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ChatGPT As a Study Assistant: Effectiveness, Satisfaction and Impact on Academic Performance Among University Students

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ABSTRACT

The rapid advancement of artificial intelligence (AI) has transformed how university students approach learning, with ChatGPT emerging as one of the most widely adopted AI-powered study tools among students globally. Our study investigates the impact of ChatGPT as a study assistant among university students, with specific objectives to (1) examine the effectiveness of ChatGPT as a study assistant; (2) assess student satisfaction with ChatGPT as a study tool; and (3) investigate the impact of ChatGPT usage on academic performance. Data will be collected from 150 university students through an online survey via Google Forms. The findings revealed that student satisfaction significantly positively impacts academic performance, support. However, the direct effect of ChatGPT effectiveness on academic performance was not statistically significant. Instead, student satisfaction fully mediated the relationship between ChatGPT effectiveness and academic performance. These findings a provide practical recommendations for universities to formally integrate ChatGPT into academic learning frameworks, thereby maximising its educational benefits for students.

Keywords: Academic Performance; Artificial Intelligence; ChatGPT; Effectiveness; Student Satisfaction; Study Assistant; University Students

INTRODUCTION

Artificial intelligence (AI) is transforming higher education at an unprecedented pace, reshaping how students learn, engage with academic content, and seek support outside the classroom (Crompton & Burke, 2023). Among the most prominent AI tools to emerge in recent years is ChatGPT, a generative large language model developed by OpenAI, which enables users to engage in natural language conversations, generate written content, solve problems, and receive instant explanations across a wide range of subjects. Since ChatGPT public launch in late 2022, it has been rapidly adopted by university students worldwide, who use it to assist with understanding difficult concepts, drafting and refining academic writing, preparing for examinations, and navigating research tasks. Its accessibility, versatility, and conversational interface distinguish it from earlier educational technologies and have contributed to its widespread uptake in academic settings (Tlili et al., 2023). Baidoo-Anu and Ansah (2023) further argued that generative AI tools such as ChatGPT hold significant potential for promoting active, student-centred learning by enabling on-demand explanations, personalised feedback, and interactive academic support that traditional classroom settings cannot consistently provide.

The growing integration of ChatGPT into student learning routines raises important questions about its actual value as an academic tool. While educators and institutions have responded with a mixture of enthusiasm and concern, relatively little empirical evidence exists to clarify whether ChatGPT genuinely enhances students' learning effectiveness, whether students are satisfied with it as a study assistant, and whether its use is associated with improved academic performance. Prior research has examined AI in education broadly, with scholars such as Zawacki-Richter et al. (2019) reporting positive effects of AI-based tools on student engagement. More recently, Kasneci et al. (2023) noted that ChatGPT specifically can support writing tasks and cultivate critical thinking, while Cotton et al. (2023) examined its academic integrity implications. Liu et al. (2025) further confirmed through meta-analysis that ChatGPT produces a large positive impact on learning performance across disciplines. However, these studies remain largely conceptual or focused on specific narrow dimensions of ChatGPT use, leaving the broader student experience underexplored.

A critical gap exists in the literature concerning the empirical assessment of ChatGPT as a holistic learning assistant at the university level, particularly in the context of developing and emerging economies where students' digital readiness, learning expectations, and institutional resources differ markedly from those in Western settings. Most existing studies either focus on a single dimension of AI tool use or rely on anecdotal or speculative accounts rather than systematic empirical data collected from students themselves (Chan & Hu, 2023). Furthermore, the interrelationships among ChatGPT effectiveness, student satisfaction, and academic performance have not been examined within a unified framework, limiting scholars' and practitioners' ability to draw actionable conclusions. This study addresses these gaps by adopting an integrated, student-centered empirical approach to investigate how ChatGPT functions as a study assistant across multiple dimensions simultaneously.

This study aims to explore the role of ChatGPT as a learning assistant among university students by investigating three core dimensions: (1) the effectiveness of ChatGPT as perceived by students in supporting their academic tasks; (2) student satisfaction with ChatGPT as a study tool; and (3) the perceived impact of ChatGPT usage on academic performance. The novelty of this research lies in its integrated examination of all three dimensions within a single empirical study, grounded in established theoretical frameworks from information systems and educational technology. The significance of

the study is twofold. First, it contributes to the growing scholarly discourse on generative AI in education by providing empirical, student-level evidence that moves beyond theoretical speculation (Hon, 2026). Second, it offers practical value to university administrators, course designers, and policymakers by identifying the conditions under which ChatGPT delivers meaningful academic benefits. The findings are expected to inform responsible and evidence-based integration of AI tools into higher education, ensuring that such technologies serve students' genuine learning needs rather than simply reflecting technological novelty

LITERATURE REVIEW

Theoretical Framework: Technology Acceptance Model (TAM) and Expectation Confirmation Model (ECM)

The theoretical foundation of this study draws upon two well-established frameworks from information systems and educational technology. Davis's (1989) Technology Acceptance Model (TAM) points out that perceived usefulness and perceived ease of use are the main determinants of users' willingness to adopt and continue using technology systems. While perceived usefulness describes how effectively a user believes a system will improve their work outcomes, perceived ease of use focuses on the user's anticipation of a smooth, low-effort experience during operation. In the context of ChatGPT as a study assistant, TAM provides the conceptual basis for understanding why students adopt and sustain the use of the tool, particularly when they perceive it as genuinely capable of improving their academic outcomes. Xue et al. (2026) confirmed through a meta-analysis of TAM-based studies in AI education that perceived usefulness consistently emerges as the strongest predictor of technology acceptance across diverse educational contexts, reinforcing the theoretical centrality of this construct. Sabeh et al. (2025) extended this foundation by applying the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2) alongside the Information Systems Success Model in a Malaysian classroom setting, confirming that performance expectancy, a construct conceptually aligned with perceived usefulness, significantly predicts student acceptance of ChatGPT. This empirical precedent directly supports the study's first research objective concerning ChatGPT effectiveness.

