AI-DRIVEN INSTRUCTIONAL DESIGN FOR ENGLISH LANGUAGE LEARNING AMONG UNDERGRADUATE STUDENTS

Shiyu HUANG[1] and Piyanan Pannim VIPAHASNA[1]
1 Faculty of Technical Education, Rajamangala University of Technology Thanyaburi, Thailand; shiyu_h@mail.rmutt.ac.th (S. H.); piyanan_p@rmutt.ac.th (P. V.)

ABSTRACT
This study examined the implementation of ChatGPT-assisted English writing instruction among undergraduate students at Rajamangala University of Technology Thanyaburi (RMUTT), Thailand. The study aimed to implement an AI-driven learning model, evaluate changes in students' English writing proficiency, and investigate student satisfaction. Participants were 64 second-year Learning Innovation and Information Technology students selected through convenience sampling. A mixed-methods, single-group pre-test-post-test design was conducted over 12 weeks using English writing tests, a satisfaction questionnaire, and open-ended questions. Quantitative data were analyzed using descriptive statistics and paired-sample t-tests, while qualitative responses were examined thematically. Results showed that mean writing scores increased from 7.41 (SD = 2.68) to 16.23 (SD = 1.65), with a statistically significant pre-post difference, $t(63) = 26.94$, $p < .05$) Overall satisfaction was high ($M = 4.24/5$), particularly for ease of use and instructional design. Students valued immediate feedback, personalized support, and iterative writing practice, while reporting occasional network instability and response inaccuracies. The findings suggest that ChatGPT can serve as a useful supplementary tool for university English writing instruction; however, causal interpretations remain limited by the absence of a control group.
Keywords: AI in Education, ChatGPT, English Writing Proficiency, Learning Achievement, Student Satisfaction, Higher Education

CITATION INFORMATION: Huang, S., & Vipahasna, P. (2026). AI-Driven Instructional Design for English Language Learning Among Undergraduate Students. *Procedia of Multidisciplinary Research, 4*(11), 4.

INTRODUCTION

In the contemporary era, the rapid advancement of artificial intelligence (AI) has profoundly transformed various sectors, with education being no exception. The integration of AI technologies into educational settings has emerged as a significant driver of pedagogical innovation, offering new possibilities for personalized learning, immediate feedback, and enhanced student engagement (Songsiengchai, 2025; Waluyo & Rouaghe, 2025). Among these technological innovations, ChatGPT, a large language model developed by OpenAI, has garnered considerable attention from educators and researchers for its potential to support language learning and writing instruction (Apridayani et al., 2025; Liang et al., 2024). Recent systematic reviews have further confirmed the potential of ChatGPT in ESL/EFL education, synthesizing evidence from over 70 empirical studies (Lo et al., 2024; Feng Teng, 2024), while a growing body of research has examined the role of generative AI-powered writing instruction in foreign language education contexts (Xiao et al., 2026). In Thailand, as in many other countries, higher education institutions are actively exploring the integration of AI tools to address persistent challenges in English language education, particularly in developing students' writing proficiency.

English language proficiency is a critical competency for undergraduate students in Thailand, given its importance for academic success, career advancement, and global communication. However, Thai students often face significant challenges in mastering English, particularly in writing skills, due to limited opportunities for authentic language practice, insufficient individualized feedback, and varying levels of prior English competence (Panurag et al., 2026; Thangthong et al., 2024). Traditional English writing instruction, which typically relies on teacher-centered approaches and delayed feedback, frequently fails to meet the diverse learning needs of students, resulting in low motivation, limited practice, and suboptimal learning outcomes (Hatcher & Shin, 2025; Songsiengchai, 2025). Similar challenges have been documented among EFL learners in other Asian contexts, including Vietnam and Saudi Arabia (Meniado et al., 2024; Ahmed, 2023), suggesting that these difficulties are not unique to Thailand but reflect broader issues in EFL writing instruction across the region. These challenges underscore the need for innovative instructional approaches that can provide students with more interactive, personalized, and immediate support for writing development. ChatGPT, with its ability to generate human-like responses, provide instant feedback, and engage users in conversational practice, presents a promising solution to these pedagogical challenges. Unlike traditional computer-assisted language learning tools that rely on pre-programmed responses, ChatGPT offers dynamic, context-aware interactions that can adapt to individual learners' needs and writing levels (Zhao & Zhang, 2025). Research has begun to explore the application of ChatGPT and similar AI tools in English language education, with preliminary studies suggesting positive effects on students' writing performance, motivation, and engagement (Apridayani et al., 2025; Liang et al., 2024; Waluyo & Rouaghe, 2025). Empirical evidence from quasi-experimental studies has demonstrated that ChatGPT-assisted instruction significantly improves EFL students' writing skills and motivation (Hoang, 2025; Zargaran & Aldhahli, 2026; Song & Song, 2023), while also enhancing writing engagement (Teng & Huang, 2025; Teng, 2024). Furthermore, researchers have begun to examine the metacognitive dimensions of ChatGPT-assisted writing, revealing that students' metacognitive awareness plays a crucial role in how they utilize AI feedback for writing improvement (Teng, 2025a; Teng & Shen, 2025; Tekir, 2026). However, much of the existing research has been conducted in Western or East Asian educational contexts, with limited empirical evidence available regarding the effectiveness of ChatGPT-assisted writing instruction in Thai higher education settings (Songsiengchai, 2025; Thangthong et al., 2024).

The study was conducted at Rajamangala University of Technology Thanyaburi (RMUTT), a public university located in Pathum Thani Province, Thailand, that serves students from diverse

academic and linguistic backgrounds. The participants were second-year undergraduate students enrolled in the Learning Technology and Innovation program, a course that aims to equip students with the skills and knowledge necessary for integrating technology into educational practice. The English writing instruction in this course focuses on developing students' ability to produce coherent, grammatically accurate, and well-organized texts in academic and professional contexts.

