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The Impact of ChatGPT Usage on Academic Performance: The Mediating Role of Self-Regulated Learning

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ABSTRACT

The increasing adoption of generative artificial intelligence tools, particularly ChatGPT, has transformed the way students approach learning and academic tasks in higher education. This study examines the effect of ChatGPT usage on students' academic performance and analyses the mediating role of self-regulated learning. A quantitative research design was employed, and data were collected from 20 higher education students using a structured questionnaire. ChatGPT usage was treated as the independent variable, self-regulated learning as the mediating variable, and academic performance as the dependent variable. The findings show that ChatGPT usage has a positive effect on academic performance and self-regulated learning. The results also indicate that self-regulated learning positively influences academic performance and mediates the relationship between ChatGPT usage and academic performance. These findings suggest that ChatGPT can support students by improving learning efficiency, providing quick access to information, and assisting with academic tasks.

Keywords: ChatGPT Usage; Academic Performance; Self-Regulated Learning; Generative Artificial Intelligence; Higher Education; Student Learning Outcomes

INTRODUCTION

The rapid development of artificial intelligence has brought significant changes to higher education. In recent years, generative artificial intelligence tools such as ChatGPT have become increasingly popular among university students. ChatGPT is commonly used to support academic activities such as searching for information, generating ideas, improving writing, clarifying difficult concepts, summarising learning materials, and completing academic tasks. As artificial intelligence continues to shape the future of education, students are increasingly required to develop the ability to use digital tools effectively, responsibly, and critically (Grassini, 2023; Kasneci et al., 2023; Molenaar, 2022; Strzelecki, 2024; Wang et al., 2023). As students become more familiar with AI-assisted learning, ChatGPT has gradually become part of their daily academic experience.

However, the influence of ChatGPT usage on students' academic performance remains an important issue for discussion. On one hand, ChatGPT may improve learning efficiency by providing quick responses, personalised explanations, and immediate academic support. These functions may help students understand course content more effectively and complete assignments more confidently. On the other hand, excessive reliance on ChatGPT may reduce students' independent thinking, weaken problem-solving ability, and limit the development of critical learning skills. Therefore, it is important to examine whether ChatGPT usage contributes positively to students' academic performance and under what conditions this relationship occurs.

Most existing studies have focused mainly on the direct relationship between ChatGPT usage and academic performance. However, less attention has been given to the psychological and behavioural learning factors that may explain how ChatGPT influences academic outcomes. One important factor is self-regulated learning. Self-regulated learning refers to students' ability to plan, monitor, control, and evaluate their own learning process (Zimmerman, 2002). It is widely recognised as an important factor in academic success because students with strong self-regulated learning skills are better able to set goals, manage their time, monitor their understanding, and reflect on their learning strategies (Panadero, 2017; Schunk & Greene, 2018). Students with strong self-regulated learning skills are more likely to use ChatGPT purposefully as a learning support tool rather than depend on it blindly. In contrast, students with weak self-regulation may use ChatGPT mainly to obtain quick answers without fully understanding the learning content.

Self-regulated learning is especially important in AI-supported education because students need to make responsible decisions when using digital tools. ChatGPT can support learning, but it cannot replace students' own effort, reflection, and judgement. Students who can set learning goals, manage their time, monitor their understanding, and evaluate AI-generated responses are more likely to benefit from ChatGPT. Recent studies have also suggested that generative AI can support self-regulated learning when students use it for planning, feedback, reflection, and improvement rather than simply copying answers (Chiu, 2024; Jin et al., 2023). This is consistent with the broader understanding that students' learning behaviour and wellbeing can be shaped by environmental, organisational, and psychosocial factors, including demands, engagement, support systems, and learning climate (Teoh & Kee, 2022; Teoh et al., 2021). Therefore, examining self-regulated learning as a mediating variable can provide a clearer explanation of how ChatGPT usage affects academic performance.

This study is also relevant to the development of higher education in the digital era. As universities increasingly integrate technology into teaching and learning, students need

to develop both digital competence and self-management skills. Higher education should not only expose students to technology but also guide them to use it ethically, critically, and effectively. The connection between academic learning and practical skill development is important because students must be prepared for real-world learning and work environments where digital tools are widely used (Lim et al., 2024). Therefore, understanding the role of self-regulated learning in AI-supported academic performance is useful for students, educators, and higher education institutions.

