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A Review of the Features and Efficacy of Chat-GPT AI Writing Assistant in Influencing EFL Learners' English Writing Skills

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Abstract. In today's digital age, the growing use of AI-driven tools in language acquisition, especially for English writing, calls for more investigation. Grasping the impact of advanced technologies such as Chatbot Generative Pre-trained Transformer (Chat-GPT) on the learning of English as a Foreign Language (EFL) is crucial for both educators and researchers. Consequently, the objective of this study is to investigate how Chat-GPT, in its role as an AI writing assistant, influences the writing abilities and performance of EFL students. Utilizing Constructivism theory, this research delves into the characteristics and effectiveness of Chat-GPT in improving the writing abilities, performance, motivation, engagement, self-regulation, and self-efficacy of EFL students in English writing. A review of existing literature indicates that Chat-GPT's attributes, such as smart tutoring, interactive tutoring, an investigative learning setting, and automated writing assessment systems, play a major role in enhancing students' writing abilities and creating a supportive educational atmosphere. Additionally, the research underscores the beneficial impact of Chat-GPT on the writing abilities of students. To sum up, the research highlights the significance of incorporating AI-driven tools such as Chat-GPT into language education methods and underscores the necessity for future studies to fully understand their role in improving the writing skills of EFL students.

Keywords: Chat-GPT; English writing; EFL learning.

1. Introduction

Under the current digital era, emerging AI-powered writing supportive technologies, typically leading-edge Chatbot Generative Pre-trained Transformer (Chat-GPT), have been found to affect the English writing performance and skills of English as a foreign language (EFL) learners [1]. Given the extensive adoption of writing assistant technologies in English language acquisition, particularly in writing, investigating how these AI tools impact the writing skills and tactics of EFL students is vital. However, due to the novelty of AI writing supportive technologies combined with language acquisition, literature and experiments in this field are still relatively limited, and the systematic research framework remains underdeveloped [2]. Previous literature reviews mainly focused on people's perceptions of Chat-GPT and predicted its future development [3,4]. Experiments primarily used comparative or qualitative research methods to assess Chat-GPT's overall efficacy in student's English writing and learning, few with emphasis on systematically summarizing the concerned features of Chat-GPT and its potential positive and negative impacts on EFL learners' English writing skills and learning strategies, let alone analyzing the underlying mechanisms behind [4-6].

Therefore, this review paper, based on constructivism theory, aims to investigate the following two questions:

1) What main systems does Chat-GPT offer in assisting EFL learners with their English writing skills?

2) How does Chat-GPT affect EFL learning through variables including English writing skills and proficiency, motivation and engagement, and self-regulation and self-efficacy?

In the subsequent sections, a detailed analysis of these research questions will be conducted, incorporating recent literature and experimental data, to provide insights and suggestions on this research topic.

2. Theoretical Framework: Constructivism

Constructivism finds its roots in the philosophical inquiries of thinkers such as Socrates, through whose dialectical method, emphasized the importance of active inquiry and critical thinking in knowledge construction. The term is said to be most probably derived from Piaget's and Bruner's description of 'constructivist' as 'discovery learning' [7]. According to Piaget's theory of personal and cognitive constructivism, learners form their worldview through cognitive mechanisms like assimilation and accommodation [8]. Conversely, Vygotsky's theory of social constructivism emphasized the importance of social engagement and cultural backdrop in cognitive growth [9]. Constructivists, through the lens of these two primary branches, argue that learning is rooted in a person's own experiences and cultural backdrop, focusing on developing proactive learning skills and utilizing knowledge to address practical issues [10].

Constructivism theory suggests that in the realm of English as a Foreign Language (EFL) education and writing, aided by AI assistants such as Chat-GPT, students not only partake in personal exploration and discovery but also gain from joint learning experiences and feedback interactions [7]. Furthermore, Constructivism theory links to crucial educational elements like involvement, drive, self-control, and individualized learning in the realm of AI-aided language learning [6]. Constructivism underscores the importance of learners' involvement, drive, and independence in the educational journey by stressing their active participation in creating knowledge. Chat-GPT's capacity to enhance engagement, independent learning, genuine language use, and cooperative learning aligns with the principles of Constructivism theory. Thus, adopting a constructivist perspective allows for a comprehensive investigation of how Chat-GPT facilitates learners' language learning experiences and proficiency development.

