

Impact of an AI-Empowered Writing Coach on Writing Skills in Saudi EFL University Classrooms

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(Submitted to the journal on 01/01 /2026 AD, and accepted for publication on 05/02 /2026 AD)

Abstract:

This study examines the impact of ChatGPT, an AI-powered writing coach, on the writing development of Saudi EFL learners in a university context. Employing a quasi-experimental pre-test/post-test design, the study investigated changes in five key writing components-grammar, spelling, style, structure, and voice-over a five-week instructional intervention. The participants were 15 female undergraduate students enrolled in an academic writing course, where ChatGPT was systematically integrated into classroom instruction to provide iterative, personalized feedback alongside instructor guidance. Quantitative data were collected using analytic writing rubric applied to pre- and post-intervention writing tasks. The findings indicate notable improvement in higher-order writing skills, particularly structure and voice, with mean scores increasing from 2.53 to 3.60 and from 2.20 to 3.33, respectively. Moderate gains were observed in style, while improvements in grammar and spelling were limited, reflecting students' relatively strong baseline performance in these areas. Overall, the results suggest that AI-assisted feedback is especially effective in supporting idea organization and expressive writing, while foundational language accuracy continues to benefit from traditional instruction. The study highlights the pedagogical value of integrating AI tools within a balanced instructional framework that combines automated feedback with human oversight, and it underscores the need for ethical, guided use of generative AI in EFL writing pedagogy. Future research is recommended to examine long-term effects and scalability across diverse learner populations.

Keywords: AI-assisted writing, ChatGPT, EFL writing, AI-enhanced pedagogy, Saudi EFL learners

دراسة كمية حول أثر المدرب الكتابي المدعوم بالذكاء الاصطناعي في تحسين مهارات الكتابة والممارسات التدريسية في فصول تعليم اللغة الإنجليزية كلغة أجنبية في الجامعات السعودية

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المستخلص:

تبحث هذه الدراسة في فاعلية ChatGPT بوصفه مدربًا كتابيًا مدعومًا بالذكاء الاصطناعي في تحسين مهارات الكتابة لدى متعلمي اللغة الإنجليزية كلغة أجنبية في جامعة شقراء. وانطلاقًا من التحديات المستمرة التي يواجهها الطلبة في تحقيق الكفاءة الكتابية، لا سيما في مجالات القواعد الإملائية والنحوية، والأسلوب، والبناء، والصوت الكتاب، اعتمدت الدراسة تصميمًا شبه تجريبي قائمًا على الاختبار القبلي/البعدي لقياس التحسن خلال فترة خمسة أسابيع. وتم دمج ChatGPT في التدريس الصفّي؛ حيث شارك الطلبة في أنشطة كتابة تكرارية وتلقوا تغذية راجعة مخصصة من النظام الذكي. وأظهرت النتائج تقدمًا ملحوظًا في بناء النص والصوت الكتابي؛ إذ ارتفعت المتوسطات من 2.53 إلى 3.60، ومن 2.20 إلى 3.33 على التوالي. وتعكس هذه المكاسب فاعلية إرشادات ChatGPT في تنظيم الأفكار بصورة متماسكة وتطوير صوت كتابي أكثر أصالة وتعبيرًا. كما تشير التحسينات في الأسلوب؛ حيث ارتفع المتوسط من 2.93 إلى 3.40، إلى تنوع أفضل في الجمل وتحسن في النبرة، رغم استمرار معاناة بعض الطلبة من عدم الاتساق الأسلوبي. في المقابل، كانت التحسينات في القواعد النحوية (من 3.33 إلى 3.53) والإملاء (من 3.73 إلى 3.80) محدودة نسبيًا؛ مما يوحي بأن المهارات اللغوية الأساسية قد تتطلب تعزيزًا تقليديًا أكبر بقيادة المعلم. وبوجه عام، تؤكد الدراسة إمكانات أدوات الذكاء الاصطناعي في دعم التعلم من خلال ممارسات كتابة تفاعلية قائمة على التغذية الراجعة، مع التشديد على ضرورة تبني مقاربة تربوية متوازنة تتضمن التوجيه البشري. ومن خلال تقديم رؤية شاملة لنقاط القوة والقيود في التعلم المدعوم بالذكاء الاصطناعي، تبرز الدراسة أهمية دمج هذه التقنيات في مناهج تعليم اللغة الإنجليزية كلغة أجنبية بما يعزز الكفاءة التقنية والقدرة على الكتابة المستقلة والنقدية. وتوصي الدراسة المستقبلية باستكشاف الآثار طويلة المدى وتحسين آليات دمج الذكاء الاصطناعي في تعليم اللغات.

الكلمات المفتاحية: الكتابة المدعومة بالذكاء الاصطناعي، التعلم بمساندة الذكاء الاصطناعي، تعليم اللغة الإنجليزية كلغة أجنبية، طلاب اللغة الإنجليزية كلغة أجنبية في السعودية

Introduction

Writing proficiency is widely recognized as a central component of English as a Foreign Language (EFL) curriculum (e.g., Hyland, 2019; Richards, 2008). For academic purposes, students are expected to develop advanced linguistic skills to express complex ideas clearly. Yet many EFL learners—including those in Saudi Arabia—continue to struggle with grammar, structure, vocabulary, and style. Traditional lecture-based instruction and individual feedback often fail to address these persistent issues, sparking growing interest in supplementing teaching with Artificial Intelligence (AI).

AI tools such as ChatGPT, Grammarly, and Wordtune provide instant feedback on grammar, style, and structure, making writing more interactive and iterative. They align with Computer Assisted Language Learning (CALL) frameworks, supporting autonomy while complementing teacher feedback. Research suggests that Grammarly improves grammatical accuracy and syntactic range, while ChatGPT enhances creativity and idea generation. Previous studies have shown that AI-assisted tools can improve grammatical accuracy and support idea generation in writing (e.g., O'Neill & Russell, 2019; Ranalli, 2021). AI also fosters motivation, brainstorming, and cyclical writing practice.

However, concerns remain about over-reliance, academic integrity, and the limits of automated feedback. Most existing studies have focused on short-term improvements in writing performance following brief interventions (e.g., O'Neill & Russell, 2019; Strobl et al., 2019), leaving the long-term impact of such tools underexplored. Moreover, students often still prefer teacher feedback for complex tasks like critical analysis and argumentation. Within this context, empirical research into the impact of ChatGPT as a “Writing Coach” in Saudi EFL classrooms is especially needed. This study seeks to fill that gap. The present study is informed by the following key objectives:

1. The extent to which ChatGPT enhances grammar, spelling, structure, style, and voice when writing by students.
2. To determine how ChatGPT, combined with teacher feedback, fosters iterative learning and reflective writing.
3. Analysis of the level of engagement, attitudes developed, and challenges faced by students during the execution of academic writing tasks with ChatGPT.
4. To establish if writing improvements could be maintained over five weeks, through the comparison of pre-exercise to post-exercise results.

This quasi-experimental study tracked the progress of students over five weeks using a pre-test/post-test design. The findings will clarify how AI tools support language acquisition in EFL education and guide their balanced integration with traditional pedagogy. They will also highlight the importance of ensuring ethical use of AI in classrooms, safeguarding academic integrity and promoting independent learning.

