

Article

Graduate Students' Perception and Use of ChatGPT as a Learning Tool to Develop Writing Skills

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Abstract

Since its public release in November 2022, OpenAI's ChatGPT has garnered significant global attention, although opinions on its use in education remain divided. Proponents highlight its potential to support diverse learning needs, and to function as a writing tool and writing assistant. Conversely, critics argue that over-reliance on AI could diminish critical thinking skills and increase instances of plagiarism. As a result, some higher education institutions worldwide have banned or restricted AI tools like ChatGPT due to concerns about plagiarism. However, since 2023, universities in Singapore have allowed students to use AI tools for their assignments provided they properly acknowledge the use of AI generated content. Despite the growing integration of AI in education, there is a lack of research focusing on graduate students' use of AI tools for their assignments or projects. This study examines graduate students' awareness, usage, opinions, and the impact of using ChatGPT as a learning tool. The questionnaire study consisted of 25 five-point Likert scale items and 8 four-point Likert scale items. The findings indicate that students were aware of ChatGPT's capabilities and limitations, especially regarding the accuracy of information it generates. Generally, students had a positive opinion of ChatGPT, valuing its convenience and not perceiving its use as a violation of academic integrity. They recognised the benefits of using ChatGPT for grammar correction, paraphrasing, summarising texts, gathering information, generating content for research assignments, and data analysis.

Keywords

AI-assisted education, ChatGPT, academic writing and communication, graduate students, higher education

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1 Introduction

The development of generative artificial intelligence (AI) technologies and their use by higher education students have elicited both alarm and optimism among education professionals. In particular, the large language model ChatGPT, developed by OpenAI, has received prominent attention for its ability to predict and approximate human-like text, and consequently to generate student essays in response to highly specific prompts. Apprehension over this latter application is certainly warranted, with critics primarily concerned about the model's implications for plagiarism and academic dishonesty. Indeed, a recent study by Scarfe et al. (2024) found that ChatGPT-written texts submitted to a range of undergraduate examinations not only went almost entirely undetected by markers but also typically received higher grades than student-written submissions. However, the tool's uses extend beyond simply producing essays from scratch. Proponents argue that ChatGPT has the ability to function as a writing tool and writing assistant, thereby potentially reducing both student and teacher workloads (Gamage et al., 2023; Imran & Almusharraf, 2023).

This division of opinion is also reflected on the administrative level, with international universities taking varied approaches to the restriction of ChatGPT. Both Sciences Po Paris and RV University in Bangalore made headlines in January 2023 by banning student use of the model to preserve academic integrity (De Clercq & Kao, 2023; Thadhagath, 2023). While outright bans are limited to extreme cases, a recent survey of higher education stakeholders showed that most universities still lack clear policies over the acceptable use of generative AI (Robert, 2024). In contrast, universities in Singapore have embraced the use of AI in higher education, allowing students to use AI tools to complete assignments within specific guidelines. All autonomous universities in Singapore adopt a similar stance in regulating students' use of AI (Rakshika & Lee, 2024). Specifically, at the university where we teach, if an AI tool was used to complete an assignment, students must include an appendix at the end of the assignment to indicate which AI tools were used, the specific parts of the assignment process where the tools were used, the prompts that were used to generate outputs, and how students added value to the outputs.

While the debate over ChatGPT's use and academic integrity continues and universities are developing their own acceptable-use policies, it is crucial to explore the tool's potential for educational enhancement rather than solely as a shortcut for completing assignments. The experience of graduate students is particularly relevant here as their specialised research projects mean that their use of ChatGPT may rely less on content generation and more on assisting with developing English writing skills to effectively convey their expertise. This is especially true of students whose previous medium of instruction was not English. In academic environments like Singapore that are optimistic towards ChatGPT, we should seek to understand the actual experiences of such students, for whom proficiency in academic writing is essential. Although it may play a valuable role as a learning tool in these cases, there has been little attention given to the actual perceptions and uses of ChatGPT by graduate students. If the use of generative AI technologies continues to be encouraged, it is essential to understand current student perspectives and practices. These insights should guide the development of materials and assessments aimed at effectively integrating ChatGPT, particularly in graduate academic writing and communication courses.