As an emerging instructional tool, ChatGPT demonstrates unique advantages in addressing the challenges of English writing instruction. Its capacity to provide immediate, individualized feedback can facilitate deeper cognitive processing and enhance learning outcomes. Furthermore, ChatGPT can reduce learners' cognitive load by providing immediate access to information, feedback, and support, thereby freeing cognitive resources for higher-order writing processes such as organization and argumentation (Lee & Otani, 2025). Recent research has also shown that ChatGPT can alleviate students' writing anxiety (Hawanti & Zubaydulloevna, 2023; Almusharraf,2026; Abdelsaheed & Alsalamah, 2026), with some scholars reconceptualizing writing anxiety as a dynamic construct emerging from human-technology interaction rather than a static trait (Zhang, Y., 2026). Additionally, studies grounded in self-determination theory have suggested that AI tools may enhance students' intrinsic motivation by fulfilling their basic psychological needs for autonomy, competence, and relatedness (Tran, 2026).

Nevertheless, simply introducing ChatGPT into the classroom does not automatically lead to optimal teaching outcomes. The existing literature has primarily focused on the general applicability of AI tools in language learning, with relatively limited attention paid to the specific mechanisms through which ChatGPT enhances writing proficiency, learning interest, and satisfaction in Thai higher education contexts (Songsiengchai, 2025; Zhao & Zhang, 2025). While recent studies have begun to examine Thai university students' perceptions and experiences with generative AI tools (Limna & Shaengchart, 2025; Tanharat & Phootirat, 2025; Susamawathanakun, 2025; Bacon & Kraus, 2025),intervention studies that implement an AI-driven writing instructional model in authentic Thai university classrooms and examine pre-test-post-test learning gains and student satisfaction remain scarce in the Thai higher education context. Furthermore, the relationship between ChatGPT use, self-regulated learning strategies, and metacognitive awareness in Thai EFL settings has yet to be fully explored (Liu, Z.M. et al., 2026; Zhang, Z. et al., 2025; Qazi et al., 2025). Previous studies have confirmed that ChatGPT can enhance learning interest and writing practice (Apridayani et al., 2025; Liang et al., 2024). However, improving final academic performance and writing skills requires not only access to high-quality AI tools but also thoughtful instructional design and theoretical guidance. The effectiveness of ChatGPT-assisted writing instruction depends on whether its design and implementation truly reflect a student-centered principle, transforming students from passive "knowledge recipients" into active "knowledge constructors."

Therefore, this study examines changes associated with ChatGPT-assisted writing practice in students'English writing proficiency, learning interest and engagement, and overall satisfaction. Specifically, this study aims to: 1) implement an AI-driven English language learning model for undergraduate students; 2) evaluate learning outcomes by comparing students' pre-test and post-test scores after participating in the AI-driven learning model; 3) investigate students' learning satisfaction after participating in the AI-driven learning model.

This study implements a ChatGPT-assisted writing practice model in a Thai university setting and conducts empirical teaching experiments over a 12-week period. The aim is to validate the role of ChatGPT in enhancing writing proficiency, promoting learning interest and engagement, and fostering satisfaction through quantitative and qualitative data, ultimately providing theoretical support and practical guidance for the integration of AI tools in higher education English instruction.

LITERATURE REVIEWS

The relationship between ChatGPT-assisted writing practice and students' English writing proficiency. The relationship between AI-assisted writing practice and students' English writing proficiency has attracted increasing scholarly attention in recent years, particularly in the field of language education where writing instruction requires both linguistic knowledge and practical composition skills. AI-powered tools, especially large language models like ChatGPT, have been identified as effective instructional resources to provide immediate feedback, generate writing examples, and facilitate knowledge construction (Songsiengchai, 2025; Zhao & Zhang, 2025). A growing body of systematic reviews has consolidated this evidence, confirming that ChatGPT integration in EFL writing classrooms yields positive outcomes in terms of writing quality, accuracy, and learner engagement (Lo et al., 2024; Feng Teng, 2024). These benefits have been observed across various educational contexts, with studies reporting significant improvements in writing proficiency among EFL learners in both Asian and Middle Eastern settings (Meniado et al., 2024; Ahmed, 2023). Unlike traditional writing instruction that relies heavily on delayed teacher feedback and limited practice opportunities, ChatGPT offers dynamic, interactive, and personalized writing support that allows students to engage in iterative writing and revision processes (Hatcher & Shin, 2025).

In Thai higher education contexts, where students often struggle with English writing due to limited exposure to authentic language use and insufficient individualized instruction, ChatGPT offers unique advantages. It not only enables flexible and repeated practice outside the classroom but also enhances writing confidence and motivation by providing immediate, non-judgmental feedback (Apridayani et al., 2025; Thangthong et al., 2024). Empirical evidence further supports the effectiveness of ChatGPT-assisted writing instruction. For instance, Songsiengchai (2025) demonstrated that ChatGPT implementation significantly improved Thai students' English language learning outcomes, with students showing measurable gains in writing accuracy and fluency. Similarly, Zhao and Zhang (2025) conducted a long-term tracking study and found that generative AI-supported English language teaching models had sustained positive effects on students' language acquisition and writing performance. Quasi-experimental studies in other Asian contexts have reinforced these findings: Hoang (2025) found that ChatGPT-assisted language learning significantly enhanced Vietnamese English majors' writing skills and motivation, while Zargaran and Aldhahli (2026) proposed a stage-specific affordance model of ChatGPT deployment in EFL writing, providing criterion-level evidence from a quasi-experimental design. Bacon and Kraus (2025) conducted a learner-centered intervention in a Thai university pre-sessional foundation writing course and found that ChatGPT, when leveraged through data-driven learning principles, significantly improved academic writing proficiency. Additionally, Liu, Z.M. et al. (2026) demonstrated that integrating large language models into EFL writing instruction positively affected students' writing performance, self-regulated learning strategies, and motivation. Mekheimer (2025) further reported that generative AI-assisted feedback significantly enhanced EFL learners' writing proficiency and revision frequency, while Zhang, Z. et al. (2025) found that hybrid feedback combining generative AI and teacher input effectively improved L2 writing skills. Qazi et al. (2025) specifically examined AI-assisted self-regulated learning with ChatGPT and confirmed its positive impact on students' engagement and writing skill enhancement.