Complementing TAM, the Expectation Confirmation Model (ECM) developed by Bhattacherjee (2001) offers a theoretically grounded explanation of user satisfaction and continuance intention with information systems. ECM posits that post-adoption satisfaction emerges when a technology confirms or exceeds users' prior expectations, and that confirmed expectations lead to heightened perceived usefulness and sustained use. In the present study, students who initially expect ChatGPT to deliver accurate, contextually relevant, and timely academic support are anticipated to report elevated satisfaction when those expectations are fulfilled. Legramante et al. (2023) demonstrated that an integrated TAM and DeLone–McLean Information Systems Success Model framework effectively predicts both satisfaction and continuance intention in e-learning platforms, providing direct methodological precedent for combining these models in digital education research. This theoretical logic is reinforced by Sabeh et al. (2021), whose systematic review of the DeLone and McLean Information Systems Success Model in e-learning contexts identified information quality and system quality as critical determinants of user satisfaction, insights that directly shape how student satisfaction with ChatGPT is conceptualised and operationalised in this study. Together, TAM and ECM provide a complementary dual-model lens through which ChatGPT effectiveness, student satisfaction, and academic performance can be systematically examined within a unified empirical framework.

ChatGPT Effectiveness as a Study Assistant

The effectiveness of AI-powered tools in higher education refers to the degree to which students perceive such tools as genuinely supportive in accomplishing academic tasks,

including conceptual understanding, assignment completion, examination preparation, and research navigation. Kasneci et al. (2023) provided a comprehensive examination of ChatGPT's educational utility, noting that the tool can support higher-order cognitive processes, including critical thinking and academic writing while cautioning against risks such as factual inaccuracy and over-reliance. Complementing this view, Farrokhnia et al. (2024) conducted a SWOT analysis of ChatGPT in educational contexts and identified its capacity for immediate content generation and personalised learning as key strengths, while cautioning that risks such as factual inaccuracy and student over-reliance must be carefully managed to preserve the integrity of learning outcomes. Their analysis underscores the importance of evaluating effectiveness not solely in terms of task completion speed but also in terms of the quality of learning generated through ChatGPT interaction. This distinction is central to the present study's conceptualization of effectiveness as a multi-dimensional construct rooted in both cognitive and academic task outcomes.

In Malaysia, Anwar et al. (2024) found that digital e-learning tools significantly enhance business students' problem-solving capabilities, with psychological motivation and peer collaboration serving as key mediating mechanisms. This finding establishes a relevant empirical precedent for the positive influence of AI-powered tools on effectiveness outcomes among Malaysian university students, the primary target demographic of this research. Furthermore, Zawacki-Richter et al. (2019) reported consistent positive associations between AI tool use and student engagement across a systematic review of higher education studies, reinforcing the expectation that students who actively use ChatGPT as a study assistant will perceive it as an effective academic resource. Based on the reviewed literature, the following hypothesis is proposed:

H1: ChatGPT effectiveness positively affects student academic performance.

Student Satisfaction with ChatGPT

Student satisfaction with digital learning tools is a well-established predictor of sustained technology adoption and academic engagement. In the ChatGPT context, satisfaction is conceptualised as a positive affective response to the tool's performance in meeting or exceeding students' expectations for academic support. Fozeli et al. (2022) examined student satisfaction with e-learning tools during the COVID-19 pandemic and identified three primary drivers: perceived usefulness, ease of use, and system quality. Firat (2023) similarly reported that both scholars and students hold broadly positive perceptions of ChatGPT's role in higher education, with students in particular valuing the tool's accessibility and responsiveness as key contributors to their satisfaction with AI-assisted study experiences. Moreover, Rasul et al. (2023) reinforced this perspective by demonstrating that university students who engaged with ChatGPT as a learning companion reported heightened satisfaction attributed to the tool's ability to deliver immediate, contextually relevant responses, reduce academic anxiety, and foster a sense of autonomous learning that conventional study methods often fail to provide. These findings are directly applicable to ChatGPT, as students' satisfaction with the tool is similarly contingent upon their evaluation of its utility, the intuitiveness of its conversational interface, and the reliability of its output quality. The natural language design of ChatGPT distinguishes it from earlier e-learning platforms, making it comparatively more accessible and potentially more satisfying for students across varying levels of digital literacy.