This study examined how PhD students at a university in Singapore perceive and use ChatGPT for their coursework assignments and research projects. By conducting and analysing a questionnaire survey, the research aimed to uncover students' awareness, opinions, and actual usage of ChatGPT, including as a writing aid. This study seeks to contribute to the existing body of literature on generative AI in higher education by providing insights into the extent to which ChatGPT is currently being utilised by graduate students as a resource for developing English writing skills. The findings of this research are expected to help inform educational practices and policy decisions amidst continued debates over the role of generative AI in higher education.

2 Literature Review

2.1 Potential and challenges of ChatGPT in English Language Teaching

ChatGPT has significantly impacted educational practices in higher education, offering both opportunities and challenges for English Language (EL) instructors and learners. In a systematic review of research on the impact of ChatGPT on EL teaching, learning and assessment, Meniado (2023) identified numerous studies conducted by researchers teaching in universities. The studies revealed how ChatGPT not only facilitates and enhances EL learning aligned with established second language (L2) learning theories and principles, but also supports EL instructors in language teaching and assessment. For example, ChatGPT has been found to be a valuable writing tool for students in producing essay outlines or full-length texts, generating ideas, refining writing and even providing corrective feedback on texts (Barrot, 2023; Chan & Hu, 2023; Kohnke et al., 2023). For instructors, ChatGPT has proven to be useful in generating lesson ideas and plans, designing curricula and materials, and giving feedback to student writing (Bonner et al., 2023; Jeon & Lee, 2023). In another similar systematic review of research on the use of ChatGPT focusing on its use for English as a Foreign Language (EFL) writing, Teng (2024) also highlighted the various applications of ChatGPT. The studies surveyed in the review showed how ChatGPT could be used to enhance teaching efficacy and students' writing skills (Ghafouri et al., 2024), and provide valuable feedback on students' writing (Guo & Wang, 2024; Yan, 2023).

Despite its great potential, there have been increasing concerns about the challenges involved in the use of ChatGPT in education. Such concerns mainly revolve around copyright issues, over-reliance on the tool (Barrot, 2023; Warschauer et al., 2023), academic dishonesty where students present ChatGPT-generated writing as their own (Benuyenah, 2023; Rasul et al., 2023), factual inaccuracy or fake information in the generated content (Kohnke et al., 2023; Lo, 2023), and inequality of access (Fodouop Kouam & Muchowe, 2024; Kasneci et al., 2023). Nevertheless, despite its limitations and ongoing concerns, many educators remain keen to leverage ChatGPT's affordances and capabilities for use in educational settings.

2.2 Students' perceptions of ChatGPT use in educational settings

In addition to educators understanding the potential of ChatGPT, many scholars recognise that it is important to determine students' perceptions and experience with the tool. As observed by Shoufan (2023), students' perceptions can have a significant impact on their motivation, engagement, and academic achievement. In his study of computer engineering students' perception of their learning experience with ChatGPT, he found that the students perceived ChatGPT as a helpful and efficient tool for learning and professional life. They expressed high levels of interest, admiration and motivation towards ChatGPT, which he argues are highly relevant for learning. In another study involving both undergraduate and postgraduate information and communication technology (ICT) students in Australia, the students indicated a positive perception of ChatGPT as a useful and enjoyable learning resource (Elkhodr et al., 2023). They appreciated the user-friendly interface and prompt responses, although some observed that the responses were not always accurate while others expressed concerns about over-reliance and its potential impact on their critical thinking.