Literature Review

The growing presence of artificial intelligence (AI) in language education has begun to influence how English as a Foreign Language (EFL) is taught and learned (Zhai & Wibowo, 2023; Zhang & Zou, 2023; Zitouni, 2022). Tools such as ChatGPT, Grammarly, and Wordtune offer learners immediate

feedback on aspects of writing such as grammar, structure, and coherence, which can support the development of written performance (Jen & Salam, 2024; Alotaibi & Alshehri, 2023). In the Saudi context, recent studies suggest an increasing interest in integrating AI into EFL classrooms, with attention to both its potential benefits and the challenges associated with its use (Alhalangy & AbdAlgane, 2023; Alsalem, 2024). This review considers current research on AI-assisted writing, with particular attention to its relevance for EFL instruction in Saudi higher education.

The work of John McCarthy (1997) represents a rare combination of technical expertise, imagination, and philosophical reflection. It is precisely for this reason that his contribution to what artificial intelligence is nowadays cannot be overestimated. Defining it as “the science and engineering of making intelligent machines,” he came to mean that there is more to AI systems than just emulations of human intelligence, capable of solving real-life problems in an effective and flexible manner. The vision reflects McCarthy’s belief that machines should be capable of performing tasks and, at the same time, solving unexpected problems that may suddenly appear in a dynamic environment, very much as humans do. He saw intelligent systems not just as tools for automation but as collaborators in creative processes: generating ideas, solving puzzles, and making decisions in ways humans might not consider.

AI in writing education provides essential support for correcting grammatical errors, improving lexical richness, and generating ideas (Alotaibi & Alshehri, 2023). The theoretical underpinnings of AI use in education align with computer-assisted language learning and interactive learning frameworks, where feedback guides students through multiple iterations of writing and revision (Zhai & Wibowo, 2023). Jen and Salam (2024) emphasize that generative AI tools, such as ChatGPT, are especially valuable in brainstorming, giving feedback, and idea development by engaging them in self-directed learning processes, a practice supported by constructivist theories and student-centered learning frameworks.

Abdalgane and Othman 2023’s work investigates the role of AI in Saudi EFL classrooms, focusing on Google Translate, automated evaluation systems, and AI-based writing tools such as Wordtune. The study found AI enhances students’ writing fluency and enables immediate feedback, improving teaching practices. Challenges include the limited technical skills and internet access issues of the instructors. The authors stress the need for teacher training and infrastructure. The study concluded that AI can promote collaboration, personalize learning, and motivate students, which raises the overall quality of EFL instruction.

Alhalangy and Abdalgane (2023) examine Saudi university EFL education, focusing on intelligent teaching systems, virtual environments, and self-directed learning aids to assess their impact on teaching efficiency and student engagement. Surveying 45 educators, the study finds AI tools enhance language proficiency and classroom interaction but notes challenges such as limited teacher familiarity and risks of reduced motivation from over-reliance. The authors recommend stronger teacher training and broader AI integration, concluding that with proper support, AI can optimize practices, improve student-teacher interactions, and enhance academic outcomes in EFL contexts.

Several studies have examined the role of AI tools in supporting the writing development of EFL learners. For example, Jen and Salam (2024) found that AI-based writing tools can assist students in improving organization and idea development through guided prompts. In the Saudi context, Alhalangy and AbdAlgane (2023) report that AI integration in EFL classrooms can enhance students’ engagement

with writing tasks, while Alsalem (2024) highlights learners' generally positive attitudes toward the use of ChatGPT, alongside a continued preference for teacher feedback in tasks requiring deeper analysis. At the same time, concerns have been raised regarding the limitations of automated feedback, particularly in relation to contextual sensitivity and higher-order writing skills (Jen & Salam, 2024).

Recent research highlights the value of embedding AI tools into learning workflows, where continuous feedback and seamless support enhance higher education outcomes. Zitouni (2022) found that AI-powered tools improve motivation and autonomy by providing timely feedback in online and hybrid contexts. However, concerns remain about overreliance, as Jen and Salam (2024) caution that dependence on automated feedback may weaken independent writing skills. Clear ethical guidelines are therefore essential to safeguard academic integrity, prevent plagiarism, and ensure responsible use of AI-generated content.

Despite the growing body of research on AI-assisted writing in EFL contexts, several gaps remain. Existing literature have mainly focused on grammatical accuracy, learner perceptions, or short-term outcomes, typically measured over brief interventions ranging from single-session activities to periods of a few weeks, with limited attention to higher-order writing skills such as structure and voice. Moreover, empirical classroom-based research examining the sustained impact of generative AI tools, particularly ChatGPT, within Saudi EFL contexts remains scarce. Despite the growing body of research on AI-assisted writing in EFL contexts, several gaps remain. Existing literature have mainly focused on grammatical accuracy, learner perceptions, or short-term outcomes, typically measured over brief interventions ranging from single-session activities to periods of a few weeks, with limited attention to higher-order writing skills such as structure and voice. Moreover, empirical classroom-based research examining the sustained impact of generative AI tools, particularly ChatGPT, within Saudi EFL contexts remains scarce. Most prior studies rely on short-term interventions, often limited to brief instructional periods, offering limited insight into measurable writing development over time (Li & Hegelheimer, 2013; Crossley & McNamara, 2011; Zhang & Zou, 2023). In this regard, a five-week instructional intervention provides a more sustained context for observing changes in writing performance compared to the shorter durations commonly reported in the literature.

In response to the identified research gap and in alignment with the study's objectives, the present study is guided by the following research questions:

1. To what extent does the integration of ChatGPT as an AI-powered writing coach affect Saudi EFL students' overall writing performance over a five-week instructional intervention?
2. Which writing components—grammar, spelling, style, structure, and voice—show the most significant improvement following AI-assisted, iterative writing practice?
3. How does ChatGPT-mediated feedback contribute to the development of higher-order writing skills, particularly structure and voice, among Saudi EFL learners?
4. What limitations remain in foundational language accuracy (grammar and spelling) after the use of ChatGPT, and how do these findings inform the need for complementary instructor-led instruction?

Research Methodology

This study is a quasi-experiment, which employs a pre-test/post-test design to find the effect of AI-powered tools, particularly ChatGPT, on improving the writing skills of Saudi EFL students. The quasi-experimental design has been applied in this study because it allows the researcher to study different educational interventions in their real classroom settings, and random assignment is often not possible (Creswell & Creswell, 2018).

Participants and Setting

This study involved 15 female undergraduate students enrolled in a Writing Essay course in the English Language Department at a Saudi public university during the 2024 academic year. All participants were Saudi nationals and were studying English as a Foreign Language. Their proficiency level was approximately intermediate (B1–B2), based on course placement requirements. Participants were selected through convenience sampling, a method commonly used in educational research, although it limits the generalizability of findings (Etikan et al., 2016). The relatively small sample size reflects the intact classroom setting in which the study was conducted and is consistent with classroom-based intervention research.

The study was carried out in a regular classroom environment, where students attended their scheduled writing classes and completed course-related tasks. As part of the instructional design, students used ChatGPT as a “writing coach” through guided activities integrated into the course. This approach allowed the study to examine writing development within an authentic learning context, supporting ecological validity (Muijs, 2010).

Data Collection

This study adopts a primarily quantitative approach, with limited qualitative data used to support interpretation of the findings (Creswell & Plano Clark, 2011). Quantitative data includes pre- and post-test scores across five rubric categories, along with weekly assignment scores to track progress. Qualitative data is drawn from students’ reflections through discussions and feedback forms, as well as the instructor’s documented observations during feedback sessions to capture engagement and learning behaviors. The instructor was a female faculty member with experience in teaching EFL writing at the undergraduate level in Saudi higher education. Although Course Evaluation Forms collected by the Quality Assurance Unit were available, they were excluded as they lacked pedagogical relevance. Incorporating qualitative insights supports interpreting the quantitative results (Patton, 2015).

