

Exploring the Influence of Social Cognitive Theory on Academic Writing and ChatGPT

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ABSTRACT

This study explores the influence of Social Cognitive Theory on academic writing and ChatGPT usage among university learners. Specifically, it examines the relationships among environmental, personal, and behavioural factors in academic writing. A quantitative survey was conducted involving 256 respondents from various academic disciplines. The instrument measured environmental factors through ChatGPT usage, critical thinking, academic achievement, and student engagement; personal factors through metacognitive and cognitive writing strategies; and behavioural factors through effort regulation, social, and affective strategies. The findings revealed a significant difference in writing components across gender but no significant difference across disciplines. Learners perceived ChatGPT positively, particularly for translation, idea generation, research support, and engagement. Correlation analysis further showed significant positive relationships among environmental, personal, and behavioural factors. The findings support Social Cognitive Theory by demonstrating that academic writing in AI-supported environments is shaped by the reciprocal interaction between learners' writing strategies, behaviours, and environmental support.

Keywords: Social Cognitive Theory, ChatGPT, writing strategies, artificial intelligence, ESL learners

INTRODUCTION

Background of Study

In the context of higher education, academic writing refers to structured, formal, and evidence-based writing used as a core pillar for knowledge dissemination and intellectual validation (Raoofi et al., 2017). Academic writing serves as an important cognitive tool for university students to not only articulate complex ideas, present arguments, and explain their knowledge but also to achieve academic success. It encompasses everything from as simple note-taking tasks to more complex tasks such as writing essays, dissertations, and empirical research papers (Bouwer & Van der Veen, 2024). This demanding linguistic requirement impacts an extremely wide range of student populations, which becomes the main challenge for many university students, especially for English as a Second Language (ESL) learners who frequently identify academic writing as the most complex, draining, and stressful phase in their language learning process (Guna et al., 2025; Peter & Singaravelu, 2020; Jusun & Yunus, 2017). These learners regularly perceived academic writing as an exhausting journey, as it requires simultaneous demands of grammatical accuracy, spelling, precise vocabulary, and lexical diversity to present ideas logically. Many learners are under increasing pressure as they are constantly required to negotiate

their writing strategies, produce complex writing quickly, and develop writing proficiency, which contributes to the writing anxiety and the increase in perceived skills gaps among learners.

Interestingly, the rising use of artificial intelligence (AI), especially tools like ChatGPT (Generative Pre-trained Transformer), has the capability to facilitate this process in an effortless way and, at the same time, remove the limitations that are traditionally associated with academic writing. AI is now evolving and becoming more common in academic writing environments (Afzal et al., 2025) and has significantly changed how learners engage in their academic writing activities. Today, ChatGPT serves as an active learning tool that helps learners in academic writing for creating, improving, and structuring academic texts. Although the use of ChatGPT among learners is highly relevant and does not pose any detrimental effects, excessive dependency can pose significant risks. These risks are not limited to the absence of personal voice but also include a decline in fundamental writing abilities. Additionally, relying too much on ChatGPT can foster cognitive passivity, which enables learners to hide their writing shortcomings.

Therefore, to further understand this phenomenon, this study draws upon the perspective of Social Cognitive Theory, a framework developed by Bandura (2012), in which the theory states that human performance derives from an active and mutual relationship of individual characteristics, environmental influences, and behavioural habits. This study will explore how the environmental, personal, and behavioural factors shape academic writing outcomes and the relationship between the usage of AI technologies, particularly ChatGPT, for academic writing.

Statement of Problem

Learners nowadays have been relying on the use of artificial intelligence in transforming the way of thinking, learning and completing the studies. Tools such as ChatGPT has been prominent in generating ideas, organising content and proofreading writing assignments. The ideal perspective of using ChatGPT is by using it as a supportive learning aid rather than a replacement for thinking capacity. Writing mainly involves cognitive and behavioural processes as the result of environmental, personal and behavioural factors according to the Social Cognitive Theory (Bandura, 2012). Besides, Raoofi et al. (2017) highlighted that writing academically involves metacognitive, cognitive, affective and social strategies rather merely a linguistic activity.

Currently, learners have shown confidence in ESL writing by optimising the use of ChatGPT. However, this technological shift has transformed learners' writing behaviour. Whilst ChatGPT initially dominating as the artificial intelligence tool for many learners, it offers instant feedback and language assistance to the users. This has influenced learners' creative thinking, writing strategies and academic dependency. This situation has extended concerns over the reliability and validity when the excessive dependency on ChatGPT could inhibit learners' actual evaluation and originality (Youssef et al., 2024). Moreover, Rahmat (2021) reported many students encountered challenges in rewriting and paraphrasing idea for ESL work thus resorting into the use of automated writing via artificial intelligence tools.

Thus, many current studies majorly delve into the effectiveness of ChatGPT in academic writing and the ethical concerns entailed. Other than that, limited studies explore on the Social Cognitive Theory relation to the writing behaviours when learners use ChatGPT in writing work. Youssef et al. (2024) in their previous study suggested further researchers to investigate the relationship between cognitive activities and independent learning behaviours and strategies. Hence, this study focuses on exploring the influence of ChatGPT on academic writing via Social Cognitive Theory.

Objective of the Study and Research Questions

This study is done to explore writing and ChatGPT using social cognitive theory. Specifically, this study is done to answer the following questions;

- Is there a significant difference in writing components across gender?

H_{01} : There is no significant difference in writing components across gender



- Is there a significant difference in writing components across disciplines?