The DeLone and McLean Information Systems Success Model, reviewed systematically by Sabeh et al. (2021), establishes that information quality characterised by accuracy, completeness, and relevance, is a critical determinant of user satisfaction. Since ChatGPT's primary academic function is generating informational responses to student queries, the quality of those responses is directly implicated in satisfaction outcomes. When students receive responses that are accurate, contextually appropriate, and pedagogically meaningful, satisfaction with the tool is expected to increase. Conversely,

responses characterised by hallucinated content or insufficient depth may erode satisfaction and reduce students' willingness to continue using ChatGPT. Munir et al. (2021) further identified cross-country differences in student satisfaction with online learning tools between Malaysia and Pakistan, noting that institutional context and prior digital experience significantly moderate satisfaction outcomes, a finding that contextualises the present study's attention to demographic and institutional variables as potential moderating factors. The following hypotheses are therefore proposed:

H2: Student satisfaction with ChatGPT positively affects student academic performance.

H3: ChatGPT effectiveness positively affects student satisfaction.

Impact of ChatGPT on Academic Performance

Academic performance in the context of AI-assisted learning encompasses students' self-reported improvements in subject comprehension, assignment quality, and examination preparedness, as well as objective performance indicators such as grade point averages and assignment scores. Kee et al. (2023) found that digital skills acquisition positively influences students' perceived academic outcomes, with course quality serving as a significant mediating variable. This finding implies that the impact of ChatGPT on academic performance is contingent not only on access to the tool but also on the quality of learning interactions it facilitates a distinction that the present study operationalises through its effectiveness and satisfaction constructs.

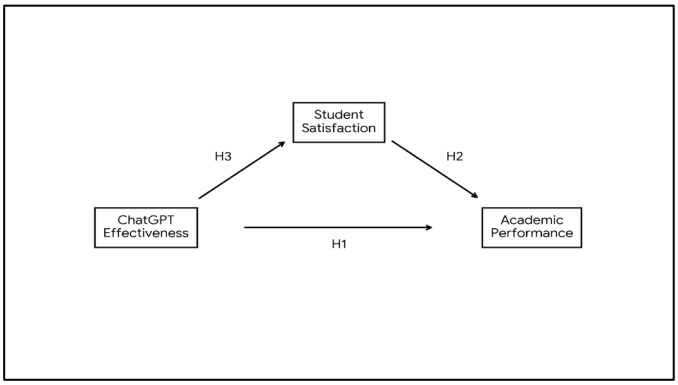
Ullah et al. (2022) investigated technology adoption among university students during educational disruptions and found that sustained academic performance was associated with technology use when students perceived the technology as both useful and accessible findings that align with the TAM-based theoretical framework of the present study. Kuh et al. (2008) further established that student engagement defined as the purposeful investment of time and effort in academic activities is a strong predictor of academic performance outcomes. AI tools like ChatGPT, when used as genuine study assistants rather than shortcuts for task avoidance, may increase engagement by making academic content more accessible and by enabling immediate, iterative feedback. This engagement-amplifying effect may be particularly salient for students who lack access to conventional academic support channels such as office hours or peer tutoring. Collectively, the literature supports the expectation that ChatGPT usage, when perceived as effective and satisfying, will be positively associated with students' academic performance. The following hypothesis is therefore proposed:

H4: ChatGPT effectiveness positively affects student satisfaction, which in turn positively affects academic performance.

Conceptual Framework

The study framework model is depicted in Figure 1

Figure 1. Research Framework



Note: H4 represents the mediating role of Student Satisfaction between ChatGPT Effectiveness and Academic Performance.

RESEARCH METHOD

Sample and Procedures

This study employed a quantitative survey methodology to examine the effectiveness, satisfaction, and academic performance impact of ChatGPT as a study assistant among university students. Data were collected through an online questionnaire administered via Google Forms. To ensure broad participation and sample diversity, the survey link was disseminated across multiple faculties and academic programmes at Universiti Sains Malaysia (USM) and Presidency University, India. Respondents were required to have used ChatGPT as a study tool at least once within the preceding six months, ensuring that all participants possessed first-hand experience relevant to the study's constructs. The study successfully gathered and analyzed a sample of 150 valid responses. The questionnaire link was shared across several faculties and academic programmes to collect data from students enrolled at Universiti Sains Malaysia (USM), Malaysia, and Presidency University, India. Given the diverse campus populations, the final sample naturally included international students studying abroad at these two universities, thereby reflecting various countries of origin within the student demographic profile. Utilizing IBM SPSS Statistics Version 32, the data underwent descriptive, reliability, correlational, and regression analyses.

Measures

This study measured ChatGPT effectiveness, student satisfaction, and academic performance using a 5-point Likert scale anchored by 1 (Strongly Disagree) and 5 (Strongly Agree). The complete list of measurement items is detailed in the Appendix. Items were adapted from established scales in the information systems and educational technology literature and pre-tested with 15 university students to ensure clarity, readability, and face validity prior to full-scale data collection. Cronbach's alpha was computed for each construct to assess internal consistency, with a minimum threshold of 0.70 applied consistent with Hair et al. (2010).

ChatGPT Effectiveness: Three items assessed students' perceptions of ChatGPT's utility in supporting their academic tasks, adapted from Davis (1989) and Sabeh et al. (2025). These items evaluated dimensions including concept clarification, task facilitation, study efficiency, and overall learning support. An example item is: "Using ChatGPT helps me understand difficult academic concepts more easily."

