

AI-Assisted Writing: Exploring ChatGPT's Influence on Undergraduate Writing Processes

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DOI: <https://doi.org/10.47772/IJRISS.2026.100600819>

Received: 18 June 2026; Accepted: 24 June 2026; Published: 06 July 2026

ABSTRACT

Mastering academic writing is a complex cognitive process requiring students to plan, translate ideas into text, and review their work. Recently, artificial intelligence tools like ChatGPT have become popular for supporting these demanding tasks. While students use these tools to generate ideas and improve language, concerns exist regarding their continued engagement in essential cognitive writing stages. Therefore, this study explores undergraduate learners' perceptions of the relationship between ChatGPT usage and their writing processes. A quantitative survey design was employed, collecting data through a three-section questionnaire. The study involved 162 undergraduate respondents from various academic clusters. Overall findings indicated no significant gender differences in ChatGPT usage and writing processes, though significant differences emerged among academic clusters. Additionally, correlation analysis revealed a strong positive relationship between ChatGPT use and the planning and translating stages of writing. Despite relying on the tool for drafting, students maintained critical thinking by actively verifying AI-generated information. These findings suggest that educators should transition from restricting AI tools to teaching AI literacy. Guiding students to responsibly use and evaluate AI texts will support the development of their independent cognitive skills alongside modern educational technology.

Keywords: ChatGPT, writing process, artificial intelligence, academic writing, cognitive strategies

INTRODUCTION

Background of Study

Mastering academic writing is widely recognised as a complex and demanding endeavour for undergraduate students. The development of writing skills is often perceived as challenging because it requires careful consideration of various linguistic, semantic, and structural elements (Khairuddin et al., 2021). Fundamentally, writing is not a linear act but a dynamic cognitive process that involves distinct stages such as planning, translating ideas into text, and reviewing the drafted content (Flower & Hayes, 1981). These interconnected stages require students to continuously employ cognitive and metacognitive strategies to express their arguments clearly and meet rigorous academic expectations (Rahmat, 2021).

To thoroughly comprehend the intersection of artificial intelligence and academic literacy, it is necessary to define the core variables of this study: the writing process and ChatGPT. The writing process is theoretically framed as a series of deliberate cognitive decisions and choices that writers make to achieve their communicative goals (Flower & Hayes, 1981). It demands significant intellectual effort, social awareness, and affective regulation. Conversely, ChatGPT represents a modern technological intervention capable of alleviating portions of this cognitive load. It acts as an interactive AI platform that can simulate conversation, retrieve information,

and formulate structured text, essentially serving as a collaborator during a student's cognitive processing of an academic assignment (Youssef et al., 2024).

Despite the rapidly growing body of literature examining the general utility of AI in higher education, there is a noticeable gap regarding how undergraduates specifically integrate ChatGPT into the distinct cognitive phases of writing. While previous research has largely focused on broad academic outcomes, ethical implications, or general student engagement, less is known about the exact ways students interact with ChatGPT during the planning, translating, and reviewing stages of composition. Investigating this specific relationship remains highly relevant, as it provides educators with empirical insights into whether and how AI tools can be constructively integrated into academic writing curricula. By exploring this phenomenon, the current study seeks to establish an evidence-based understanding of how AI assistance interacts with the traditional writing process, ensuring that students' independent cognitive development is supported rather than compromised.

Statement of Problem

The development of artificial intelligence (AI) tools like ChatGPT has created major changes in educational practices, particularly in the field of writing. Numerous students currently use ChatGPT as a supportive tool to generate ideas, improve their language use and assist them with writing tasks. A recent study found that ChatGPT successfully enhances students' critical thinking by offering immediate access to diverse viewpoints, streamlining complex data/information analysis, and reinforcing their capacity to build structured, logical arguments (Melisa et al., 2025). With the increasing presence of AI in education, it is important to understand how students are applying these technologies and how these tools are shaping their writing. Therefore, this study aims to explore learners' perceptions of the relationship between ChatGPT and the writing process among undergraduates. Understanding this relationship may provide educators with a clearer picture of how AI can be integrated into writing instruction while ensuring that students continue to develop meaningful writing skills and cognitive engagement.

Writing is a complicated process, and it is about more than just getting ideas down on paper. Writing is a cognitive process that involves many recursive stages including, planning, translating ideas into written form, and reviewing written work (Flower and Hayes, 1981). Similarly, Raoofi et al. (2017) suggested that learners use different strategies including metacognitive, cognitive, social and affective strategies during the writing process. However, with the growing use of AI tools such as ChatGPT, questions are raised whether learners are participating in these writing processes or whether they are becoming overly reliant on technology during writing activities. While research has explored the educational benefits of ChatGPT, most of it covers broader aspects such as learning outcomes and academic performance. For example, Youssef et al. (2024) explored the impact of ChatGPT on students' academic learning and engagement. Another study revealed significant positive improvements in academic achievement, with 89.5% of students reporting that ChatGPT directly enhanced their academic performance (Gonzalez-Garcia et al., 2025). However, there is still a need to understand ChatGPT in relation to specific stages of the writing process, especially among undergraduate learners. More specifically, little attention has been paid to how ChatGPT might influence students' planning, translating, and reviewing processes when they are engaged in writing tasks.

Hence, the present study aims to explore the perception of undergraduates' perception of the relationship between ChatGPT and the writing process. Knowing this relationship may give teachers a better understanding of how AI can be incorporated into writing instruction while promoting the development of meaningful writing skills and cognitive engagement in students.

Objective of the Study and Research Questions

This study is done to explore the writing process and ChatGPT. Specifically, this study is done to answer the following questions;

- Is there a significant relationship between (a) ChatGPT and (b) the writing process across gender?

H₀₁: There is no significant relationship between (a) ChatGPT and (b) the writing process across gender

- Is there a significant relationship between (a) ChatGPT and (b) the writing process across clusters?

H₀₂: There is no significant relationship between (a) ChatGPT and (b) the writing process across clusters

- How do learners perceive the writing process?
- How do learners perceive ChatGPT in writing?
- Is there a significant relationship between the writing process and ChatGPT?