This study aims to examine the effect of ChatGPT usage on academic performance among higher education students and to analyse the mediating role of self-regulated learning. The novelty of this study lies in its focus on self-regulated learning as the mechanism that explains how ChatGPT usage may influence academic performance. The findings are expected to contribute to the literature on educational artificial intelligence by showing that the impact of ChatGPT depends not only on the tool itself but also on students' ability to manage and regulate their own learning. Practically, this study may help educators guide students in using ChatGPT responsibly while strengthening their self-regulated learning skills to improve academic outcomes.

Research Objectives

This study aims to examine the relationship between ChatGPT usage, self-regulated learning, and academic performance among higher education students. Specifically, the objectives of this study are:

1. To examine the effect of ChatGPT usage on self-regulated learning among higher education students.
2. To examine the effect of self-regulated learning on academic performance among higher education students.
3. To examine the effect of ChatGPT usage on academic performance among higher education students.
4. To analyse the mediating role of self-regulated learning in the relationship between ChatGPT usage and academic performance.

LITERATURE REVIEW

ChatGPT Usage in Higher Education

ChatGPT is a generative artificial intelligence tool that can produce human-like responses based on user prompts. In higher education, ChatGPT has become increasingly relevant because it can support students in various academic tasks, including searching for information, generating ideas, improving writing, summarising reading materials, explaining difficult concepts, and preparing assignments. The use of artificial intelligence in education has created new opportunities for personalised, flexible, and technology-supported learning (Grassini, 2023; Molenaar, 2022; Wang et al., 2023).

In the context of higher education, ChatGPT can act as a learning assistant when students use it appropriately. It can provide immediate explanations, offer examples, support brainstorming, and help students clarify complex topics. These functions may improve students' learning efficiency because they can access academic support quickly and conveniently. Previous studies have suggested that AI-assisted learning tools can improve students' learning experiences by supporting feedback, content understanding, learning engagement, and academic achievement (Chiu, 2024; Jin et al., 2023; Youssef et al., 2024).

However, ChatGPT also presents several challenges. If students rely too much on ChatGPT, they may become dependent on quick answers and reduce their own thinking

effort. Over-reliance on AI tools may also weaken students' critical thinking, problem-solving, independent learning skills, and academic integrity if students use AI-generated responses without proper evaluation (Abbas et al., 2024; Sullivan et al., 2023). Therefore, ChatGPT should not be viewed as a replacement for learning but as a support tool that can enhance learning when used responsibly. The impact of ChatGPT on academic performance may depend on how students use it and whether they have the ability to regulate their own learning.

Self-Regulated Learning

Self-regulated learning refers to the process in which students actively plan, monitor, control, and evaluate their own learning. According to Zimmerman (2002), self-regulated learners are active participants in their learning process because they set learning goals, select appropriate strategies, monitor their progress, and reflect on their performance. Self-regulated learning is widely recognised as an important factor in academic success because students who can manage their learning are more likely to achieve better academic outcomes.

Self-regulated learning involves several important components, including goal setting, time management, self-monitoring, strategy adjustment, motivation, and self-evaluation. Students with strong self-regulated learning skills are able to identify what they need to learn, plan how to complete their academic tasks, monitor whether they understand the learning materials, and make changes when their current learning strategies are ineffective. Previous studies have shown that self-regulated learning is strongly related to students' academic achievement, especially in higher education and technology-supported learning environments (Broadbent & Poon, 2015; Panadero, 2017; Schunk & Greene, 2018).

In AI-supported learning environments, self-regulated learning becomes even more important. ChatGPT can provide quick information and learning support, but students must still evaluate the quality, accuracy, and relevance of the responses generated by the tool. Students with strong self-regulation are more likely to use ChatGPT for planning, checking understanding, improving ideas, and reflecting on their work. In contrast, students with weak self-regulation may use ChatGPT mainly to obtain ready-made answers without fully engaging in the learning process. Therefore, self-regulated learning may play an important role in determining whether ChatGPT usage leads to positive academic outcomes.