The Pre-Test

The study begins with a pre-test in which students write a 500-word reflective paragraph on a suggested topic without instructor assistance. This baseline sample measures initial writing proficiency and provides data for comparison (Fraenkel & Wallen, 2006). A customized rubric was used to assess five dimensions of writing: grammar, spelling, style, structure, and voice. Each dimension was rated on a 5-point scale, with scores ranging from 1 (very limited performance) to 5 (highly effective performance), resulting in a total possible score of 25 points (Andrade, 2005). The rubric descriptors were designed to reflect varying levels of accuracy, coherence, and clarity in students’ writing.

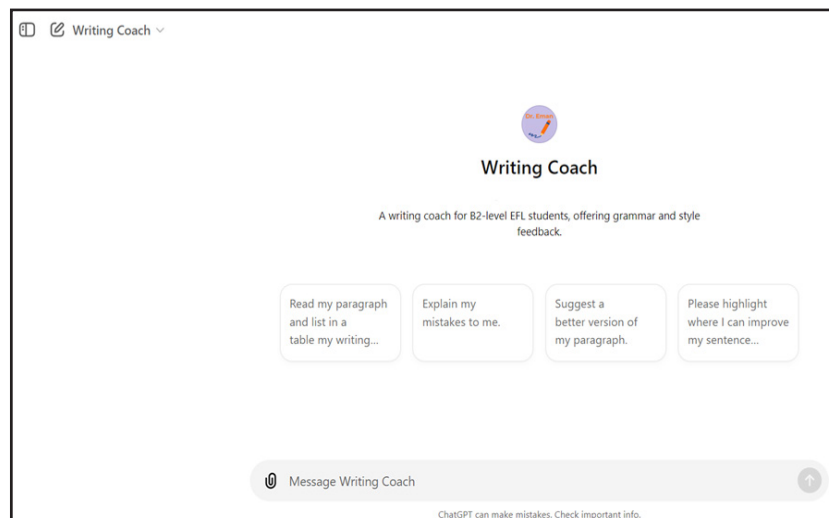
Pre-test responses were analyzed to identify recurring patterns of error across these dimensions.

Based on this analysis, targeted prompts were developed to address specific areas of weakness. These prompts were introduced progressively during the intervention, allowing students to receive focused and context-sensitive guidance as they revised their writing.

Intervention Using ChatGPT

After the pre-test, students used the “Writing Coach,” an AI tool powered by ChatGPT, created by the instructor to support B2-level EFL learners. Over five weeks, it provided personalized feedback on grammar, vocabulary, structure, and style, promoting iterative learning through continuous refinement of writing based on AI-generated guidance. A screenshot of the interface of this tool is shown in Figure 1.

Figure 1: the interface of the Writing Coach



In this research, the tool served dual purposes: supporting learners and acting as an object of investigation to study the effects of AI-assisted feedback on writing. Its interactive interface allowed participants to engage in iterative writing practice, providing real-time corrections and recommendations tailored to their language proficiency and writing objectives.

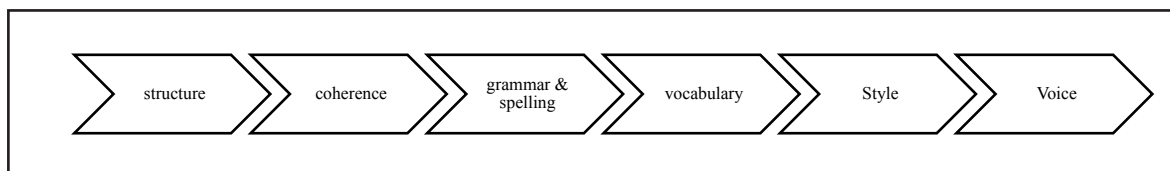
During the intervention, which was conducted as part of regular classroom instruction, students used the Writing Coach in a structured sequence designed to develop specific writing aspects, from organization to style. Each stage was guided by a focused prompt, followed by AI-generated feedback and instructor-led discussions to support analysis and revision.

On a weekly basis, one student’s paragraph was selected for class-wide discussion to encourage collaborative reflection. Students then revised their work based on AI feedback and peer discussion. This process continued across the intervention period until all targeted aspects of writing had been addressed. Finally, students produced revised paragraphs independently during class time, which were evaluated by the instructor to monitor progress.

The sequence of targeted aspects was intentionally designed to move from foundational to more complex writing features. Initial stages focused on grammatical accuracy and sentence-level clarity, while later stages addressed organization, style, and voice. This progression reflects common pedagogical practices in EFL writing instruction, where control of lower-level linguistic features supports the development of higher-order writing skills. The aspects targeted in this study were arranged in the

sequence demonstrated in Figure 2:

Figure 2: The sequential arrangement of writing aspects targeted in this study



Organizing Structure: The initial step involved guiding students to establish a robust structural framework for their paragraph. This step was based on research indicating that a strong organizational plan is foundational to effective writing (Graham & Perin, 2007). The focus on structure helped simplify subsequent revisions and ensured a well-organized flow of ideas.

1. **Enhancing Coherence:** Once the overall structure was established, the next step focused on improving the logical flow between paragraphs. Students used the AI coach to integrate appropriate transition words and phrases. This technique aimed to enhance readability and ensure that ideas connected seamlessly, supported by studies highlighting the importance of coherence and cohesion in written communication (McNamara et al., 2010).
2. **Addressing Grammar and Spelling:** The third stage involved using the AI writing coach to identify and correct grammar and spelling errors. Students received feedback in a detailed table format, listing mistakes with explanations to aid understanding. Research emphasizes that early error correction lays a strong foundation for advanced writing elements and fosters better writing practices (Ferris, 2006).
3. **Expanding Vocabulary:** With grammar and spelling errors corrected, students were then guided to enhance their vocabulary. The AI writing coach provided more vivid and specific synonyms to replace generic words, such as 'good' and 'bad,' making the writing more engaging; varied vocabulary significantly impacts reader engagement and adds depth to the writing (Crossley & McNamara, 2011).
4. **Improving Sentence Variety:** Next, students worked on refining their style by introducing sentence variation. The AI coach suggested ways to rewrite sentences to avoid monotony and maintain the reader's interest. Research supports the idea that varied sentence structures enhance writing sophistication and improve overall readability (Hillocks, 1986). This step helped students elevate their writing style and keep the content engaging.
5. **Developing Voice:** After addressing structural and technical aspects, the focus shifted to personalizing the writing. The AI writing coach assisted students in enhancing their voice, suggesting revisions to better reflect their thoughts and emotions. Writing studies have shown that an authentic voice makes writing more relatable and impactful (Elbow, 1994). This stage encouraged students to express their individuality and connect emotionally with their audience.

Ensuring Tone Consistency: The final stage involved fine-tuning the paragraph's tone for consistency. The AI coach analyzed the tone and suggested adjustments to maintain a cohesive and deliberate voice throughout the piece. Research indicates that a consistent tone enhances the credibility

of the writing and avoids reader confusion (Conrad & Goldstein, 1999). This last step polished the writing and ensured that the intended message was effectively conveyed.

Table 1 details the set of prompts used during the intervention, with each targeting a specific writing aspect.