Moreover, Hatcher and Shin (2025) reported that data analytics from AI learning platforms can effectively assess and enhance students' writing progress, providing valuable insights for instructional design. Their findings highlighted that AI-assisted learning platforms, when integrated with sound pedagogical strategies, can significantly improve learning outcomes by offering personalized feedback and adaptive practice opportunities. Waluyo and Rouaghe (2025) further demonstrated that student-initiated interactions with AI tools, including

translanguaging practices, enhanced foreign language acquisition by promoting autonomous learning and meaningful language use. These findings underscore the importance of AI tool design and pedagogical integration in maximizing learning effectiveness.

Based on the above theoretical and empirical evidence, it can be concluded that ChatGPT-assisted writing practice plays a positive role in improving students' English writing proficiency, bridging the gap between conceptual knowledge and practical writing skills. Accordingly, the following hypothesis is proposed:

H1: The use of ChatGPT for writing practice significantly improves undergraduate students' English writing proficiency.

The relationship between ChatGPT-assisted writing practice and students' learning interest and engagement

The relationship between AI-assisted writing practice and students' learning interest and engagement has been emphasized in both theoretical and empirical studies. Learning interest and engagement are widely recognized as crucial factors influencing students' motivation, persistence, and overall learning outcomes. Traditional English writing instruction in Thai higher education often struggles to sustain students' attention and motivation due to its limited interactivity, delayed feedback, and insufficient personalization, particularly in large classes where individual attention is scarce. ChatGPT, with its interactive, responsive, and adaptive features, provides an alternative instructional approach that can effectively capture learners' attention and stimulate intrinsic motivation (Apridayani et al., 2025; Waluyo & Rouaghe, 2025).

In writing courses, ChatGPT allows students to engage in authentic writing tasks, receive immediate feedback, and revise their work iteratively, all of which contribute to a more engaging and motivating learning experience. Such features not only reduce writing anxiety but also enhance emotional engagement, thereby fostering sustained interest in learning (Liang et al., 2024; Panurag et al., 2026). For instance, Liang et al. (2024) found that Chinese university EFL learners perceived AI tools as helpful for generating ideas, organizing content, and reducing writing difficulties, leading to increased engagement and motivation. Similarly, Panurag et al. (2026), drawing on an extended Technology Acceptance Model, found that Thai students' positive user experiences with AI-assisted English learning platforms were associated with greater interest and engagement, supported by factors such as ease of use, perceived usefulness, and social support. Teng (2024) further emphasized that EFL learners view ChatGPT as "a companion, not an enemy" in the writing process, with students reporting enhanced writing engagement and self-efficacy. In a subsequent study, Teng and Huang (2025) confirmed that incorporating ChatGPT for EFL writing significantly and positively affected writing engagement across multiple dimensions. Moreover, Teng (2025a) found that metacognitive awareness played a crucial role in shaping EFL learners' perceptions and experiences when utilizing ChatGPT for writing feedback, with higher levels of metacognitive awareness associated with more positive learning experiences. Teng and Shen (2025) further demonstrated that metacognitive awareness significantly predicted EFL learners' writing performance in ChatGPT-assisted writing contexts. Teng (2025b) further examined EFL student writers' metacognitive awareness in utilizing ChatGPT, finding that metacognitive awareness significantly influenced how students engaged with and benefited from ChatGPT-generated feedback. Song and Song (2023), in a highly cited study, assessed the efficacy of ChatGPT in AI-assisted language learning and found substantial improvements in both academic writing skills and learner motivation. Tran (2026), drawing on self-determination theory, explored how AI serves as a "game changer" in EFL students' academic writing, identifying key motivational factors including autonomy, competence, and relatedness. Lim, Yunus, and Wong (2026) conducted a systematic review confirming that AI writing tools positively impact learners' motivation in English writing. Tajik and Karkhaneh (2025) similarly

found that AI-driven dynamic writing platforms improved EFL learners' writing skills and fostered their motivation.

Additionally, Thangthong et al. (2024) reported that Thai EFL learners who used AI writing assistance tools demonstrated higher levels of writing confidence and willingness to write, suggesting that AI tools can positively influence affective factors related to writing development. Their study highlighted that students appreciated the autonomy and flexibility offered by AI tools, which allowed them to practice writing at their own pace and receive immediate, constructive feedback. These findings are corroborated by recent Thai-based studies: Limna and Shaengchart (2025) found that Thai university students held positive perceptions of generative AI tools including ChatGPT and Gemini for academic writing, while Tanharat and Phootirat (2025) reported that Thai English-major students valued ChatGPT for its utility in generating ideas and organizing content. Susamawathanakun (2025) further demonstrated that Thai EFL learners' confidence in academic writing significantly increased after using AI tools, with ChatGPT being the most popular choice among available options.

Based on these findings, it can be concluded that ChatGPT-assisted writing practice has a significant positive effect on promoting students' learning interest and classroom engagement. Accordingly, the following hypothesis is proposed:

H2: ChatGPT-assisted writing instruction significantly enhances students' learning interest and classroom engagement.

The relationship between ChatGPT-assisted writing practice and students' overall satisfaction

The relationship between AI-assisted writing practice and students' overall satisfaction has also been increasingly acknowledged in the field of educational innovation. Satisfaction reflects learners' overall evaluation of teaching methods, content, and learning outcomes, and serves as an important indicator of instructional effectiveness and student acceptance of new technologies. In traditional writing instruction contexts, students often express low satisfaction due to limited opportunities for individualized feedback, inflexible pacing, and insufficient interaction with instructors. ChatGPT, however, provides learners with more autonomy and flexibility, allowing them to control the pace of writing practice, review feedback repeatedly, and engage in learning activities more effectively (Songsiengchai, 2025; Panurag et al., 2026). Empirical evidence from recent studies strongly supports this view. Specifically, in the context of Thai higher education, the use of ChatGPT has been shown to transform the writing learning experience by serving as a supportive learning aid that enhances writing quality and revision processes, while also allowing students to receive immediate feedback and practice writing outside of class, effectively addressing diverse learning needs (Apridayani et al., 2025; Thangthong et al., 2024). This flexibility and ability to support self-paced learning is highly valued by students. Furthermore, the immediate and interactive nature of ChatGPT's feedback is highly effective in maintaining students' engagement and addressing their writing difficulties. Songsiengchai (2025) confirmed that ChatGPT implementation in Thai English language courses attracted students' attention and improved learning effectiveness, while Panurag et al. (2026) emphasized that supportive conditions and positive user experiences contribute to higher satisfaction with AI-assisted learning. Lee and Otani (2025) examined EFL university students' motivation, cognitive load, and satisfaction with using generative AI for English learning, finding that satisfaction was closely associated with reduced cognitive load and increased motivation. Ahmed (2023) investigated ChatGPT use in Saudi Arabia's EFL classrooms and identified key satisfaction components including learning content, learning progress, ease of use, and interactive opportunities. Yang and Li (2024), in a comprehensive review published in System, noted that while ChatGPT offers substantial benefits for L2 learning, its effects on learning satisfaction warrant further investigation. Liu, Z. (2024), employing the Technology Acceptance Model (TAM), found that writing anxiety significantly

affects perceived ease of use and perceived usefulness of ChatGPT, which in turn influences students' acceptance and satisfaction with the tool.

