

AI-Assisted Feedback and EFL Writing Development: Evidence from Thai University Students in an English for Business Course

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Abstract

This study examines the effects of ChatGPT-assisted feedback on the English writing development of Thai university students enrolled in an English for Business course. The research adopted a mixed-methods design involving 60 undergraduates divided into an AI-assisted experimental group ($n = 30$) and a teacher-led control group ($n = 30$). The participants were EFL students whose proficiency levels ranged from CEFR B1 to C1. Over an eight-week period, the experimental group used ChatGPT to support English writing and reflect on their own work. Pre- and post-test writing evaluations were analysed using t-tests, with significance set at $p < 0.05$. Participants' reflections were analysed using thematic analysis. After triangulating the findings from the pre- and post-tests and reflections, the results showed that both the experimental and control groups significantly improved on their pre-test scores across all four writing criteria. The experimental group demonstrated substantially greater improvement than the control group across all four assessment criteria. More specifically, writing organisation showed the greatest improvement in the experimental group. The thematic analysis findings aligned with the quantitative data, indicating that the experimental participants became more aware of English language mechanics, organisation, and grammar. However, lexical development appeared to require more time for noticeable improvement. The study concludes that AI integration in ELT can serve as an effective tool for Thai learners in higher education. Further investigation into AI integration for EFL writing is recommended.

Keywords: AI-assisted feedback, ChatGPT, English as a Foreign Language (EFL) writing, English Language Teaching (ELT), higher education

1. Introduction

The use of artificial intelligence (AI) in modern society has significantly influenced higher education, including English Language Teaching (ELT). The widespread use of generative AI tools, such as ChatGPT and Gemini, among English as a Foreign Language (EFL) students is undeniable. Due to the extensive use of AI tools, a heated debate has emerged over whether AI provides more advantages or disadvantages for EFL learners. Some prior studies (Alam et al., 2026; Tukhtaeva et al., 2026) highlight that AI can serve as a powerful tool for making learning more efficient, accessible, and personalised. However, Nelson et al. (2025) argue that the use of AI may foster plagiarism and reduce self-reliance and critical thinking skills. These concerns raise a crucial question: is an AI-generated feedback system a genuine language learning assistant or merely a homework helper?

This study therefore aims to examine the role of ChatGPT as an ELT assistant tool for Thai university students in English writing. Understanding the benefits of AI will allow EFL teachers to adapt their teaching methods more effectively and collaboratively for learners in the digital era. AI has become embedded in many aspects of younger generations' daily lives. The increasing reliance on AI tools has prompted concerns about EFL learners' personal growth and language acquisition (Marzuki et al., 2023; Limna & Shaengchart, 2025). It is thus beneficial for ELT teachers to understand how to implement technology wisely in their classrooms while maintaining the quality of human-centred instruction (Tukhtaeva et al., 2026).

Nevertheless, keeping pace with technological change remains a considerable challenge for many EFL teachers, particularly in relation to learners' English writing assignments. In the Thai context, numerous studies highlight that Thai universities face the challenge of adapting to AI-generated feedback in EFL writing instruction (Limna & Shaengchart, 2025; Buripakdi & An, 2024; Thangthong et al., 2024). More specifically, many Thai learners' writing proficiency remains limited. They often lack confidence and struggle to meet the expectations of workplace-orientated writing (Thi et al., 2025). This situation underscores the urgent need to adapt pedagogical approaches that not only acknowledge the benefits of AI for ELT but also effectively harness its potential to support EFL writing development. This is because integrating AI-generated feedback into writing classrooms could empower learners to engage in continuous, self-directed practice and revision.

To implement AI as an effective ELT learning assistant rather than merely a homework helper, its use must be carefully investigated. Some previous studies (Liang, 2025; Sakmiankaew et al., 2024) found that participants' writing performance improved after using

AI-generated feedback, particularly in relation to grammatical and lexical development. Baca (2024) employs grammar, vocabulary, task response, and organisation as rubric criteria for navigating ChatGPT while assessing students' business writing. Nguyen (2016) also emphasises that task completion, coherent and cohesive organisation, lexical resources, and grammatical accuracy are key writing areas for Vietnamese undergraduate students to improve. Drawing on these prior studies, the present study employs the same writing rubrics to scrutinise the effectiveness of AI-generated feedback for Thai students in higher education through ChatGPT.

