraduates exhibit positive attitudes towards using ChatGPT to enhance the quality of their thesis. Findings indicated that postgraduates strongly believe that ChatGPT is a valuable AI tool for improving several aspects of their thesis. While ChatGPT holds various features that may make it difficult to use, findings revealed that postgraduates did not find any difficulties using ChatGPT; in contrast, ChatGPT had been perceived as an easy and user-friendly tool, making it a fun experience, according to the postgraduates' viewpoint. Moreover, while the findings revealed a varying degree of the effect of social encouragement, suggesting that an external influence may play a role in their willingness to use ChatGPT, postgraduates expressed a high level of agreement towards the intention to proceed

using ChatGPT for future studies, demonstrating their satisfaction and emphasizing its significance and value to enhance the quality of their thesis writing.

These findings aligned with previous studies (Essel et al., 2022; Lee et al., 2022; Chen et al., 2023; Chen et al., 2020). For example, incorporating AI-powered chatbots for support has shown effects on student's academic performance, self-confidence, attitude toward learning, and motivation (Essel et al., 2022; Lee et al., 2022). Chatbots have received feedback from students who appreciate their promptness, interactive nature, and confidential assistance in learning (Chen et al., 2023). Chen et al. (2020) highlighted that the distinctive features of ChatGPT go beyond grammar correction; they offer a suite of functionalities that revolutionize the writing process. It allows researchers to efficiently verify the accuracy of information, ensuring the integrity of the content being produced (Kooli, 2023). They can quickly retrieve details, adding depth and richness to their work (Lee & Hwang, 2022). ChatGPT goes beyond grammar-checking programs by freeing researchers from time-consuming activities, enabling them to focus on higher-level tasks such as analysis and interpretation (Junaidi, 2020; Kooli, 2023).

The findings of this study highlight ChatGPT's significant role in enhancing the literature review aspect of thesis writing; it has been found that utilizing ChatGPT provided excellent guidance in assessing students finding relevant studies, identifying key sources, summarizing the main points, and improving citation accuracy. These findings support by previous findings.

These findings also align with Marzuki et al. (2023), who highlighted AI Chatbot's advanced capabilities to improve academic writing by identifying and correcting grammar, punctuation, and syntax errors. Further, Kalla and Smith (2023) Have also spotlighted the significant role of ChatGPT for researchers and scholars in various fields, as it provides several benefits to simplify tasks such as analyzing and interpreting a wide range of data. The findings of this study highlight ChatGPT's significant role in enhancing the literature review aspect of thesis writing; it has been found that utilizing ChatGPT provided excellent guidance in assessing students finding relevant studies, identifying key sources, summarizing the main points, and improving citation accuracy. These support previous findings (Bailey et al., 2021; Marzuki et al., 2023; Sumakul et al., 2022).

Students from different disciplines have acknowledged the impact of AI on their academic endeavors and future careers. They are interested in integrating AI into their learning experiences and future professional practice (Bisdas et al., 2021; Gong et al.).

Concerns and drawbacks related to the use of AI include potentially incorrect data, lack of emotional connection, ethical issues, and potential impacts on job opportunities and practices. These concerns have been discussed in studies by (Bisdas et al., 2021; Chen et al., 2023; Essel et al., 2022; Gong et al., 2019).

Conclusion

It's crucial to understand that although ChatGPT can offer assistance in writing, it should be seen as something other than a substitute for human guidance and feedback. Teachers need to

maintain their role in offering students direction, support, and detailed feedback for an enriching learning journey. Supervisors should consider the potential advantages, ethical issues, and limitations of using ChatGPT to enhance thesis writing. For instance, supervisors should be aware that some students may overreliance on ChatGPT as an AI writing assistant tool, which hinders their creativity and critical thinking, including fake citations; therefore, the supervisors should pay attention to the significance of human feedback, encourage the postgraduate students to ask for advice and feedback, from their supervisors, counselors, and classmates rather than depending on ChatGPT.

Every academic research inherently has several significant limitations that need to be considered. First, this study is centered explicitly around using ChatGPT as an AI writing assistant tool. Therefore, more research is needed to determine the efficacy of other AI writing assistant tools that help postgraduate students enhance their master's thesis. Second, this study's limitation is the small sample size of postgraduate students; future research should include a more representative sample size to enhance the generalizability of the findings. Further investigation and replication studies are needed to use a similar research design and methodology from other scientific departments or different contexts to validate this study's findings.

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