H₀₂: There is no significant difference in writing components across disciplines

- How do learners perceive environmental factors in writing?
- How do learners perceive personal factors in writing?
- How do learners perceive behavioural factors in writing?
- Is there a significant relationship between environment and personal factors in writing?

H₀₃: There is no significant relationship between environment and personal factors in writing

- Is there a relationship between personal and behavioural factors in writing?

H₀₄: There is no significant relationship between personal and behavioural factors in writing

- Is there a relationship between behavioural and environmental factors in writing?

H₀₅: There is no significant relationship between behavioural and environmental factors in writing

LITERATURE REVIEW

Theoretical Framework of the Study

Social Cognitive Theory and Writing

According to Bandura (2012), the Social Cognitive Theory proposes the idea that human learning and actions are controlled through an interaction among three determinants: personal, behavioural, and environmental factors. Within the scope of academic writing, the reciprocity between these factors creates a conceptual approach to analysing the development of university students' writing practices. Personal factors imply internal strategies, such as grammatical knowledge, planning, and evaluation skills, owned by a student (Raoofi et al., 2017). Behavioural factors are defined by specific actions, collaboration, and affective control used to deal with difficult writing assignments. Lastly, environmental factors are determined by external factors and tools shaping the surrounding of a person.

As regards the involvement of artificial intelligence into the process of writing, it should be noted that ChatGPT serves as one of the most important environmental factors. This technology influences learners' environments through providing timely feedback, structural support, and improving language and modifying the learner's ecosystem, which leads to altering of internal personal strategies such as critical thinking and shaping actions in relation to academic writing assignments (Youssef et al., 2024). Modern scientific research proves such connections between AI tools and academic writing; for instance, Adam and Chowdhury (2024) analyse generative AI chatbots and their potential for knowledge creation using Social Cognitive Theory.

ChatGPT in writing

The fast merging of ChatGPT as one of the most widely used AI tools in supporting learning processes across various subjects, particularly in academic writing, has been investigated by numerous research. ChatGPT, a generative artificial intelligence (AI) tool, has been receiving considerable attention because of its potential to transform academic writing in higher education environments (Jo, 2023; Gultom et al., 2024; Playfoot et al., 2024). Interestingly, recent studies (Asad et al., 2024; Doe et al., 2022; Holland & Ciachir, 2025) have demonstrated that this tool is well recognised for aiding students in grammatical improvement, ideas generation, and information organization as well as academic language refinement. In addition, modern literature (Smith & Johnson, 2021; Tiwari et al., 2024) reported that ChatGPT may also improve writing productivity, creativity, and help in building confidence among students by offering instant feedback along with writing guidance. These findings highlight that ChatGPT is a positive intervention in the student learning process because there is no delay in receiving feedback, as it provides real-time feedback. Furthermore, according to Durgungoz and

Kharrufa (2026), ChatGPT also promotes collaborative learning through group discussions and encourages self-directed learning by allowing students to independently explore information, revise their work, and develop more profound understanding of academic topics. This shows that ChatGPT serves as a valuable educational aid that supports academic performance.

Despite having numerous positive impacts on academic performance and being recognised as a valuable educational application, current studies (Alfarraj & Wardat, 2024; Tlili et al., 2023; Wise et al., 2024; Na et al., 2024) have expressed concerns and warned against the excessive dependency on ChatGPT. Experts (Farhi et al., 2023; Huallpa et al., 2023; Jarrah et al., 2023; Malik et al., 2024; Perkins, 2023) have argued on the drawbacks along with the limitations that it may cause to the learners, encompassing academic integrity, the potential decline of critical thinking and independent writing skills, as well as plagiarism. Apart from that, Yilmaz et al., (2023) also argued on the various problems that have been linked with writing using ChatGPT, as this application has the possibility of spreading misinformation and biases, in addition to inaccurate information. Therefore, in order to avoid these challenges, learners who use ChatGPT for academic writing need to exercise discernment, fact-check, and use critical thinking skills (Chen, 2025). Nevertheless, it is safe to say that ChatGPT is a beneficial educational assistant that aids the learning process and academic success when used properly and appropriately.

Past Studies on Writing and ChatGPT

Many studies have investigated the effects of AI writing tools on the writing strategies especially academic writing. Raoofi et al. (2017) revealed that writing strategies greatly contributing to learners' writing processes and self-regulation. This was based on the quantitative survey study on the validity and reliability of writing strategy scales conducted among university students. The survey measured cognitive, metacognitive, social, affective, and effort regulation strategies in writing. Besides, it also highlighted on the improvement of writing quality and learners' autonomy based on the metacognitive and cognitive strategies. This is supported by another quantitative study on ESL learners which concluded that learners have better organization, monitoring and evaluation skills in writing activities when applying metacognitive strategies, (Rahmat, 2021).

On another perspective, Youssef et al. (2024) investigated the effects of ChatGPT on learners' academic learning in the United Arab Emirates and found out that this specific AI tool has positively influenced learners' engagement, productivity and performance in general. Based on this quantitative approach study, the result indicated concerns towards the excessive automated writing responses and reduced critical thinking routine among learners. Similarly, Mahapatra (2024) reported that ChatGPT has improved learners' grammar, vocabulary control and overall writing quality by acting as a formative feedback tool during writing work. The study involved ESL undergraduates via a mixed-method study which also investigated learners' perceptions on ChatGPT. In line with the previous concerns by Youssef et al. (2024), this study summarized similar concerns over the reliance on ChatGPT without proper guidelines and limitations.