3. Concerned Features of Chat-GPT

Chat-GPT, a cutting-edge chatbot created by OpenAI, employs sophisticated algorithms to produce text and natural language generation (NLG) tasks akin to humans with great precision [11]. Initially introduced at the close of 2022, it utilized an extensive language model and continued to evolve through machine learning, natural language processing, and reinforcement methods.

In the context of AI research in education and learning (AIED), Park and Park initially pinpointed seven characteristics of AI-driven technologies as educational instruments [12]. Expanding upon this, Kim and colleagues, and Alharbi additionally mention that Chat-GPT, a tool for language acquisition, includes features like an Intelligent Tutoring System (ITS), Dialogue-based Tutoring System (DBTS), Exploratory Learning Environment (ELE), and Automated Writing Evaluation (AWE) within its seven attributes [2,13].

3.1. ITS

Nwana originally defined ITS as computer programs that utilize AI techniques to offer personalized instruction tailored to the subject matter, the learner, and the optimal teaching approach [14]. Although not primarily targeting educational purposes, Chat-GPT, as a Large Language Model (LLM) with natural language processing capabilities, can dynamically generate educational content such as English writing materials and ideas, ensuring personalized and comprehensive learning experiences for online EFL learners through personalized questioning and interaction. This advanced system indeed aligns with the concept of ITS, both advocating for intelligent student-centered tailored learning support [15].

3.2. DBTS

Holmes and Tuomi claim that DBTS facilitates interactive conversations, often text-based, between a tutor and a student [16]. Similarly, these AI-powered systems including Chat-GPT also employ a Socratic tutoring approach, guiding students through questioning to foster deep understanding and independent problem-solving. Kaiquan et al. also approve the use of DBTS systems in conjunction

with AI technologies like Chat-GPT to assist language learners. These AI-powered text generation tools leverage their vast databases and learning resources to help students integrate and master study materials [17]. With their superior adaptability, timely feedback, learning plan adjustments, high information retrieval efficiency, and personalized learning environment, these AI-powered tools, especially Chat-GPT, elevate the level of AI-powered DBTS dialogue-based instruction.

3.3. ELE

Unlike the step-guided learning support offered by ITS and DBTS systems, ELE motivates students to proactively build their knowledge through the exploration and alteration of various aspects of the educational setting. This approach stimulates students' interest in autonomous learning and enhances their self-motivation [18]. However, some opposing scholars argue that ELE requires students to discover knowledge principles and construct knowledge frameworks on their own, lacking systematic guidance and correct cognitional sequences [19]. Consequently, this approach may result in low learning efficiency, questionable knowledge quality, cognitive overload, or poor learning outcomes. Nevertheless, AI-powered supportive systems like Chat-GPT have changed the game by integrating ELE with other features and systems, such as ITS and DBTS that customize personalized learning plans and provide numerous helpful self-learning materials, as well as AWE offering automatic evaluation and correction. Experimental evidence shows that integrating various educational technologies, both exploratory and structured, enhances students' exploratory learning [20].

3.4. AWE

AWE systems provide immediate online scoring, suggestions, and corrective feedback (CF) regarding students' writing grammar, sentence structure, spelling, and word choice [13]. Scholars have expressed concerns about the accuracy of grading and feedback provided by systems like Chat-GPT with embedded AWE functionality compared to human teachers [21]. However, experiments have demonstrated the effectiveness of Chat-GPT's AWE system, suggesting that it may address the unreliability issues associated with human teacher ratings, such as fatigue, subjectivity, and inconsistency [22].

4. Impact of Chat-GPT on EFL English Writing Skills and Performances

4.1. Writing Skills and Proficiency

Proficiency in writing is defined as the skill to converse proficiently using written language. This includes a range of abilities and insights, such as an understanding of social and rhetorical aspects, domain-specific knowledge and conceptual tactics, along with language application and norms throughout the writing phase. English written language proficiency is often assessed in terms of structure, grammar, and mechanics, with a focus on identifying persistent errors and providing improvement solutions [23].