Despite the growing body of research on AI-assisted writing instruction, few studies have examined the effectiveness of ChatGPT-assisted feedback among Thai university students through a mixed-methods approach that combines objective measures of writing performance with learners' reflections. Furthermore, empirical evidence regarding the use of AI-assisted feedback in English for Business courses remains limited. Therefore, the present study investigates both the impact of ChatGPT-assisted feedback on writing performance and EFL students' perceptions of its role as a learning assistant in a Thai higher education context.

1.1 Research Objectives

This current research aims to assess AI ChatGPT in enhancing English writing competencies among Thai EFL university students. This paper aims to achieve the following goals:

1. To ascertain the extent to which the ChatGPT integration significantly improves the English writing performance of Thai EFL university students compared to traditional instruction.
2. To investigate Thai EFL university students' perceptions of using ChatGPT as a learning assistant in their writing process.

With the points mentioned above, this research aims to discuss how to strategically implement AI in ELT writing classrooms while still providing valuable, human-centred instructional aids for the digital era.

1.2 Research Questions

1. To what extent does the integration of ChatGPT improve the English writing performance of Thai EFL university students compared to traditional instruction?
2. What are Thai EFL university students' perceptions of using ChatGPT as a learning assistant in their writing process?

2. Literature Review

2.1 AI and EFL Writing

The integration of AI, specifically ChatGPT, into EFL classrooms has been consistently discussed in recent ELT discourse, particularly within writing instruction. Many scholars (Liang, 2025; Sakmiankaew et al., 2024) emphasise that AI can significantly enhance language acquisition in educational environments by offering personalised, instant, and constructive feedback. Nguyen (2024) elaborated on the substantial development of learners' writing skills, including grammatical accuracy, structural cohesion and coherence, and academic conventions. These components are widely recognised in the field as micro- and macro-skills, a categorisation that is fundamental to language assessment frameworks (Brown, 2004).

Furthermore, Marzuki et al. (2023) confirmed in their study that AI writing tools are capable of supporting coherent writing flow by effectively encompassing topic sentences, supporting details, and concluding statements. In other words, AI tools can be regarded as effective teaching assistants for EFL teachers. This aligns with Park's findings (2025), which noted that the utilisation of automated feedback is positively associated with EFL learners' self-efficacy. In the Thai context, Thangthong et al. (2024) note that regular interaction with AI-generated grammar and stylistic recommendations improves the overall quality of learners' writing. This implies that AI may help learners strengthen their cognitive and analytical skills in writing. In this regard, it is understandable why many scholars (Ali et al., 2023; Polakova & Ivenz, 2024) affirm that AI-generated feedback from tools such as ChatGPT can be seen as a learning companion that functions as an active, motivational, and responsive assistant.

On the contrary, concerns have also been raised about the negative impacts of AI use in academic contexts, particularly in relation to accuracy and learner autonomy. Alnsour et al. (2025) raised significant concerns about incorrect information, fact-checking, and trustworthiness. Meanwhile, Sorfa (2023) critically described ChatGPT as a high-tech plagiarism tool and a pathway of avoiding learning. Many empirical studies (Malik et al., 2024; Thangthong et al., 2024; Thi et al., 2025) support this concern, finding that the overuse of AI can undermine critical thinking, decision-making, and creative writing abilities. This trajectory poses a risk of academic dishonesty and plagiarism in EFL contexts (Nelson et al., 2025).

Hence, in light of both the positive and negative concerns raised regarding the use of AI for EFL learners, this study focuses on improving Thai university students' writing skills. This research asserts that AI-generated feedback, specifically through ChatGPT, can be used as an effective and helpful writing assistant tool for non-native English-speaking (NNES) learners in the digital era. It is thus important to investigate whether ChatGPT can sharpen learners' writing skills through its feedback.