Conceptual Framework of the Study

Figure 1 presents the conceptual framework of the study. This study is rooted in Social Cognitive Theory by Bandura (2012), which states three main components of learning: personal, behavioural, and environmental factors. In the context of academic writing, these three factors are also needed by the writers to guide them towards the writing process. 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) as they compose. One difficulty of the writing process is paraphrasing information from one text to another (Rahmat, 2021). Today, paraphrasing is facilitated using ChatGPT. According to Youssef et al. (2024), the use of ChatGPT impacts learners' critical thinking abilities.

This study merges the Social Cognitive theory to portray the relationship between the application of ChatGPT for academic writing.

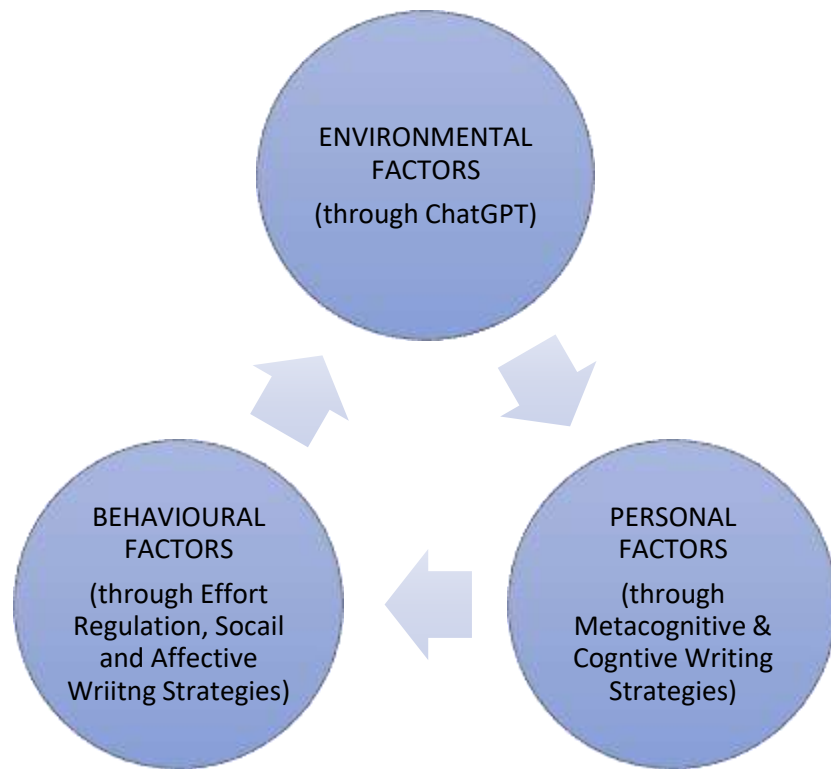


Figure 1: Conceptual Framework of the Study

Writing and ChatGPT through the Social Cognitive Theory

METHODOLOGY

This quantitative study is done to explore the writing and ChatGPT using Social Cognitive Theory. A convenient sample of 256 participants responded to the survey. It is rooted in Bandura (2012) 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 Often, and 5 is for Always.

1	Never
2	rarely
3	Sometimes
4	Often
5	Always

Table 1: Likert Scale Use

Section	Variable	Construct	No of Items/ Indicators	
B	Personal	Metacognitive	10	16 (0.900)
		Cognitive	6	
	Behaviour	Effort Regulation	4	11 (.826)
		Social	4	
		Affective	3	
C	Environment	Critical thinking abilities	4	16 (.911)
		Academic achievement	4	



	ChatGPT usage	5	
	Student engagement	3	
			43 (.928)

Table 2: Distribution of Items in the Survey

The distribution of the survey items is shown in Table 2, which is a total of 43 survey questions for the assessment of the three essential elements of Social Cognitive Theory. These survey questions have been formulated from well-validated scales; namely, the Writing Strategies Scale from Raoofi et al. (2017) and the ChatGPT Usage and Impact Instrument from Youssef et al. (2024). In Section B, Personal Factors will be assessed using 16 items that include the Metacognitive and Cognitive constructs (10 and 6 items, respectively) in addition to Behavioral Factors that include 11 items, specifically Effort Regulation, Social, and Affective constructs (4, 4, and 3 items, respectively). Finally, Environmental Factors will be measured through 16 items, namely the Critical Thinking Abilities, Academic Achievement, ChatGPT Usage, and Student Engagement constructs (4, 4, 5, and 3 items, respectively).

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

Table 3: Reliability Levels, Cronbach's Alpha Ranges, and Their Interpretations

Table 3 presents the Cronbach Alpha's level ranges suggested by Ahmad, et al. (2024). Table 2 also shows the reliability of the survey. The analysis shows a Cronbach alpha of .900 for Personal components, .826 for Behavioural components, .911 for Environmental components and .911 for ChatGPT. The overall Cronbach alpha for all 43 items is .928; 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), researches 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.

Question	Demographic Profile	Categories	Percentage (%)
1	Gender	Male	27%
		Female	73%
2	Discipline	Science & Technology	37%
		Arts, Social Sciences & Humanities	6%
		Accountancy, Business & Management	57%

Table 4: Percentage for Demographic Profile

Table 4 presents the demographic profile of the respondents involved in this study based on gender and discipline. In terms of gender distribution, female respondents formed the majority at 73%, while male respondents accounted for 27%. Regarding discipline, most respondents were from Accountancy, Business and Management, representing 57% of the total sample. This was followed by respondents from Science and

Technology at 37%. Meanwhile, Arts, Social Sciences and Humanities recorded the lowest percentage, with only 6% of the respondents.

Inferential Statistics

There are three main functions of a T-test (Shah, 2024). 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 used 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.