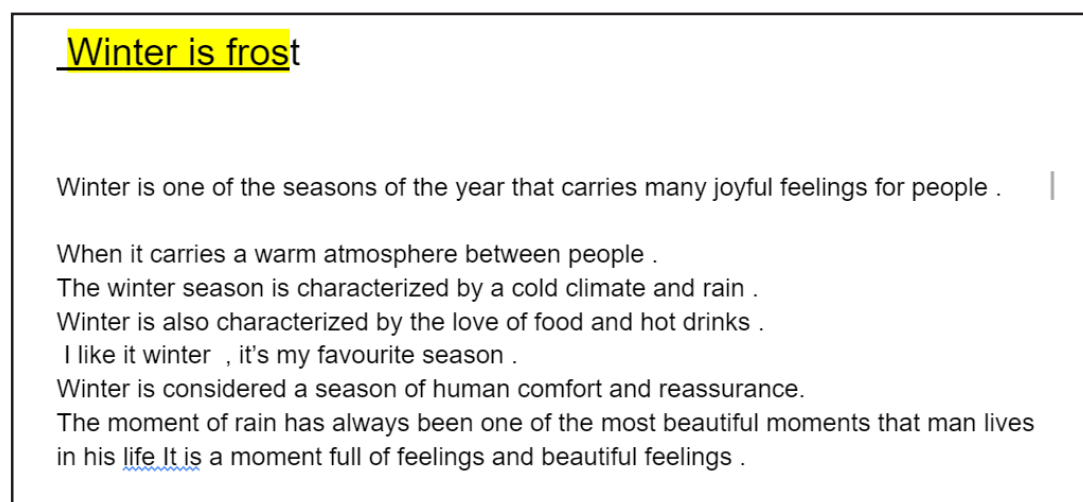
Table 1: Prompts and techniques used to enhance writing aspects

Aspect	Technique	Prompt
Structure	Outlining	Provide a clear outline for my paragraph with suggested transitions between sections.
	Transition words	Suggest appropriate transition phrases to improve the flow between paragraphs.
Grammar & Spelling	Error identification	In a table, list all grammar and spelling mistakes in my paragraph with explanations.
Style	V o c a b u l a r y E x p a n s i o n	Provide more vivid synonyms for the generic words used in my paragraph.
	Sentence variation	Suggest ways to rewrite the following sentences with more variety:
Voice	Voice enhancement	Suggest how I can revise my paragraph to better reflect my personal thoughts and emotions.
	Tone Consistency	Analyze the tone of my paragraph and suggest changes to make it consistent.

Writing Coach Responses:

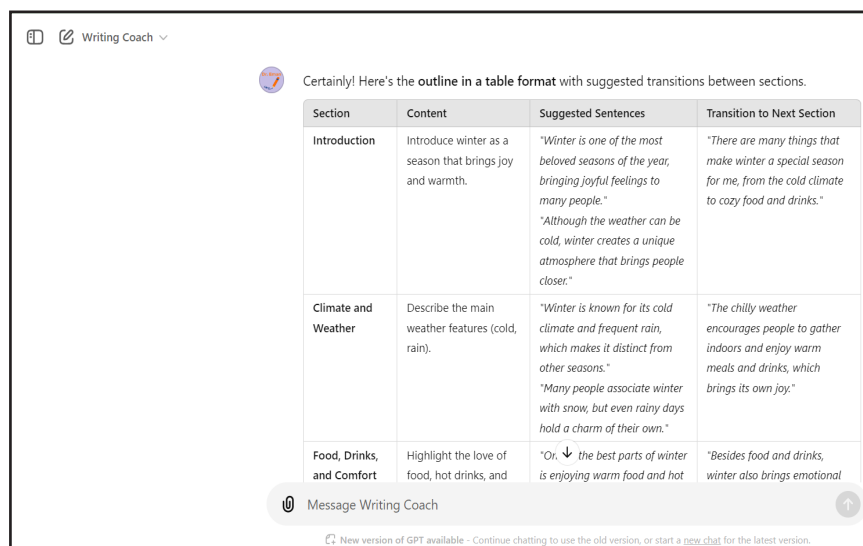
This section offers a detailed overview of how the intervention unfolded in actual classroom settings, highlighting the practical application of ChatGPT as a Writing Coach. To illustrate the process clearly, an example is provided. Figure 3 shows a student's reflective paragraph on their favorite season, which was the focus of feedback and revision. This example demonstrates how ChatGPT's tailored suggestions were used to guide students in enhancing the overall quality of their writing, emphasizing structural coherence, grammatical precision, and expressive voice.

Figure3: An example of a first draft written by one student prior to the intervention



When the student engaged with the initial prompt, following detailed guidance from the instructor's handout, ChatGPT generated a tailored response, as illustrated in Figure 4. The AI's feedback included a structured breakdown of the student's writing, along with specific suggestions for improving organization and flow. This supported students' understanding of how to develop ideas more clearly and use transitions more effectively.

Figure 4: ChatGPT's Response to the Initial Prompt



Certainly! Here's the outline in a table format with suggested transitions between sections.

Section	Content	Suggested Sentences	Transition to Next Section
Introduction	Introduce winter as a season that brings joy and warmth.	"Winter is one of the most beloved seasons of the year, bringing joyful feelings to many people." "Although the weather can be cold, winter creates a unique atmosphere that brings people closer."	"There are many things that make winter a special season for me, from the cold climate to cozy food and drinks."
Climate and Weather	Describe the main weather features (cold, rain).	"Winter is known for its cold climate and frequent rain, which makes it distinct from other seasons." "Many people associate winter with snow, but even rainy days hold a charm of their own."	"The chilly weather encourages people to gather indoors and enjoy warm meals and drinks, which brings its own joy."
Food, Drinks, and Comfort	Highlight the love of food, hot drinks, and	"Or, the best parts of winter is enjoying warm food and hot	"Besides food and drinks, winter also brings emotional

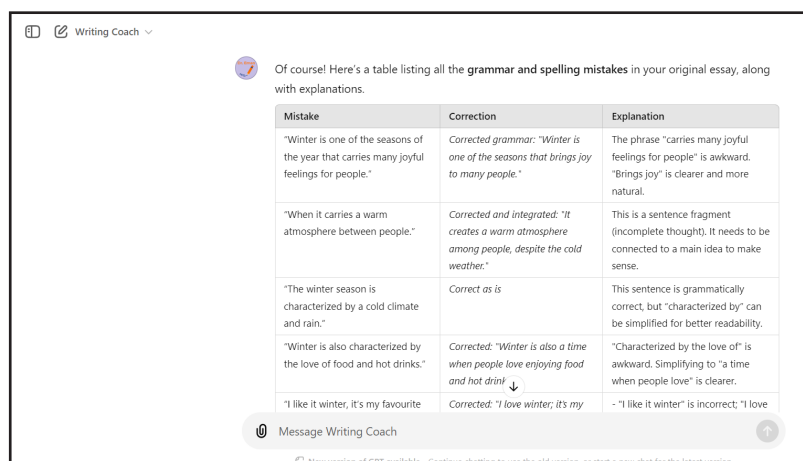
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As shown above, ChatGPT systematically deconstructed the student's writing into its core components, providing a detailed analysis and recommending an improved outline to help structure the remainder of the paragraph effectively. Additionally, the AI proposed transition phrases to enhance the logical flow between sections, ensuring a smoother reading experience.