2.2 AI-Generated Feedback and EFL Writing in Higher Education

There are two-sided coins of perceptions towards AI-assisted writing. On the one hand, some previous studies report benefits of AI-assisted writing. Escalante, et al. (2023) highlighted that AI-generated feedback has been widely discussed in higher education, particularly in the context of student writing tasks. Many scholars have further emphasised that learners frequently use AI for revision,

proofreading, and language support, leading to improvements in organisation, task completion, grammar, and vocabulary (Escalante et al., 2023; Fan, 2023). Similarly, Fitria (2021) found that AI-assisted feedback helped students identify grammatical issues and improve textual organisation. Malik et al. (2023) explored Indonesian undergraduate students' views on the use of AI in academic essay writing. The results showed that students had positive attitudes towards the use of AI in writing academic essays, particularly for grammatical usage. Urzua et al. (2025) also reported the benefits of AI-generated feedback for postgraduate students' writing.

On the contrary, other studies highlight that excessive reliance on AI may reduce learners' critical thinking, cognitive engagement, and writing autonomy, while increasing concerns regarding academic dishonesty and plagiarism (Malik et al., 2024; Thangthong et al., 2024; Nelson et al., 2025).

Although existing studies have examined AI-generated feedback and its effects on writing tasks in higher education, empirical evidence regarding the actual impact of AI-generated feedback on EFL learners' writing development remains limited, particularly in the Thai context.

2.3 Process Writing Approach and Research Gap

The product and process writing approaches are two of the most widely discussed perspectives in ELT writing instruction. While the product approach focuses on writing tasks in which learners imitate, copy, and transform teacher-selected writing models, the process approach concentrates on the stages involved in creating written work (Hyland, 2003). Because the current research focuses on writing development, the process writing approach is adopted.

The process writing approach emphasises writing as a cyclical cognitive, creative, and socially interactive process (Zhang, 2024). In other words, it views writing development as an ongoing process that involves producing, reflecting on, discussing, and revising multiple drafts over time. Within this perspective, feedback plays a crucial role in facilitating writing development. Bowen and Van Waes (2020) further emphasise the importance of revision within the writing process, arguing that revision is central because it enables writers to clarify meaning and improve communication. Likewise, Graham (2019) highlights that effective writing development requires time, feedback, and opportunities for revision. Drawing on this assertion, the present study explores EFL learners' writing development in higher education by comparing an experimental group that used AI-generated feedback with a control group that received traditional instruction only.

More specifically, the process writing approach in the modern digital era is highly relevant to AI-generated feedback. Generative AI tools such as ChatGPT can provide immediate feedback on grammar, vocabulary, organisation, and task fulfilment, allowing learners to engage in iterative revision and self-reflection. Rather than replacing teachers, AI-assisted feedback may supplement traditional instruction by providing additional opportunities for learners to review and improve their writing throughout the writing process.

Although previous studies have reported positive outcomes associated with AI-assisted writing, several gaps remain. First, relatively few studies have focused specifically on Thai university students. Second, much of the existing research relies heavily on learner perceptions rather than combining objective writing assessments with qualitative reflections. Third, limited research has examined AI-generated feedback within English for Business courses, despite the increasing importance of professional writing skills in higher education. Collectively, these gaps indicate the need to examine the effectiveness of AI-generated feedback on EFL learners' writing performance and their experiences within authentic EFL classroom settings.

Consequently, this study investigates whether ChatGPT-generated feedback supports Thai EFL learners' writing development through drafting, revision, and reflection. It also explores students' perceptions of AI as a learning assistant. By focusing on Thai university students in an English for Business course and employing a mixed-methods design, the study addresses existing gaps in the literature and contributes empirical evidence to the growing body of research on AI integration in ELT within an NNES context.

3. Method

3.1 Research Design

This study adopted a quasi-experimental mixed-methods research design to examine the efficacy of ChatGPT as a learning assistant. The design was informed by the process writing approach, which emphasises drafting, feedback, revision, and reflection as key stages in writing development. The quantitative phase utilised a pre- and post-test design to measure gains in writing performance. Meanwhile, the qualitative phase employed thematic analysis of student reflections to provide depth to the statistical findings, allowing for data triangulation regarding students' engagement and learning processes.