However, a one-way ANOVA (Analysis of Variance) is a statistical method used to compare the means of three or more independent (unrelated) groups to determine if there is a statistically significant difference between them. It is a parametric test that evaluates the effect of a single independent variable (the factor) on a dependent variable.

Findings for gender

This section presents data to answer research question 1: Is there a significant difference in writing components across gender?

H_{01} : There is no significant difference in writing components across gender

Group Statistics					
	Q1GENDER	N	Mean	Std. Deviation	Std. Error Mean
WRITING_COMPONENTS	MALE	69	3.6842	.45778	.05511
	FEMALE	187	3.8554	.38786	.02836

Independent Samples Test										
Levene's Test for Equality of Variances					t-test for Equality of Means					
		F	Sig.	t	df	Significance One-Sided p Two-Sided p	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
WRITING_COMPONENTS	Equal variances assumed	2.347	.127	-2.980	254	.002 .003	-.17117	.05744	-.28428	-.05806
	Equal variances not assumed			-2.762	106.074	.003 .007	-.17117	.06198	-.29406	-.04829

Table 5: T-Test for writing components across gender

A two-sample t-test was performed to compare writing components across gender. There was a significant difference in writing components across gender ($p=0.003$).

Findings for disciplines

This section presents data to answer research question 2: Is there a significant difference in writing components across disciplines?

H₀₂: There is no significant difference in writing components across disciplines

WRITING_COMPONENTS

	N	Mean	Std. Deviation	Std. Error	95% Confidence Interval for Mean		Minimum	Maximum
					Lower Bound	Upper Bound		
S&T	95	3.8414	.41074	.04214	3.7577	3.9250	3.00	4.67
A & SS & H	15	3.9860	.37425	.09663	3.7788	4.1933	3.33	4.95
ACC ,BM	146	3.7701	.41605	.03443	3.7021	3.8382	2.49	5.00
Total	256	3.8092	.41401	.02588	3.7583	3.8602	2.49	5.00

ANOVA

WRITING_COMPONENTS

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.790	2	.395	2.329	.100
Within Groups	42.919	253	.170		
Total	43.709	255			

Table 6: ANOVA for writing components across disciplines

An ANOVA was performed to compare writing components across disciplines. There was no significant difference for writing components ($p=0.100$) across disciplines.

Descriptive Statistics

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 Environmental Factors

This section presents data to answer research question 3: How do learners perceive environmental factors in writing? In the context of this study, this is measured by (i) Critical Thinking Abilities, (ii) Academic Achievements, (iii) ChatGPT Usage, and (iv) Student Engagement.

Critical Thinking Abilities

Item	M	SD
CTQ1 I usually need clarification on the precision and reliability of information provided by ChatGPT, which enhances my critical thinking skills.	3.80	0.85
CTQ2 ChatGPT's responses made me doubt their validity, leading me to seek further clarification or evidence.	3.66	0.85
CTQ3 I actively explore alternative viewpoints or sources of information when using ChatGPT to ensure a comprehensive understanding of the topic.	3.88	0.78
CTQ4 I need clarification about the accuracy of ChatGPT's output, which often encourages me to evaluate the information and conduct additional research independently.	3.85	0.80

Table 7: Mean (M) and Standard Deviation (SD) for Critical Thinking Abilities (CT)



Table 7 shows the overall mean scores ranged from ($M = 3.66$ to $M = 3.88$) for critical thinking abilities. The highest mean score was obtained where most of the respondents strongly agreed that they proactively seek out different perspectives or resources when using ChatGPT in order to gain a thorough grasp of the subject matter ($M = 3.88$, $SD = 0.78$), followed closely by most respondents believed in engaging in additional research independently in order to evaluate the accuracy of ChatGPT's output ($M = 3.85$, $SD = 0.80$). In contrast, the lowest mean score was recorded where most respondents sought for more explanation or proof if ChatGPT's feedback caused suspicion on their validity, which is ($M = 3.66$, $SD = 0.85$).

Academic Achievements

Item	M	SD
AAQ1 ChatGPT brings innovative ideas that are ready to be shared with students.	3.77	0.85
AAQ2 Students can anticipate robust writing guidance from ChatGPT.	3.86	0.80
AAQ3 ChatGPT has improved my academic performance.	3.73	0.74
AAQ4 ChatGPT has improved my learning pace.	3.80	0.78

Table 8: Mean (M) and Standard Deviation (SD) for Academic Achievements (AA)

Table 8 exhibits the mean score and standard deviations for academic achievements. Generally, the results indicate that respondents thought ChatGPT had a somewhat favourable impact on their academic performance. Respondents largely agreed that ChatGPT assisted various elements of their academic work, as seen by the mean ratings for all four criteria ranging from 3.73 to 3.86. AAQ2 had the highest mean score ($M = 3.86$, $SD = 0.80$), indicating that respondents thought ChatGPT was a helpful resource for writing advice.

This suggests that ChatGPT could help students with the development, organisation, and clarity of their written work. The subsequent highest mean score ($M = 3.80$, $SD = 0.78$) is noticed in statement 4, where the respondents felt that ChatGPT has helped improved their learning pace. This implies that ChatGPT could help students by giving them brief explanations, examples, and feedback so they can comprehend academic material more quickly. Immediately following, with only a relatively small difference, is the third highest rated mean score ($M = 3.77$, $SD = 0.85$), at which primarily of the respondents said that ChatGPT provides innovative ideas that can be shared with students. At last, the lowest mean score was found for AAQ3 ($M = 3.73$, $SD = 0.74$), where the respondents felt that ChatGPT has positive effects on their academic achievement and success. Despite being the lowest-rated item, the mean score is still above the midpoint, indicating that respondents still perceived ChatGPT improved their academic achievement.