When addressing grammar and spelling, the prompt was highly targeted, instructing the AI to identify and explain each error comprehensively. These corrections were presented clearly, making them easy for students to understand and apply. Since the students had used relatively simple language, they required minimal time to process and implement these straightforward corrections. Figure 5 illustrates an example of ChatGPT's responses to the grammar and spelling prompt.

Figure 5: ChatGPT's Grammar and Spelling Feedback



Of course! Here's a table listing all the grammar and spelling mistakes in your original essay, along with explanations.

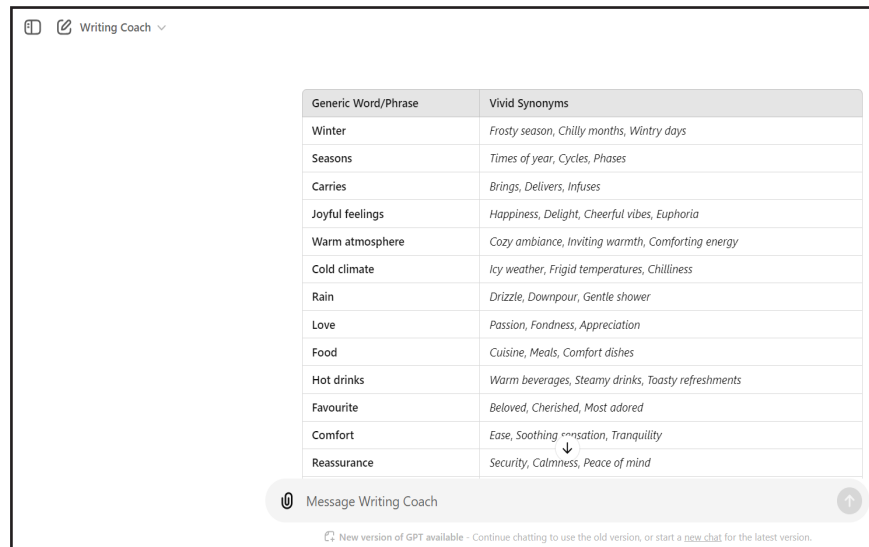
Mistake	Correction	Explanation
"Winter is one of the seasons of the year that carries many joyful feelings for people."	Corrected grammar: "Winter is one of the seasons that brings joy to many people."	The phrase "carries many joyful feelings for people" is awkward. "Brings joy" is clearer and more natural.
"When it carries a warm atmosphere between people."	Corrected and integrated: "It creates a warm atmosphere among people, despite the cold weather."	This is a sentence fragment (incomplete thought). It needs to be connected to a main idea to make sense.
"The winter season is characterized by a cold climate and rain."	Correct as is	This sentence is grammatically correct, but "characterized by" can be simplified for better readability.
"Winter is also characterized by the love of food and hot drinks."	Corrected: "Winter is also a time when people love enjoying food and hot drinks."	"Characterized by the love of" is awkward. Simplifying to "a time when people love" is clearer.
"I like it winter, it's my favourite"	Corrected: "I love winter, it's my	"I like it winter" is incorrect; "I love

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For vocabulary expansion, ChatGPT provided students with feedback by suggesting more vivid and precise synonyms to replace the generic words they had initially used. This approach aimed to enrich their writing and make it more engaging. Additionally, students were encouraged to compile personalized vocabulary lists based on the AI's suggestions and to integrate these enhanced word choices across various academic assignments and courses. The AI's response illustrating this vocabulary feedback is presented in Figure 6.

Figure 6: ChatGPT's Vocabulary Enhancement Suggestions



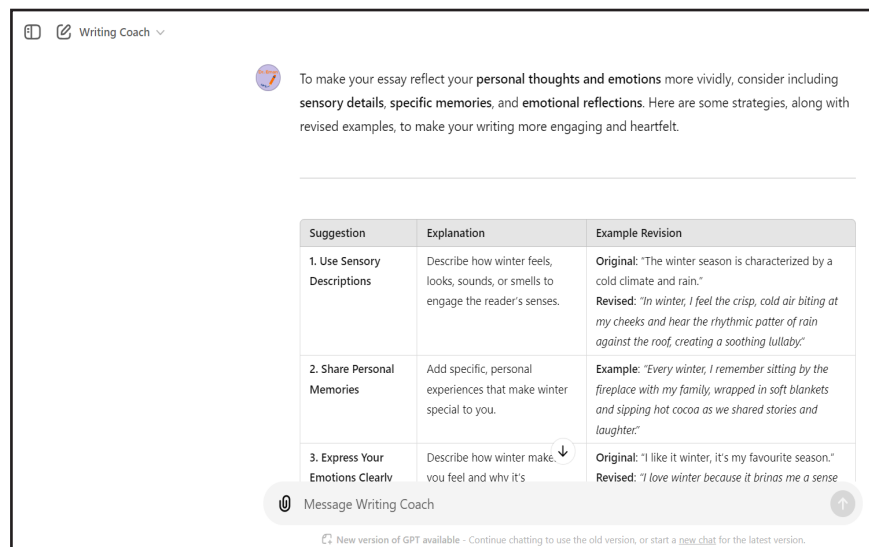
Generic Word/Phrase	Vivid Synonyms
Winter	Frosty season, Chilly months, Wintry days
Seasons	Times of year, Cycles, Phases
Carries	Brings, Delivers, Infuses
Joyful feelings	Happiness, Delight, Cheerful vibes, Euphoria
Warm atmosphere	Cozy ambiance, Inviting warmth, Comforting energy
Cold climate	Icy weather, Frigid temperatures, Chilliness
Rain	Drizzle, Downpour, Gentle shower
Love	Passion, Fondness, Appreciation
Food	Cuisine, Meals, Comfort dishes
Hot drinks	Warm beverages, Steamy drinks, Toasty refreshments
Favourite	Beloved, Cherished, Most adored
Comfort	Ease, Soothing sensation, Tranquility
Reassurance	Security, Calmness, Peace of mind

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Next, Students focused on developing their writing voice, using ChatGPT's tailored feedback. For reflective paragraphs, emphasis was placed on sensory details. The AI guided students in adding vivid, engaging descriptions, making their reflections more compelling and relatable. The AI's recommendations for voice improvement are illustrated in Figure 7.

Figure 7: ChatGPT's Voice Enhancement Feedback



To make your essay reflect your **personal thoughts and emotions** more vividly, consider including **sensory details**, **specific memories**, and **emotional reflections**. Here are some strategies, along with revised examples, to make your writing more engaging and heartfelt.