Academic Performance

Academic performance refers to students' learning outcomes and academic achievements. It may include examination results, assignment quality, class participation, understanding of course content, ability to apply knowledge, and overall academic progress. In this study, academic performance refers to students' perceived academic outcomes in relation to their learning activities and use of ChatGPT.

Academic performance is influenced by many factors, including learning motivation, learning strategies, digital learning readiness, self-management skills, and the learning environment. In the context of digital and AI-supported education, students' academic performance may be shaped not only by the availability of technology but also by how effectively students use the technology for learning. AI tools such as ChatGPT may support academic performance by helping students understand difficult concepts, complete assignments more efficiently, and improve the quality of academic work. However, academic performance may be negatively affected if students use ChatGPT passively or depend on it without critical thinking.

Therefore, it is important to examine the relationship between ChatGPT usage, self-regulated learning, and academic performance. This study argues that ChatGPT usage may improve academic performance directly, but its effect may also occur indirectly through self-regulated learning. Students who use ChatGPT responsibly and regulate their learning effectively are more likely to transform AI support into better academic outcomes.

Hypotheses Development

ChatGPT usage may influence students' self-regulated learning because the tool can support various learning processes such as planning, monitoring, feedback, and reflection. When students use ChatGPT to clarify difficult topics, organise ideas, prepare study plans, and check their understanding, they are engaging in self-regulated learning activities. ChatGPT can also provide immediate responses that help students identify gaps in their knowledge and adjust their learning strategies. Therefore, students who use ChatGPT constructively may develop stronger self-regulated learning behaviours.

H1: ChatGPT usage has a significant positive effect on self-regulated learning.

Self-regulated learning is expected to have a positive effect on academic performance. Students with strong self-regulated learning skills are usually better at setting academic goals, managing time, monitoring their understanding, adapting learning strategies, and evaluating their progress. These behaviours can help students complete assignments more effectively, prepare for assessments, and improve their overall academic outcomes. Previous research has consistently shown that self-regulated learning is an important predictor of academic success (Broadbent & Poon, 2015; Panadero, 2017; Zimmerman, 2002).

H2: Self-regulated learning has a significant positive effect on academic performance.

ChatGPT usage may also have a direct positive effect on academic performance. When students use ChatGPT appropriately, it can help them understand course content, generate ideas, improve writing, summarise information, and complete academic tasks more efficiently. These forms of support may improve students' confidence, learning efficiency, and academic performance. However, this positive effect depends on responsible and ethical use of the tool. When ChatGPT is used as a learning assistant rather than a shortcut, it may contribute positively to students' academic outcomes.

H3: ChatGPT usage has a significant positive effect on academic performance.

Self-regulated learning may mediate the relationship between ChatGPT usage and academic performance. ChatGPT usage alone may not automatically improve academic performance because students still need to plan their learning, evaluate AI-generated responses, monitor their understanding, and apply knowledge independently. Students with strong self-regulated learning skills are more likely to use ChatGPT effectively and transform AI support into meaningful learning outcomes. Therefore, self-regulated learning may explain how ChatGPT usage leads to better academic performance.

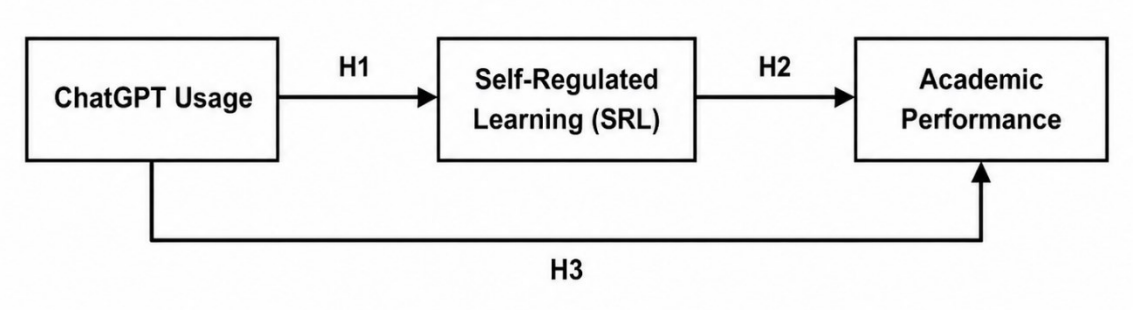
H4: Self-regulated learning mediates the relationship between ChatGPT usage and academic performance.