Research findings consistently show that students demonstrate higher acceptance of ChatGPT-assisted writing practice compared with conventional approaches. For instance, studies reveal that students appreciate the clarity, usefulness, and practicality of AI-generated feedback. Liang et al. (2024) reported that university EFL learners showed positive perceptions of AI in English writing, appreciating the immediate feedback and idea-generation support it provided. Similarly, Waluyo and Rouaghe (2025) found that student-initiated use of AI tools for translanguaging and writing practice enhanced learning experiences and satisfaction by aligning with students' diverse needs and learning preferences. The ability to access writing support at any time and the integration of personalized feedback features further enhance satisfaction by providing a responsive and supportive learning environment.

Therefore, it can be concluded that the overall acceptance of ChatGPT-assisted writing practice among students is higher than that of traditional writing instruction, and their satisfaction with the method is relatively high. Accordingly, the following hypothesis is proposed:

H3: Students report a high level of satisfaction with the ChatGPT-based writing learning model.

RESEARCH METHODOLOGY

This study employed a mixed-methods, single-group pre-test-post-test design. No control group was included. Therefore, improvements in post-test scores cannot be attributed solely to ChatGPT; they may also reflect 12 weeks of general English exposure, practice effects, or natural maturation. The design was chosen for classroom feasibility, and the results should be interpreted as preliminary evidence.

Participants

The participants were 64 second-year undergraduate students enrolled in the Learning Technology and Innovation program at Rajamangala University of Technology Thanyaburi (RMUTT), Thailand. Students were selected using a convenience sampling technique from two classes taught by the researcher during the 2026 academic year. All participants were Thai native speakers with prior English language learning experience through secondary education. Their English writing proficiency levels ranged from beginner to upper-intermediate, as self-reported in the demographic section of the satisfaction questionnaire, which may limit the generalizability of the findings.

RESEARCH INSTRUMENTS

The research instruments employed in this study included:

1) English Proficiency Test (Pre-test and Post-test): A standardized English writing test was developed by the researcher based on the course learning objectives. The test assessed students' writing proficiency across multiple dimensions, including grammatical accuracy, vocabulary use, content organization, and overall coherence. The same test format was used for both pre-test and post-test to ensure comparability, with different but equivalent prompts to minimize practice effects. The test was reviewed and validated by two experienced English language instructors to ensure content validity.

2) Student Satisfaction Questionnaire: A self-developed questionnaire was designed to measure students' satisfaction with the ChatGPT-based writing learning model. The questionnaire consisted of three main sections:

Demographic Information: Gender, self-assessed English writing proficiency, prior experience with AI tools, and average weekly time spent using ChatGPT for writing practice.

Perceived Usefulness (6 items): Assessing students' perceptions of how ChatGPT helped with idea generation, grammar correction, vocabulary expansion, content improvement, overall writing ability, and writing confidence.
Perceived Ease of Use (5 items): Assessing students' perceptions of ChatGPT's interface, ease of requesting writing help, speed of feedback, understandability of suggestions, and overall stress reduction in writing practice.
Instructional Design Elements (3 items): Assessing students' perceptions of the design of weekly writing tasks, guidance on prompt writing, and integration of ChatGPT with classroom teaching.
The questionnaire used a 5-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Open-ended questions were also included to gather qualitative feedback on the advantages and challenges of using ChatGPT for writing learning.
3) Open-ended Questions: Qualitative data were collected through open-ended questions included at the end of the satisfaction questionnaire. Students were asked to provide feedback on the biggest advantages of using ChatGPT for English writing learning, as well as difficulties or challenges encountered during the writing tasks and suggestions for improving the instructional design or tool usage.

Data Collection Procedures

Data collection was conducted over a 12-week period during the 2026 academic semester.