Chat-GPT's integrated AWE system delivers instantaneous insights into grammar and sentence formation, along with advice on selecting vocabulary and sentences, thereby boosting the efficiency, accuracy, quality, and lexical diversity of EFL learners' writing. By absorbing these suggestions and knowledge, EFL learners can further improve their writing skills and proficiency. Research indicates that AWE is effective in enhancing writing skills and proficiency, with earlier usage showing more pronounced effects [24]. However, due to the immaturity of artificial intelligence technology in fully understanding and applying the complexity and richness of human language, context, and pragmatics, the assistance provided by AWE systems for advanced writing skills such as organization, coherence, and argumentation is relatively limited [24]. Additionally, experimental researchers criticize and oppose the autonomous application of AWE systems by learners in aiding English writing, advocating that these tools, apart from proofreading, do not enhance their writing skills or develop their second language proficiency, with few students engaging in memorizing, let alone cognitive processing after using these tools, and little evidence of learning transfer is shown across tasks [25, 26]. Hence, the

use of Chat-GPT should be accompanied by guidance and supervision from teachers or appropriate learning directives to achieve effective learning outcomes.

4.2. Learning Motivation and Engagement

The concept of learning motivation encompasses the eagerness, aspiration, and willingness of people to participate in educational pursuits and achieve academic objectives. This includes internal elements like individual interest and inquisitiveness, along with external aspects like external incentives or acknowledgment [27]. When students feel a sense of autonomy or control over their learning process, perceive themselves as competent in the tasks they undertake, and have a sense of connection or belongingness to the learning environment, their motivation to engage in learning activities is enhanced. Enhancement of students' learning motivation may be one of the mechanisms through which Chat-GPT facilitates the improvement of EFL learners' English writing skills. Research suggests that an increase in motivation is positively correlated with improvements in learners' writing abilities and performance [28]. Therefore, by ITS, DBTS, and ELE systems providing personalized feedback, generating engaging study materials, and fostering an immersive and interactive self-learning environment, Chat-GPT can contribute to enhancing students' learning motivation and ultimately improving their English writing skills.

Hatmanto and Sari qualitatively interviewed 10 university teachers who taught technology-integrated lectures in the School of English Education [29]. According to the study, Chat-GPT's ITS, DBTS, and ELE systems containing strategies like virtual Socratic dialogues, simulated learning discourse, and interactive narrative creation, can significantly improve students' learning motivation and engagement. Silitonga et al. illustrated that compared to traditional English writing classes, students receive more timely, adaptive, and targeted feedback through applying Chat-GPT [30]. The use of Chat-GPT can enhance students' positive learning emotions, increase their active participation, and significantly improve their learning motivation. Ali et al. also conducted quantitative research with 80 students and teachers [27]. The result demonstrates that Chat-GPT generally encourages learners to develop English writing skills with all types of motivational factors from autonomy, intrinsic to extrinsic witnessing positive effects in data analysis. Despite the influence of involving Chat-GPT in English writing learning, the study also indicates that many other factors, especially the proficiency of learners, may also have a strong correlation with motivation. Therefore, the diversification of control groups and more concerned variables should be considered in subsequent studies. For instance, with experiments evaluating AWE system's impact on students' English learning motivation, Palermo, Wilso, Grimes, and Warschauer argue that when considering the effectiveness of AWE systems, student-related variables such as personal characteristics, proficiency level, perception of usefulness and effectiveness, and attitudes toward the AWE system significantly influence experimental data and thus should be taken into account [31,32]. Students' individual traits, language proficiency, and their level of trust in the learning tool largely determine whether they effectively utilize the AWE tool and to what extent.

4.3. Self-regulated Learning and Self-efficacy

Self-regulated learning denotes the method by which people actively regulate, control, and monitor their learning actions, strategies, and motivations. It involves setting goals, planning, monitoring progress, and adapting strategies based on feedback to achieve desired educational results. Self-efficacy refers to individuals' beliefs in their capabilities to execute tasks, exert effort, and overcome challenges to achieve academic success. Self-regulated learning and self-efficacy can be fostered through metacognitive awareness, goal setting, self-reflection, self-monitoring, and self-motivation. Studies suggest that self-regulated learning and self-efficacy also positively correlate with learners' writing abilities and performance [28].