H₀₃: There is no significant relationship between the writing process and ChatGPT

LITERATURE REVIEW

Theoretical Framework of the Study

Genitive Cognitive Process in Writing by Flower and Hayes (1981)

The Cognitive Process Theory of Writing, pioneered by Flower and Hayes (1981), conceptualises composition as a dynamic, non-linear, and goal-directed cognitive phenomenon rather than a sequence of rigid chronological stages. This theoretical framework posits that writing operates through three major components which are the task environment, the writer's long-term memory, and the core writing processes – planning, translating, and reviewing. These processes are all regulated by an internal monitor. Within this cognitive architecture, planning allows writers to generate ideas, organise information, establish goals, while translating transforms these internal concepts into written verbal forms, and at the same time, reviewing enables the evaluation and subsequent revision of the text. Building upon this groundwork, Raoofi et al. (2017) emphasise that writing represents an intricate operation demanding a highly sophisticated coordination of diverse cognitive and linguistic resources. This complexity means that writers rarely proceed in a linear manner. Instead, they move fluidly through recursive before, during, and after writing stages, constantly applying cognitive and metacognitive strategies to manage text production and overcome compositional challenges. These internal mechanics are simultaneously shaped by broader rhetorical considerations, requiring writers to negotiate their ideas against specific communicative purposes, linguistic constraints, and audience expectations. Because any individual cognitive sub-process can be embedded within another, the framework provides a comprehensive account of how individuals actively manage their thinking patterns, handle cognitive load, and progressively refine meaning during the act of writing.

AI theory and ChatGPT use

The theoretical framework of this research is grounded in the intersection of Constructivism Learning Theory and the Cognitive Process Theory of Writing, providing a comprehensive lens to understand how students interact with artificial intelligence during compositional tasks. From a constructivist perspective, learning is viewed as an active, ongoing process of knowledge creation where AI systems like ChatGPT function as facilitative resources, offering continuous support, tailored feedback, and assistance with comprehending complex concepts (Youssef et al., 2024). When applied to academic writing, this technological assistance naturally intersects with the underlying mechanics of composition, which is fundamentally a goal-directed cognitive activity driven by a highly recursive series of decisions and choices rather than a simple, linear output (Flower & Hayes, 1981). Within the systematic stages of planning, translating ideas into text, and reviewing, writers must actively employ a combination of cognitive and metacognitive strategies to synthesize information and manage their structural organisation (Rahmat, 2021). By integrating these complementary theoretical perspectives, this research posits that ChatGPT acts as a digital scaffold that supports undergraduates through the demanding cognitive stages of the writing process, thereby influencing how they independently navigate metacognitive challenges, maintain engagement, and construct meaningful academic arguments (Flower & Hayes, 1981; Youssef et al., 2024).

Past Studies

Past Studies on Writing and ChatGPT

In today's era, with numerous ongoing societal and technological development, the shift education field is also

not left behind. Various changes have been made or attempted to improve and enhance the efficacy of learning and teaching processes. Among the many efforts, one of the most pursued efforts done is implementing the self-regulated learning (SRL) processes among the students. Like other areas of education, writing has been one of the areas that can implement the SRL process. According to Faza and Lestari (2025), as students stepped into a higher level of education, it is vital for them to practice SRL to achieve academic success as the key strategies such as goal setting, metacognitive and cognitive processes, self-reflection, time management, monitoring, and help seeking, are involved in SRL. It was also further stated that by offering individualized feedback and promoting autonomy in learning, technologies including learning management systems (LMS), massive open online courses (MOOCs), artificial intelligence (AI), collaborative platforms, and learning analytics assist SRL. Sohail et al. (2025) also supported this concept in which they carried out a study to explore the impact of technologies implementation towards SRL, specifically through the use of AI-enhanced online mentoring platform. Their study focused on incorporating technology into pedagogy, and particularly their findings showed that technology integration assists SRL and is crucial in helping students develop self-control and lessen their cognitive load as real-time feedback and online mentorship are enabled.

Throughout the years, since the emergence of Artificial Intelligence (AI) tools, a vast extension of research has been done in regard to the AI tools integration and implementation in the academic field. The study by Jelson et al. (2026) was done to investigate the issues of how students use ChatGPT in writing essays and how the ChatGPT tools contribute in helping students throughout different stages of writing process including the planning, translating, reviewing, and overall writing. Centered around the Flower and Hayes Cognitive Process Theory of Writing, the study investigated students' patterns of engagement in using ChatGPT and how it affects their writing behaviours. A number of 77 participants were involved in their study, in which the students were required to carry out an online study using the in-house ChatGPT developed by the researchers, and the questions and queries posed by the students while writing and composing an essay were recorded. Through qualitative analysis, the study determined the categories of assistance sought by the students and presented the usage patterns, spanning from asking for feedback on the topic to assigning the whole writing. Additionally, it was discovered that students' levels of ownership and originality differed according on how they utilized ChatGPT, and that their writing self-efficacy affected their inquiring patterns.

Levine et al., (2024) conducted an empirical study focussing on how students used text based generative AI tools specifically in ChatGPT, as collaborative partners in different stages of writing, which include the planning, translating, and reviewing essays. They also focussed to identify how students engage with, adapt, adopt, or reject the language and content generated by ChatGPT in their actual writing process. 12 respondents were involved in the study and using the writing prompts designed by the researchers, the students were required to work using ChatGPT to produce their writings. Based on the statistical computational text analysis, the study indicated that students mostly used ChatGPT to obtain ideas during planning and drafting, then expanded on those ideas. It was also presented that students can utilize ChatGPT as a writing tool without avoiding the planning, drafting, and reviewing processes, and it can be integrated into a social, distributed writing model.

Based on the presented past studies, it can be encapsulated that AI tools have its own role and can contribute to the efficiency of students' writing processes. Students may rely on using AI tools not only to plan and review essays, but also to generate organized and coherent structure of the whole writings produced, which can enhance their SRL processes ability. In this study, further detailed roles of AI tools, specifically the features of ChatGPT, will be explored. The study will explore the strategies used by students in writing and how they utilise ChatGPT to facilitate the process, as well as whether or not ChatGPT can contribute to the students' critical thinking skills and academic achievements.

Conceptual Framework of the Study

Figure 1 shows the conceptual framework of the study. This study explores learners' perceptions on the influence on ChatGPT on their writing process. The writing process is anchored by Flower and Hayes (1981) writing theory which states that the writer goes through three main stages in the writing process: planning, translating, and reviewing. According to Raoofi et al. (2017), writers use strategies such as metacognitive, effort regulation, cognitive, social, and affective strategies when they write.

