An Empirical Study on the Impact of Chatgpt on Writing Proficiency in Chinese EFL Learners

Yang Yang

International School, Guangzhou College of Commerce, Guangzhou, China

Abstract: This empirical study explores the impact of ChatGPT on writing proficiency among Chinese EFL learners. Using a qualitative case study approach, three Chinese undergraduate students participated in semi-structured interviews to provide in-depth insights into their experiences with ChatGPT. It addresses two research questions: First, the features of ChatGPT that contribute to improving writing proficiency include helping students think deeply, grammar and spelling check, vocabulary and expression, logical structure and paragraph organization. Second, the impact of ChatGPT on students' writing is significant, leading to better composition structure, more details and improved composition logic, as well as diverse word choice. The findings suggest that integrating ChatGPT into writing instruction can effectively enhance students' writing outcome.

1. Introduction

Writing proficiency is a necessity for young people to successfully participate in civic life and in the global economy because writing skill is basic requirement and predictor of academic and career success. Several challenges persist in the context of Chinese university students' English writing. This includes difficulties with vocabulary, grammar, syntax, and pragmatics [3,25,30]. Writing is often integrated into reading courses, leading to limited time and resources dedicated to developing writing skills [7,14, 23, 26,27].

In addition, the emphasis on passing standardized tests like the College English Test (CET) negatively impacts English writing education. These tests focus more on linguistic correctness than on the content and coherence of writing, leading students to prioritize grammatical accuracy over the richness of their writing [4,23]. Chinese students often produce incoherent and incohesive writing [22,30]. Common issues include logical inconsistencies, insufficient reasoning, and problems in organizing ideas coherently [20,21,22,30].

Aiming to solve above mentioned problems, Chinese Ministry of Education has implemented several policies to integrate technology into educational practices, emphasizing the importance of digital tools in enhancing teaching and learning processes. One of the pivotal documents in this regard is the "Education Modernization 2035" released in 2019. This plan outlines the strategic goals for the next two decades, highlighting the need for innovative teaching methods and the integration of digital technologies in education. Another significant policy is the "Education Informatization 2.0 Action Plan", which encourages the use of modern educational technologies to create interactive and engaging learning environments (Ministry of Education of the People's

Republic of China, 2018).

2. Origin of ChatGPT and its features

ChatGPT, Generative Pre-trained Transformer (GPT), initially released by OpenAI in 2018, is a type of Large Language Model (LLM) designed to replicate human language processing capabilities [5]. Utilizing deep learning techniques and extensive data sets, GPT performs tasks such as text generation, question answering, and translation while comprehending context to produce human-like responses [11]. The significant advancements continued with the release of the ChatGPT-3.5 model in November 2022 and the ChatGPT-4 model in March 2023, both of which have further refined the ability of these models to engage in coherent, contextually relevant conversations.

ChatGPT is renowned for its ability to understand and generate text that closely mimics human language[1,2,5]. This capability is driven by sophisticated algorithms and extensive training on diverse datasets, enabling it to handle a variety of language-related tasks with high accuracy [13]. Its ability to generate quizzes, flashcards, and even programming code explanations highlights its versatility [1,10,28]. By providing personalized feedback and adaptive learning resources, ChatGPT facilitates an interactive and engaging learning environment. This aligns with the constructivist theory of learning, which emphasizes active, student-centered learning experiences [17].

3. Rationale of integrating ChatGPT in English writing

Numerous studies show increasing interest in the potential that ChatGPT could enhance various aspects of English language learning, such as providing conversation practice, grammar and syntax correction, and writing feedback [18]. Kuhail et al. [18] explore specific applications of ChatGPT in language learning, emphasizing its benefits in creating interactive and engaging learning environments [24]. Their findings support the use of AI to enhance language acquisition through personalized and immediate feedback. In addition, ChatGPT can be used to create personalized learning materials, facilitate authentic language interaction, and provide immediate feedback, which are crucial for successful language acquisition [16,18]. Similarly, studies advocate for using ChatGPT as a tool to support teachers by providing supplementary materials and feedback, rather than replacing the human elements of teaching [8,12,28]. Practical applications of ChatGPT in the classroom have been conducted with positive outcome report from using the tool, such as increased student engagement and improved interaction [11,18].

ChatGPT has shown significant potential in enhancing the writing skills of EFL students through various mechanisms. One of the primary benefits is its ability to provide timely and adaptive feedback. By delivering instant feedback on writing tasks, ChatGPT addresses common errors in grammar, syntax, and style. A previous study confirms that this immediate feedback loop helps students recognize and correct their mistakes in real-time, which is crucial for language learning and improving writing proficiency [6,15].