Conceptual Framework

Based on the literature reviewed, this study proposes a mediation framework involving ChatGPT usage, self-regulated learning, and academic performance as shown in Figure

1. ChatGPT usage is the independent variable, self-regulated learning is the mediating variable, and academic performance is the dependent variable. The framework suggests that ChatGPT usage may directly influence academic performance and may also indirectly influence academic performance through self-regulated learning.
In this framework, students who use ChatGPT constructively are expected to show stronger self-regulated learning behaviours, such as goal setting, planning, monitoring, strategy adjustment, and self-evaluation. These self-regulated learning behaviours are then expected to improve students' academic performance. Therefore, self-regulated learning serves as an important mechanism that explains how ChatGPT usage may contribute to academic success.

Figure 1. Research Framework



RESEARCH METHOD

Research Design

This study employed a quantitative research design to examine the relationship between ChatGPT usage and students' academic performance, with self-regulated learning as the mediating variable. A structured empirical approach was adopted to ensure that the relationships among the variables could be systematically examined through statistical analysis. Quantitative research is appropriate for this study because it allows researchers to measure variables objectively and test relationships among constructs using numerical data (Creswell, 2014). In this study, ChatGPT usage was treated as the independent variable, self-regulated learning was treated as the mediating variable, and academic performance was treated as the dependent variable.

Sampling and Respondents

The target population for this study consisted of students enrolled in higher education programmes, including undergraduate, postgraduate, doctoral, diploma, certificate, and professional courses. The unit of analysis was individual students who were actively involved in academic learning activities and had exposure to ChatGPT as a learning tool.

A non-probability convenience sampling technique was used due to accessibility and time limitations. This sampling method was suitable for the present study because the researchers aimed to collect responses from students who were available and willing to participate. A total of 20 valid responses were collected and included in the final dataset. Although the sample size was relatively small, it was considered suitable for a preliminary student-level study that explores the use of emerging artificial intelligence tools in higher education. Previous studies have also highlighted the growing importance of examining artificial intelligence adoption and its influence on students' learning experiences and academic performance in higher education (Ali et al., 2023; Grassini, 2023).

Data Collection Procedure

Primary data were collected using a structured questionnaire administered through an online platform. The questionnaire was designed to capture students' experiences, perceptions, and behaviours related to ChatGPT usage, self-regulated learning, and academic performance. The use of an online survey was appropriate because it allowed data to be collected efficiently and conveniently from student respondents.

The questionnaire consisted of multiple sections. The first section collected demographic information, including age, gender, course or programme, year of study, and average academic score. The remaining sections measured the main constructs of the study, namely ChatGPT usage, self-regulated learning, and academic performance. Respondents were asked to indicate their level of agreement with each statement using a five-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree. The Likert scale is commonly used in educational and social science research to measure respondents' attitudes, perceptions, and levels of agreement toward specific statements (Likert, 1932).

Measurement of Variables

This study measured three main constructs: ChatGPT usage, self-regulated learning, and academic performance. The questionnaire items were designed to reflect students' use of ChatGPT for academic purposes, their ability to regulate their own learning, and their perceived academic outcomes.

ChatGPT usage was measured using items that captured students' frequency of use, reliance on ChatGPT for academic tasks, use of ChatGPT to understand difficult concepts, time spent using ChatGPT, preference for AI-based learning, dependence on ChatGPT for quick answers, and use of ChatGPT to improve academic work. Sample items include "I frequently use ChatGPT for my academic tasks," "I use ChatGPT to understand difficult concepts," and "I depend on ChatGPT for quick answers instead of thinking independently." These items reflect both the functional use of ChatGPT as a learning support tool and the possibility of behavioural reliance on the tool. This measurement is consistent with recent discussions on generative artificial intelligence in education, which suggest that AI tools can support learning activities but may also create challenges when students depend on them excessively (Chiu, 2024; Wang et al., 2023).