Student Satisfaction: Three items measured students' satisfaction with ChatGPT as a study tool, adapted from Bhattacherjee (2001) and Fozeli et al. (2022). These items assessed the extent to which ChatGPT met or exceeded students' expectations for quality, accuracy, and relevance of academic support. An example item is: “I am satisfied with my overall experience of using ChatGPT as my study assistant."

Academic Performance: Three items examined students' self-reported academic performance outcomes attributable to ChatGPT usage, adapted from Kee et al. (2023) and Ullah et al. (2022). These items captured perceived improvements in assignment quality, subject comprehension, examination preparedness, and overall academic outcomes. An example item is: "Using ChatGPT has helped me achieve better results in my assignments and assessments.”

RESULTS

Table 1. Summary of Respondents’ Demographic Information (N = 150)

Response	Frequency	Percent (%)
Gender		

Response	Frequency	Percent (%)
Female	88	58.7
Male	62	41.3
Current Level of Study		
Bachelor's Degree	97	64.7
Diploma	10	6.7
Master's Degree	38	25.3
PhD	5	3.3
Country of Origin		
China	5	3.3
India	84	56.0
Kyrgyzstan	1	0.7
Malaysia	59	39.3
Philippines	1	0.7
Age		
18–20	28	18.7
21–24	104	69.3
25–29	15	10.0
Above 30	3	2.0
Frequency of Using ChatGPT for Studies		
Daily	66	44.0
Several times a week	55	36.7
Once a week	16	10.7
Rarely	13	8.7
Average Hours per Week Using ChatGPT for Studying		
Less than 1 hour	52	34.7
1 – 4 hours	79	52.7
5 – 10 hours	13	8.7
More than 10 hours	6	4.0

Note: N = 150. Age data were missing for the first 48 responses due to an initial survey oversight. Missing values were estimated via proportional allocation based on the observed distribution of the 102 complete cases (missing at random). Estimated counts: 18–20 (n ≈ 9), 21–24 (n ≈ 33), 25–29 (n ≈ 5), Above 30 (n ≈ 1). Purpose percentages exceed 100% as respondents could select multiple purposes.

Table 1 details the demographic characteristics of the sample (N = 150). With regard to gender distribution, the majority of the respondents were female (N = 88, 58.7%), while male respondents accounted for 41.3% (N = 62) of the sample. Regarding the current level of study, most respondents were enrolled in a Bachelor's Degree programme (N = 97, 64.7%), followed by those pursuing a Master's Degree (N = 38, 25.3%), Diploma (N = 10, 6.7%), and PhD (N = 5, 3.3%). In terms of country of study, the largest proportion of respondents were studying in India (N = 84, 56.0%), followed by Malaysia (N = 59, 39.3%), China (N = 5, 3.3%), and one respondent each from Kyrgyzstan and the Philippines.

With respect to age, it is important to note that age data were not collected for the first 48 responses due to an oversight in the initial deployment of the survey instrument. As the missing age data were confined to the early responses and the 48 affected respondents were demographically comparable to the remaining 102 respondents in terms of gender and level of study, the missing data are considered to be missing at random (MAR). To address this limitation, age values for the 48 missing cases were estimated using proportional allocation, whereby the observed age distribution of the 102 complete cases was applied proportionally to the 48 missing entries. Based on this estimation, the combined age distribution across all 150 respondents is as follows: the majority fell within the 21–24 age group (N = 104, 69.3%), followed by 18–20 years (N = 28, 18.7%), 25–29 years (N = 15, 10.0%), and above 30 years (N = 3, 2.0%). This age distribution aligns naturally with the fact that the sample is composed primarily of students.

Table 2. Descriptive Statistics, Cronbach's Coefficient Alpha, and Zero-order Correlations for All Study Variables

Variable	1	2	3	Number of Items	Mean	Standard Deviation
1. ChatGPT Effectiveness	**.852**			3	4.047	.927
2. Student Satisfaction	.729***	**.791**		3	3.978	.838
3. Academic Performance	.576***	.688***	**.842**	3	3.971	.902

Note: N = 150; ***p < .001. The bold diagonal entries represent Cronbach's Coefficient Alpha. ChatGPT Effectiveness (α = .852); Student Satisfaction (α = .791); Academic Performance (α = .842).

The descriptive statistics, internal consistency reliabilities, and zero-order correlations for the three research variables are detailed in Table 2. All constructs demonstrated satisfactory levels of reliability, with Cronbach's alpha coefficients ranging from .791 to .852, exceeding the commonly accepted threshold of .70 (Hair et al., 2010). Specifically, ChatGPT Effectiveness recorded the highest alpha (α = .852), followed by Academic Performance (α = .842) and Student Satisfaction (α = .791), indicating adequate internal consistency across all scales.

For all three constructs, the mean scores surpassed the neutral midpoint of the 5-point scale, indicating that the overall feedback from respondents was quite positive. ChatGPT Effectiveness obtained the highest mean score (Mean = 4.047, Standard Deviation = 0.927), indicating that respondents viewed ChatGPT as an effective study tool in terms of enhancing conceptual understanding, improving study efficiency, and providing academically relevant responses. Student Satisfaction yielded a mean of 3.978

(Standard Deviation = 0.838), reflecting a favourable overall experience with ChatGPT as a study assistant. Academic Performance recorded a mean of 3.971 (Standard Deviation = 0.902), suggesting that respondents generally perceived ChatGPT as having a positive contribution to their academic outcomes.