When it comes to academic writing, learners depend on their knowledge of writing strategies (Khairuddin et al., 2021) to complete each stage of the composing process. During the first stage, writers go through the planning stage. This is where the writer reads information to use as support in their writing content. The next stage is the translating stage where writers translate their oral thoughts into written thoughts. This stage requires the writer to use paraphrasing skills (Rahmat, 2021). The last stage is the reviewing stage where writers look back at their work to add, delete or repair information in the write-up.

In this day and age, stages such as the translating and reviewing stage are facilitated by the use of ChatGPT. According to Youssef et al. (2024) and Melisa et al. (2025), the use of ChatGPT impacts learners' critical thinking abilities, academic achievement and engagement in writing. This study explores the influence of ChatGPT on the writing process.

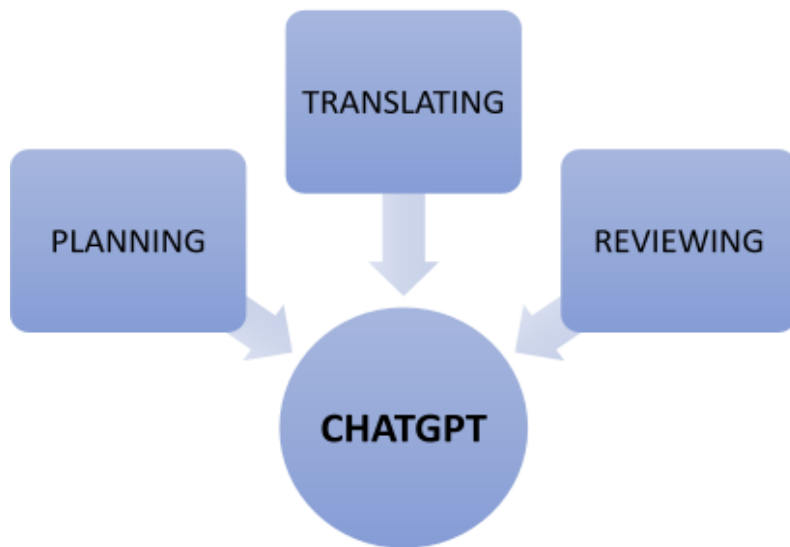


Figure 1 - Conceptual Framework of the Study

METHODOLOGY

This quantitative pilot study is done to explore the writing process and ChatGPT. A convenient sample of 162 participants responded to the survey. The instrument (refer to Table 1) used is a 5-Likert-scale survey. It is rooted in Flower and Hayes (1981) and Raoofi et al. (2017) for writing; Youssef et al. (2024) for ChatGPT. Table 1 below shows the categories used for the Likert scale; 1 is for Never, 2 is for Rarely, 3 is for Sometimes, 4 is for Very Often and 5 is for Always.

Table 1 - Likert Scale Use

1	Never
2	Rarely
3	Sometimes
4	Very Often
5	Always

Table 2 - Reliability Levels, Cronbach's Alpha Ranges, and Their Interpretations

Reliability Level	Cronbach's Alpha range	Interpretation
Excellent	0.9 and above	Indicates very high internal consistency
Good	0.80-0.89	Reflects strong internal consistency
Acceptable	0.70-0.79	Indicates acceptable internal consistency
Questionable	0.60-0.69	Reflects questionable internal consistency
Poor	Below 0.6	Indicates poor internal consistency

In order to determine the internal reliability of the instrument, reliability analysis is conducted. Table 2 above shows the distribution and interpretation of Cronbach Alpha range. According to Ahmad et al. (2024), Cronbach Alpha scores between 0.7 to 0.9 is considered acceptable to excellent.

Table 3 - Distribution of Items in the Survey

Section	Variable	Construct	No of Items / Indicators	Item	CA
B	WRITING PROCESS-PLANNING	Metacognitive	10	10	.827
		Effort Regulation	4	10	.885
	WRITING PROCESS-TRANSLATING	Cognitive	6		
		Social	4	8	.917
	WRITING PROCESS-REVIEWING	Affective	4		
C	CHATGPT	Critical thinking abilities	4	15	.916
		Academic achievement	4		
		ChatGPT usage	4		
		Student engagement	3		
				43	.959

Table 3 shows the distribution of items in the survey. Section B has 28 items on the Writing Process. Section C has 15 items on ChatGPT.

Table 3 also shows the reliability of the survey. The analysis shows a Cronbach alpha of .827 for Planning, .885 for Translating, .917 for Reviewing, .916 for ChatGPT. The overall Cronbach Alpha for all 43 items is .959; thus, revealing a good reliability of the instrument chosen/used. Further analysis using SPSS is done to present findings to answer the research questions for this study.

FINDINGS

Demographic Analysis

According to Ziegenfuss et al. (2021), researchers report demographic data in percentages to establish sample representatives and allow for generalizability to a larger population. The reporting also provides an overview of participants' characteristics. Percentages offer a clear and understandable picture of the sample makeup.

Table 4 - Percentage for Demographic Profile

Question	Demographic Profile	Categories	Percentage (%)
1	Gender	Male	32%
		Female	68%
3	Cluster	Science & Technology	30%
		Social Sciences, Humanities & Business	70%

Table 4 shows the demographic profile of the respondents based on their gender and academic cluster. The study has more female students, which make up 68% of the group, compared to 32% for the male students. When looking at their field of study, most of the respondents (70%) belong to the Social Sciences, Humanities, and Business cluster. The remaining 30% are students from the Science and Technology cluster. Overall, this breakdown gives a clear picture of who took part in the study before exploring how they use and view ChatGPT in their writing process.

Inferential Statistics (significant difference)

According to He (2024), there are three main functions of a t-test. Firstly, t-tests are done to compare means. This test is also done to determine if the average scores (mean) or values of two groups, or one group against a known value, are different enough to be considered statistically meaningful and are not just due to random

chance. Secondly, t-test is done to test hypotheses. Researchers use t-tests to test hypotheses about means, such as whether a new treatment significantly impacts a variable or if there's a difference in performance between two distinct groups. Lastly, t-test is done to identify significant differences. The output of a t-test provides a p-value (significance value). If this p-value is below a pre-determined threshold (often 0.05), it indicates a statistically significant difference, allowing researchers to conclude the populations from which their samples were drawn.

Findings for Gender

This section presents data to answer research question 1- Is there a significant relationship between (a) ChatGPT and (b) the writing process across gender?

H₀₁: There is no significant relationship between (a) ChatGPT and (b) the writing process across gender.