Self-regulated learning was measured using items related to students' ability to manage their own learning process. The items covered goal setting, planning, monitoring understanding, identifying learning difficulties, adjusting study methods, trying different strategies, managing time, maintaining motivation, avoiding distractions, evaluating performance, learning from mistakes, and reflecting on learning improvement. Sample items include "I set specific goals before I begin studying," "I plan how to complete my academic tasks efficiently," "I regularly check my understanding while studying," and "I evaluate my performance after completing tasks." These items are consistent with the concept of self-regulated learning, which refers to students' ability to actively plan, monitor, control, and evaluate their own learning process (Zimmerman, 2002). Previous studies have also shown that self-regulated learning is an important factor in students' academic achievement, especially in higher education and technology-supported learning environments (Broadbent & Poon, 2015; Panadero, 2017; Schunk & Greene, 2018).

Academic performance was measured using self-reported items that assessed students' perceived academic outcomes and learning performance. The items included assignment completion, performance in examinations and assessments, understanding of subjects taught in class, participation in academic activities, consistency in grades, ability to apply knowledge, attention during lectures and study sessions, accuracy in

academic work, confidence in academic ability, and whether academic performance met students' expectations. Sample items include "I complete my academic assignments on time," "I perform well in exams and assessments," and "My academic performance meets my expectations." These items were used because the study focused on students' perceived academic performance rather than official academic records. Self-reported academic performance is suitable for preliminary student-level research when respondents come from different programmes and academic backgrounds.

Data Analysis Techniques

The collected data were analysed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics, including minimum, maximum, and mean values, were used to summarise the data and identify general patterns among the respondents. These statistics helped provide an overview of students' ChatGPT usage, self-regulated learning, and academic performance.

Regression analysis was then conducted to examine the relationships among the variables. Specifically, the analysis tested the effect of ChatGPT usage on academic performance, the effect of ChatGPT usage on self-regulated learning, and the effect of self-regulated learning on academic performance. The mediating role of self-regulated learning was assessed by examining whether ChatGPT usage influenced academic performance directly and indirectly through self-regulated learning. Mediation analysis is commonly used to determine whether the relationship between an independent variable and a dependent variable can be explained by a third variable (Baron & Kenny, 1986).

Ethical Considerations

This study followed basic ethical principles in data collection and analysis. Participation in the study was voluntary, and respondents were informed about the purpose of the research before answering the questionnaire. Confidentiality and anonymity were maintained throughout the study, and no personally identifiable information was collected. The data were used solely for academic research purposes. Respondents were also allowed to answer the questionnaire based on their own willingness and understanding.

RESULTS

The data collected from 20 respondents were analysed using SPSS to examine the relationships among ChatGPT usage, self-regulated learning, and academic performance. Descriptive statistics were first computed to identify the general patterns of the data. Regression analysis was then conducted to test the proposed relationships among the variables and to examine the mediating role of self-regulated learning.

Table 1. Descriptive Statistics (N = 20)

Construct	Minimum	Maximum	Mean
ChatGPT Usage	2.10	4.80	4.05
Self-Regulated Learning	2.30	4.90	3.82
Academic Performance	2.50	4.95	3.91

Table 1 presents the descriptive statistics for ChatGPT usage, self-regulated learning, and academic performance. The mean score for ChatGPT usage was 4.05, indicating that respondents generally reported a high level of engagement with ChatGPT for

academic purposes. This suggests that ChatGPT has become a commonly used learning support tool among the students in this study.

The mean score for self-regulated learning was 3.82, showing that respondents demonstrated a moderately high level of self-regulated learning. This indicates that students were generally able to plan, monitor, manage, and evaluate their own learning process. Academic performance recorded a mean score of 3.91, suggesting that respondents generally perceived their academic performance positively. Overall, the descriptive results show that students who participated in this study actively used ChatGPT, showed a relatively strong level of self-regulated learning, and reported positive academic outcomes.

Table 2. Regression Results

Construct	B	SE	β
ChatGPT Usage → Academic Performance	0.31	0.08	0.42**
ChatGPT Usage → Self-Regulated Learning	0.28	0.07	0.39**
Self-Regulated Learning → Academic Performance	0.36	0.09	0.45**

Note. B = Unstandardised coefficient; SE = Standard Error; β = Standardised Beta; **p < .01.