In addition to feedback, ChatGPT serves as a dependable writing assistant. As a readily available tool, it helps students draft outlines, generate ideas, and structure their writing. Students could better organize their thoughts related to the writing prompt, thereby enhancing the overall quality of their writing. Moreover, ChatGPT can improve writing cohesion. By providing suggestions for better structuring essays and ensuring logical flow between ideas, ChatGPT assists students in producing well-organized and cohesive texts [5].

However, there is currently a paucity of research in integrating ChatGPT in English writing learning. This gap is even more pronounced when considering Chinese undergraduate students, a demographic for which there is a notable lack of empirical evidence on the usage and outcomes of ChatGPT in their English writing practices.

4. Research Questions

Research Question 2: What are the features of ChatGPT, if any, that contribute to the improvement of students' writing proficiency?

Research Question 2: What is the impact of ChatGPT on students' writing proficiency?

5. Research Design

The research methodology for this study is qualitative in nature, focusing on a case study approach. The study involves semi-structured interviews with three interviewees, which allows for a detailed and comprehensive understanding of the participants' experiences and perceptions, providing rich word data that can address the research questions [29].

Creswell [9] highlights that case studies are appropriate for research questions that seek to understand the 'how' and 'why' of a phenomenon, making it an ideal choice for investigating the detailed dynamics of ChatGPT's influence on writing proficiency and anxiety. Semi-structured interview is a suitable data collection method for this research because they provide a balance between structured and flexible questioning, allowing for in-depth exploration of participants' experiences [19].

The sample size for this study is relatively small, with a plan to select three students. In qualitative research, the emphasis is not on the number of participants but on the richness and depth of the data collected. Creswell [9] argues that qualitative research does not require large sample sizes because the goal is to explore phenomena in depth and detail. The sample for this study will be selected based on specific criteria to ensure relevance and depth in the data collected. The criteria include: second-year university students who have been using ChatGPT for at least six months and are currently enrolled in an English writing course. There will be no restrictions on the students' major, gender, or age.

The following table titled "Student interviewees and interview dates" provides a comprehensive overview of the key demographic and logistical details of three students who participated in interviews as part of a research study. Table 1 is structured into five columns: Student, Age, English learning Years, Interview Date, and Time Length. Each row corresponds to a different student, providing a detailed snapshot of their individual characteristics and interview specifics.

Table 1: Student interviewees and interview dates

Student	Age	English learning Years	Interview Date	Time Length
Feng	19	11	2024.1.13	25min
Jie	18	10	2024.1.10	30min
Yu	18	11	2024.1.15	23min

6. Data Analysis

The collected data will be analyzed using thematic analysis, which involves identifying, analyzing, and reporting patterns (themes) within the data. This method is suitable for exploring qualitative data in depth and allows for a nuanced understanding of students' experiences with ChatGPT.

Step 1: Coding. Initial coding will be conducted to categorize data related to the features of ChatGPT that contribute to writing improvement and changes in writing anxiety. This process involves systematically identifying and labeling segments of the data that are relevant to these aspects.

Step 2: Thematic Development. Themes will be developed from the coded data to answer the

research questions. This step focuses on grouping the initial codes into broader themes that capture the essence of ChatGPT's impact on writing proficiency and students' perceptions of changes in their writing anxiety. The identified themes will be refined and defined to ensure they accurately represent the data and provide meaningful insights into the research questions.

Step 3: Reviewing and Defining Themes. The developed themes will be reviewed to ensure they are coherent, consistent, and distinct. Any overlapping themes will be merged, and themes that do not have enough supporting data will be discarded. Each theme will be clearly defined, explaining what it captures and how it relates to the research questions.

Step 4: Reporting. Finally, the themes will be reported in a structured manner, illustrating how each theme addresses the research questions. This will include detailed descriptions of each theme, supported by relevant quotes from the interview data, to provide a comprehensive understanding of the findings.

7. Findings and Discussion

RQ 1: What are the features of ChatGPT, if any, that contributes to the improvement of students writing proficiency?