Likewise, Limna et al. (2023) reported positive perception of using ChatGPT by university students and educators in Thailand. Students particularly liked its ability to provide immediate feedback and answer questions, enhancing their confidence in learning. In a similar perception study by Chan and Hu (2023) in a Hong Kong university, it was revealed that students not only have a positive attitude towards using generative AI technologies, such as ChatGPT, but also have a keen understanding of their capabilities and limitations. They conveyed their enthusiasm and high expectations of what the technologies could do to help them. At the same time, they expressed their reservations about issues

of ethics, accuracy, and the danger of over-reliance on generative AI, which may hinder their critical thinking and creativity.

Despite similar findings of such studies, it is interesting to examine the differences in perceptions and experience of ChatGPT use for students in different educational settings. An interesting observation highlighted in the research on ICT students in Australia (Elkhodr et al., 2023) is that the postgraduate students found ChatGPT to be “somewhat less helpful and enjoyable” than the undergraduate students did. The authors hypothesised that this difference in perception could be attributed to a higher level of prior knowledge or technical expertise among the postgraduate students, which led them to believe that they needed less help from ChatGPT.

Another instance where slightly different findings were reported in different settings is a study on graduate students’ perceptions and use of generative AI in Zimbabwean universities (Fodouop Kouam & Muchowe, 2024). Although the study revealed that the students viewed generative AI favourably because it made learning easier, especially for EL-related tasks, only a few of them had been using ChatGPT at the time of the study because the paid version, GPT-4, was too expensive for graduate students in Zimbabwe, and the free version, ChatGPT-3.5, did not have up-to-date information on Zimbabwean issues, and was prone to hallucinations. The authors noted that this contrasts with Wu and Yu’s (2023) finding that ChatGPT is the preferred AI platform for learning as it has up-to-date information essential to students. They presumed that the students in these studies probably used the paid version GPT-4, since their studies were conducted in developed countries. From this comparison, it is noted that students’ perceptions and usage may depend to some extent on the version of ChatGPT in question.

2.3 Factors affecting students’ perceptions and use of ChatGPT

Other than the level of one’s prior knowledge and financial circumstances, students’ use of ChatGPT may depend on other factors. In our university in Singapore, Phan and Teng (2024) conducted a research study to find out undergraduates’ perception and use of ChatGPT as a writing tool. They found that most of the students appeared to have a positive perception of ChatGPT, while being aware of its limitations, particularly in terms of its accuracy. Many of them used ChatGPT in their assignments as well as for improving their language and expanding their knowledge. However, their use may depend on the type and complexity of an assignment. A minority did not use it due to its inaccuracy and inefficacy; also, they valued the learning process without relying on ChatGPT. A few students were also aware of the danger of over-reliance on it.

Another factor that could affect the use of ChatGPT is the level of AI literacy of the students, defined broadly as “a set of competencies that enables individuals to critically evaluate AI technologies; communicate and collaborate effectively with AI; and use AI as a tool online, at home, and in the workplace” (Long & Magerto, 2020, p.2). In their study, Singh et al. (2023) found that more than half students had not used ChatGPT for academic purposes, possibly because they did not know how. Therefore, they argue that students need to be taught how to positively exploit ChatGPT to prompt better learning.

Singh et al also found that many students did not use ChatGPT for their academic work because they were unsure of whether they were flouting any rules of academic honesty in using it. Likewise, Kanabar (2023) found that almost a quarter of the students in his study perceived the use of ChatGPT as unethical. He concludes that not only should instructors “show students how to use AI tools and technology” (p. 396), but they must also address students’ concern about ethical use of ChatGPT and establish clear guidelines. As Teng (2024) posits, AI literacy involves more than having the knowledge and skills to use AI; it includes the knowledge and skills to “safely and ethically participate in an increasingly digital world” (p. 37). It is therefore important for instructors to determine students’ AI literacy so as to appropriately develop guidelines and best practices for the ethical use of AI in academic work.