Table 2 presents the regression results for the relationships among ChatGPT usage, self-regulated learning, and academic performance. The results show that ChatGPT usage had a positive and statistically significant effect on academic performance ($\beta = 0.42$, $p < .01$). This indicates that higher ChatGPT usage was associated with better perceived academic performance among the respondents. Therefore, H3 was supported.

The results also show that ChatGPT usage had a positive and statistically significant effect on self-regulated learning ($\beta = 0.39$, $p < .01$). This suggests that students who used ChatGPT more frequently or constructively were more likely to report stronger self-regulated learning behaviours, such as planning, monitoring, and evaluating their learning. Therefore, H1 was supported.

In addition, self-regulated learning had a positive and statistically significant effect on academic performance ($\beta = 0.45$, $p < .01$). This indicates that students with stronger self-regulated learning skills were more likely to report better academic performance. Therefore, H2 was supported.

The regression results also provide preliminary support for the mediating role of self-regulated learning. ChatGPT usage was significantly related to self-regulated learning, and self-regulated learning was significantly related to academic performance. At the same time, ChatGPT usage also had a significant direct effect on academic performance. These findings suggest that self-regulated learning may explain part of the relationship between ChatGPT usage and academic performance. Therefore, H4 was supported.

Table 3. Summary of Hypothesis Testing

Hypothesis	Statement	Result
H1	ChatGPT usage has a significant positive effect on self-regulated learning.	Supported
H2	Self-regulated learning has a significant positive effect on academic performance.	Supported
H3	ChatGPT usage has a significant positive effect on academic performance.	Supported
H4	Self-regulated learning mediates the relationship between ChatGPT usage and academic performance.	Supported

Table 3 summarises the hypothesis testing results. All four hypotheses were supported. The findings indicate that ChatGPT usage was positively related to both self-regulated learning and academic performance. The findings also show that self-regulated learning was positively related to academic performance and played a mediating role in the relationship between ChatGPT usage and academic performance. Overall, the results suggest that ChatGPT can support students' academic performance, especially when students are able to regulate their own learning effectively.

DISCUSSION

The primary objective of this study was to examine how ChatGPT usage influences academic performance and to determine whether self-regulated learning mediates this relationship. The findings provide useful insights into the role of artificial intelligence in higher education, particularly in understanding how students use ChatGPT as a learning support tool and how their self-regulated learning skills may strengthen academic outcomes.

First, the results showed that ChatGPT usage had a significant positive effect on academic performance. This finding suggests that students who use ChatGPT for academic purposes may benefit from faster access to information, clearer explanations of difficult concepts, support in idea generation, and assistance in completing academic tasks. This is consistent with previous research indicating that AI tools can enhance learning efficiency and support students' academic achievement when they are used appropriately (Doo & Park, 2026; Lee et al., 2024). In this study, ChatGPT appeared to function as a supplementary learning resource that helped students manage academic tasks more effectively.

Second, the findings showed that ChatGPT usage had a significant positive effect on self-regulated learning. This indicates that students may use ChatGPT not only to obtain information, but also to support their learning strategies. For example, students may use ChatGPT to plan assignments, clarify learning goals, check their understanding, receive immediate explanations, and reflect on their academic work. This finding is consistent with studies suggesting that AI-supported learning tools can enhance self-regulated learning when students use them purposefully and critically (Chiu, 2024; Jin et al., 2023). Therefore, ChatGPT can support students' learning process when it encourages planning, monitoring, and evaluation rather than passive dependence.

Third, self-regulated learning was found to have a significant positive effect on academic performance. This result supports the view that students who actively manage their own

learning are more likely to perform well academically. Students with strong self-regulated learning skills are usually better at setting academic goals, managing time, monitoring understanding, adjusting learning strategies, and evaluating their own progress. These behaviours can help students complete assignments more effectively, prepare better for assessments, and improve their overall academic performance. This finding is consistent with established self-regulated learning literature, which emphasises the importance of self-regulation in academic success (Broadbent & Poon, 2015; Panadero, 2017; Zimmerman, 2002).