3.2 Participants

The participants were 60 undergraduate students enrolled in the English Language for Business course at the Faculty of Humanities, Srinakharinwirot University. This English for Specific Purposes (ESP) context was selected due to the increasing demand for occupational communication within the ASEAN Economic Community (AEC). The participants were Thai EFL learners with Common European Framework of Reference for Languages (CEFR) English proficiency levels ranging from B1 to C1. To ensure homogeneity, pre-tests were administered, and t-tests confirmed no significant difference in initial writing proficiency between the groups ($p > 0.05$). The students were divided into an experimental group (EG, $n = 30$), which utilised AI-generated feedback via ChatGPT, and a control group (CG, $n = 30$), which received only traditional classroom instruction.

3.3 Data Collection

Data collection for this research was divided into two parts: quantitative and qualitative.

The first phase involved quantitative data collection. The writing samples were assessed using an analytic rubric worth 20 points in total, with 5 points allocated to each category. The rubric evaluated four criteria: task completion, writing organisation, lexical accuracy, and grammatical structure. Paired-samples t-tests were used to measure within-group improvements, and mean scores were analysed to compare performance between the two groups.

The second phase involved qualitative data collection and analysis. Following the framework proposed by Brown (2004) and applied by Nguyen (2024), these criteria were categorised into macro-skills, including task completion and organisation, and micro-skills, including lexis and grammar, to provide a comprehensive view of writing proficiency. Furthermore, student reflections were analysed using thematic analysis. Codes were generated to identify patterns in how students perceived the utility of AI feedback in relation to their writing skill development. These themes were then triangulated with the quantitative results to validate the findings.

3.4 Data Collection Procedures

The study scheduled the research for an eight-week period, as provided in further detail below.

Weeks 1-6: Both experimental and control groups followed the same syllabus, focusing on comparing and contrasting business writing between two different products and brands.

Experimental Group (EG): Received training on how to use AI ChatGPT effectively for English business writing and utilised ChatGPT to generate feedback on their drafts. Consistent with the Process Writing Approach, students used ChatGPT-generated feedback to review, revise, and refine their drafts throughout the writing process. They were guided to specifically prompt the AI for feedback on textual clarity, organisation, and grammatical accuracy rather than ask it to rewrite the text for them.

Control Group (CG): Received only traditional direct instruction with manual feedback from the instructor on their drafts.

Week 7: Both groups completed an in-class writing post-test without using AI tools or external assistance to measure their writing skills.

Week 8: The experimental group completed a semi-structured reflection assignment to analyse their learning experiences.

4. Results

The findings of the current research are divided into two sections: quantitative and qualitative. Since the participants' writing assignments were analysed before their reflections, the quantitative data analysis is presented first, followed by the thematic analysis of the reflection assignments. These findings support the process writing approach, which emphasises the role of feedback and revision in writing development.

4.1 Quantitative Findings

This section reports the findings regarding the impact of the intervention on writing performance. Table 1 presents the comparison of pre- and post-test scores for both the experimental and control groups, while Table 2 shows the scores for each rubric criterion: grammar, lexis, organisation, and task completion.

Table 1. Pre- and post-test total writing scores

Group	Group of participants (N. 30)	Pre-test 20 pts.		Post-test 20 pts.		Improvement		p-value
		Mean	SD	Mean	SD	Mean	SD	
Experimental	30	11.63	1.85	14.63	1.13	3.00	2.17	< 0.001
Control	30	12.70	2.38	14.43	2.06	1.73	1.57	< 0.001

As presented in Table 1, the results revealed statistically significant improvements from pre-test to post-test scores within both the experimental and control groups, with p-values of less than 0.001. A closer examination of the experimental group showed that participants who received AI-generated feedback demonstrated a remarkable improvement, increasing from a pre-test mean score of 11.63, with a standard deviation (SD) of 1.85, to a post-test mean score of 14.63, with an SD of 1.13. This indicates a significant mean improvement of 3.00 points. These findings suggest that ChatGPT was able to support students' overall discourse structure, which significantly aided EFL learners in mastering macro-level writing skills. In contrast, although the control group also showed significant progress, its mean score improvement of 1.73 was notably lower than that of the experimental group.

More interestingly, although the control group began with a higher mean score of 12.70, the experimental group surpassed the control group's mean score in the post-test. This suggests that the AI-integrated approach was effective in accelerating overall writing development among Thai EFL learners in higher education compared with traditional instruction alone.