Table 5 - (a) ChatGPT and (b) the writing process across gender

Group Statistics											
		Q1GENDER	N	Mean	Std. Deviation	Std. Error Mean					
CHATGPT	MALE		52	3.2513	.53896	.07474					
	FEMALE		110	3.3115	.66305	.06322					
WRITING_PROCESS	MALE		52	3.1779	.56838	.07882					
	FEMALE		110	3.2140	.63444	.06049					

Independent Samples Test											
		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						One-Sided p	Two-Sided p			Lower	Upper
CHATGPT	Equal variances assumed	1.426	.234	-.572	160	.284	.568	-.06023	.10538	-.26835	.14788
	Equal variances not assumed			-.615	121.084	.270	.540	-.06023	.09789	-.25403	.13357
WRITING_PROCESS	Equal variances assumed	1.682	.197	-.349	160	.364	.728	-.03608	.10336	-.24019	.16804
	Equal variances not assumed			-.363	110.788	.359	.717	-.03608	.09936	-.23296	.16081

A two-sample t-test (Table 5) was performed to compare (a) ChatGPT and (b) the writing process gender. There were no significant differences for (a) ChatGPT (p=0.568) and (b) writing process (p=0.728) across gender. The null hypothesis is accepted for H₀₁.

Findings for Cluster

This section presents data to answer research question 2- Is there a significant relationship between (a) ChatGPT and (b) the writing process across clusters?

H₀₂: There is no significant relationship between (a) ChatGPT and (b) the writing process across clusters.

Table 6 - (a) ChatGPT and (b) the writing process across clusters

Group Statistics					
	Q2DIS	N	Mean	Std. Deviation	Std. Error Mean
CHATGPT	S&T	48	3.0847	.55484	.08008
	SS,H&B	114	3.3795	.63426	.05940
WRITING_PROCESS	S&T	48	2.9881	.50611	.07305
	SS,H&B	114	3.2926	.63262	.05925

Independent Samples Test											
		Levene's Test for Equality of Variances		t-test for Equality of Means							
		F	Sig.	t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						One-Sided p	Two-Sided p			Lower	Upper
CHATGPT	Equal variances assumed	3.426	.066	-2.800	160	.003	.006	-.29481	.10530	-.50277	-.08685
	Equal variances not assumed			-2.957	100.318	.002	.004	-.29481	.09971	-.49263	-.09699
WRITING_PROCESS	Equal variances assumed	4.030	.046	-2.958	160	.002	.004	-.30451	.10293	-.50780	-.10122
	Equal variances not assumed			-3.237	109.473	<.001	.002	-.30451	.09406	-.49092	-.11810

A two-sample t-test (Table 5) was performed to compare (a) ChatGPT and (b) the writing process clusters. There were significant differences for both (a) ChatGPT ($p=0.006$) and (b) writing process ($p=0.004$) across clusters. The null hypothesis is rejected for H_{02} .

Descriptive Statistics (mean)

Why is there a need to report the mean and standard deviation? According to Vetter (2017), Mean (M) represents the average, or centre of a data set. Standard Deviation (SD) indicates the typical distance of individual observations from the mean which shows the data's variability or spread. A low SD means the data points are clustered close to the mean while a high SD indicates they are more spread out. It is good to have a high SD.

Findings for Writing Process

This section presents data to answer research question 1: How do learners perceive the writing process? In the context of this study, this is measured by (i) the Planning Stage, (ii) the Translating Stage and (iii) the Reviewing Stage.

(i) Planning Stage - This stage is measured by Metacognitive Writing Strategies (MWS)

Table 7 - Mean (M) and Standard Deviation (SD) for Planning Stage - Metacognitive (MWS)

ITEM	M	SD
MWSQ1 - I organize my ideas prior to writing.	3.11	0.68
MWSQ2 - I revise my writing to make sure that it includes everything I want to discuss in my writing.	3.21	0.86
MWSQ3 - I check my spelling.	3.11	1.21
MWSQ4 - I check my writing to make sure it is grammatically correct.	3.32	0.97
MWSQ5 - I evaluate and re-evaluate the ideas in my essay.	2.93	0.94
MWSQ6 - I monitor and evaluate my progress in writing.	3.53	0.94
MWSQ7 - I revise and edit an essay two or more times before I hand it in to my lecturer.	3.91	0.92
MWSQ8 - I go through the planning stages in my writing.	3.68	0.85
MWSQ9 - I go through the drafting stages in my writing.	3.69	0.88
MWSQ10 - I go through the revising and editing stages in my writing.	3.86	0.86

Table 7 shows how learners perceive the process of writing during the planning stage through their application of metacognitive writing strategies. The table presented the highest mean score on the item "I revise and edit an essay two or more times before I hand it in to my lecturer" (MWSQ7; $M = 3.91$, $SD = 0.92$), demonstrating that participants heavily prioritise final-stage text refinement. This practice aligns closely with their high self-reported engagement in the formal revising and editing stages of composition (MWSQ10; $M = 3.86$, $SD = 0.86$). Learners also reported a consistent tendency to navigate structured writing processes, as reflected in their active execution of drafting stages (MWSQ9; $M = 3.69$, $SD = 0.88$) and designated planning stages (MWSQ8; $M = 3.68$, $SD = 0.85$). Ongoing tracking behaviours, including monitoring personal progress (MWSQ6; $M = 3.53$, $SD = 0.94$) and confirming grammatical correctness (MWSQ4; $M = 3.32$, $SD = 0.97$), occupied a moderate position in their writing routines. Similarly, reviewing the text to guarantee the inclusion of all desired discussion points yielded a mean score of 3.21 (MWSQ2; $SD = 0.86$). Pre-writing organisation (MWSQ1; $M = 3.11$, $SD = 0.68$) and basic orthographic spelling checks (MWSQ3; $M = 3.11$, $SD = 1.21$) shared identical baseline scores, though spelling

actions showed a notably wider individual dispersion among respondents. Conversely, the lowest mean score was observed for item MWSQ5, where learners evaluated and re-evaluated the core ideas in their essays ($M = 2.93$, $SD = 0.94$), suggesting a relative reluctance to deeply question or alter their conceptual frameworks once the writing process has commenced.