Significant positive associations were observed among all three variables based on the zero-order correlation analysis. ChatGPT Effectiveness was most strongly correlated with Student Satisfaction ($r = .729$, $p < .001$), followed by Academic Performance ($r = .576$, $p < .001$). Student Satisfaction also demonstrated a significant positive correlation with Academic Performance ($r = .688$, $p < .001$). These results suggest that higher perceptions of ChatGPT's effectiveness are associated with greater student satisfaction, and that satisfaction in turn is closely linked with improved academic performance outcomes. All correlations were significant at the .001 level. Therefore, H3 (ChatGPT effectiveness positively affects student satisfaction) is supported ($r = .729$, $p < .001$).

Table 3. Regression Analysis

Variables	Academic Performance
1. ChatGPT Effectiveness	.159 (p= .068)
2. Student Satisfaction	.572***
R^2	.486
F value	69.370
Durbin-Watson Statistic	1.856

Note: N = 150; ***p < .001. Standardised coefficients (β) are reported

Table 3 presents the results of the multiple regression analysis examining the influence of ChatGPT Effectiveness and Student Satisfaction on Academic Performance. The overall regression model was statistically significant ($F = 69.370$, $p < .001$), explaining 48.6% of the variance in Academic Performance ($R^2 = .486$). The Durbin-Watson statistic of 1.856 indicated the absence of problematic autocorrelation in the residuals, supporting the robustness of the model.

Among the two predictors, Student Satisfaction emerged as the only significant predictor of Academic Performance ($\beta = .572$, $p < .001$), indicating that higher levels of satisfaction with ChatGPT as a study assistant were associated with better perceived academic performance outcomes. This finding aligns with prior research demonstrating the positive role of user satisfaction in technology-enhanced learning environments (Sabeh et al., 2021). In contrast, ChatGPT Effectiveness did not yield a statistically significant effect on Academic Performance ($\beta = .159$, $p = .068$), suggesting that the perceived effectiveness of ChatGPT alone may not be sufficient to directly predict academic performance when student satisfaction is simultaneously accounted for in the model. The non-significant direct effect suggests that, within the context of this study, the perceived effectiveness of ChatGPT may not translate directly into measurable academic outcomes unless students are genuinely satisfied with the tool.

Overall, the regression results highlight that Student Satisfaction is the more proximal driver of Academic Performance in the context of ChatGPT use, while ChatGPT Effectiveness may exert its influence on academic outcomes indirectly through its strong positive association with satisfaction ($r = .729$, $p < .001$), as shown in Table 2. These findings underscore the importance of ensuring that students not only perceive ChatGPT as an effective tool, but also derive genuine satisfaction from their experience of using it, as it is this satisfaction that most meaningfully predicts academic performance improvements. Based on the regression analysis and correlation results, the remaining

hypotheses are evaluated as follows. H1 (ChatGPT effectiveness positively affects student academic performance) is not supported, as the regression model shows no statistically significant direct effect of effectiveness on performance when satisfaction is included (β = .159, p = .068). Conversely, H2 (Student satisfaction with ChatGPT positively affects student academic performance) is supported, with satisfaction emerging as a highly significant predictor of academic performance (β = .572***, p < .001). Finally, H4 (ChatGPT effectiveness positively affects student satisfaction, which in turn positively affects academic performance) is also supported. The data indicates full mediation, as effectiveness significantly predicts satisfaction (Table 2) and satisfaction significantly predicts performance (Table 3), while the direct effect of effectiveness on performance remains non-significant.