ChatGPT Usage

Item	M	SD
CUQ1 ChatGPT is a state-of-the-art writing model that is favorably used today.	3.91	0.87
CUQ2 Students seek help from ChatGPT's assistance in composing essays and articles.	3.88	0.77
CUQ3 ChatGPT helps students in English language translation.	4.00	0.84
CUQ4 Employing ChatGPT significantly improves human productivity.	3.53	0.93
CUQ5 The advent of ChatGPT marks a groundbreaking transformation in Natural Language Processing capabilities.	3.63	0.75

Table 9: Mean (M) and Standard Deviation (SD) for ChatGPT Usage (CU)

The above table portrays the positive perceptions towards the use of ChatGPT in academic writing and language learning. Respondents mostly agreed that ChatGPT helps students in English language translation ($M = 4.00$, $SD = 0.84$). However, lowest mean score ($M = 3.53$, $SD = 0.93$) was recorded on improving human productivity item reflecting variety perceptions among respondents. In general, the result suggests that most respondents perceive ChatGPT as a useful writing tool with the median mean score ($M = 3.88$, $SD = 0.77$) to support writing



and language activities when most of the respondents agreed that they use ChatGPT for essay and article composition

Student Engagement

Item	M	SD
SEQ1 ChatGPT is more interactive, human-like, and engaging for the students.	3.62	0.89
SEQ2 ChatGPT increases confidence in my ability to conduct research/to search for materials.	3.75	0.85
SEQ3 ChatGPT is easy to use and more engaging for me	4.02	0.81

Table 10: Mean (M) and Standard Deviation (SD) for Student Engagement (SE)

Table 10 shows the items to study the Student Engagement factor. The highest mean ($M = 4.02$, $SD = 0.81$) is reflected on the idea of ChatGPT as an easy AI tool. The lowest mean score ($M = 3.62$, $SD = 0.89$) highlighted that ChatGPT is engaging and interactive for the respondents. Hence, it increases confidence in respondents' ability to conduct research or search for materials ($M = 3.75$, $SD = 0.85$).

Findings for Personal Factors

This section presents data to answer research question 4: How do learners perceive personal factors in writing? In the context of this study, this is measured by (i) Metacognitive and (ii) Cognitive Writing Strategies.

Item	M	SD
MWSQ1 I organize my ideas prior to writing.	3.88	0.76
MWSQ2 I revise my writing to make sure that it includes everything I want to discuss in my writing.	4.14	0.78
MWSQ3 I check my spelling.	4.21	0.79
MWSQ4 I check my writing to make sure it is grammatically correct.	4.07	0.80
MWSQ5 I evaluate and re-evaluate the ideas in my essay.	3.87	0.78
MWSQ6 I monitor and evaluate my progress in writing.	3.75	0.79
MWSQ7 I revise and edit an essay two or more times before I hand it in to my teacher.	3.90	0.81
MWSQ8 I go through the planning stages in my writing.	3.83	0.82
MWSQ9 I go through the drafting stages in my writing.	3.78	0.93
MWSQ10 I go through the revising and editing stages in my writing.	3.90	0.76

Table 11: Mean (M) and Standard Deviation (SD) for Metacognitive (MWS)

Table 11 shows the mean scores and standard deviations of the metacognitive writing strategies, revealing that a high level of metacognitive knowledge has been consistently attained. The mean scores range from $M = 3.75$ to $M = 4.21$. The most common metacognitive strategies are those related to checking spelling and grammar, with mean scores being $M = 4.21$ ($SD = 0.79$) and $M = 4.07$ ($SD = 0.80$), respectively. The third-ranked metacognitive practice is revision of writing to make sure that all points have been raised ($M = 4.14$, $SD = 0.78$). Additionally, respondents engaged in basic planning and editing activities such as multiple revision of the essay ($M = 3.90$, $SD = 0.81$); progression to the stage of revising and editing ($M = 3.90$, $SD = 0.76$); organising thoughts before writing ($M = 3.88$, $SD = 0.76$); and evaluating the ideas used in the essay ($M = 3.87$, $SD = 0.78$). The lowest-ranked metacognitive practices with moderately high mean scores are progression through the drafting stages ($M = 3.78$, $SD = 0.93$) and monitoring/evaluating progress in writing ($M = 3.75$, $SD = 0.79$).

Item	M	SD
CWSQ1 I use memorized grammatical elements such as singular and plural forms, verb tenses, prefixes and suffixes, etc, in my writing.	3.78	0.82
CWSQ2 I put newly memorized vocabulary in my sentences.	3.63	0.84



CWSQ3 In order to generate ideas for my writing, I usually engage myself in brainstorming.	3.8	0.79
CWSQ4 I use different words that have the same meaning.	3.65	0.90
CWSQ5 I use my experiences and knowledge in my writing.	4.15	0.73
CWSQ6 I try to use effective linking words to ensure clear and logical relationship between sentences or paragraphs.	4.00	0.78

Table 12: Mean (M) and Standard Deviation (SD) for Cognitive (CWS)

Table 12 shows the results on respondents' cognitive writing strategies. The scores obtained range from $M = 3.63$ to $M = 4.15$. A large number of respondents depend significantly on using their own experience and information in writing; the technique was found to be used most frequently, obtaining the highest score of all ($M = 4.15$, $SD = 0.73$). Respondents were found to put considerable effort into linking words that help to maintain consistency in the relationships among sentences and paragraphs ($M = 4.00$, $SD = 0.78$). Idea generation using brainstorming ($M = 3.80$, $SD = 0.79$) and using memorised grammar items (e.g., verb tenses and plurals, $M = 3.78$, $SD = 0.82$) were also rated quite highly. Conversely, the two techniques least used by learners include replacing words with synonyms ($M = 3.65$, $SD = 0.90$) and using new words in sentences ($M = 3.63$, $SD = 0.84$).