Suggestion	Explanation	Example Revision
1. Use Sensory Descriptions	Describe how winter feels, looks, sounds, or smells to engage the reader's senses.	Original: "The winter season is characterized by a cold climate and rain." Revised: "In winter, I feel the crisp, cold air biting at my cheeks and hear the rhythmic patter of rain against the roof, creating a soothing lullaby."
2. Share Personal Memories	Add specific, personal experiences that make winter special to you.	Example: "Every winter, I remember sitting by the fireplace with my family, wrapped in soft blankets and sipping hot cocoa as we shared stories and laughter."
3. Express Your Emotions Clearly	Describe how winter makes you feel and why it's	Original: "I like it winter, it's my favourite season." Revised: "I love winter because it brings me a sense

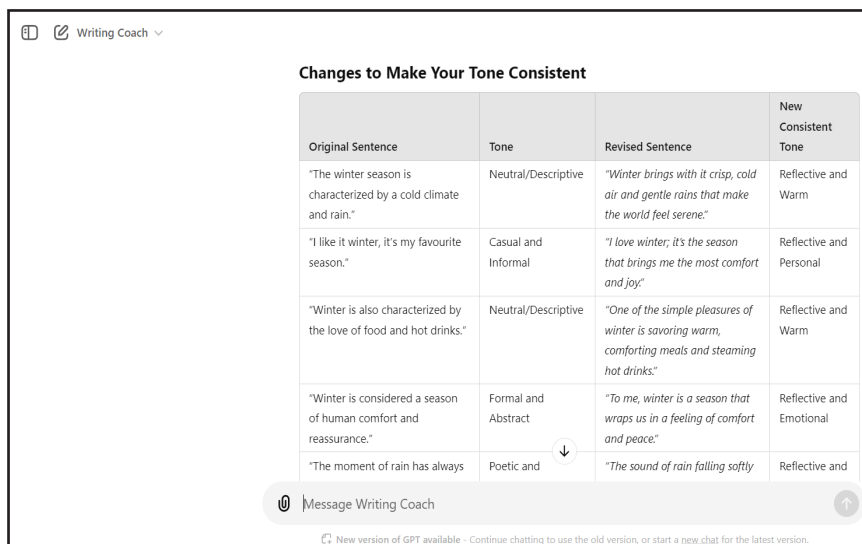
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The final step focused on refining paragraph tone for reflective writing. ChatGPT proved highly effective, explaining why the original tone was unsuitable and offering revisions. Its feedback demon-

strated how adjustments could create consistency, appropriateness, and cohesion, strengthening the reflective style across the entire piece. This illustrative feedback is displayed in Figure 8.

Figure 8: ChatGPT's Tone Refinement Feedback



Original Sentence	Tone	Revised Sentence	New Consistent Tone
"The winter season is characterized by a cold climate and rain."	Neutral/Descriptive	"Winter brings with it crisp, cold air and gentle rains that make the world feel serene."	Reflective and Warm
"I like it winter, it's my favourite season."	Casual and Informal	"I love winter; it's the season that brings me the most comfort and joy."	Reflective and Personal
"Winter is also characterized by the love of food and hot drinks."	Neutral/Descriptive	"One of the simple pleasures of winter is savoring warm, comforting meals and steaming hot drinks."	Reflective and Warm
"Winter is considered a season of human comfort and reassurance."	Formal and Abstract	"To me, winter is a season that wraps us in a feeling of comfort and peace."	Reflective and Emotional
"The moment of rain has always	Poetic and	"The sound of rain falling softly	Reflective and

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Post-Test

At the conclusion of the intervention, students were asked to write a final 500-word reflective paragraph without using ChatGPT. The paragraphs are graded using the same rubric applied during the pre-test to ensure consistency and comparability. The use of identical rubrics for both assessments allowed changes in performance to be tracked more reliably, while reducing potential grading bias (Brookhart, 2013). Two colleagues (assistant professors of Applied Linguistics) independently graded the paragraphs using a unified rubric, and the average score was calculated for each student.

Data Analysis Methods

Data analysis combined statistical and thematic approaches. Descriptive statistics (mean, median, standard deviation) summarized pre-test, post-test, and weekly scores. A paired t-test assessed significance of changes within the group over time (Field, 2013). Complementing this, thematic analysis provided deeper insight into students' learning experiences and writing development beyond the quantitative results.

For the qualitative analysis, thematic analysis was applied to students' reflections and instructor observations. This approach facilitated the identification of key patterns and themes in students' experiences with ChatGPT, offering deeper insights into their engagement and the educational process (Braun & Clarke, 2006). The analysis focused on pre-test and post-test comparisons to examine changes in writing performance over the intervention period, which directly addressed the study's primary objective of evaluating development over time.

Ethical Considerations

Following university regulations, students received the course plan early in the term, detailing teaching strategies, assessment tools, and integration of the Writing Coach for instruction and evaluation. Students showed enthusiasm and willingness to engage with AI as a tutoring resource. The study ad-

heres to ethical guidelines, with informed consent obtained to ensure participants understood objectives, procedures, and their right to withdraw. To maintain confidentiality, all data were anonymized, with students identified by codes (e.g., S1, S2, S3), ensuring identities remained protected when grades or results were reported.

Reliability and Trustworthiness

Reliability was supported through the use of a consistent rubric across both pre-test and post-test assessments, ensuring uniform evaluation criteria. In addition, the involvement of two independent raters, along with the use of a unified scoring guide, helped reduce potential grading bias and improve scoring consistency.

To strengthen the trustworthiness of the findings, the study combined quantitative measures of writing performance with qualitative insights from student reflections and classroom observations. This complementary approach allowed for a more comprehensive understanding of students' writing development over the intervention period (Shadish et al., 2002).

Limitations of the Study

Several limitations must be acknowledged. The study's small sample size of 15 participants may limit the generalizability of the findings to other EFL contexts. Additionally, the lack of a control group makes it difficult to attribute improvements solely to the use of ChatGPT. Finally, the five-week duration of the intervention may not be sufficient to capture long-term improvements in writing skills.

Results

The results are presented in relation to the study's research questions. The first section reports changes in students' writing performance across the five assessed components. The second section examines students' engagement and perceptions based on qualitative data. The final section addresses challenges encountered during the intervention.

The pre-test revealed key challenges in students' writing, including limited sentence variety, limited lexical range of vocabulary, and inconsistent tone, highlighting the need for targeted practice in nuanced structures and word choice. Organizational issues reduced coherence, with students requiring guidance on outlines and transition words. Developing a personal voice and maintaining consistency proved difficult, emphasizing reflective, engaging practice. Although grammar and spelling scores were generally high in the rubric-based assessment, minor errors remained in students' written output. Varying proficiency levels underscored the importance of personalized feedback and iterative writing, enabling students to set goals and improve through multiple drafts. Each component was scored on a 5-point scale, where 1 indicates very limited performance and 5 indicates highly effective performance, with a total possible score of 25. Table 2 presents the pre-test writing performance scores across the five assessed components and overall grades.

Table 2: Pre-Test Results

Student	Grammar (5)	Spelling (5)	Style (5)	Structure (5)	Voice (5)	Overall grade (25)
S1	4	5	3	2	5	19
S2	5	5	4	3	5	22
S3	2	3	1	3	2	11
S4	3	4	4	3	2	16
S5	5	5	4	2	2	18
S6	5	5	4	3	1	18
S7	3	2	1	2	1	9
S8	2	2	2	2	2	10
S9	1	2	1	2	2	8
S10	4	5	4	4	3	20
S11	5	5	5	3	2	20
S12	3	3	2	2	1	11
S13	3	4	3	3	1	14
S14	3	3	3	2	2	13
S15	2	3	3	2	2	12

Performance Overview

The mean overall score across all students was 14.73 out of 25. Scores ranged from 8 (S9) to 22 (S2), indicating variation in writing performance at the beginning of the study. The standard deviation of 4.54 suggests a moderate spread of scores across participants, reflecting differences in proficiency across the assessed writing components.

Strengths in Writing Skills

Two relative strengths emerged in the pre-test: grammar and spelling. Grammar showed a mean score of 3.33, with some students (e.g., S2, S5, S6) achieving perfect scores of 5, though variability remained, as S9 scored as low as 1. Spelling showed a higher mean score of 3.73, with a larger number of high-performing students. This pattern may reflect students' familiarity with basic language forms, possibly supported by prior instruction or the use of digital writing tools. Overall, the results indicate a stronger performance in lower-level writing features compared to more complex aspects of writing.