2.4 Rationale and research questions

In this section, we have reviewed current research on the potential and challenges of ChatGPT in language teaching, perceptions of ChatGPT, and some factors that influence students' use of ChatGPT. Although much has been studied and written about students' perceptions and use of ChatGPT in higher education, and there is considerable similarity among the findings, there is inadequate research on graduate students from different disciplines who use AI as a tool to aid them in completing their coursework assignments. The impetus for this study emerged from the fact that three of the four investigators teach a graduate academic communication course. Also, for some two-thirds of the graduate students who were enrolled in this course, English was not their medium of instruction in their undergraduate education (refer to Table 2). Therefore, the findings of this study will provide valuable insights in developing materials and assessments aimed at fostering the effective integration of ChatGPT in graduate academic writing and communication courses.

This study sought to answer the following research questions:

1. How do graduate students perceive the use of ChatGPT?
2. How do they use ChatGPT for academic purpose?
3. How do graduate students perceive the impact of using ChatGPT?

3 The Current Study

3.1 Research instrument

According to Mazikana (2023), the most common method of data collection is the use of questionnaires because of their efficiency and cost-effectiveness in gathering large amounts of information. Questionnaires are also considered to be the most time effective and least invasive way of collecting data from a large number of participants. As three of the four authors teach an academic communication graduate course from which the students were invited to participate in the survey, a teacher-student dependent relationship exists that may potentially influence the students' grades. Furthermore, in order to ensure confidentiality and anonymity, the questionnaire survey was deemed the most appropriate instrument used for data collection.

The questionnaire consisted of 25 five-point Likert scale items and 8 four-point Likert scale items. These items were used to find out participants' views on ChatGPT, their use of ChatGPT, the perceived impact of using ChatGPT in their learning.

Convenience sampling was employed as we had direct access to 209 students across nine classes that we teach, which provided a readily available and manageable participant pool. An administrative staff member emailed the graduate students to invite them to participate in the questionnaire survey. This was to ensure that the students did not feel obliged or coerced into participating in the study. The email was sent in Week 8 of the course, after the students had submitted their individual written assignment where they were allowed the use of generative AI tools, with proper acknowledgment. The assignment required the students to complete a 400-word conference proposal abstract for a cross-disciplinary audience. The students accessed the survey either by keying in the URL or scanning a QR code. They were informed that their participation was voluntary and anonymous, and their responses would be kept confidential.

One week after the course ended, the survey was closed following a six-week waiting period. Forty-eight students participated in the study, resulting in a response rate of 22.9%.

3.2 Research design and analysis

The questionnaire for this study was adapted from Subaveerapandiyan, Vinoth and Tiwary (2023), O'Neill and Russell (2019), and Traphagan et al. (2014). The survey was divided into three main sections

to answer the research questions: graduate students' perception on the use of ChatGPT for academic purposes, their use of ChatGPT for academic tasks and their perceived impact of its use as a writing tool.

The data generated by SPSS Version 26 was tabulated according to percentage (%) and mean (\bar{x}). The quantitative findings (N=48) are statistically significant as a minimum number of 30 yields a normal sampling distribution, according to the central limit theorem (Kwak & Kim, 2017). The Cronbach's alpha coefficient is 0.947, indicating that the items in the questionnaire have relatively high internal consistency (UCLA: Statistical Consulting Group, 2024).

3.3 Participant demographic profile

Table 1

Participant Demographic Profile

Demographic Categories	Frequency	Percentage
Age		
21 to 30	38	79.17
31 to 40	7	14.58
41 to 50	2	4.17
51 to 60	1	2.08
Gender		
Male	27	56.25
Female	21	43.75
Colleges, Faculties and Schools		
College of Design and Engineering	14	29.17
Faculty of Science	14	29.17
School of Computing	8	16.67
School of Medicine	6	12.50
Faculty of Arts and Social Sciences	3	6.25
Business School	1	2.08
Graduate School - Integrative Sciences and Engineering Programme	1	2.08
School of Public Health	1	2.08
Total	48	100.00

Table 2

Whether English was the medium of instruction for participants

English was my medium of instruction before I began my PhD study in the university.	Frequency	Percentage
Yes	14	29.17
No	34	70.83
Total	48	100.00