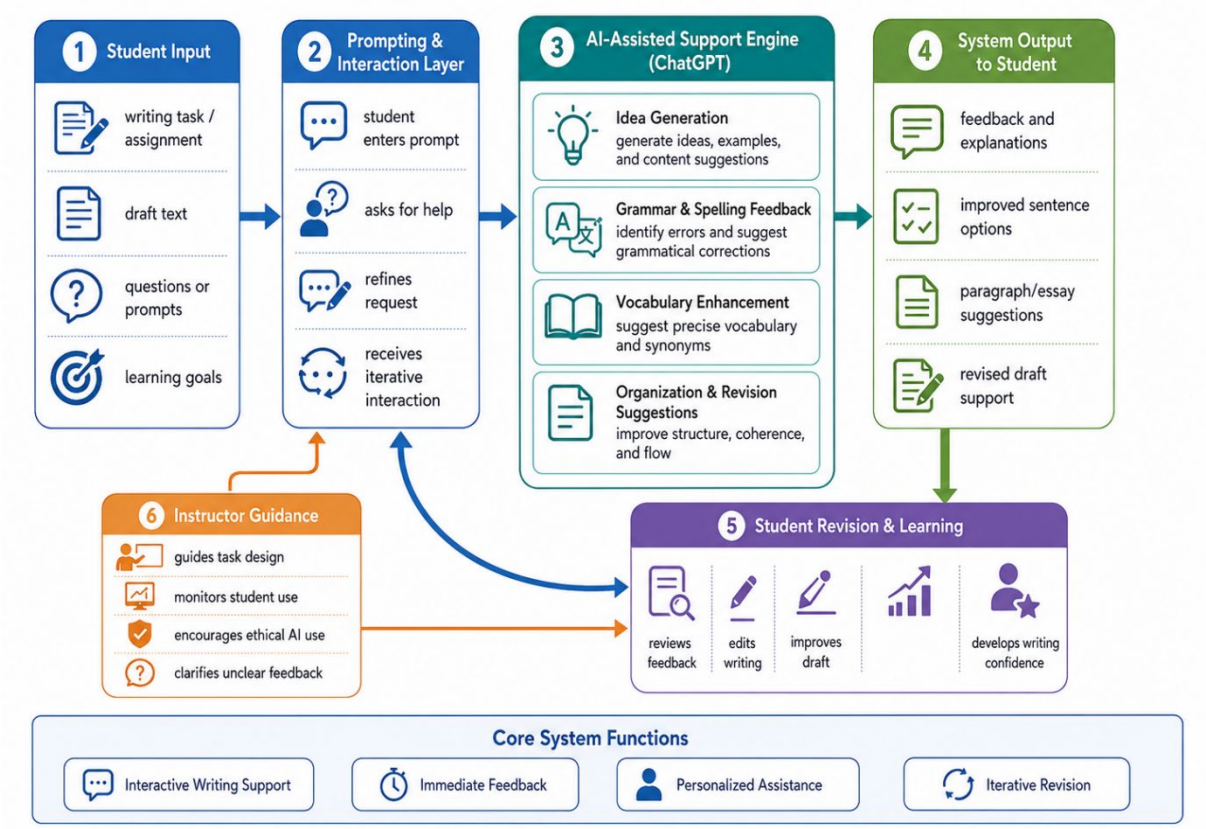

Figure 1 Logical Model of the AI-Assisted English Writing System

Figure 1 illustrates the proposed logical model, which conceptualizes the AI-assisted English writing system as an iterative interaction among the learner, the AI support engine, and instructional guidance. The process begins with student input, including writing tasks, draft texts, questions, prompts, and individual learning goals. These inputs are communicated through the prompting and interaction layer, where students formulate requests, seek assistance, refine prompts, and continue interacting with ChatGPT until the generated support

becomes relevant to their writing needs. At the center of the model, ChatGPT functions as an AI-assisted support engine that provides four principal forms of assistance: idea generation, grammar and spelling feedback, vocabulary enhancement, and suggestions for improving organization, coherence, and revision. These functions directly reflect the instructional emphasis of the study, in which students used ChatGPT for grammar correction, idea generation, vocabulary development, paragraph and essay writing, content organization, and revision. Rather than positioning AI as a replacement for the learner's writing process, the model therefore represents ChatGPT as an interactive cognitive and linguistic support mechanism that provides immediate and individualized assistance while the student remains responsible for constructing and improving the written work.

A central characteristic of the model is its feedback-revision loop, through which AI-generated responses are transformed into opportunities for active learning rather than simply accepted as final answers. After receiving explanations, alternative sentence formulations, vocabulary suggestions, or organizational recommendations, students review the feedback, evaluate its relevance, revise their drafts, and, when necessary, return to the prompting layer with a refined request. This recursive process reflects the manuscript's emphasis on dynamic, personalized, and iterative writing support, in which immediate feedback enables repeated practice and revision. Instructor guidance operates across this cycle by structuring writing tasks, teaching effective prompting strategies, monitoring students' use of AI, and helping learners interpret or question problematic AI responses. This human-guided component is important because the study explicitly argues that effective ChatGPT-assisted instruction depends not merely on access to AI technology, but on deliberate instructional design and pedagogical guidance that enable students to become active knowledge constructors. Consequently, the model can be understood as a human-AI collaborative writing system built around four core mechanisms—interactive writing support, immediate feedback, personalized assistance, and iterative revision—through which technological affordances are integrated with learner agency and instructor scaffolding.

Data Analysis

Data were analyzed using both quantitative and qualitative methods. For quantitative data, descriptive statistics (means and standard deviations) were calculated to examine students' overall performance and satisfaction levels. Paired-sample t-tests were conducted to compare pre-test and post-test writing scores, assessing whether observed improvements in writing proficiency were statistically significant. The significance level was set at $p < .05$) For qualitative data from open-ended questions, thematic analysis was employed to identify recurring themes and patterns related to students' experiences, advantages, and challenges in using ChatGPT for writing learning. All statistical analyses were performed using IBM SPSS Statistics.

RESEARCH RESULTS

Respondents' Profiles

The study involved 64 second-year undergraduate students from the Learning Innovation and Information Technology program at Rajamangala University of Technology Thanyaburi. Among the respondents, 55 were male (85.29%) and 9 were female (14.71%). All participants were enrolled in the second year of their undergraduate program. Regarding their self-assessed English writing proficiency, 15 students (23.53%) reported having beginner level, 32 students (50.00%) reported lower-intermediate, 13 students (20.59%) reported upper-intermediate, and 4 students (5.88%) reported advanced level. Prior experience with AI tools for writing before this course indicated that 4 students (5.88%) had never used such tools, 15 students (23.53%) had used them 1-3 times, 26 students (41.18%) had used them 4-10 times, and 19 students (29.41%) had used them more than 10 times. Regarding the average weekly time spent using

ChatGPT for English writing practice during the course, 15 students (23.53%) reported spending less than 1 hour, 30 students (47.06%) reported 1-2 hours, 13 students (20.59%) reported 2-3 hours, and 6 students (8.82%) reported more than 3 hours. This demographic information provides a comprehensive overview of the study sample and helps contextualize the subsequent analysis of the ChatGPT-assisted writing intervention.

Comparison of Pre-test and Post-test English Writing Proficiency Scores

Table 1 shows the effectiveness of students using ChatGPT for English writing practice in the course.The mean score on the pre-test was 7.41, with a standard deviation of 2.68) After the 12-week ChatGPT-assisted writing intervention, students' writing proficiency improved, reaching a mean post-test score of 16.23 with a standard deviation of 1.65) Comparing the pre- and post-test scores, a paired-sample t-test showed a t-value of 26.94, indicating a significant difference between pre- and post-test scores ($p < .05$). Post-test scores were significantly higher than pre-test scores, demonstrating the effectiveness of ChatGPT-assisted writing instruction in enhancing students' English writing proficiency.