Weaknesses in Writing Skills

The analysis identified three areas that required further development: style, structure, and voice. Style had a mean score of 2.93, which was lower than grammar and spelling, indicating comparatively greater difficulty in this area. Students showed limited variation in sentence construction, challenges in selecting precise vocabulary, and difficulty maintaining a consistent tone. Although the difference between scores was not substantial, the pattern suggests that higher-order writing features were less developed than sentence-level accuracy, highlighting areas for targeted instruction.

Notable Patterns and Variability

The variability in scores indicated differences in students' writing performance. For example, S2 and S10 achieved relatively high total scores of 22 and 20, reflecting balanced performance across criteria. In contrast, S9 and S7 scored 8 and 9, respectively, indicating lower performance across several components, particularly style, structure, and voice. These patterns suggest that students experienced greater difficulty with higher-order aspects of writing compared to sentence-level features.

This variation highlights the need for differentiated instructional support, where students with stronger performance may benefit from more advanced tasks, while others may require targeted feedback to address specific areas of difficulty.

Overall, the pre-test results presented a mixed profile of students' initial writing abilities. Grammar and spelling showed relatively higher scores, while challenges were observed in style, structure, and voice. These areas require greater cognitive and organizational control, which may explain the differences in performance. The intervention with ChatGPT was designed to address these areas through iterative feedback and guided revision.

The Post-test

The post-test results provide valuable insight into the progress made by students after five weeks of using the ChatGPT Writing Coach. By comparing the pre-test and post-test scores, this analysis demonstrates the effectiveness of the intervention in enhancing various aspects of students' writing skills. Table 3 shows results of the post-test.

Table 3: Post-Test Results

Student	Grammar (5)	Spelling (5)	Style (5)	Structure (5)	Voice (5)	Overall grade (25)
S1	4	5	3	3	5	20
S2	5	5	4	5	5	24
S3	2	3	2	4	3	14
S4	3	4	4	4	2	17
S5	5	5	4	4	3	21
S6	5	5	4	3	3	20
S7	3	3	3	3	2	14
S8	2	2	2	4	4	14
S9	3	2	3	3	3	14
S10	4	5	4	4	4	21
S11	5	5	5	4	3	22
S12	3	3	3	4	3	16
S13	3	3	3	3	4	16
S14	3	4	4	3	4	18
S15	3	3	3	3	2	14

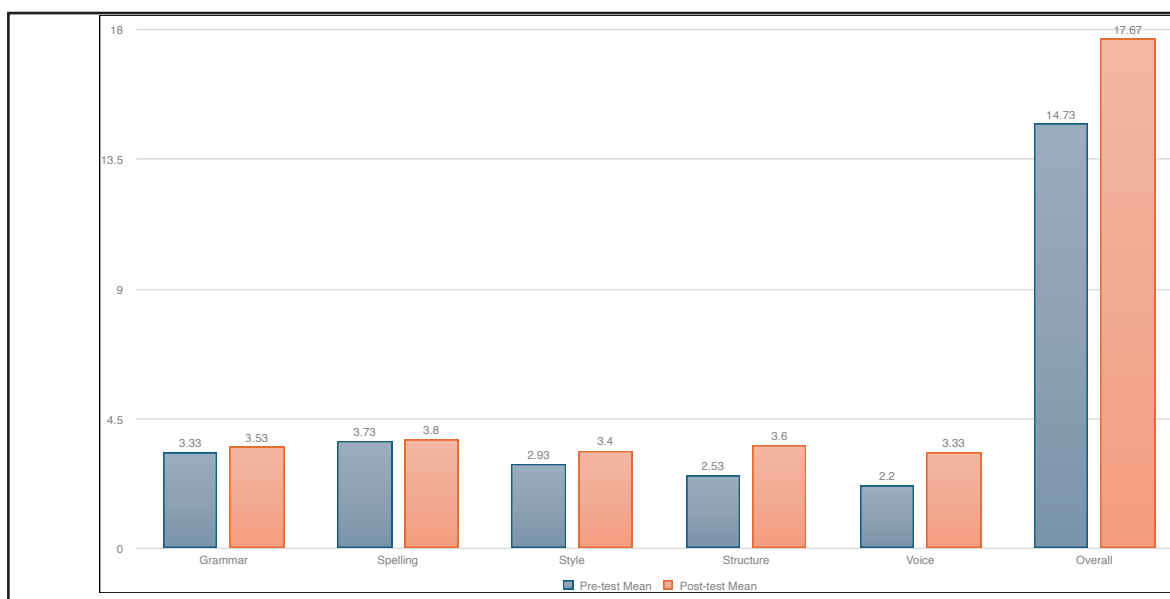
Overall Performance Improvement

The post-test results showed a mean score of 17.67 out of 25, representing an average gain of ap-

proximately 2.94 points from the pre-test mean of 14.73. This increase indicates overall improvement in students' writing performance following the intervention. The highest post-test score was 24, achieved by S2, who had also demonstrated strong performance in the pre-test. In contrast, lower-performing students showed more noticeable gains, suggesting that the intervention may have had a more pronounced effect on students with weaker initial performance.

The lowest post-test score was 14, shared by S3, S7, and S15. The standard deviation decreased from 4.54 in the pre-test to 3.44 in the post-test, indicating reduced variability in performance across students. Figure 9 illustrates improvements across all assessed writing components from pre-test to post-test.

Figure 9: Comparison of pre-test and post-test mean scores by writing criteria



Overall Performance Improvement

The mean overall score improved from 14.73 in the pre-test to 17.67 in the post-test, representing an increase of 2.93 points. A paired-samples t-test showed that this difference was statistically significant, $t(14) = 6.81, p < .001$. The effect size was large (Cohen's $d = 1.76$), indicating a substantial improvement in students' writing performance over the course of the intervention.

Improvements were observed across all assessed criteria, with more noticeable gains in structure and voice, while spelling showed relatively smaller changes, likely due to higher initial performance.

Table 4: Comparison of Pre-Test and Post-Test Mean Scores by Writing Criteria

Criteria	Pre-test Mean	Post-test Mean	Improvement
Grammar	3.33	3.53	0.20
Spelling	3.73	3.80	0.07
Style	2.93	3.40	0.47
Structure	2.53	3.60	1.07
Voice	2.20	3.33	1.13
Overall	14.73	17.67	2.93

Discussion

The present study examined the impact of ChatGPT as an AI-powered writing coach on Saudi EFL students' writing development over a five-week instructional intervention. This section discusses the results in relation to the study's research questions and situates them within the existing literature on AI-assisted EFL writing.

Impact of ChatGPT on Overall Writing Performance

The findings indicate a statistically significant improvement in students' overall writing performance following the intervention. The increase in mean scores from the pre-test to the post-test, supported by the paired-samples t-test results, suggests that students' writing developed over the course of the study. This improvement may be associated with the use of iterative, AI-mediated feedback, which encouraged engagement with the writing process and supported ongoing revision (Zhai & Wibowo, 2023; Jen & Salam, 2024).

A reduction in score variability was also observed across participants, indicating a more consistent distribution of performance in the post-test. This pattern may reflect differential effects of the intervention, where students with lower initial performance showed greater gains, while higher-performing students demonstrated more modest improvements. Such variation is consistent with classroom-based learning contexts, where instructional tools may support learners at different proficiency levels in different ways.