Table 2. Pre- and post-test writing subdomain scores

Rubrics	Group of participants (N. 30)	Pre-test 5pts.		Post-test 5pts.		Improvement		p-value
		Mean	SD	Mean	SD	Mean	SD	
Grammar	Experimental	2.37	0.49	3.23	0.62	0.87	0.71	< 0.001
	Control	2.96	0.76	3.60	0.60	0.64	0.68	< 0.001
Lexical	Experimental	2.83	0.65	3.33	0.47	0.50	0.86	0.006
	Control	3.14	0.78	3.60	0.54	0.46	0.54	0.002
Organisation	Experimental	2.73	0.64	3.97	0.49	1.23	0.83	< 0.001
	Control	2.96	0.92	3.74	0.70	0.76	0.84	< 0.001
Task Completion	Experimental	3.70	0.75	4.37	0.61	0.67	0.76	< 0.001
	Control	3.64	0.50	3.94	0.60	0.30	0.40	0.012

Table 2 presents the comparative analysis of the writing rubric criteria used in the current research, each worth 5 points: grammatical accuracy, lexical accuracy, writing organisation, and task completion.

A closer examination of each rubric criterion revealed interesting results. The greatest improvement in participants' writing was found in organisation, with a statistically significant p-value of less than 0.001. The experimental group showed the highest mean improvement in writing organisation, increasing by 1.23 points. Meanwhile, the control group's mean score for writing organisation reached 3.74 in the post-test, reflecting an increase of 0.76 points from the pre-test mean score. This analysis implies that AI-generated feedback was particularly effective in helping EFL students structure their writing more logically.

Similarly, for grammatical accuracy, the experimental group showed a greater mean improvement than the control group. More specifically, the experimental group's mean score increased from 2.37 to 3.23, with a p-value of less than 0.001. Although the control group also demonstrated improvement in grammatical accuracy, its mean gain was lower than that of the experimental group.

The experimental group also showed numerically higher improvements in task completion, with a mean gain of 0.67, and lexical accuracy, with a mean gain of 0.50. The control group's improvements in these two rubric criteria remained lower, with mean gains of 0.30 and 0.46, respectively. Based on the data analysis, it can be concluded that both traditional instruction and the hybrid approach combining AI-generated feedback with traditional instruction led to positive learning outcomes. However, the AI-integrated approach showed greater improvements in participants' writing organisation, grammatical accuracy, and task completion. Nevertheless, although lexical improvement was observed in both groups, lexical accuracy was the least improved criterion.

4.2 Qualitative Findings

This section revealed the thematic analysis of participants' reflections in three primary themes. These include language mechanics and writing organisation, grammar and lexical refinement, and the development of learning awareness.

4.2.1 Awareness of Language Mechanics and Writing Organisations

The analysis indicated significant progress in participants' ability to identify errors. The majority of respondents demonstrated increased awareness of effective comparison and contrast essay writing, particularly in relation to language mechanics and writing organisation (R1, R2, R3, R5, R6, R7, and R11). ChatGPT's feedback reportedly helped students move beyond viewing errors as isolated incidents and instead understand them as structural patterns.

"From the comments I received, I realised that my sentence structure, writing organisation, and subject-verb agreement needed improvement as I sometimes missed the punctuation, commas, full stops, capitalising, and main verb in the complete sentence... I now recognise that I should concentrate on always checking that every sentence has a complete subject and a correct verb." (R11)

After reviewing the ChatGPT-generated feedback together with teacher feedback in the classroom, several participants (R1, R5, R9, and R13) were able to take their mistakes more seriously and avoid repeating the same errors. Moreover, issues regarding coherence and cohesion were frequently highlighted. Participants (R3, R4, R8, and R12) reported previous difficulties in organising ideas across multiple paragraphs. The AI feedback highlighted their tendencies to include multiple ideas in a single sentence or fail to make their thoughts explicit. This awareness directly linked mechanical accuracy and organisation in essay writing to academic clarity.

"I now recognise that I should concentrate on carefully checking grammar... and separating long paragraphs. Without having a clear thesis statement, topic sentence, and supporting ideas, it is difficult for me to show my opinions fully on papers." (R9)

4.2.2 Improvement of Grammatical and Lexical Refinement

The reflections suggested that ChatGPT-generated feedback acted as an important scaffold for grammatical and lexical acquisition among Thai EFL learners. Participants reported that the feedback helped them distinguish between general English and the formal register required for business writing (R1, R4, R7, R8, R9, and R10). Rather than simply correcting words, the AI provided alternatives that enhanced precision and collocation.