Table 1 Comparison of Average Scores Before and After ChatGPT-Assisted Writing Intervention

Items	n	$\bar{X}$	S.D.	t-test	Sig. (2-tailed)
Pre-test	64	7.41	2.68	26.94	.000*
Post-test	64	16.23	1.65		

*$p < .05$

Student Satisfaction Evaluation Results

Table 2 shows the results of the student satisfaction questionnaire. The average scores for each item ranged from 3.41 to 4.68, placing them above average. The highest average score was for "ChatGPT's interface is clear and easy to use for writing practice" (Item 2.1), at 4.68; the lowest average score was for "ChatGPT helps me correct grammar and spelling errors in my writing" (Item 1.2), at 3.41) The overall average satisfaction score was 4.24 out of 5.00, indicating a high level of student satisfaction with the ChatGPT-based writing learning model.

Table 2 Evaluation Results of Students' Satisfaction with ChatGPT-Assisted Writing Instruction

Evaluation Items	$\bar{X}$	S.D.	Interpretation
1) Perceived Usefulness			
1.1 ChatGPT helps me generate ideas and outlines when I do not know how to start writing.	4.03	0.97	Satisfied
1.2 ChatGPT helps me correct grammar and spelling errors in my writing.	3.41	1.21	Satisfied
1.3 ChatGPT helps me expand my vocabulary and use more varied expressions.	4.00	0.92	Satisfied
1.4 ChatGPT provides useful suggestions to improve my writing content and logic.	3.74	1.02	Satisfied
1.5 Using ChatGPT has improved my overall English writing ability.	3.65	1.18	Satisfied
1.6 Using ChatGPT has increased my confidence in English writing.	3.50	1.19	Satisfied
Perceived Usefulness (Overall)	3.72	1.08	Satisfied
2) Perceived Ease of Use			

2.1 ChatGPT's interface is clear and easy to use for writing practice.	4.68	0.81	Very Satisfied
2.2 I find it easy to ask ChatGPT for writing help (e.g., correction, revision, idea generation).	4.35	0.85	Satisfied
2.3 ChatGPT provides feedback quickly, which helps me revise my writing efficiently.	4.44	0.99	Satisfied
2.4 The writing suggestions from ChatGPT are easy to understand and apply.	4.32	0.88	Satisfied
2.5 Using ChatGPT makes English writing practice less stressful and more enjoyable.	4.06	0.92	Satisfied
Perceived Ease of Use (Overall)	4.37	0.89	Satisfied
3) Instructional Design Elements			
3.1 The weekly writing tasks (e.g., sentence correction, paragraph writing, essay drafting) using ChatGPT were well-designed and helpful.	4.15	1.02	Satisfied
3.2 The guidance on how to write effective prompts for ChatGPT was useful for my writing practice.	4.21	1.04	Satisfied
3.3 The integration of ChatGPT with classroom teaching created a good balance for my writing development.	4.24	1.05	Satisfied
Instructional Design (Overall)	4.20	1.04	Satisfied
Total	4.24	1.21	Satisfied

Note: Satisfaction levels are based on a 5-point Likert scale, where 4.50-5.00 = Very Satisfied, 3.50-4.49 = Satisfied, 2.50-3.49 = Neutral, 1.50-2.49 = Dissatisfied, and 1.00-1.49 = Very Dissatisfied.

DISCUSSION & CONCLUSION

The results of this study demonstrate that the integration of ChatGPT into English writing instruction for undergraduate students yields positive outcomes in both academic performance and student satisfaction.

The comparison of pre-test and post-test scores revealed a statistically significant improvement in students' writing proficiency after exposure to ChatGPT-assisted writing practice.The mean score increased from 7.41 to 16.23, with a significant t-test value statistically significant indicating that ChatGPT effectively enhanced students' writing skills. The findings are consistent with previous research by Songsiengchai (2025) and Zhao and Zhang (2025), who also reported significant improvements in language learning outcomes associated with AI-assisted instruction. The significant improvement observed in this study also aligns with quasi-experimental findings from Hoang (2025), who reported that ChatGPT-assisted language learning positively affected Vietnamese English majors' writing skills, and with Zargaran and Aldhahli (2026), whose stage-specific affordance model provided criterion-level evidence for ChatGPT's effectiveness in EFL writing. Furthermore, the improvement in writing proficiency may be attributed to ChatGPT's capacity to promote self-regulated learning strategies, as suggested by Liu, Z.M. et al. (2026) and Zhang, Z. et al. (2025). The present study thus contributes empirical evidence from the Thai higher education context, extending the findings of earlier systematic reviews (Lo et al., 2024; Feng Teng, 2024; Xiao et al., 2026) to a Southeast Asian setting. The magnitude of improvement observed in this study is comparable to that reported by Song and Song (2023), whose pioneering work demonstrated the efficacy of ChatGPT in enhancing both academic writing skills and learner motivation among EFL students. Therefore, H1 is supported.

Furthermore, the satisfaction survey results indicated a high level of student acceptance and enthusiasm for ChatGPT-assisted writing practice. The overall satisfaction score of 4.24 (on a 5-point scale) reflects students' positive perception of the ChatGPT-based learning model. Items related to perceived usefulness, ease of use, and instructional design received particularly high ratings, suggesting that ChatGPT is not only educationally effective but also engaging and user-friendly. The high scores on perceived ease of use (overall mean = 4.37) and instructional design (overall mean = 4.20) suggest that students found the tool accessible and the course structure well-organized, which likely contributed to their sustained engagement and interest in the writing activities. The results are consistent with previous studies by Apridayani et al. (2025), Liang et al. (2024), and Panurag et al. (2026), who found that students generally held positive perceptions of AI-assisted writing tools. The high satisfaction scores in the present study are also consistent with recent Thai-based research: Limna and Shaengchart (2025) reported that Thai university students perceived ChatGPT and Gemini positively as academic writing aids, while Tanharat and Phootirat (2025) found that Thai English-major students appreciated ChatGPT's role in idea generation and content organization. Susamawathanakun (2025) similarly found that Thai EFL learners' writing confidence significantly increased following AI tool use. Furthermore, the perceived ease of use (mean = 4.37) observed in this study mirrors the findings of Lee and Otani (2025), who identified ease of use as a key factor influencing EFL students' satisfaction with generative AI tools. The lower score for grammar correction (3.41) suggests that students may view ChatGPT as more useful for higher-order writing processes than for lower-order mechanical correction, a finding that echoes the concerns raised in systematic reviews regarding ChatGPT's limitations in providing accurate grammatical feedback (Feng Teng, 2024; Lo et al., 2024). This finding also aligns with Liu, Z.'s (2024) observation that perceived usefulness and perceived ease of use are not uniformly distributed across all aspects of writing support. Therefore, H2 and H3 are supported.