Findings for Behavioural factors

This section presents data to answer research question 5: How do learners perceive behavioural factors in writing? In the context of this study, this is measured by (i) Effort Regulation, (ii) Social, and (iii) Affective Writing Strategies.

Effort Regulation

ITEM	M	SD
ERSQ1 I write a lot to develop my writing skills.	3.19	0.88
ERSQ2 I often work hard to do well in my writing even if I don't like English writing tasks.	3.82	0.87
ERSQ3 Even if the writing activities are difficult, I don't give up but try to engage in them.	4.08	0.73
ERSQ4 I concentrate as hard as I can when doing a writing task.	4.20	0.73

Table 13: Mean (M) and Standard Deviation (SD) for Effort Regulation (ERS)

Table 13 presents the mean and standard deviation scores for effort regulation. Overall, the findings indicate that learners demonstrated a relatively high level of effort regulation when completing writing tasks. The highest mean score was recorded for ERSQ4, "I concentrate as hard as I can when doing a writing task" ($M = 4.20$, $SD = 0.73$), followed by ERSQ3, "Even if the writing activities are difficult, I don't give up but try to engage in them" ($M = 4.08$, $SD = 0.73$). These findings suggest that learners generally showed strong concentration and persistence when dealing with writing tasks, even when the activities were challenging. ERSQ2 also recorded a high mean score ($M = 3.82$, $SD = 0.87$), indicating that learners were willing to work hard to perform well in writing, even when they did not enjoy English writing tasks. However, the lowest mean score was recorded for ERSQ1, "I write a lot to develop my writing skills" ($M = 3.19$, $SD = 0.88$), suggesting that although learners showed effort and perseverance during writing tasks, they may practise writing less frequently as a way to improve their writing skills.

Social

Item	M	SD
SWSQ1 In order to generate ideas for my writing, I usually discuss the writing topic with a friend or classmate.	3.55	0.94
SWSQ2 After revising and editing my essay thoroughly, I ask a friend or my classmate to read and comment on it.	3.33	1.04
SWSQ3 I try to identify friends or classmates whom I can ask for help in my writing.	3.62	0.95
SWSQ4 When I have trouble writing my essay, I try to do it with my classmates or friends.	3.60	0.96

Table 14: Mean (M) and Standard Deviation (SD) for Social (SWS)

Table 14 shows the mean scores and standard deviations for social. The results displayed that many of the respondents preferred seeking support and assistance from classmates or friends whenever they encounter issues related to writing, as this statement reflects the highest mean score ($M = 3.62$, $SD = 0.95$). Slightly lower mean scores were observed ($M = 3.55$, $SD = 0.94$) where some respondents believed in collaborative learning, as they generally have a discussion with friends or classmates in order to generate ideas for their writing. The mean value with the lowest score, which is ($M = 3.33$, $SD = 1.04$) suggests that a minority of those who responded seek feedback or suggestions from their friends after they have modified and revised their writing.

Affective Writing Strategies

Item	M	SD
AWSQ1 I try to write an essay in class with confidence and ease.	3.59	0.83
AWSQ2 I try to relax whenever I feel afraid of writing.	3.84	0.83
AWSQ3 I encourage myself to write even when I am afraid of making mistakes.	4.05	0.77

Table 15: Mean (M) and Standard Deviation (SD) for Affective (AWS)

Table 15 shows the overall mean scores ranged from ($M = 3.59$ to $M = 4.05$), showing low to moderate levels of affective writing strategies. The highest mean value of ($M = 4.05$, $SD = 0.77$) was reported, where many of the respondents strongly agreed that they motivate themselves to keep on writing despite worrying and feeling anxious about making errors. Conversely, the second highest mean value of ($M = 3.84$, $SD = 0.83$) was recorded, where most of the respondents make an effort to calm down whenever they are feeling anxious about writing. In addition, the minority of the respondents who believed that they tried writing an essay in classroom with confidence as well as comfort recorded the lowest mean score, which is ($M = 3.59$, $SD = 0.83$).

Exploratory Statistics

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. According to He (2024), 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.

Findings for the relationship between environment and personal factors in writing

This section presents data to answer research question 6: Is there a significant relationship between environment and personal factors in writing?

H_{01} : There is no significant relationship between environment and personal factors in writing

To determine if there is a significant association in the mean scores between environment and personal factors in writing, data is analysed using SPSS for correlations. Results are presented separately in Table 15 below.

		Environment	Personal	Behaviour
Environment	Pearson (Correlation)	1	.311**	.359**
	Sig (2-tailed)		<.001	<.001
	N	256	256	256
Personal	Pearson (Correlation)	.311**	1	.659**
	Sig (2-tailed)	<.001		<.001



	N	256	256	256
Behaviour	Pearson (Correlation	.359**	.659**	1
	Sig (2-tailed)	<.001	<.001	
	N	256	256	256

Table 16: Correlation between environment and personal factors

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

Table 16 shows there is an association between environment and personal factors in writing. Correlation analysis shows that there is a moderate significant association between environment and personal factors in writing ($r=.311^{**}$) and ($p<.001$).

Findings for the Relationship between personal and behavioural factors in writing

This section presents data to answer research question 7: Is there a relationship between personal and behavioural factors in writing?