"I have discovered that employing accurate collocations plays a crucial role, as it helps make my ideas clearer and improves the formality of our writing. The comments pointed out that my selection of

terminology... required adjustment, as I sometimes used incorrect plural or article forms... [This] makes my comparison sound more professional. I also learnt some new words. I know the meaning, but I am still not quite sure how to use them in sentences.” (R1)

More interestingly, some participants (R2, R3, R5, R14, and R15) emphasised that they had not only learned new vocabulary through ChatGPT feedback but also identified common mistakes in grammatical accuracy. However, not all participants were able to use the new vocabulary or correct their mistakes in time before the post-test. Participants with higher pre-test scores and stronger English language proficiency demonstrated greater lexical development. Participants with more limited English proficiency, on the other hand, were able to learn from their mistakes but had not yet managed to correct their language accuracy within the empirical data collection timeline.

4.2.3 Learning Awareness and Room for Improvement

The qualitative data highlighted a shift in participants' learning awareness and their approach to writing development and instruction.

After thoroughly reviewing their own writing with in-depth AI feedback, respondents (R2, R3, R5, R8, R9, and R13) shared distinct strategies for self-improvement. They began to identify their repetitive mistakes and better comprehend the teacher's feedback and recommendations. A significant transformation was also noted in student attitudes. Before the intervention, students largely viewed AI merely as a tool for “task completion”. However, following the instructional sessions on AI literacy for English writing, they began to view it as a personal assistant that not only improved their writing but also encouraged them to think more critically and logically.

“A significant takeaway I obtained from the comments is the importance of organising ideas logically... In future assignments, I will implement this by planning my structure before writing, using clear transition signals... and revising my sentences for clarity to strengthen the quality of my written work.” (R2)

The participants' reflections further provided in-depth data on the gap between AI feedback explanations and EFL learners' understanding. Participants R14 and R15 emphasised that some of ChatGPT's explanations were unclear. Although the explanations were clearly written and the programme answered all the questions they asked, there remained some gaps between English and their mother tongue. More specifically, some explanations were unclear because the AI was not fully able to explain the differences in grammatical structure and linguistic patterns between English and Thai. Therefore, teacher clarification of ChatGPT feedback was significantly important for these participants.

To conclude, the qualitative data highlighted that the combination of traditional classroom teaching and AI-generated feedback enabled EFL learners to better develop their writing skills. This is because learners can practise writing and ask questions of the AI assistant at any time and from any location. Nevertheless, it is important for instructors and teachers to raise students' awareness of the true benefits of ChatGPT and other forms of AI-generated feedback. As long as students use AI not merely as a homework completion tool but as a personal tutor, AI can significantly benefit English writing development for EFL learners.

5. Discussion

After triangulating the quantitative and qualitative data, the study identified significant answers to the current research questions. The triangulation not only allowed the research to emphasise areas in which the quantitative and qualitative data reached similar conclusions but also demonstrated the alignment between the current findings and prior studies.

5.1 ChatGPT and Instant Benefits on Writing Mechanics and Organisation

Both the quantitative and qualitative data emphasised the benefits of ChatGPT for enhancing learners' business writing skills. More specifically, the quantitative data revealed that the experimental group (EG) demonstrated greater improvement than the control group (CG). This result aligns with the qualitative reflections, in which participants reported that AI feedback helped them reconceptualise their writing organisation and plan their structure more logically before composing their work. This finding suggests that generative AI tools such as ChatGPT can act as effective personal learning assistants. Unlike traditional ELT writing feedback, in which learners often have to wait for a scheduled time to receive teacher feedback, ChatGPT provides immediate, holistic feedback on logical flow at any time and from any location.

This result aligns well with prior studies (Alkhateeb et al., 2025; Amin, 2025). Marzuki et al. (2023) significantly emphasised the impact of AI writing tools on the content and organisation of students' writing in Indonesian higher education. Based on their empirical findings, it can be concluded that AI writing tools, including ChatGPT, positively improved students' writing quality, particularly by enhancing the quality of their content and organisation. The results for Indonesian EFL learners in their study are consistent with the current study on Thai EFL students at the university level.