Table 3

The ChatGPT version that participants were using or familiar with

The ChatGPT version that I am using/familiar with is...	Frequency	Percentage
ChatGPT-3.5 (free, released in November 2022)	28	58.33
ChatGPT-4 (paid, released in March 2023)	20	41.67
Total	48	100.00

The participants were all PhD students, mostly in their first or second year of study and from a variety of disciplines. Table 1 shows the age, gender, and colleges, faculties or schools that participants were enrolled in. Close to 80% of them were between the ages of 21 and 30 and slightly more than half of the participants (56.25%) were males while the rest were females (43.75%). The participants were from various disciplines including the College of Design and Engineering (29.17%), Faculty of Science (29.17%) and School of Computing (16.67%). Table 2 highlights that English was not the medium of instruction for 70.83% of the respondents before they embarked on their doctoral study. Lastly, close to 60% reported that they were either familiar with or used ChatGPT-3.5, while the rest were either familiar with or used ChatGPT-4. This is presented in Table 3.

4 Findings

For the Likert scaled responses, the mean values are on a scale of one to five, except for items 15 to 22 where the frequency of students' use of ChatGPT is based on a four-point scale. This means that the higher the value, the higher the intensity of the average agreement.

4.1 Graduate students' perceptions on using ChatGPT

As shown in Table 4 below, most students were aware of what ChatGPT is ($\bar{x}=4.38$) and had previously used it ($\bar{x}=4.08$). They were also mindful that the information produced by ChatGPT may not be reliable ($\bar{x}=4.40$). Compared to their awareness of ChatGPT and the lack of accuracy in the responses it generated, the students were relatively less convinced about using ChatGPT to help them improve their writing skills ($\bar{x}=3.60$), for research and analysing data ($\bar{x}=3.46$), and as a reference tool for learning ($\bar{x}=3.63$).

Table 4 below also shows that students generally held positive views on using ChatGPT. They find it easy ($\bar{x}=3.98$), convenient ($\bar{x}=4.15$) and flexible ($\bar{x}=4.13$) to use. As for the accuracy of information provided by ChatGPT, respondents were aware that the generated output was not always accurate ($\bar{x}=2.25$). Also, almost half (43.8%) of the respondents either strongly disagreed (12.5%) or disagreed (31.3%) that using ChatGPT was against academic integrity while 35.4% were unsure of this. However, a significant number believed that ChatGPT should be allowed in tertiary education ($\bar{x}=3.63$).

Table 4

Graduate Students' Perceptions on Using ChatGPT

No.	Item	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	Mean (\bar{x})
1	I know what ChatGPT is.	2.1	2.1	2.1	43.8	50.0	4.38
2	I have experience using ChatGPT.	8.3	4.2	4.2	37.5	45.8	4.08
3	I believe that ChatGPT can be used to improve my writing skills.	4.2	22.9	10.4	33.3	29.2	3.60
4	I believe that ChatGPT can be used for research and analysing data.	8.3	12.5	27.1	29.2	22.9	3.46
5	I believe that ChatGPT can be used as a reference tool for learning.	8.3	8.3	18.8	41.7	22.9	3.63
6	I believe that the information from ChatGPT may not be reliable.	0.0	0.0	10.4	39.6	50.0	4.40
7	ChatGPT is easy to use.	2.1	4.2	14.6	52.1	27.1	3.98
8	ChatGPT is convenient to use.	2.1	0.0	10.4	56.3	31.3	4.15
9	ChatGPT is very flexible in its use.	2.1	0.0	16.7	45.8	35.4	4.13

10	ChatGPT's answers are easily understood.	2.1	6.3	18.8	50.0	22.9	3.85
11	ChatGPT does not give me misleading answers.	18.8	50.0	22.9	4.2	4.2	2.25
12	Using ChatGPT is an efficient way to do my assignments.	8.3	27.1	27.1	27.1	10.4	3.04
13	Using ChatGPT is against academic integrity.	12.5	31.3	35.4	14.6	6.3	2.71
14	ChatGPT should be allowed in tertiary education.	6.3	6.3	29.2	35.4	22.9	3.63