The qualitative findings supported the quantitative results. Students appreciated the immediate feedback and personalized support provided by ChatGPT, which is consistent with previous studies reporting that AI tools can enhance writing engagement and reduce writing anxiety (Liang et al., 2024; Hawanti & Zubaydulloevna, 2023). At the same time, students reported technical and accuracy limitations, suggesting that ChatGPT should be used as a supplementary tool rather than a replacement for teacher feedback. This finding echoes concerns in systematic reviews about ChatGPT's limitations in providing accurate grammatical feedback (Feng Teng, 2024; Lo et al., 2024). The theme on teacher scaffolding also indicates that prompt training and instructor guidance are important for effective AI-assisted writing instruction.

However, the qualitative feedback indicated several challenges, including occasional network instability and response inaccuracies from ChatGPT. These issues suggest that while ChatGPT is a powerful tool for writing instruction, further technical improvements and pedagogical strategies may be needed to optimize its effectiveness. The slightly lower scores on certain items—particularly "ChatGPT helps me correct grammar and spelling errors in my writing" (3.41)—suggest that while students value in-class use, further strategies may be needed to encourage more frequent self-directed use and address technical limitations.

These findings support the notion that ChatGPT is a valuable tool for higher education English writing instruction. It helps bridge the gap between theoretical knowledge and practical writing application, provides flexible learning opportunities, and caters to diverse learning paces and styles. Moreover, the positive reception from students underscores the potential of ChatGPT to increase writing motivation, engagement, and confidence.While the findings are promising, the use of convenience sampling limits the generalizability of the results to the broader undergraduate population in Thailand.

In conclusion, this study confirms that ChatGPT-assisted writing instruction can significantly improve both learning outcomes and student engagement in university English courses. It is

recommended that educators and curriculum developers incorporate AI tools like ChatGPT as a supplementary component of instructional design, particularly in writing-intensive courses. However, careful attention should be paid to pedagogical integration, prompt design guidance, and technical support to maximize the benefits and minimize potential challenges. Future research could explore the long-term retention of writing skills developed through ChatGPT-assisted practice, as well as the application of AI tools in other English language skill areas and across different educational contexts and student populations.Additionally, further studies could investigate the role of metacognitive awareness in mediating the effects of ChatGPT-assisted writing instruction on writing outcomes (Teng, 2025a; Teng & Shen, 2025; Tekir, 2026), as well as the interplay between AI use, writing anxiety reduction, and writing performance (Hawanti & Zubaydulloevna, 2023; Almusharraf, 2026; Abdelsaheed & Alsalamah, 2026). Zhang, Y.'s (2026) reconceptualization of AI-associated academic writing anxiety as a dynamic system-level construct offers a promising theoretical direction for future investigations. Additionally, the role of self-regulated learning strategies in mediating the effects of ChatGPT-assisted writing instruction on writing performance warrants further investigation (Liu, Z.M. et al., 2026; Zhang, Z. et al., 2025; Qazi et al., 2025), as does the potential of hybrid feedback models combining generative AI and teacher input (Zhang, Z. et al., 2025). Additionally, comparative studies with control groups could provide more robust evidence on the relative effectiveness of ChatGPT-assisted instruction compared with traditional approaches.

REFERENCES

Abdelsaheed, B. S. M., & Alsalamah, L. A. (2026). ChatGPT as a tool for reducing anxiety and enhancing presentation skills: Perspectives of Saudi EFL students. International Journal of Instruction, 19(1), 719-748.

Ahmed, M. A. (2023). ChatGPT and the EFL classroom: Supplement or substitute in Saudi Arabia‘s eastern region. Information Sciences Letters, 12(7), 2727-2734.

Almusharraf, A. (2026). AI chatbots in L2 writing: Anxiety, usefulness, and writing outcome. Humanities and Social Sciences Communications, 13(1), 393.

Apridayani, A., Wichaidith, A., & Doromae, R. (2025). ChatGPT for English writing: A qualitative inquiry among English major students at Thai higher education. rEFLections, 32(1), 1-25.

Bacon, E. D., & Kraus, H. (2025). Improving academic writing proficiency for EFL students: Leveraging ChatGPT using data-driven learning principles. REFLections, 32(1), 550-575.

Feng Teng, M. (2024). A systematic review of ChatGPT for English as a foreign language writing: Opportunities, challenges, and recommendations. International Journal of TESOL Studies, 6(3), 36.

Hatcher, R., & Shin, M. H. (2025). Data analytics in language education: Assessing the effectiveness of an AI learning platform. Journal of Economics, Marketing, and Management, 13(3), 75-85.

Hawanti, S., & Zubaydulloevna, K. M. (2023). AI chatbot-based learning: Alleviating students‘ anxiety in English writing classroom. Bulletin of Social Informatics Theory and Application, 7(2), 182-192.

Hoang, N. H. (2025). ChatGPT-assisted language learning: Effects on Vietnamese English majors’ writing skills and motivation. The JALT Call Journal, 21(2), 102429.

Lee, Y. J., & Otani, M. (2025). EFL university students‘ motivation, cognitive load, and satisfaction with using GenAI for English learning. LLT Journal: A Journal on Language and Language Teaching, 28(2), 572-586.

Liang, J., Huang, F., & Teo, T. (2024). Understanding Chinese university EFL learners' perceptions of AI in English writing. International Journal of Computer-Assisted Language Learning and Teaching, 14(1), 1-18.

Lim, J. H., Yunus, M. M., & Wong, W. L. (2026). The impact of artificial intelligence writing tools on learners' motivation in English writing: A systematic review. International Journal of Learning, Teaching and Educational Research, 25(1), 695-713.