H₀₂: There is no significant relationship between personal and behavioural factors in writing.

In addition to that, also based on Table 16, there is an association between personal and behavioural factors in writing. Correlation analysis shows that there is a high significant association between personal and behavioural factors in writing ($r=.659^{**}$) and ($p<.001$).

Findings for the Relationship between behavioural and environmental factors in writing

This section presents data to answer research question 8: Is there a relationship between behavioural and environmental factors in writing?

H₀₅: There is no significant relationship between behavioural and environmental factors in writing

Furthermore, also based on Table 16, there is an association between behavioural and environmental factors in writing. Correlation analysis shows that there is a moderate significant association between environment and behavioural factors in writing. ($r=.359^{**}$) and ($p<.001$).

CONCLUSION

SUMMARY OF FINDINGS AND DISCUSSIONS

The findings of this study show a significant difference in writing components between genders. This suggests that male and female learners differed in how they perceived and applied writing components. The finding indicates that gender may influence learners' writing practices, although the result should be interpreted with caution as the sample was dominated by female respondents. This finding aligns with Raoofi et al. (2017), who stated that writing strategies are important for understanding learners' writing processes, as learners may use metacognitive, cognitive, social, affective, and effort regulation strategies differently when completing writing tasks.

The study also found no significant differences in writing components across disciplines. This means that learners from Science and Technology, Arts, Social Sciences and Humanities, and Accountancy, Business and Management showed generally similar writing components. Although the respondents came from different academic backgrounds, their writing practices did not differ significantly. This result implies that academic writing is a problem faced by many academic fields. This is in accordance with Peter and Singaravelu (2020), who reported that learners commonly face problems in English writing, and Guna et al. (2025), who highlighted that EFL learners experience lexical and structural challenges in writing.



The overall findings indicate that learners perceived environmental factors positively in writing, especially in relation to ChatGPT. For critical thinking abilities, the highest mean indicated that learners actively explored alternative viewpoints or sources when using ChatGPT, whereas the lowest mean indicated that learners were less likely to doubt ChatGPT's validity and seek further evidence. Regarding academic achievement, the highest mean indicated that ChatGPT was a helpful resource for writing guidance, while the lowest mean suggested that learners were less certain about ChatGPT has positive effects on their academic achievement. For ChatGPT usage, the highest mean showed that ChatGPT helped learners with English translation, while the lowest mean showed lower agreement that ChatGPT improved human productivity. For student engagement, the highest mean showed that ChatGPT was easy to use and engaging, while the lowest mean showed weaker agreement that ChatGPT was interactive and human-like. These findings align with Youssef et al. (2024), who found that ChatGPT positively influenced learners' engagement, productivity, and academic performance. They also support Mahapatra (2024), who reported that ChatGPT improved learners' grammar, vocabulary control, and writing quality.

For personal factors, learners showed positive use of metacognitive and cognitive writing strategies. In metacognitive strategies, the highest response was related to checking spelling, while the lowest was related to monitoring and evaluating writing progress. This shows that learners focused more on surface-level accuracy than long-term self-monitoring. In cognitive strategies, the highest response showed that learners used their own experience and knowledge in writing, while the lowest response showed that they were less likely to use newly memorised vocabulary. This finding is in accordance with Raoofi et al. (2017), who identified metacognitive and cognitive strategies as important writing strategy components. It also supports Rahmat (2021), who found that metacognitive and cognitive strategies help learners organise, monitor, and manage ESL writing tasks.

For behavioural factors, the findings show that learners perceived effort regulation, social strategies, and affective strategies positively. In effort regulation, learners showed strong concentration and persistence, but they were less likely to write frequently to improve their writing skills. In social strategies, learners preferred identifying friends or classmates who could help them, but they were less likely to ask peers to read and comment on their revised work. In affective strategies, learners encouraged themselves to write despite fear of making mistakes, although they reported lower confidence when writing essays in class. This finding is consistent with Raoofi et al. (2017), who identified effort regulation, social, and affective strategies as important writing strategies. It also supports Bandura's (2012) Social Cognitive Theory, which explains that learners' behaviour is determined by the interaction between personal and environmental factors.

The correlation findings showed a significant positive relationship between environmental and personal factors in writing. This indicates that learners' use of ChatGPT as an environmental support was related to their metacognitive and cognitive writing strategies. When learners used ChatGPT for ideas, clarification, translation, and research support, these external supports were connected to their internal writing strategies. This finding supports Bandura's (2012) Social Cognitive Theory, which explains that environmental and personal factors influence one another. This is also consistent with Youssef et al. (2024), who found that ChatGPT influenced learners' academic learning, engagement, and productivity.

The study also showed a significant positive relationship between personal and behavioural factors in writing. This means that learners who used metacognitive and cognitive writing strategies were also more likely to show effort regulation, social support, and affective control. In other words, learners' internal writing strategies were connected to their actions, persistence, collaboration, and self-encouragement during writing. This finding is in accordance with Bandura's (2012) view that personal and behavioural factors interact in the learning process. It also aligns with Raoofi et al. (2017), who argued that writing strategies involve not only cognitive and metacognitive processes but also effort regulation, social interaction, and affective control.

Finally, the findings showed a significant positive relationship between behavioural and environmental factors in writing. This suggests that learners' writing behaviours, such as persistence, collaboration, confidence, and emotional control, were associated with ChatGPT's environmental support. Learners' behaviour in writing was therefore connected to the tools, feedback, and learning support available in their writing environment. This finding aligns with Bandura's (2012) Social Cognitive Theory, which argues that behaviour and the environment influence each other. It is also in accordance with Youssef et al. (2024), who showed that ChatGPT can influence



learners' participation and academic achievement, and Mahapatra (2024), who found that ChatGPT can support ESL writing development when used as a formative feedback tool.