(ii) **Translating Stage - This stage is measured by (A) Effort Regulation and (B) Cognitive Writing Strategies.**

(a) **Effort Regulation (ERS)**

Table 8 – Mean (M) and Standard Deviation (SD) for (A) Effort Regulation (ERS)

ITEM	M	SD
ERSQ1 - I use AI to help me write a lot to develop my writing skills.	3.00	0.87
ERSQ2 - AI helps me work hard to do well in my writing even if I don't like English writing tasks.	2.90	1.02
ERSQ3 - Even if the writing activities are difficult, I don't give up but try to engage in them with the help of AI.	3.14	1.02
ERSQ4 - AI helps me concentrate as hard as I can when doing a writing task.	2.91	1.08

Table 8 shows how the learners perceive the writing process in the Translating Stage in terms of the Effort Regulations (ERS) construct. The table presented the highest mean score is on the item ERSQ3, with the mean score of 3.14 ($M = 3.14$, $SD = 1.02$). This demonstrates that the students believed that ChatGPT and AI tools serve as an important motivational scaffold, fostering perseverance and academic resilience when students encounter challenging writing obstacles. The moderate mean score was also presented in the table, which is on the item ERSQ4 with a score of 2.91 ($M = 2.91$, $SD = 1.08$), and is followed by the lowest mean score on the item ERSQ2, yielding a 2.90 mean score, ($M = 2.90$, $SD = 1.02$). This suggest that students moderately agreed that AI assists them in maintaining concentration during writing tasks, and that while AI is highly effective at helping students push through difficult tasks, its ability to drive hard work or completely mitigate a lack of intrinsic interest in English writing is slightly more limited among the respondents.

(b) **Cognitive Writing Strategies (CWS)**

Table 9 – Mean (M) and Standard Deviation (SD) for Translating Stage - (B) Cognitive (CWS)

ITEM	M	SD
CWSQ1 - I use memorized grammatical elements such as singular and plural forms, verb tenses, prefixes and suffixes, etc, in my writing	3.75	0.86
CWSQ2 - I put newly memorized vocabulary in my sentences.	3.03	0.94
CWSQ3 - In order to generate ideas for my writing, I usually engage myself in brainstorming.	2.93	1.03
CWSQ4 - I use different words that have the same meaning.	3.44	1.03
CWSQ5 - I use my experiences and knowledge in my writing.	4.15	0.86
CWSQ6 - I try to use effective linking words to ensure clear and logical relationship between sentences or paragraphs	3.17	0.94

Table 9 shows how the learners perceive the writing process in the Translating Stage in terms of the Cognitive (CWS) Construct. The table presented the highest mean score on item CWSQ5, revealing the mean score of 4.15 ($M = 4.15$, $SD = 0.85$). This highlights that students rely heavily on their prior knowledge and personal schema as their primary cognitive resource during the drafting process. The items CWSQ1 and CWSQ4 also showed high mean score in which the mean scores for each item are 3.75 ($M = 3.75$, $SD = 0.86$) and 3.44 ($M = 3.44$, $SD = 1.03$) respectively. This illustrates that students also showed high agreement regarding structural and vocabulary mechanics during translation. They frequently draw upon memorized grammatical frameworks and consciously employ lexical variation through synonyms to diversify their expression. The moderate mean scores presented in the table refer to the item CWSQ6 with the mean score of 3.17 ($M = 3.17$, $SD = 0.94$) and item CWSQ2 with the mean score of 3.03 ($M = 3.03$, $SD = 0.94$). Learners demonstrated moderate agreement on using transitional

elements to establish logical text flow and integrating newly acquired vocabulary into their writing. The lowest mean score presented in the table is for the item CWSQ3 with the mean score of 2.93 ($M = 2.93$, $SD = 0.94$), which suggests structured or independent brainstorming is the least utilized cognitive strategy during translation among these respondents.

(iii) **Reviewing Stage – This stage is measured by (A) Social and (B) Affective Writing Strategies.**

(a) **Social Writing Strategies (SWS)**

Table 10 – Mean (M) and Standard Deviation (SD) for Social (SWS)

ITEM	M	SD
SWSQ1 - In order to generate ideas for my writing, I usually discuss the writing topic with a friend or classmate.	2.64	1.13
SWSQ2 - After revising and editing my essay thoroughly, I ask a friend or my classmate to read and comment on it.	2.74	1.13
SWSQ3 - I try to identify friends or classmates whom I can ask for help in my writing.	2.73	1.08
SWSQ4 - When I have trouble writing my essay, I try to do it with my classmates or friends.	2.96	0.98

Table 10 shows how learners perceive the writing process in the reviewing stage in terms of the Social Writing Strategies (SWS) Construct. The table presented the highest mean score on item SWSQ4 ($M = 2.96$, $SD = 0.98$), indicating that collaborating with peers when encountering writing difficulties is the most frequently employed social strategy. Items SWSQ2 and SWSQ3 showed relatively comparable mean scores, with 2.74 ($M = 2.74$, $SD = 1.13$) and 2.73 ($M = 2.73$, $SD = 1.08$), respectively. This indicates that learners used peer feedback moderately and identified reliable peers for writing assistance. The lowest mean score was recorded on item SWSQ1 ($M = 2.64$, $SD = 1.13$). This reflects how discussing the writing topic with peers to generate ideas is the least utilized social strategy used by students during this stage. Overall, the findings indicate that learners do not heavily rely on social interactions when generating ideas during the writing process; instead, idea generation is predominantly an individual activity.

Affective Writing Strategies (AWS)

Table 11 – Mean (M) and Standard Deviation (SD) for Affective (AWS)

ITEM	M	SD
AWSQ1 - I try to write an essay in class with confidence and ease	2.98	0.93
AWSQ2 - Using AI helps me try to write an essay in class with greater ease.	2.92	0.93
AWSQ3 - I try to relax whenever I feel afraid of writing.	2.81	1.08
AWSQ4 - I encourage myself to write even when I am afraid of making mistakes	3.08	1.06

Table 11 shows how learners perceive the writing process in the reviewing stage in terms of the Affective writing strategies. The table revealed the highest mean score on item AWSQ4 ($M = 3.08$, $SD = 1.06$), indicating that self-encouragement is the most frequently employed affective strategy among learners. Next, item AWSQ1 revealed the second highest mean score ($M = 2.98$, $SD = 0.93$) reflecting moderate confidence and ease when writing an essay. Item AWSQ2 recorded a mean score of 2.92 ($M = 2.92$, $SD = 0.93$), suggesting that AI assistance offers only a moderate boost to learners' ease during writing. Lastly, item AWSQ3 shows the lowest mean score ($M = 2.81$, $SD = 1.08$). This illustrates how learners find it difficult to remain relaxed when writing is perceived to induce fear. Overall, the data presented in Table 11 indicate that students exhibit limited affective regulation during the reviewing process, although self-encouragement appears to provide some degree of support.