Limna, P., & Shaengchart, Y. (2025). Generative AI as an English writing aid: Thai university students' perceptions and experiences with ChatGPT and Gemini. Suranaree Journal of Social Science, 19(3).

Liu, Z. (2024). Second language writing anxiety and ChatGPT adoption as an automated writing evaluation tool. Journal of Applied Research in Higher Education.

Liu, Z. M., Hwang, G. J., Chen, C. Q., Chen, X. D., & Ye, X. D. (2026). Integrating large language models into EFL writing instruction: Effects on performance, self-regulated learning strategies, and motivation. Computer Assisted Language Learning, 39(3), 466-490.

Lo, C. K., Yu, P. L. H., Xu, S., Ng, D. T. K., & Jong, M. S. Y. (2024). Exploring the application of ChatGPT in ESL/EFL education and related research issues: A systematic review of empirical studies. Smart Learning Environments, 11(1), 50.

Mekheimer, M. (2025). Generative AI-assisted feedback and EFL writing: A study on proficiency, revision frequency and writing quality. Discover Education, 4(1), 170.

Meniado, J. C., Huyen, D. T. T., Panyadilokpong, N., & Lertkomolwit, P. (2024). Using ChatGPT for second language writing: Experiences and perceptions of EFL learners in Thailand and Vietnam. Computers and Education: Artificial Intelligence, 7, 100313.

Panurag, W., Panurug, D., Jantakoon, T., Unarat, W., Pasmala, R., Wannapiroon, P., & Nilsook, P. (2026). Toward an extended technology acceptance model for AI-assisted English learning: A qualitative inquiry into user experiences, supportive conditions, and barriers. Edelweiss Applied Science and Technology, 8(2), 112-128.

Qazi, M. H., Munir, T., Zaigham, M. S., & Mughal, U. A. (2025). The impact of AI-assisted self-regulated learning, specifically ChatGPT, on students' engagement and writing skill enhancement. Journal of Applied Linguistics and TESOL (JALT), 8(1), 393-415.

Song, C., & Song, Y. (2023). Enhancing academic writing skills and motivation: Assessing the efficacy of ChatGPT in AI-assisted language learning for EFL students. Frontiers in Psychology, 14, 1260843.

Songsiengchai, S. (2025). Implementation of artificial intelligence (AI): Chat GPT for effective English language learning among Thai students in higher education. Journal of Education and Learning, 14(2), 45-62.

Susamawathanakun, P. (2025). Utilizing artificial intelligence (AI) tools for improving academic writing: Thai EFL learners' perspectives. Ph. D. in Social Sciences Journal, 15(3), 917-936.

Tajik, A., & Karkhaneh, A. (2025). Exploring the role of AI-driven dynamic writing platforms in improving EFL learners' writing skills and fostering their motivation: An integrative study. Journal of Studies in Applied Language (JSAL), 8(4), 69-109.

Tanharat, N., & Phootirat, P. (2025). Integrating generative AI in EFL academic writing: Thai English-major students' purposes, perceptions, and experiences with ChatGPT. rEFLections, 32(3), 1891-1916.

Tekir, S. (2026). Generative AI use in EFL writing: Associations with originality, critical reasoning, and metacognitive engagement in a Turkish higher education context. Computer Assisted Language Learning, 1-22.

Teng, M. F. (2024). “ChatGPT is the companion, not enemies”: EFL learners’ perceptions and experiences in using ChatGPT for feedback in writing. Computers and Education: Artificial Intelligence, 7, 100270.

Teng, M. F. (2025a). Metacognitive awareness and EFL learners‘ perceptions and experiences in utilising ChatGPT for writing feedback. European Journal of Education, 60(1), e12811.

Teng, M. F. (2025b). Understanding EFL student writers’ metacognitive awareness in utilizing ChatGPT. System, 103848.

Teng, M. F., & Huang, J. (2025). Incorporating ChatGPT for EFL writing and its effects on writing engagement. International Journal of Computer-Assisted Language Learning and Teaching (IJCALLT), 15(1), 1-21.

Teng, M. F., & Shen, X. (2025). Metacognitive awareness and EFL learners‘ writing performance in ChatGPT-assisted writing context. International Journal of Applied Linguistics.

Thangthong, P., Phiromsombut, J., & Imsa-ard, P. (2024). Navigating AI writing assistance tools: Unveiling the insights of Thai EFL learners. LEARN Journal: Language Education and Acquisition Research Network, 17(2), 210-235.

Tran, H. (2026). How does AI work as a “game changer”? Self-determination and influencing factors in EFL students‘ use of AI for academic writing. Technology in Language Teaching & Learning, 8, 103723.

Waluyo, B., & Rouaghe, F. (2025). Beyond teacher-led approaches: Student-initiated translanguaging with artificial intelligence tools in foreign language acquisition. SAGE Open, 15(2), 1-18.

Xiao, F., Zhu, S., & Xin, W. (2026). Exploring the landscape of generative AI (ChatGPT)-powered writing instruction in English as a foreign language education: A scoping review. ECNU Review of Education, 9(1), 20965311241310881.

Yang, L., & Li, R. (2024). ChatGPT for L2 learning: Current status and implications. System, 124, 103351.

Zargaran, Z., & Aldhahli, S. S. B. (2026). A stage-specific affordance model of ChatGPT deployment in EFL writing: Criterion-level evidence from a quasi-experimental design. Journal of International Students, 16(17), 339-358.

Zhang, Y. (2026). AI-associated academic writing anxiety in AI-assisted contexts: Evidence from Chinese EFL postgraduate students. Frontiers in Psychology, 17, 1841607.

Zhang, Z., Zhou, S., & Bai, B. (2025). A systematic scoping review of self-regulated learning with AI in language education. International Journal of Applied Linguistics.

Zhao, X., & Zhang, J. (2025). A long-term tracking study of the cognitive effects of a generative artificial intelligence-supported English language teaching model innovation on language acquisition. International Journal for Housing Science and Its Applications, 46(4), 234-251.

Data Availability Statement: The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

Conflicts of Interest: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Publisher’s Note: All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors

and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.



Copyright: © 2026 by the authors. This is a fully open-access article distributed under the terms of the Attribution-NonCommercial-NoDerivatives 4.0 International (CC BY-NC-ND 4.0).