Differential Improvement Across Writing Components

Analysis of individual writing components revealed uneven patterns of improvement, with the most substantial gains observed in structure and voice, followed by moderate improvement in style. In contrast, grammar and spelling showed only marginal gains. These results suggest that ChatGPT is particularly effective in supporting higher-order writing skills that involve organization, coherence, and expressive meaning, rather than surface-level language accuracy.

The significant improvement in structure may be attributed to ChatGPT's ability to provide explicit guidance on outlining, logical sequencing, and the use of transitional devices. Such feedback helps learners conceptualize writing as a structured process rather than a linear task, reinforcing principles of coherent text construction highlighted in writing research (Graham & Perin, 2007; McNamara et al., 2010). Similarly, gains in voice indicate that AI-generated prompts encouraging reflection, personalization, and expressive language can support EFL learners in developing a more authentic authorial presence—an aspect often underdeveloped in second language writing.

The limited improvement in grammar and spelling is noteworthy but not unexpected. Participants demonstrated relatively strong baseline performance in these areas, leaving less room for measurable growth. Moreover, prior research suggests that mastery of grammatical accuracy often requires sustained, explicit instruction and repeated practice beyond automated correction (Ferris, 2006; Li & Hegeheimer, 2013). While ChatGPT raised students' awareness of grammatical issues, the findings indicate that AI feedback alone may be insufficient for achieving advanced accuracy.

ChatGPT and the Development of Higher-Order Writing Skills

One of the contributions of this study lies in its evidence that ChatGPT-mediated feedback can meaningfully support the development of higher-order writing skills, particularly structure and voice. Unlike traditional grammar-checking tools, ChatGPT provided discursive, explanatory feedback that encouraged students to rethink organization, clarify ideas, and enhance expressive depth. This aligns with constructivist and process-oriented writing theories, which emphasize reflection, revision, and learner agency (Hyland, 2003; Sadler, 1989).

The iterative nature of AI feedback appeared to promote recursive writing practices, allowing students to revise their texts multiple times with targeted guidance. This process-oriented engagement supports earlier findings that AI tools foster learner autonomy and sustained interaction with writing tasks (Zitouni, 2022; Zhang & Zou, 2023). Importantly, the improvement in voice suggests that AI feedback can move beyond mechanical correction to support meaning-making and personal expression—areas traditionally considered challenging for automated systems.

Persistent Challenges and the Need for Instructor Mediation

Despite overall improvement, persistent challenges remained, particularly in grammar accuracy and stylistic consistency for some students. These findings reinforce concerns raised in prior research regarding the limitations of AI-generated feedback, especially in addressing nuanced linguistic, cultural, and rhetorical dimensions of writing (Alsalem, 2024; Jen & Salam, 2024). Some students continued to struggle despite access to AI support, indicating that individualized teacher intervention remains essential.

The study therefore underscores the importance of a hybrid instructional model in which AI tools function as supplements rather than substitutes for teacher feedback. Instructor-led discussions played a critical role in helping students interpret AI suggestions, evaluate their appropriateness, and apply them meaningfully within academic contexts. This finding aligns with Alhalangy and Abdalgane's (2023) recommendation that AI integration must be accompanied by pedagogical scaffolding and teacher training in the use of AI tools to ensure effective and ethical implementation.

Furthermore, concerns related to over-reliance and academic integrity highlight the need for guided implementation of generative AI tools. By positioning ChatGPT as a “writing coach” rather than a content generator, the study demonstrates a responsible pedagogical approach that encourages independent thinking while leveraging technological support.

Implications for EFL Writing Pedagogy

Taken together, the findings suggest that AI-powered writing tools can play a valuable role in EFL writing instruction when thoughtfully integrated into the curriculum. ChatGPT is particularly effective in supporting higher-order writing skills, promoting reflective practice, and enhancing learner engagement. However, foundational language accuracy and critical writing skills continue to require sustained teacher involvement. A balanced approach that combines AI-assisted feedback with instructor mediation offers the most pedagogically sound model for AI-enhanced EFL writing instruction.

The results align with previous research on AI-assisted learning. Earlier studies by Alotaibi and Alshehri (2023) and Zhai and Wibowo (2023) similarly demonstrated the effectiveness of AI tools like

Grammarly and Wordtune in enhancing writing proficiency through continuous, iterative feedback. Like ChatGPT, these tools have been shown to help students self-correct and diversify their writing style. Furthermore, the current study supports findings by Alhalangy and Abdalgane (2023), who highlighted the motivational benefits of AI tools in language learning, where students become more engaged and feel a sense of independence. However, existing literature and this research point to challenges, such as technical issues and the need for proper teacher training to use AI effectively.

One major concern addressed in the study is the risk of over-reliance on AI tools. Researchers like Alsalem (2024) and Jen & Salam (2024) have warned that excessive dependence on automated feedback could hinder the development of critical thinking and independent writing skills. This study found that while ChatGPT was effective in promoting fluency and clarity, it fell short in fostering higher-order writing skills such as argument development, critical evaluation of ideas, and organization of extended responses, highlighting the need for teacher-led feedback for deeper learning. Additionally, Jen & Salam (2024) and Zhai and Wibowo (2023) have noted AI's limitations in providing culturally and contextually relevant feedback. This issue was apparent in the current study, as teacher intervention was sometimes necessary to help students interpret and apply AI-generated feedback correctly.

The hybrid approach of combining AI and human instruction proved effective. While ChatGPT offered immediate and personalized suggestions, teachers provided deeper insights into the nuances of writing, addressing areas where AI feedback was insufficient. This supports Alhalangy and Abdalgane's (2023) recommendation for integrating AI with traditional teaching methods to leverage the strengths of both. This way, educators can mitigate AI's limitations, such as a lack of cultural awareness and the inability to give comprehensive feedback on argumentation and critical analysis.

To sum, the study highlights ChatGPT's potential to improve writing skills through personalized, iterative feedback, especially in structure and voice. However, the modest gains in grammar and spelling indicate that these areas still require traditional, focused instruction. The study also emphasizes the need for a differentiated approach, with additional teacher support for struggling students. Ultimately, the findings call for thoughtful integration of AI tools into the curriculum, balancing automated feedback with teacher guidance.

Conclusion

This study investigated the effectiveness of ChatGPT as an AI-powered writing coach in enhancing the writing skills of Saudi EFL university students over a five-week instructional intervention. The findings demonstrate that integrating AI-assisted feedback into writing instruction may lead to improvements in overall writing performance, particularly in higher-order writing components such as structure and voice. This is in line with previous research highlighting the potential of AI tools as support for idea organization, coherence, and expressive writing when used within a guided pedagogical framework.

While moderate improvement was observed in stylistic features, gains in grammar and spelling were limited, reflecting students' relatively strong baseline proficiency and underscoring the continued importance of explicit, instructor-led instruction for foundational language accuracy. AI-generated feedback alone, then, may not fully address all dimensions of EFL writing development, especially those requiring sustained practice and nuanced linguistic judgment.

Importantly, the study highlights the value of integrating AI tools with instructor guidance in writing

instruction. Instructor mediation played a critical role in helping students interpret AI suggestions, apply them appropriately, and maintain academic integrity. When positioned as a writing coach rather than a content generator, ChatGPT can support iterative learning, learner autonomy, and reflective engagement with writing tasks.

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