Findings for ChatGPT

This section presents data to answer research question 2: How do learners perceive ChatGPT in writing? In the context of this study, this is measured by (i) Critical Thinking abilities (CT), (ii) Academic Achievement (AA), ChatGPT Usage (CU), and (iv) Student Engagement (SE).

(i) Critical Thinking Abilities (CT)

Table 12 – Mean (M) and Standard Deviation (SD) for Critical Thinking Abilities (CT)

ITEM	M	SD
CTQ1 - I usually need clarification on the precision and reliability of information provided by ChatGPT, which enhances my critical thinking skills.	3.13	0.95
CTQ2 - ChatGPT's responses made me doubt their validity, leading me to seek further clarification or evidence.	3.39	1.03
CTQ3 - I actively explore alternative viewpoints or sources of information when using ChatGPT to ensure a comprehensive understanding of the topic.	3.36	1.03
CTQ4 - I need clarification about the accuracy of ChatGPT's output, which often encourages me to evaluate the information and conduct additional research independently.	3.36	1.00

Table 12 shows how learners perceive their Critical Thinking Abilities (CT) when utilising ChatGPT in writing. The highest mean score was recorded on item CTQ2 ($M = 3.39$, $SD = 1.03$). This finding indicates that the learners demonstrated considerable caution regarding the validity of their writing by actively seeking further clarification. Items CTQ3 and CTQ4 produced identical mean scores of 3.36 ($M = 3.36$, $SD = 1.03$ and $M = 3.36$, $SD = 1.00$, respectively). This suggests that learners frequently seek alternative perspectives and pursue further clarification by conducting additional research to verify the accuracy of ChatGPT's output. These findings also indicate that learners are aware of the limitations associated with relying on AI, particularly in relation to obtaining accurate information. Conversely, the lowest means score was recorded on the item assessing learners' ability to seek clarification to ensure the precision of the information provided by ChatGPT (CTQ1, $M = 3.13$, $SD = 0.95$). Overall, the moderate mean scores across all items suggest that the use of ChatGPT moderately promotes learners' critical thinking by encouraging them to verify, question, and supplement AI-generated content rather than accepting it uncritically.

(ii) Academic Achievement (AA)

Table 13 – Mean (M) and Standard Deviation (SD) for Academic Achievements (AA)

ITEM	M	SD
AAQ1 - Exploring alternative viewpoints through ChatGPT has directly improved the quality of my academic assignments.	3.36	0.90
AAQ2 - ChatGPT brings innovative ideas that are ready to be shared with students.	3.38	0.83
AAQ3 - Students can anticipate robust writing guidance from ChatGPT.	3.16	0.80
AAQ4 - ChatGPT has improved my academic performance.	3.53	0.91

Table 13 shows how learners perceive the role of ChatGPT specifically in relation to their academic achievements. The table presented the highest mean score on the item where students reported that ChatGPT has improved their academic performance (AAQ4; $M = 3.53$, $SD = 0.91$). This suggests a strong overall consensus among learners regarding the tool's positive impact on their academic success. Following this, respondents also agreed that the AI tool brings innovative ideas that are ready to be shared with students, which recorded the second-highest mean score (AAQ2; $M = 3.38$, $SD = 0.83$). Additionally, learners indicated a sense of responsibility in their usage of the technology; the item reflecting their tendency to actively explore alternative viewpoints or sources of information to improve academic the quality of academic assignment yielded a mean of 3.36 (AAQ1; $SD = 0.90$). Conversely, the lowest mean score within this category was found for the item assessing whether students can anticipate robust writing guidance from ChatGPT (AAQ3; $M = 3.16$, $SD = 0.80$). While still indicating general agreement, this slightly lower score implies that learners might view the AI more as an idea generator or performance enhancer rather than a definitive instructional guide for writing.

(iii) ChatGPT Usage (CU)

Table 14 – Mean (M) and Standard Deviation (SD) for ChatGPT Usage (CU)

ITEM	M	SD
CUQ1 - ChatGPT is a state-of-the-art writing model that is favourably used today.	3.30	0.91
CUQ2 - Students seek help from ChatGPT's assistance in composing essays and articles.	3.43	0.81
CUQ3 - ChatGPT helps students in English language translation.	3.37	0.94
CUQ4 - Employing ChatGPT significantly improves human productivity.	3.04	0.99

Table 14 shows how learners perceive ChatGPT in writing under the ChatGPT Usage (CU) construct. The table showed the highest mean score is for item CUQ2 with the mean score of 3.43 ($M = 3.43$, $SD = 0.81$). This demonstrates that the primary operational role of ChatGPT among these students is providing direct compositional support during essay construction. The moderate mean score presented in the table refers to items CUQ1 and CUQ3 with the mean scores of 3.30 ($M = 3.30$, $SD = 0.91$) and 3.37 ($M = 3.37$, $SD = 0.94$), respectively. Respondents strongly recognized ChatGPT's linguistic capabilities, turning to it as a translation tool for English language tasks. They also widely acknowledged its standing as a modern writing platform, agreeing that it functions as a state-of-the-art writing model that is favourably used today. The lowest mean score presented in the table is the item CUQ4, with the mean score of 3.04 ($M = 3.04$, $SD = 0.99$). While still leaning toward a positive perception, this lower score indicates that students are somewhat more reserved when it comes to claiming that the tool yields sweeping, fundamental shifts in their overall output and productivity.

(iv) Student Engagement (SE)

Table 15 – Mean (M) and Standard Deviation (SD) for Student Engagement (SE)

ITEM	M	SD
SEQ1 - ChatGPT is more interactive, human-like, and engaging for the students.	2.97	0.86
SEQ2 - ChatGPT increases confidence in my ability to conduct research/to search for materials	3.17	0.87
SEQ3 - ChatGPT is easy to use and more engaging for me	3.33	0.93

Table 15 reveals how learners perceive the use of ChatGPT in writing in terms of Student Engagement (SE). The highest mean score was recorded on item SEQ3 ($M = 3.33$, $SD = 0.93$), suggesting how learners view ChatGPT as both easy to use and engaging. Following this, item SEQ2 scored slightly lower mean scores, 3.17 ($M = 3.17$, $SD = 0.87$). This finding suggests how ChatGPT boosts learners' confidence in conducting research and searching for relevant materials. Conversely, item SEQ1 shows that learners are less convinced by ChatGPT's interactive and human-like abilities, resulting in it having the lowest mean score among all the items ($M = 2.97$, $SD = 0.86$).