Amin (2025) also confirmed the use of ChatGPT as an exam preparation tool in the digital era. This is because ChatGPT can serve as a powerful tool for students' self-study during exam preparation. Even so, it remains important to highlight that any student who uses it simply to obtain direct answers to exam questions will fail to achieve the intended learning experience. Based on this assertion and the empirical findings of the current research, it can be affirmed that learners should use technology as a gateway to knowledge and understanding. Students should approach ChatGPT and other AI tools through clarification, verification, and explanation.

5.2 ChatGPT and Long-term Benefits on Grammatical and Lexical Development

The quantitative and qualitative data showed complementary benefits of ChatGPT for EFL writing. Within the two-month data collection period, the study showed statistically significant improvement in the overall writing performance of all participants. Both EG and CG participants showed greater improvement in writing organisation, grammatical accuracy, and task completion. However, a closer examination of the data showed that lexical development in both the EG and CG demonstrated the least improvement. Because of this outcome, it is important to shed light on the nature of language development. Vocabulary is not acquired instantly. It involves complex cognitive processes, repeated exposure, and extensive practice. Therefore, it is logical that two months may be a relatively short period for deeper learning, particularly for learners with lower language proficiency.

As confirmed through the qualitative data analysis, participants may be able to recognise more words relatively quickly, but actively incorporating them correctly and naturally into their writing requires much more time. In other words, some participants learned new vocabulary and identified their mistakes after receiving feedback from ChatGPT. The results imply that the qualitative findings affirmed the quantitative data regarding learners' slower progress in lexical accuracy. Studies on English language acquisition (Thangthong et al., 2024), which is a second language (L2) for Thai learners, consistently demonstrate that significant gains in both grammatical accuracy and lexical richness occur through a gradual and cumulative process.

Based on the findings above, the current research affirms that ChatGPT-generated feedback, as well as other AI learning tools, can serve as an important tool for EFL learners' writing development in the digital era.

5.3 Harnessing AI to Transform ELT Practice for Enhancing EFL Writing

The current research data analysis sheds light on the complementary roles of ChatGPT and teacher feedback in EFL writing. It revealed that some participants found the combination of ChatGPT and teacher feedback significantly beneficial. This is because ChatGPT feedback allowed participants to review and apply the recommendations given by their teachers, while teachers were able to clarify any ambiguities left by ChatGPT. This synergy occurred because ChatGPT's suggestions enabled participants to directly apply or revise the teacher's recommendations in their writing. Any remaining ambiguities were then clarified in a more concrete and logical manner by the teacher, who shared the learners' mother tongue.

These findings directly address the study's central question of whether ChatGPT integration significantly improves the English writing performance of Thai EFL university students. ChatGPT significantly supported learners' English writing skills in several respects. It functioned not only as a homework helper but also as an English writing coach for EFL learners. Therefore, based on the empirical outcomes of this study, the current research affirms that it is crucial to implement AI writing tools in EFL writing classes and raise awareness of AI literacy for English writing. In other words, students should be taught that AI, specifically ChatGPT, is a tool designed to assist those with limited language mechanics and organisation skills, allowing them to concentrate on higher-level writing skills such as rhetorical goals, critical thinking, and analytical thinking.

This affirmation aligns with previous studies. Marzuki et al. (2023) highlighted that in Indonesian higher education, AI tools positively impact students' writing quality, particularly in relation to content and organisation. The empirical study of Thai and Vietnamese cases by Meniado et al. (2024) revealed that ChatGPT served as participants' learning assistant, enhanced their writing skills, and facilitated the overall writing process. Park (2025) and Polakova and Ivenz (2024) also emphasised the benefits of AI for EFL learners' self-efficacy and writing development. These outcomes strongly echo the quantitative findings on writing organisation and task completion among Thai EFL undergraduates, as well as participants' reflections. In other words, combining AI-generated feedback with teacher-led instruction allows Thai undergraduates to understand the material rather than passively accept AI responses.