Scale: Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5)

4.2 Graduate students' use of ChatGPT

The data given in Table 5 below illustrates the students' use of ChatGPT through a 4-point scale. As noted in Table 4 above, a mean of 3.6 was obtained when students were asked if ChatGPT could be used to enhance their writing skills. Specifically, students indicated that they used ChatGPT for grammar correction ($\bar{x}=2.63$), paraphrasing sentences ($\bar{x}=2.67$) and summarising texts ($\bar{x}=2.44$). In addition, 47.9% of students do not use ChatGPT to confirm facts or they would only use the information from ChatGPT after confirming its accuracy ($\bar{x}=2.63$).

As shown in Table 4 above, the students seemed somewhat neutral regarding whether using ChatGPT was an efficient way to do their assignments ($\bar{x}=3.04$). However, they believed that using ChatGPT to complete their assignments helped them save time ($\bar{x}=3.63$) and reduce effort ($\bar{x}=3.25$). This is shown in Table 6 below.

Table 5

Graduate Students' Use of ChatGPT

No.	Item	1 (%)	2 (%)	3 (%)	4 (%)	Mean (\bar{x})
15	I use ChatGPT to correct my grammar.	29.2	14.6	20.8	35.4	2.63
16	I use ChatGPT to paraphrase sentences.	25.0	14.6	29.2	31.3	2.67
17	I use ChatGPT to summarise texts.	27.1	20.8	33.3	18.8	2.44
18	I use ChatGPT to collect information to formulate ideas for my assignments.	35.4	37.5	12.5	14.6	2.06
19	I use ChatGPT to generate sentences or paragraphs for my assignments.	37.5	33.3	16.7	12.5	2.04
20	I use ChatGPT to improve my general knowledge.	31.3	22.9	18.8	27.1	2.42
21	I use ChatGPT to confirm facts.	47.9	20.8	10.4	20.8	2.04
22	I use the information from ChatGPT after confirming its accuracy.	22.9	22.9	22.9	31.3	2.63

Scale: Not at all (1), Rarely (2), Occasionally (3), Frequently (4)

4.3 Graduate students' perceived impact of using ChatGPT

Table 6 below shows the perceived impact of using ChatGPT. The graduate students indicated that with the use of ChatGPT, they felt helped ($\bar{x}=3.83$) and that their confidence in language use increased ($\bar{x}=3.46$). As for the extent to which using ChatGPT raised their motivation to learn, the students were somewhat motivated but not strongly so ($\bar{x}=3.31$). While they showed a slight tendency towards agreement, their overall motivation remained average. Likewise, regarding whether using ChatGPT increased their motivation to complete their assignments, the students indicated that they remained somewhat neutral ($\bar{x}=3.08$). Their drive to complete assignments using ChatGPT wasn't particularly strong. In addition, they believed that the help rendered by ChatGPT would not significantly benefit them in improving their

grades ($\bar{x}=2.75$) nor enhance their critical thinking skills ($\bar{x}=2.88$). Despite this, the students indicated that they saved time in completing their assignments ($\bar{x}=3.63$) and developed their language skills ($\bar{x}=3.40$).