Exploratory Statistics (correlation)

According to He (2024), correlation is a statistical technique that shows how strongly two variables are related to each other or the degree of association between the two. It's a common tool for describing simple relationships without making a statement about cause and effect. This section presents data to answer the research question on correlation.

Findings for the Relationship between the Writing Process (planning, translating, reviewing) and ChatGPT

This section presents data to answer research question 3: Is there a significant relationship between the writing process and ChatGPT?

H_{03} : There is no significant relationship between the writing process and ChatGPT

To determine if there is a significant association in the mean scores between the Writing Process (planning, translating, reviewing) and ChatGPT, data is analysed using SPSS for correlations. Results are presented separately in table 16, 17 and 18 below for Planning, Translating and Reviewing respectively.

Table 16 - Correlation between ChatGPT and Planning

		Planning
ChatGPT	Pearson (Correlation)	.518**
	Sig (2-tailed)	<.001
	N	162

**Correlation is significant at the 0.05 level (2-tailed)

Table 16 shows there is an association between ChatGPT and Planning. Correlation analysis shows that there is a strong significant association between ChatGPT and Planning ($r=.518^{**}$) and ($p=<.001$). According to He (2024), the coefficient is significant at the .05 level and positive correlation is measured on a 0.1 to 1.0 scale. Weak positive correlation would be in the range of 0.1 to 0.3, moderate positive correlation from 0.3 to 0.5, and strong positive correlation from 0.5 to 1.0. This means that there is also a strong positive relationship between ChatGPT and Planning.

Table 17 - Correlation between ChatGPT and Translating

		Translating
ChatGPT	Pearson (Correlation)	.743**
	Sig (2-tailed)	<.001
	N	162

**Correlation is significant at the 0.01 level (2-tailed)

Table 17 shows there is an association between ChatGPT and Translating stage. Correlation analysis shows that there is a strong, significant association between ChatGPT and Translating ($r=.743^{**}$) and ($p=<.001$). According to He (2024), the coefficient is significant at the .05 level and a positive correlation is measured on a 0.1 to 1.0 scale. Weak positive correlation would be in the range of 0.1 to 0.3, moderate positive correlation from 0.3 to 0.5, and strong positive correlation from 0.5 to 1.0. This means that there is also a strong positive relationship between ChatGPT and the translating stage.

Table 18 - Correlation between ChatGPT and Reviewing

		Reviewing
ChatGPT	Pearson (Correlation)	.654**
	Sig (2-tailed)	<.001
	N	162

**Correlation is significant at the 0.05 level (2-tailed)

Table 18 shows there is an association between ChatGPT and the reviewing stage. Correlation analysis shows that there is a moderate, significant association between ChatGPT and the reviewing stage ($r=.654^{**}$) and ($p=<.001$). According to He (2024), the coefficient is significant at the .05 level, and a positive correlation is measured on a 0.1 to 1.0 scale. Weak positive correlation would be in the range of 0.1 to 0.3, moderate positive correlation from 0.3 to 0.5, and strong positive correlation from 0.5 to 1.0. This means that there is also a moderate positive relationship between ChatGPT and the reviewing stage.

Hence, null hypothesis is therefore rejected for H_{03} .

CONCLUSION

Summary of Findings and Discussions

The findings of this study offer empirical insights into how undergraduate students perceive and navigate the intersection between their academic writing processes and artificial intelligence. When examining demographic

differences, the results indicated no significant variance between male and female students in their relationship with ChatGPT and the writing process. However, a notable and statistically significant difference emerged across academic clusters. Students belonging to the Social Sciences, Humanities, and Business cluster engaged with AI tools differently than the students in the Science and Technology cluster. This variation suggests that different academic fields likely dictate the extent and manner in which students seek technological assistance for their writing tasks.

In terms of how learners perceive the distinct stages of writing, the data revealed specific patterns of strategy application. During the planning stage, students demonstrated a strong prioritization of final-stage text refinement, actively engaging in extensive revising and editing before finalizing their submissions. On the other hand, they exhibited a notable reluctance to evaluate or fundamentally alter their core ideas once the initial planning phase concluded. Moving into the translating stage, learners relied heavily on their prior knowledge to draft content, rather than utilizing structured brainstorming sessions. Within the reviewing stage, social collaboration was primarily utilized when encountering specific writing difficulties, whereas peer discussion for initial idea generation remained largely unused. These behavioural patterns heavily reinforce the Cognitive Process Theory of Writing outlined by Flower and Hayes (1981), which characterizes composition as a highly goal-directed and non-linear cognitive phenomenon. Furthermore, these findings support the assertions made by Raoofi et al. (2017) and Khairuddin et al. (2021) that students must constantly negotiate complex metacognitive, cognitive, social, and linguistic strategies to manage the structural demands of academic writing.

When evaluating perceptions of ChatGPT, respondents expressed strong agreement that the AI tool significantly improves their academic performance and provides valuable support during essay writing. Despite acknowledging its ease of use and its capacity to increase research confidence, students maintained a highly critical approach to the information generated. The results highlighted that learners actively doubted the validity of ChatGPT's responses, frequently seeking alternative viewpoints and conducting independent research to verify the accuracy of the output. This active scepticism aligns seamlessly with the findings of Youssef et al. (2024), who suggested that AI interaction can unintentionally stimulate critical thinking by requiring students to evaluate and synthesize information continuously rather than accepting it at face value. Additionally, this reflects the empirical observations of Levine et al. (2024), demonstrating that students utilize generative text models to expand on ideas without bypassing their inherent cognitive responsibilities in the drafting process.

Finally, the correlational analysis established a significant positive relationship between ChatGPT usage and all phases of the writing process. The association was particularly strong during the initial planning and translating stages, while remaining moderate during the final reviewing stage. This indicates that learners heavily depend on AI scaffolding when organizing their thoughts and translating internal concepts into written language, an action that requires complex paraphrasing skills as highlighted by Rahmat (2021). This sustained reliance across writing phases is highly consistent with the qualitative findings of Jelson et al. (2026), affirming that students seek varied categories of AI assistance tailored to specific stages, primarily to generate coherent structures and refine their academic arguments.