To sum up, the empirical evidence confirms that AI integration can benefit ELT practice for enhancing EFL writing. It moves beyond the debate over AI's advantages and disadvantages for learning. Since the world is moving rapidly towards more advanced technology, it is crucial for educators to adapt and adjust their teaching and learning methods to fit learners' lifestyles. In this way, teachers can maintain human-centred instruction more effectively, while EFL undergraduate students can further develop their English writing skills in the digital era.

6. Conclusion

Amid the heated debate over the use of AI in education, this study ascertained the extent to which ChatGPT integration improves Thai university students' English writing performance and investigated their perceptions of using this AI tool as a learning assistant. Based on the empirical data analysis, both the experimental and control groups demonstrated overall improvement in participants' writing performance over the eight-week intervention.

In relation to the first research question, although both the experimental and control groups showed signs of improvement, the experimental group demonstrated greater improvement across all assessed areas. Participants' writing organisation reflected the greatest improvement in the experimental group, followed by grammatical accuracy. These advantages highlight AI's potential to provide accessible and instant feedback on writing mechanics. Although the experimental group outperformed the control group across all four criteria, it is important to highlight that lexical accuracy showed the least improvement. The study concluded that, due to the limited data collection timeframe, participants with limited writing proficiency, particularly those at CEFR level B1, were able to recognise new words but were not yet sure how to use them accurately within a short period.

In addressing the second research question, a thorough analysis of the qualitative data confirmed the benefits of using ChatGPT in EFL writing. Participants in the experimental group acknowledged the advantages of AI-generated feedback tools for EFL writing. Writing organisation and grammatical structure were key areas of improvement for participants within the limited timeframe, while lexical accuracy required more practice time, especially for learners with limited English writing proficiency. Nevertheless, due to the integration of AI into the classroom, participants in the experimental group were not only able to develop their writing skills but also enhance their perceptions of self-efficacy and critical thinking in relation to writing development. The mixed-methods data analysis affirmed that the integration of AI and teacher-led instruction complemented each other effectively. More specifically, when ambiguities arose during one of these learning methods, learners were able to scrutinise the other method and seek clarification. This study contributes to previous research by providing empirical evidence regarding the advantages of AI integration for EFL writing within the Thai university context.

In conclusion, the integration of ChatGPT significantly improves certain aspects of English writing, particularly the organisational and grammatical accuracy of Thai university students. Students' perceptions of ChatGPT-generated feedback reflected their writing development and self-efficacy. This combined method allows learners to understand the material and use their critical and analytical skills rather than passively adhering to AI-generated suggestions. The current research hence recommends integrating AI-generated feedback into EFL undergraduate classrooms so that learners can use its potential for English writing wisely. For future research, it is recommended that longer instructional interventions, targeted AI prompting strategies, and collaborative models that explicitly integrate teacher expertise with AI support be explored to optimise English writing instruction in diverse EFL contexts.

6.1 Limitations and Recommendations for Further Studies

Although the research was carefully prepared and achieved its aims, a few limitations and shortcomings should be acknowledged.

First, the duration of data collection was constrained to an eight-week period. Although the current research timeframe was sufficient to observe significant improvements in respondents' overall writing performance, it may have been relatively brief for certain aspects of EFL learners' language acquisition. More specifically, content and task achievement are logically structured tasks, whereas lexical accuracy is a linguistic feature that requires a longer intervention period due to the gradual nature of vocabulary development. Therefore, future studies are recommended to consider a longer research period so that lexical development can be examined more comprehensively.

Second, the study was conducted with a specific sample population in the Thai higher education context. The participants comprised 60 undergraduate students enrolled in an English Language for Business course at a single Thai university. The findings may thus not be fully generalisable to EFL learners from different educational contexts. Hence, it is recommended that future studies implement the use of AI for business writing in different contexts.

Finally, this research focused on one specific AI learning tool. ChatGPT was used as the AI learning assistant for EFL business writing tasks in this study. Although the findings highlighted how ChatGPT helped EFL learners improve their writing skills through the use of an AI learning assistant, the study did not fully examine how AI tools in general can benefit business writing. Thus, future studies may consider exploring other AI tools for English business writing, as different platforms may offer different forms of feedback and support.

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Authors' contributions

Phohnthip Smithsarakarn, PhD, is the sole author of this article and contributed to all aspects of the research, including study design, data collection, data analysis, and manuscript writing.

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Competing interests

The author declares that he has no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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