Through a comparative experiment, Liu et al. state that an AI-supported English writing study approach with AWE systems can significantly improve EFL learners' English writing skills and performance [33]. Accordingly, students' self-efficacy and self-regulated learning enhanced as well.

Their research data demonstrate that integrating AI-powered AWE systems for real-time automatic feedback promotes students' self-reflective thinking, reduces their cognitive load, and consequently enhances their learning strategies, self-efficacy, and learning autonomy. Nonetheless, as discussed earlier, students should first be trained to have independent reflection awareness and metacognitive learning strategies before using Chat-GPT. Merely relying on short-term memory of feedback, new vocabulary, and correct sentence structures provided by AWE systems will not sustainably enhance students' English writing abilities, linguistic diversity, language knowledge, and learning strategies.

Based on Vygotsky's hypothesis that the social and cultural contexts of learners shape their language learning experiences, Wei et al. believe that people with lesser skill levels might experience restricted exposure to the target language and culture, potentially limiting their chances of learning the language [34]. For EFL learners with lower proficiency, a limited language knowledge system may hinder students from fully processing feedback provided by Chat-GPT, thereby preventing them from utilizing the suggestions and knowledge for further review and application [35]. As a result, the positive effects of self-learning tools like Chat-GPT may be more pronounced among high-proficiency EFL learners. High-proficiency EFL learners tend to possess better language comprehension skills, a more comprehensive knowledge base, and learning strategies that are better suited to their study paces and needs. Their stronger self-regulated learning strategies and better performance-induced self-efficacy contribute to a positive feedback loop in their learning process involving in Chat-GPT.

However, some researchers argue that self-learning tools like Chat-GPT and AWE systems have a more pronounced impact on low-proficiency EFL learners [36]. This is because features such as AWE primarily assist learners with fundamental language skills and error correction. Advanced writing skills such as coherence, logic, and the ability to generate novel and compelling arguments require long-term and structured training. Therefore, improvements targeting basic language knowledge and writing structures are more evident in learners with lower proficiency levels.

After all, it is worth noting that regardless of the level of learners, when using Chat-GPT to assist in English writing, especially in seeking inspiration or generating ideas with its ITS, DTBS, and ELE systems, it is important to approach it with students' own critical thinking and individual reflection. Due to its vast database, the resources of Chat-GPT have been repeatedly questioned for their source validity and information accuracy. Misusing this intelligent tool arbitrarily may instead inhibit learners' learning and writing abilities, leading them to ethical issues such as plagiarism and undermining the outcomes of writing.

5. Conclusion

Above all, studies indicate that with intelligent features including ITS, DBTS, ELE, and AWE, Chat-GPT can positively influence EFL learners' English writing skills by improving learners' writing skills and proficiency, learning motivation and engagement, and self-regulation and self-efficacy. For students' writing skills and proficiency, research suggests that Chat-GPT, particularly its AWE system, can enhance learners' writing efficiency, accuracy, quality, and lexical diversity. However, its impact on students' English proficiency remains debated, as cognitive processing may not fully engage after receiving suggestions from Chat-GPT. For students' motivation and engagement, statistics indicate that the ITS, DBTS, and ELE systems contribute to increasing students' motivation and engagement. However, future experiments should consider more the effect of variables such as students' original proficiency, characteristics, and acceptance of Chat-GPT. Finally, for students' self-regulation and self-efficacy, studies show that integrating Chat-GPT does enhance students' self-reflective thinking and learning performance, with a positive effect on self-regulation and self-efficacy. However, low- and high-proficiency learners benefit differently in self-regulation and self-efficacy levels. What's more, learners need training in metacognitive strategies to fully benefit from using Chat-GPT, for critical thinking is essential to avoid misuse and ethical issues. The study

findings wish to enable readers to have a deeper understanding of how Chat can help English writing learning and inspire future studies to explore more comprehensive experiments in this field.

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