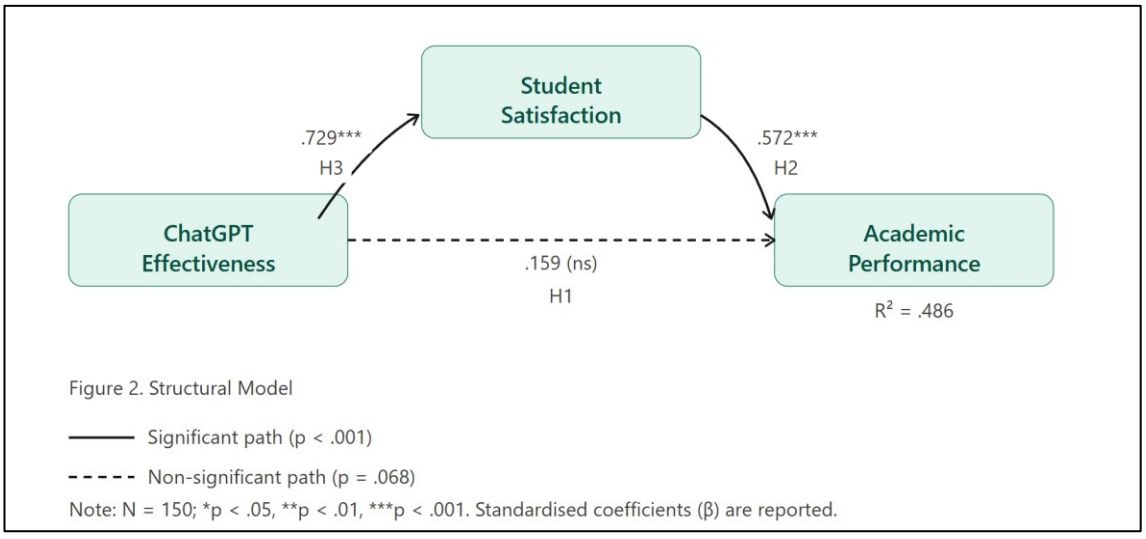


Figure 2. Structural Model

DISCUSSION

The results of this study contribute to the understanding of how ChatGPT functions as a study assistant among university students, with specific focus on its effectiveness, student satisfaction, and impact on academic performance. This section discusses the findings in relation to the proposed hypotheses and existing literature, presents the proposed business idea arising from the results, and outlines practical implications for universities and policymakers seeking to integrate ChatGPT meaningfully into academic environments.

The Influence of ChatGPT Effectiveness on Academic Performance (H1)

The regression analysis revealed that ChatGPT Effectiveness did not yield a statistically significant direct effect on Academic Performance (β = .159, *p* = .068), indicating that H1 was not supported. Although the correlation between ChatGPT Effectiveness and Academic Performance was positive and significant (*r* = .576, *p* < .001), its direct predictive effect diminished to non-significance once Student Satisfaction was simultaneously accounted for in the regression model. This pattern suggests that the perceived effectiveness of ChatGPT alone does not translate directly into measurable academic performance improvements when student satisfaction is controlled for. This finding is theoretically interpretable within the Technology Acceptance Model (TAM) framework proposed by Davis (1989), which suggests that perceived usefulness influences behaviour through intermediary attitudinal variables rather than exclusively through direct effects. While students in this study rated ChatGPT as highly effective

(Mean = 4.047), the non-significant direct path to academic performance implies that effectiveness may exert its influence on academic outcomes primarily through its strong positive effect on student satisfaction, an interpretation that is consistent with H4 and discussed further below. This result also aligns with Anwar et al. (2024), who found that digital tool effectiveness among Malaysian students enhances academic outcomes through motivational mediators, reinforcing the importance of considering indirect pathways when examining the performance impact of AI-based study tools.

The Influence of Student Satisfaction on Academic Performance (H2)
Student Satisfaction emerged as the only statistically significant predictor of Academic Performance in the regression model (β = .572, $p < .001$), providing strong support for H2. The model explained 48.6% of the variance in Academic Performance ($R^2 = .486$, $F = 69.370$, $p < .001$), confirming that Student Satisfaction is the more proximal and substantive driver of perceived academic outcomes in the context of ChatGPT use. This finding is well-explained by the Expectation Confirmation Model (ECM) proposed by Bhattacherjee (2001), which posits that post-adoption satisfaction resulting from the confirmation or exceedance of initial expectations drives continued technology use and associated performance outcomes. When students are genuinely satisfied with ChatGPT as a study assistant, they are more likely to engage with the tool consistently and purposefully, thereby deriving sustained academic benefits. These results align closely with Fozeli et al. (2022), who found that student satisfaction with e-learning tools during the COVID-19 pandemic was a significant predictor of positive academic outcomes, and with Sabeh et al. (2021), who confirmed in their systematic review of the DeLone and McLean model that information quality and system quality, both determinants of satisfaction are critical antecedents of user performance in digital learning contexts. The high mean satisfaction score (Mean = 3.978) observed in this study, combined with its strong beta coefficient, underscores that students who feel genuinely satisfied with ChatGPT's academic support are meaningfully better positioned to achieve improved performance outcomes.

The Influence of ChatGPT Effectiveness on Student Satisfaction (H3)
The zero-order correlation analysis provided strong support for H3, revealing a significant and robust positive relationship between ChatGPT Effectiveness and Student Satisfaction ($r = .729$, $p < .001$). This finding indicates that students who perceive ChatGPT as a highly effective study assistant are substantially more likely to report high levels of satisfaction with the tool, consistent with the theoretical predictions of both TAM (Davis, 1989) and ECM (Bhattacherjee, 2001). This result aligns with Sabeh et al. (2025), who confirmed that performance expectancy, a construct closely aligned with perceived effectiveness significantly predicts students' positive evaluations of ChatGPT in the Malaysian classroom context. Similarly, Sabeh et al. (2021) established that perceived system usefulness is a primary antecedent of user satisfaction in e-learning environments, a finding that maps directly onto the strong effectiveness-satisfaction relationship observed in the present study. The high Cronbach's alpha for ChatGPT Effectiveness (α = .852) and Student Satisfaction (α = .791) further validates the reliability of these constructs, lending confidence to the interpretation of their strong intercorrelation. Together, these findings reinforce that the quality and relevance of ChatGPT's academic outputs, the core dimensions of its perceived effectiveness directly shape how satisfied students feel when using it as a study assistant.