Implications and Suggestions for Future Research

Theoretical and Conceptual Implications

The findings yield substantial theoretical implications, specifically at the intersection of Constructivism Learning Theory and the Cognitive Process Theory of Writing. The established correlation between AI usage and the active stages of planning and translating validates the concept that ChatGPT functions as a dynamic digital scaffold rather than a passive replacement for human cognition. Because students continuously engaged their internal monitors to verify AI-generated facts and regulate their effort, the study reinforces the constructivist perspective highlighted by Youssef et al. (2024). In this modern academic environment, technology serves as an ongoing facilitative resource that prompts learners to actively construct knowledge, test hypotheses, and navigate metacognitive challenges independently.

Pedagogical Implications

The integration of ChatGPT into the academic writing routines of undergraduates necessitates a paradigm shift

in pedagogical approaches. Since students inherently rely on AI during the planning and translating stages to manage cognitive load, educators must actively transition from prohibiting these tools to fostering structured AI literacy within the curriculum. Writing instructors should design lessons that explicitly teach prompt engineering, allowing students to use AI effectively for generating outlines or refining complex sentence structures. Because the findings indicate that students already doubt the accuracy of AI outputs, educators can capitalize on this by implementing peer-review workshops where students collaboratively analyze, critique, and correct AI-generated essays. This method not only reinforces their existing critical thinking habits but also sharpens their independent reviewing skills, ensuring they remain the primary authors of their academic discourse.

Suggestions for Future Research

While the current quantitative survey successfully outlines the general perceptions and correlations regarding ChatGPT usage, future researchers should explore this phenomenon through qualitative methodologies. Conducting in-depth interviews or focus group discussions could illuminate the underlying reasons why significant differences exist between academic clusters, providing context on how discipline-specific writing demands alter AI dependency. Furthermore, longitudinal studies are highly recommended to observe how the continuous integration of AI tools influences actual writing proficiency and cognitive development over an extended period, moving beyond self-reported measures of academic achievement. Finally, investigating the direct relationship between specific types of student-generated prompts and the resulting structural quality of their essays would offer valuable insights for developing targeted instructional frameworks in higher education.

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APPENDIX

WRITING STRATEGIES & CHAT GPT

(Adapted from Raoofi,et.al, 2017, and Youssef,et.al ; 2024)

SECTION B - WRITING PROCESS

(i) PLANNING STAGE

a. METACOGNITIVE (MWS)

ITEM
MWSQ1 - I organize my ideas prior to writing.
MWSQ2 - I revise my writing to make sure that it includes everything I want to discuss in my writing.
MWSQ3 - I check my spelling.
MWSQ4 - I check my writing to make sure it is grammatically correct.
MWSQ5 - I evaluate and re-evaluate the ideas in my essay.
MWSQ6 - I monitor and evaluate my progress in writing.
MWSQ7 - I revise and edit an essay two or more times before I hand it in to my lecturer.
MWSQ8 - I go through the planning stages in my writing.
MWSQ9 - I go through the drafting stages in my writing.
MWSQ10 - I go through the revising and editing stages in my writing.

(ii) TRANSLATING STAGE

b. EFFORT REGULATION (ERS)

ITEM
ERSQ1 - I write a lot to develop my writing skills.
ERSQ2 - I often work hard to do well in my writing even if I don't like English writing tasks.
ERSQ3 - Even if the writing activities are difficult, I don't give up but try to engage in them.
ERSQ4 - I concentrate as hard as I can when doing a writing task.

c. COGNITIVE (CWS)

ITEM
CWSQ1 - I use memorized grammatical elements such as singular and plural forms, verb tenses, prefixes and suffixes, etc, in my writing
CWSQ2 - I put newly memorized vocabulary in my sentences.
CWSQ3 - In order to generate ideas for my writing, I usually engage myself in brainstorming.
CWSQ4 - I use different words that have the same meaning.
CWSQ5 - I use my experiences and knowledge in my writing.
CWSQ6 - I try to use effective linking words to ensure clear and logical relationship between sentences or paragraphs

(iii) REVIEWING STAGE

a. SOCIAL (SWS)

ITEM
SWSQ1 - In order to generate ideas for my writing, I usually discuss the writing topic with a friend or classmate.
SWSQ2 - After revising and editing my essay thoroughly, I ask a friend or my classmate to read and comment on it.

SWSQ3 - I try to identify friends or classmates whom I can ask for help in my writing.
SWSQ4 - When I have trouble writing my essay, I try to do it with my classmates or friends.

b. AFFECTIVE (AWS)

ITEM
AWSQ1 - I try to write an essay in class with confidence and ease
AWSQ2 - Using AI helps me try to write an essay in class with greater ease.
AWSQ3 - I try to relax whenever I feel afraid of writing.
AWSQ4 - I encourage myself to write even when I am afraid of making mistakes

SECTION B - CHATGPT

a. CRITICAL THINKING ABILITIES (CT)

ITEM
CTQ1 - I usually need clarification on the precision and reliability of information provided by ChatGPT, which enhances my critical thinking skills.
CTQ2 - ChatGPT's responses made me doubt their validity, leading me to seek further clarification or evidence.
CTQ3 - I actively explore alternative viewpoints or sources of information when using ChatGPT to ensure a comprehensive understanding of the topic.
CTQ4 - I need clarification about the accuracy of ChatGPT's output, which often encourages me to evaluate the information and conduct additional research independently.

b. ACADEMIC ACHIEVEMENTS (AA)

ITEM
AAQ1 - Exploring alternative viewpoints through ChatGPT has directly improved the quality of my academic assignments.
AAQ2 - ChatGPT brings innovative ideas that are ready to be shared with students.
AAQ3 - Students can anticipate robust writing guidance from ChatGPT.
AAQ4 - ChatGPT has improved my academic performance.

c. CHATGPT USAGE (CU)

ITEM
CUQ1 - ChatGPT is a state-of-the-art writing model that is favorably used today.
CUQ2 - Students seek help from ChatGPT's assistance in composing essays and articles.
CUQ3 - ChatGPT helps students in English language translation.
CUQ4 - Employing ChatGPT significantly improves human productivity.

d. STUDENT ENGAGEMENT (SE)

ITEM
SEQ1 - ChatGPT is more interactive, human-like, and engaging for the students.
SEQ2 - ChatGPT increases confidence in my ability to conduct research/to search for materials
SEQ3 - ChatGPT is easy to use and more engaging for me