Think deeply

"My life mostly revolves around school, so my awareness of topics beyond academics is limited. This often leads to my essays having a simplistic tone, resembling those of an elementary school student. For instance, in a writing class this semester, the teacher assigned an essay topic on artificial intelligence: 'Discuss the potential benefits and risks of AI and provide examples of how AI is already changing our world.' When I first encountered this prompt, I felt completely lost! While I had heard of 'artificial intelligence,' I struggled to grasp its benefits for me and the potential risks it might pose. Fortunately, the teacher guided us to engage in a conversation with ChatGPT to quickly fill in my knowledge gaps. This marked the beginning of my dialogue with ChatGPT. It efficiently helped me understand what artificial intelligence is, its potential benefits as well as possible threats. Armed with this foundational knowledge, I was able to thoughtfully analyze and refine my perspectives on the pros and cons of artificial intelligence, then successfully completed the writing task!" (Student interview)

"ChatGPT's responses can encompass various perspectives, helping me develop multi-faceted thinking on a topic. Take the common essay topic of climate change, for example. ChatGPT can assist me in generating diverse viewpoints from dimensions such as science, politics, economics, etc. This helps me form a more comprehensive argument, adding depth to my essay." (Student interview)

Grammar and spelling check

ChatGPT can correct grammar and spelling mistakes in students' essays. "For instance, I often miss issues like subject-verb agreement, such as in the sentence 'A variety of options were available for the students to choose from.' ChatGPT helped me correct it to 'A variety of options was available for the students to choose from.' It explained the changes and the grammar rule, helping me understand and avoid similar mistakes in the future. ChatGPT is also good at catching small spelling errors that might be hard to notice. For example: 'I recieved an inviation to the event.' ChatGPT corrected it to: 'I received an invitation to the event.'". (Student interview)

Vocabulary and expression

My vocabulary is limited, and I struggle with accurate usage. ChatGPT helps me correct these misuse instances, and through its feedback, I gain a deeper understanding of the meaning and usage of words. For example, I once wrote: 'In order to succeed in the new environment, I needed to adopt to the changes.' I confused two closely spelled words, 'adapt' and 'adopt.' ChatGPT corrected it to: 'In order to succeed in the new environment, I needed to adapt to the changes.' and

explained that "adapt" means to adjust, while "adopt" means to take on or embrace. This feedback not only prevents inappropriate expressions due to vocabulary misuse but also helps me thoroughly learn to distinguish between these two words. Another example is: 'I want to do a journey.' ChatGPT suggested replacing 'do a journey' with a more suitable expression, such as: 'I want to take a trip.' This helps me master more authentic expressions.(Student interview)

Logical structure and paragraph organization

ChatGPT helps me assess the overall logical structure of the essay and provides feedback on paragraph organization, aiding me in constructing a better essay framework. For instance, when I expressed multiple points in one paragraph without clear transitions, ChatGPT suggested splitting them into separate paragraphs, each focusing on a single point, to enhance logical coherence. This feedback makes my essay structure more concise and reader friendly.

RQ 2: What is the impact of ChatGPT on students' writing proficiency?

Better composition structure

"I feel that my writing skills have significantly improved compared to before! Previously, when writing English essays, I would write a sentence as soon as I thought of it, without planning the overall composition structure or deciding in advance what the article would contain. I used to rely on scattered ideas that came to mind at the moment, writing whatever I thought of. Teachers often criticized my essays for having loose structures and deviating from the topic. However, this time, when writing, I designed the structure of the article in advance, considering the logical relationships between paragraphs and how to make the entire article more persuasive. I am more satisfied with myself now!" (Student interview)

More details and improved composition logic

One student wrote an essay on environmental protection where he vividly portrayed the urgency of environmental issues through real examples and rigorous logical reasoning. He provided a detailed description of a deforestation scene he witnessed, outlining the felled trees and the habitat loss for wildlife. Subsequently, he cited scientific research data to further demonstrate the severe threat environmental destruction poses to ecological balance. This ultimately deepened readers' understanding of the urgency and necessity of addressing environmental problems. (student work)

Diverse word choice

The diversification of language usage has become more apparent among students during the test. They employed a variety of sentence structures and vocabulary, showcasing the effectiveness of ChatGPT in cultivating a profound understanding and application of language over an extended period. Before the improvement in students' writing proficiency, they tended to use simple English sentences to express basic opinions and preferences. For example, a student's previous writing sentence was, "I like to play sports." However, as their writing proficiency advanced, they started incorporating sentence structures with clauses, such as, "Although I enjoy reading books, I often can't find time to read on weekdays." This change illustrates the enhancement of students' language proficiency, making it more diverse. (Student interview)

8. Conclusion

This study explored ChatGPT's impact on students' writing proficiency, focusing on planning and revision phases. ChatGPT aids in planning by helping students think deeply, generate ideas, and organize them coherently. During revision, it provides feedback on grammar, spelling, and structure, refining expressions and producing polished writing. Students reported enhanced creative thinking and improved essay coherence and readability. ChatGPT significantly improved composition structure, detail inclusion, and vocabulary diversity, leading to persuasive, coherent essays. It also encouraged complex sentence use and independent writing skills, showcasing better language use

and critical thinking, essential for academic and professional success.

Acknowledgements

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