The Mediating Role of Student Satisfaction (H4)
The pattern of results across the correlation and regression analyses collectively supports H4, which proposed that ChatGPT Effectiveness positively affects Academic Performance indirectly through Student Satisfaction. The evidence for this mediation is threefold: first, ChatGPT Effectiveness was strongly correlated with Student Satisfaction

(r = .729, p < .001), supporting the antecedent path; second, Student Satisfaction was significantly correlated with Academic Performance (r = .688, p < .001), supporting the consequent path; and third, the direct effect of ChatGPT Effectiveness on Academic Performance became non-significant (β = .159, p = .068) once Student Satisfaction was included in the regression model, consistent with the pattern of full mediation. This mediation interpretation is theoretically coherent within both the TAM and ECM frameworks, which together suggest that perceived usefulness generates positive affective states, in this case, satisfaction that subsequently drive performance outcomes. The finding that effectiveness operates primarily through satisfaction rather than directly on performance carries important practical implications: it suggests that universities and educators should focus not only on ensuring students have access to ChatGPT, but on fostering conditions that maximise student satisfaction with the tool. This is consistent with Kuh et al. (2008), who established that affective engagement with academic tools reflected here through student satisfaction is a key predictor of academic performance, and with Ullah et al. (2022), who found that the performance benefits of digital technology adoption among university students are contingent on positive user evaluations of the technology.

Proposed Business Idea: ChatGPT Study Buddy Certification (CSBC)

While the findings of this study demonstrate that ChatGPT is highly effective and satisfying as a study assistant, and that student satisfaction meaningfully predicts academic performance improvement, they simultaneously reveal an important structural gap: the absence of a standardised, institutionally recognised framework for verifying and developing students' ability to use ChatGPT effectively and ethically. In response to this gap, this study proposes the ChatGPT Study Buddy Certification (CSBC), a nationally recognised AI academic proficiency certification designed for university students worldwide.

The CSBC is conceptually analogous to established digital skills credentials such as the Microsoft Office Specialist Certification and the Google Digital Marketing Certificate, both of which certify demonstrable competency in a specific digital tool rather than theoretical knowledge alone. Applied to ChatGPT, the CSBC would certify that a student is capable of using ChatGPT effectively, responsibly, and ethically as an academic study assistant transforming an informal personal study habit into a formally validated and employer-recognised academic competency. The CSBC is structured across three progressive levels. The Foundation level targets students who are new to ChatGPT, covering basic prompting techniques, understanding of the tool's capabilities and limitations, academic integrity guidelines, and proper citation of AI-generated content. The Intermediate level develops advanced prompting skills, subject-specific AI applications, strategies for critically evaluating AI-generated responses, and integration of ChatGPT with other academic research tools. The Advanced level cultivates campus AI leadership capabilities, including the ability to design AI-assisted study strategies, teach peers effective ChatGPT usage, and ethically integrate AI outputs into academic research and writing. Students who complete the Advanced level are recognised as campus AI Ambassadors, peer mentors who can support less experienced users and help universities build a culture of responsible AI usage.

The CSBC directly responds to the findings of this study. Since students perceive ChatGPT as highly effective (Mean = 4.047), the CSBC ensures that this effectiveness is maximised by teaching all students, not only self-directed early adopters how to prompt ChatGPT optimally for their specific academic needs. Since students are highly satisfied with ChatGPT (Mean = 3.978), the CSBC capitalises on this satisfaction by embedding it within a structured learning pathway that sustains and deepens engagement over time. And since student satisfaction is the most significant predictor of academic performance

(β = .572, p < .001), the CSBC is specifically designed to enhance the conditions that drive satisfaction namely, students' confidence, competence, and ethical awareness in using ChatGPT thereby amplifying its academic performance benefits equitably across student populations.

Take Malaysia as an example. For implementation in Malaysia, collaboration with the Ministry of Higher Education (MOHE) and the Malaysia Digital Economy Corporation (MDEC) is recommended. OpenAI's existing Education Plan provides a viable and cost-effective framework for universities to provide subsidised ChatGPT access to all enrolled students, ensuring equitable participation in the CSBC programme regardless of students' financial circumstances.

Several implementation risks warrant acknowledgement. The rapid pace of ChatGPT updates may render curriculum content outdated, which can be mitigated through quarterly curriculum reviews by a dedicated academic advisory committee. Concerns about assessment integrity, particularly the risk of students sharing answers can be addressed through randomised question pools and practical portfolio-based assessments requiring personalised demonstrations of skill. Resistance from academic staff can be managed through professional development incentives and by demonstrating the CSBC's alignment with existing graduate competency frameworks. These risks are manageable and should not outweigh the substantial educational and institutional benefits that the CSBC is expected to deliver.