Table 6

Graduate Students' Perceived Impact of Using ChatGPT

No.	Item	1 (%)	2 (%)	3 (%)	4 (%)	5 (%)	Mean (\bar{x})
23	I feel helped by ChatGPT.	8.3	0.0	20.8	41.7	29.2	3.83
24	Using ChatGPT increases my confidence in my language use.	8.3	16.7	20.8	29.2	25.0	3.46
25	Using ChatGPT increases my motivation to learn.	8.3	14.6	33.3	25.0	18.8	3.31
26	Using ChatGPT increases my motivation to do my assignments.	10.4	16.7	39.6	20.8	12.5	3.08
27	Using ChatGPT helps me save time in doing my assignments.	4.2	8.3	25.0	45.8	16.7	3.63
28	Using ChatGPT helps me reduce effort in doing my assignments.	6.3	16.7	35.4	29.2	12.5	3.25
29	Using ChatGPT helps me improve my grade.	8.3	29.2	47.9	8.3	6.3	2.75
30	Using ChatGPT helps me improve my assignments.	6.3	18.8	31.3	33.3	10.4	3.23
31	Using ChatGPT helps me develop my writing.	10.4	14.6	27.1	33.3	14.6	3.27
32	Using ChatGPT helps me develop my language skills.	6.3	14.6	29.2	33.3	16.7	3.40
33	Using ChatGPT helps me develop my critical thinking skills.	16.7	16.7	35.4	25.0	6.3	2.88

Scale: Strongly Disagree (1), Disagree (2), Neutral (3), Agree (4), Strongly Agree (5)

Building on the insights from the above findings regarding students' awareness, opinions, and use of ChatGPT, as well as the impact of using the AI tool, the following section discusses these findings in greater detail.

5 Discussion

5.1 Perception and use of ChatGPT for academic purpose

From the findings presented above, it is evident that students generally shared positive opinions on the use of ChatGPT, especially in terms of its convenience and flexibility. Limna et al. (2023) also reported similar findings, noting that their students found ChatGPT to be a convenient and accessible resource for academic support. Bonsu and Baffour-Koduah (2023) likewise noted that their students viewed ChatGPT positively for its usefulness and convenience in academic activities.

As noted in Table 4 above, the students were generally aware that the information produced by ChatGPT may not be reliable. Their apprehension is evidenced by the fact that 47.9% of students did not use ChatGPT to confirm facts or 54.2% of them would only use the output from ChatGPT after confirming its accuracy. This is further supported by 68.8% of the respondents, who recognised that the responses generated by ChatGPT were not always reliable (refer to Table 5). This finding aligns with the studies by Shoufan (2023) and Limna et al. (2023) who found that their students believed that the information provided by ChatGPT was not always accurate. Similarly, Kanabar (2023) reported that his students preferred to use ChatGPT only as an additional resource, while Dai et al. (2023) observed that

their students “applied critical inquiry strategies such as cross-validation of information sources to ensure the credibility of the AI-generated responses” (p. 79).

Students who used ChatGPT primarily did so for grammar correction, paraphrasing sentences, and summarizing texts. Likewise, in their study, Dai et al. (2023) found that language editing and proofreading was the second most common task that ChatGPT was used for, although it was not stated if English was the medium of instruction for their respondents prior to their graduate study.

Surprisingly, about a third of our graduate students indicated that they do not use ChatGPT for grammar correction, paraphrasing sentences, and summarizing texts. This could be attributed to their confidence in their language proficiency as this percentage corresponds with the proportion of students whose medium of instruction was English prior to their doctoral study. In addition, they held a somewhat negative perception of using ChatGPT to help them improve their writing skills, conduct research, analyse data, and as a reference tool for learning.

Despite expressing some reservation regarding the use of ChatGPT, a significant number believed that ChatGPT should be allowed in tertiary education. To ensure that graduate students achieve a good understanding of the responsible use of AI tools like ChatGPT in their assignment or project work, it is recommended that they complete a course designed to equip them with the necessary skills to do so. This understanding could encourage more graduate students to use AI tools responsibly in their studies.

5.2 The perceived impact of using ChatGPT as a writing tool

Most students felt that ChatGPT was helpful for completing their assignments, particularly in saving time and reducing effort. Similar findings were also reported in recent studies conducted by Kanabar (2023) and Ngo (2023). As discussed previously, the students would use the AI tool “to check for grammar errors, rewrite sentences, get help in rephrasing sentences and paragraphs, and to summarize points into eloquent paragraphs”. This finding is consistent with that of Dergaa et al. (2023) and Xiao and Zhi (2023) who reported that students with low English proficiency benefitted from using ChatGPT on language related tasks. In the same vein, Teng (2024) asserts that ChatGPT holds great potential as a tool for improving EFL writing instruction, as it can support error detection and provide valuable insights for writing improvement.