Limitation of the Study

The limitation of this study concerns the unequal gender distribution of the respondents. Female participants represented 73% of the sample ($n = 187$), while male participants represented only 27% ($n = 69$). Although the independent samples t-test showed a statistically significant difference in writing components across gender ($p = 0.003$), this result should be interpreted with caution. Since the female subgroup outnumbered the male subgroup by nearly three to one, the observed variance and overall pattern of responses may be more reflective of the dominant female subgroup. Therefore, the gender-based finding may have limited generalisability across both male and female learners.

IMPLICATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

Theoretical and Conceptual Implications

The findings support Bandura's Social Cognitive Theory (2012) as a relevant framework for examining academic writing in AI-supported learning environments, as the significant relationships among environmental, personal, and behavioural factors show that learners' writing practices are shaped through reciprocal interaction. Conceptually, the study expands the application of Social Cognitive Theory by positioning ChatGPT as an environmental factor that supports learners through idea generation, translation, research assistance, and engagement, while personal factors are represented through metacognitive and cognitive writing strategies, and behavioural factors are reflected through effort regulation, social strategies, and affective control.

The significant relationships between environmental and personal factors demonstrate that ChatGPT is connected to learners' internal writing strategies, while the relationships between personal and behavioural factors indicate that learners' planning, monitoring, grammar use, and idea development are linked to their persistence, collaboration, and confidence in writing. Similarly, the relationship between behavioural and environmental factors confirms that learners' writing actions are influenced by the support available in their learning environment. Therefore, the conceptual framework of this study is supported, as it demonstrates that academic writing with ChatGPT is not merely a technological practice, but a flexible interaction between learners' internal strategies, writing behaviours, and AI-mediated environmental support.

Pedagogical Implications

Instructors should integrate ChatGPT into academic writing instruction as a guided support tool rather than allowing learners to use it as a substitute for independent writing. Since the findings show that learners perceived ChatGPT positively for translation, idea generation, research support, and engagement, educators can incorporate ChatGPT in pre-writing, drafting, and revising stages through structured activities such as brainstorming prompts, outline development, vocabulary expansion, grammar checking, and draft improvement. However, because learners showed lower tendency to question ChatGPT's validity and seek further evidence, teachers should emphasise critical AI literacy by training learners to verify information, compare AI responses with credible sources, and evaluate the accuracy of generated content before using it in academic writing.

The findings also show that learners were strong in checking spelling and grammar but weaker in monitoring their overall writing progress, so writing classes should include reflective journals, self-assessment checklists, and writing portfolios to strengthen metacognitive awareness. In addition, since learners showed persistence and concentration but practised writing less frequently and sought limited peer feedback, instructors should provide regular writing tasks, peer review sessions, and collaborative writing activities to develop effort regulation, social strategies, and confidence in writing. Therefore, teaching should move towards a balanced AI-assisted writing approach that combines technological support with critical thinking, self-regulation, peer collaboration, and independent writing development.

Suggestions for Future Research



Several directions may be explored in future research. First, future studies should aim to recruit a more balanced number of male and female participants to allow a more reliable comparison of gender-related differences in writing components. Second, future studies could employ qualitative or mixed-method approaches, such as interviews and focus group discussions, to gain deeper insights into how learners use ChatGPT throughout the academic writing process and how it influences their writing decisions. Third, longitudinal studies could investigate how the use of ChatGPT affects learners' writing development, self-regulation, and critical thinking skills over time. Finally, future researchers may compare learners from different educational levels, institutions, disciplines, or countries to determine whether the relationships among environmental, personal, and behavioural factors remain consistent across contexts.

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Appendix

Writing Strategies & Chatgpt

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

Section	Variable	Construct	No Of Items/Indicators
B	Personal	Metacognitive	10
		Cognitive	6
	Behaviour	Effort Regulation	4
		Social	4
		Affective	3
C	Environment		
		Critical thinking abilities	4
		Academic achievement	4
		ChatGPT usage	5
		Student engagement	3
			43

Section B: Writing Strategies

Metacognitive (Mws)

Item	1	2	3	4	5
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 teacher.					
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.					

Effort Regulation (Ers)

Item	1	2	3	4	5
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.					
ERSQ5 I spend a lot of time and energy on writing good English assignments.					

Cognitive (Cws)



Item	1	2	3	4	5
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.					

Part 5: Social (Sws)

Item	1	2	3	4	5
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.					

Part 6: Affective (Aws)

Item	1	2	3	4	5
AWSQ1 I try to write an essay in class with confidence and ease.					
AWSQ2 I try to relax whenever I feel afraid of writing.					
AWSQ3 I encourage myself to write even when I am afraid of making mistakes.					

Section C: Chatgpt

Critical Thinking Abilities (Ct)

Item	1	2	3	4	5
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.					

Academic Achievements (Aa)

Item	1	2	3	4	5
AAQ1 ChatGPT brings innovative ideas that are ready to be shared with students.					



AAQ2 Students can anticipate robust writing guidance from ChatGPT.					
AAQ3 ChatGPT has improved my academic performance.					
AAQ4 ChatGPT has improved my learning pace.					

Chatgpt Usage (Cu)

Item	1	2	3	4	5
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.					
CUQ5 The advent of ChatGPT marks a groundbreaking transformation in Natural Language Processing capabilities.					

Student Engagement (Se)

Item	1	2	3	4	5
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.					