Practical Implications

This study offers several actionable insights for universities, educators, and policymakers in Malaysia and India seeking to leverage ChatGPT for enhanced student learning outcomes. First, universities should formally recognise ChatGPT as an approved academic resource, listing it alongside existing tools such as library databases, Turnitin, and Microsoft Office in official academic support guidelines. Formal endorsement removes the stigma and ambiguity surrounding ChatGPT use and empowers students to engage with it openly and responsibly. Second, universities should implement the proposed ChatGPT Study Buddy Certification (CSBC) as a co-curricular credential available to all enrolled students. Beginning with a voluntary pilot at selected faculties before scaling to institution-wide adoption, the CSBC provides a practical, structured pathway for developing the AI literacy competencies that this study has shown to enhance academic satisfaction and performance. Third, universities should establish faculty-specific ChatGPT prompt libraries curated collections of the most effective academic prompts for each discipline to ensure that students across all fields of study can benefit equally from ChatGPT's capabilities, regardless of their prior experience with the tool. Fourth, academic integrity policies must be updated to explicitly address ChatGPT usage, providing clear guidelines on what constitutes appropriate AI assistance versus academic misconduct. The high satisfaction and effectiveness scores found in this study suggest that students are already integrating ChatGPT into their academic routines; institutional policy must evolve to match this reality and channel student behaviour constructively. Fifth, policymakers in both Malaysia and India should consider incorporating AI literacy including responsible ChatGPT usage into national higher education competency frameworks. Given the evidence presented in this study that student satisfaction with ChatGPT is a significant predictor of academic performance improvement (β = .572, p < .001), equipping all university graduates with verified AI study skills represents not merely an educational enhancement but a strategic investment in national human capital development.

CONCLUSION

This study examined the role of ChatGPT as a study assistant among university students, focusing on three core dimensions: its effectiveness as a learning tool, student satisfaction with its use, and its impact on academic performance. Drawing upon the Technology Acceptance Model and the Expectation Confirmation Model, the findings offer empirical evidence that advances the understanding of how AI-powered tools influence student learning outcomes in higher education settings.

The results confirm that ChatGPT is perceived as a highly effective study assistant, with students reporting that the tool enhances their conceptual understanding, improves study efficiency, and provides academically relevant support. However, the direct effect of ChatGPT effectiveness on academic performance was not statistically significant when student satisfaction was simultaneously accounted for in the model, indicating that effectiveness alone is insufficient to drive academic improvements. Instead, the findings reveal that student satisfaction functions as the critical mediating mechanism through which ChatGPT effectiveness translates into better academic performance outcomes. Students who were genuinely satisfied with ChatGPT demonstrated meaningfully stronger academic performance, underscoring that the affective dimension of technology use is as important as its functional utility.

The strong positive relationship between ChatGPT effectiveness and student satisfaction further reinforces that when students perceive the tool as capable, responsive, and academically relevant, their satisfaction naturally follows. This satisfaction, in turn, drives deeper and more purposeful engagement with the tool, ultimately contributing to improved academic outcomes. Collectively, these findings support the mediating role of student satisfaction proposed in H4, offering a theoretically coherent and practically actionable account of how ChatGPT delivers its academic benefits. Specifically, H2 (student satisfaction → academic performance), H3 (ChatGPT effectiveness → student satisfaction), and H4 (mediation of satisfaction) were supported, while H1 (ChatGPT effectiveness → academic performance) was not supported, suggesting that effectiveness alone is insufficient to directly drive academic outcomes without the mediating role of satisfaction

These findings carry important implications for universities, educators, and policymakers. Rather than focusing solely on providing students with access to ChatGPT, institutions should actively cultivate the conditions that maximise student satisfaction with the tool. This includes developing structured AI literacy programmes such as the proposed ChatGPT Study Buddy Certification, updating academic integrity policies to accommodate responsible AI use, and establishing faculty-specific prompt libraries to guide effective engagement across disciplines. By embedding ChatGPT within a supportive and structured academic framework, universities can ensure that its benefits are distributed equitably across all student populations, rather than being confined to self-directed early adopters.

Several limitations qualify the findings of this research. Specifically, because the data was gathered solely from two higher education institutions in Malaysia and India, extending these conclusions to different cultural or institutional environments should be done with caution. The reliance on self-reported survey data introduces the possibility of response bias, and the cross-sectional design precludes causal inference or the examination of how ChatGPT's effects on satisfaction and performance evolve over time. Additionally, age data were unavailable for 48 of the 150 respondents due to an oversight in the initial survey deployment, and the missing values were estimated through proportional allocation, which may introduce a degree of imprecision in the demographic

profile of the sample. Future research should employ longitudinal designs, larger and more diverse samples, and objective performance measures to build on and extend the present findings. Moreover, the measurement for each individual variable was restricted to only three items, which, while sufficient for preliminary analysis, may limit the depth of construct validity; future studies should consider expanding the item pool for each variable to strengthen measurement precision. Additionally, the potential moderating roles of demographic variables such as field of study, prior digital literacy, and frequency of ChatGPT use warrant further investigation.

Despite these limitations, this study contributes meaningfully to the growing body of empirical research on generative AI in higher education. By demonstrating that student satisfaction is the most proximal driver of academic performance in the context of ChatGPT use, the findings provide a clear and actionable basis for universities seeking to integrate AI tools responsibly and effectively into their academic frameworks

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APPENDIX

ChatGPT Effectiveness

1. ChatGPT helps me understand difficult academic concepts more easily
2. Using ChatGPT as a study assistant improves my overall study efficiency
3. ChatGPT provides useful and relevant responses to my academic questions

Student Satisfaction

1. I am satisfied with my overall experience of using ChatGPT as a study assistant
2. I feel that using ChatGPT for my studies was a good decision
3. I would recommend ChatGPT as a study assistant to my fellow students

Academic Performance

1. Since using ChatGPT, my understanding of academic subjects has improved
2. Using ChatGPT has helped me achieve better results in my assignments and assessments
3. ChatGPT helps me prepare more effectively for examinations

Note: All items are measured using a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

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