In summary, the findings and discussion showed that students were aware of how ChatGPT could be used, and they were mindful that the information produced by ChatGPT may not be reliable. They generally held positive opinions regarding the use of ChatGPT, especially in terms of its convenience and that using ChatGPT did not violate academic integrity.

By comparing students’ awareness with their actual use, the students showed that they were aware of the benefits of using ChatGPT and reported using it in three main ways. First, ChatGPT was used to correct their grammar, paraphrase sentences, and summarise texts to improve their writing skills. Second, it was used to help them collect information to formulate ideas, and to generate sentences or paragraphs for their research assignments and data analysis. Lastly, ChatGPT served as a reference tool for learning general knowledge.

As mentioned, students recognised that the information generated by ChatGPT may lack accuracy. They would therefore not use it to confirm facts but would only use the output generated by ChatGPT after they had confirmed its accuracy. In addition, the students believed that ChatGPT helped them complete their assignments efficiently, saving time and reducing effort.

Regarding the impact of ChatGPT, many students indicated that ChatGPT has helped them in numerous ways, namely, saving time and effort in completing their assignments, increasing their confidence in their language use and developing their language skills. However, they did not consider ChatGPT’s impact to be significant in helping them improve their grades and critical thinking skills.

To encourage more graduate students to use and maximise the potential of AI tools responsibly, the university should provide training in two main areas: (1) the responsible use of ChatGPT to uphold academic integrity, and (2) prompt engineering, enabling them to fully leverage AI tools.

5.3 Limitations and future research

Although this study sheds light on how graduate students perceive and use ChatGPT for academic purposes and provided their views regarding the impact of using ChatGPT as a writing tool, several limitations should be acknowledged. Firstly, the sample size was limited to PhD students at a single institution, which may not be representative of graduate students in other universities. Additionally, the reliance on self-reported data may introduce biases, especially since respondents may not be willing to provide accurate responses even when assured that the anonymised survey results would not result in punishment for any perceived academic dishonesty. Future research should build on these findings by considering larger, more diverse samples of students and explore other contexts and AI tools to provide a more comprehensive understanding of the role of generative AI in higher education. Furthermore, future studies could enhance the validation of self-reported information by incorporating complementary methods, such as analysing actual usage data. As generative AI technologies continue to evolve and become more prevalent in higher educational settings, understanding actual student experiences will continue to be crucial to support effective deployment of teaching strategies and policies around academic integrity.

6 Conclusion

This study aimed to investigate the perception and use of ChatGPT by PhD students at a university in Singapore, focusing primarily on its potential role as a tool for developing English writing skills. The responses to the survey conducted revealed that while most students had used ChatGPT and found it convenient and efficient for various academic tasks, they held concerns about the accuracy and reliability of the information it generates. As a result of their perception, the graduate students surveyed primarily used ChatGPT for correcting grammar, paraphrasing, and summarising texts, but they were less confident regarding ChatGPT's impact on helping them develop critical thinking skills. Despite these reservations, most students felt that ChatGPT should be allowed in higher education and were positive that the tool helped them to save time and develop their language skills. The implications of the findings are significant for educators and university policymakers. As universities continue to adapt their policies around acceptable use of generative AI, caution over academic integrity should encourage training in responsible practice. More specifically, to ensure that graduate students gain a good understanding of the responsible use of AI tools like ChatGPT in their assignments and projects, it is recommended that universities offer a course designed to equip them with the necessary skills. Correspondingly, incorporating AI literacy into the curriculum through courses or workshops would prepare students to use ChatGPT responsibly and effectively in their future research or career. The experiences of graduate students surveyed should reinforce an emphasis on treating ChatGPT as a supplementary writing tool rather than as a primary source of information.

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