Most importantly, the findings supported the mediating role of self-regulated learning in the relationship between ChatGPT usage and academic performance. This means that the effect of ChatGPT usage on academic performance is not only direct, but also occurs through students' ability to regulate their own learning. ChatGPT may provide useful academic support, but students still need to evaluate the information, apply it appropriately, monitor their understanding, and avoid over-reliance. In other words, ChatGPT becomes more beneficial when students have strong self-regulated learning skills. This finding highlights that AI tools alone do not automatically improve academic performance. Instead, the academic benefits of ChatGPT depend strongly on how students manage and control their learning behaviour.

The findings also highlight the importance of responsible AI use in higher education. Although ChatGPT can support learning, excessive dependence on AI tools may reduce students' opportunities to think critically, solve problems independently, and develop deeper understanding. This concern is consistent with previous studies warning that over-reliance on AI may negatively affect academic learning and independent thinking (Hassan & Lee, 2023). Therefore, ChatGPT should be used as a learning assistant rather than as a substitute for students' own thinking and effort.

From a practical perspective, the findings suggest that educators and higher education institutions should guide students in using ChatGPT ethically and purposefully through clear AI-related teaching, learning, and assessment guidelines (Chan, 2023). Students should be encouraged to use ChatGPT for brainstorming, clarification, feedback, revision, and reflection, rather than for copying ready-made answers. At the same time, educators should strengthen students' self-regulated learning skills, including goal setting, time management, self-monitoring, critical evaluation, and self-reflection. This is especially important because student learning and performance are shaped not only by digital tools, but also by learning behaviours, support systems, engagement, and psychosocial conditions (Teoh & Kee, 2022; Teoh et al., 2021).

In addition, the findings are relevant to the broader purpose of higher education, which is to prepare students for future learning and work environments where digital tools are widely used. As higher education increasingly connects theory with practice, students must learn how to use AI tools responsibly while developing independent learning skills and practical competencies (Lim et al., 2024). Therefore, the balanced use of ChatGPT, together with strong self-regulated learning, can support students in becoming more independent, reflective, and effective learners.

Overall, this study shows that ChatGPT can positively contribute to students' academic performance, but its effectiveness depends largely on students' ability to regulate their own learning. The findings suggest that AI tools should be integrated into education with proper guidance, ethical awareness, and learning strategies. A balanced approach is necessary to ensure that ChatGPT supports meaningful learning outcomes without weakening students' critical thinking, independence, and academic responsibility.

CONCLUSION

This study examined the relationship between ChatGPT usage, self-regulated learning, and academic performance among higher education students. The findings showed that ChatGPT usage had a positive effect on academic performance and self-regulated learning. The results also showed that self-regulated learning had a positive effect on academic performance and provided preliminary support for its mediating role in the relationship between ChatGPT usage and academic performance.

These findings suggest that ChatGPT can be a useful learning support tool when students use it responsibly and purposefully. ChatGPT may help students access information quickly, understand difficult concepts, organise ideas, and complete academic tasks more efficiently. However, the benefits of ChatGPT depend on students' ability to regulate their own learning. Students need to evaluate AI-generated responses, monitor their understanding, and avoid depending on ChatGPT as a replacement for their own thinking.

Theoretically, this study contributes to the literature on artificial intelligence in education by highlighting self-regulated learning as an important mechanism that explains how ChatGPT usage may influence academic performance. Practically, the findings suggest that educators and higher education institutions should guide students to use ChatGPT ethically and critically while strengthening their self-regulated learning skills, such as goal setting, time management, self-monitoring, and self-reflection. This is important because students' learning and performance are shaped not only by technology use, but also by learning behaviours, support systems, engagement, and psychosocial conditions (Teoh & Kee, 2022; Teoh et al., 2021). In addition, preparing students to use digital tools responsibly is important for connecting academic learning with practical and work-based learning environments (Lim et al., 2024).

This study has several limitations. First, the sample size was small, with only 20 respondents. Second, the study used self-reported data, which may be influenced by response bias. Third, academic performance was measured based on students' perceptions rather than actual academic records. Future research should use larger and more diverse samples, include students from different universities and programmes, and apply more advanced statistical techniques such as structural equation modelling to further validate the proposed mediation model.

In conclusion, ChatGPT can positively support students' academic performance when it is used together with strong self-regulated learning skills. Therefore, students should be guided to use ChatGPT as a learning assistant rather than a shortcut, so that AI tools can support meaningful, ethical, and independent learning.

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