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# APPLICATION OF AI WRITING ASSISTANT SOFTWARE IN EFL WRITING IN CHINA: A REVIEW

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### Abstract:

Technological innovations and the need for mastery of the English language in China have contributed to the introduction of Artificial Intelligence (henceforth AI) in teaching and learning the English language. The rationality behind this article is the need to understand and optimize the acquisition and the teaching of English writing skill among China EFL students and teachers. The purpose of this review is two fold. First, author wanted to explore the features, benefits and challenges of AI utilized in teaching and learning English language. Next, this review also sought to explore the strength and limitations of AI-based writing assistant software. To do this, as systematic review was conducted concerning the application and research of AI in language education have been reviewed to investigate the varying contributions that AI has had in the teaching and learning of English language writing. Using Scopus database, a total of 84 peer-reviewed papers were identified and 21 were analyzed. It further analyses sites such as Pigai.org, Iwrite, and other valuable software to assist in determining the required results. An in-depth analysis and evaluation of the use of AI in the teaching of English writing skill seems to suggest that the use of automated writing evaluation (henceforth AWE) or automated essay scoring (henceforth AES) has greatly facilitated the tasks of English writing skill acquisition, the identification of the areas of improvement that need to be focused on in the process of student's writing, as well as issues and challenges related to the use of online resources at colleges and universities in China to enable the teaching and learning of the English language, particularly writing skill to be executed more effectively.

**Keywords:**

Artificial Intelligence, Writing, Teaching, Learning, English As Foreign Language.

**Introduction**

The evolution of English teaching in China has underscored the imperative of integrating technology to enhance the effectiveness of language instruction, assessment, and acquisition. China stands out as a nation that duly acknowledges the significance of technological innovations across various sectors, with a particular emphasis on education. Academic writing in English has been complex and difficult task especially for non-native students. This is more prevalent with English as Foreign language (EFL) teaching and learning (Hanauer, 2019). English writing can be challenging process for EFL writers who often faces language barriers.

The integration of technology, notably artificial intelligence (AI), has not only become prevalent but has also garnered appreciation within society. AI is popularly known as an automated device which help human to perform certain designated tasks (Nazari, Shabbir & Setiawan, 2021). In this sense, with the emergence of AI, new writing application were developed which provides flexible and time-saving options for the users. As argued by Nazari, Shabbir and Setiawan (2021), AI aid the teaching and learning process in term of assessment, tutoring and feedback for both educators and students.

Teachers and students alike perceive the integration of technology into English instruction as an exemplary initiative, citing its capacity to facilitate ease, effectiveness, efficiency, and enhanced mastery of language content. The recent advancement in technology especially AI-powered writing tools have emerged to support users in English writing processes (Hou, 2020). The adoption of AI software, such as iwrite, Pigai.org, and other systems like automated writing evaluation (AWE) or automated essay scoring (AES), has ushered in promising changes in the landscape of teaching and learning English as a foreign language in China's education system.

The use of AI as a writing tool in EFL classrooms are increasing rapidly. According to Jeanjaroonsri (2023), AI tools or software are easy to use, more effective, time saving and save efforts as well. AI tools are well known to be utilized by ELF students with low English proficiency (Marzuki, 2023). Recently, there is a growing number of research publication on how students utilizing AI in their learning process especially involving language. In this sense, some research suggest that utilizing AI empower students in their writing skills (Wang, 2022; Zhao, 2022). Meanwhile, some scholars raised their concern over the AI's side effects (Qadir, 2022; Lund & Wang, 2022). Thus, this paper serves as a comprehensive review of the application of AI Writing Assistant Software in EFL Writing in the Chinese education system. The purpose of this study is to explore the features, benefits and challenges of AI utilized in teaching and learning English language. Next, this review also sought to explore the strength and limitations of AI-based writing assistant software.

## Literature Review

### *The Teaching of EFL Writing in China*

In China, the teaching of English writing in Chinese EFL classrooms has been influenced by three prominent teaching approaches, which include the product approach, the process approach, and the genre approach. In the product approach, the focus is on the final written product, and it emphasizes teaching students how to produce well-written texts (Guan, 2015). This approach involves teaching specific writing techniques, vocabulary, grammar rules, and often utilizes model texts as examples (Guan, 2015). Some of the benefits generated by this approach are that it provides guidelines and systematic instruction, enabling learners to develop writing skills through the analysis and imitation of model texts. Hence, it is claimed that this approach assists in building students' confidence and motivation by facilitating the successful completion of writing tasks (Guan, 2015). However, the disadvantages of the product approach are that it focuses too much on the writing results, and the writing process seems to be a mechanical imitation process, leading to the suppression of students' creativity and a loss of their interest in English writing.

Another approach that has influenced the teaching of English writing in Chinese EFL classrooms is the process approach, a method of teaching writing that allows teachers and students to go through the process of producing a text together. The process of writing includes 6 stages: pre-writing, planning, drafting, revising, editing, and publishing (Sun, 2009). The benefits of this approach are, that it encourages critical thinking, self-expression, and autonomy by involving students in the writing process (Xu, 2018). And eventually, this approach may promote ownership and meaningful engagement with the written text (Sun, 2009). However, the process approach has its own weaknesses. The process approach can be time-consuming and may require ample time to complete its different stages, involving the production of multiple drafts and delayed attention to editing and completing the final written product. However, despite these challenges, the process approach has been found to significantly improve students' writing skills (Xu, 2018).

The genre approach, yet another teaching writing approach, has been employed in the teaching of English writing in China to help students familiarize themselves with the writing framework of different genres and use the knowledge gained to develop their writing skills. Genre-based instruction provides explicit guidance on the distinctive features of a particular genre, enabling students to learn academic writing through systematic modeling and instruction (Yang, 2016). However, there are also some disadvantages to the genre approach. Critics argue that it imposes rigid writing forms on students, potentially constraining their writing voice, discursive diversity, and creativity (Wang, 2016). Furthermore, genre pedagogy has been criticized for reinforcing the norm of authorized power in academic writing and instructing static textual features (Yang, 2016).

These three writing approaches have each played an important role and benefited the teaching of English writing in Chinese EFL classrooms, albeit in their own unique way. With the cumulative theoretical and pedagogical knowledge and skills gathered over the years, coupled with the relatively current introduction of AI assistive writing software in the teaching of English writing in China, EFL teachers and students would indeed benefit from this development.

### ***AI Writing Assistant Software in the teaching of English writing in China***

The relatively recent development in technology has given rise to the use of AI in the teaching of writing English in China (Jiang, 2022). The use of automated writing evaluation (AWE) or automated essay scoring (AES) systems has allowed teachers and students to facilitate the teaching of English writing and the acquisition of English writing skills (Yan, 2023). This system evaluates writing styles, identifies errors in writing, suggests the needed interventions, and offers solutions to errors in a bid to ensure polished English. The system works in both low and high stakes standardized testing, leading to its importance as far as English teaching is concerned. The significance of writing and the costs and demands due to the time and knowledge needed to produce quality English writing have given rise to the need for the use of AI-assisted writing software to improve written products (Gayed et al., 2022).

Intelimetric is one of the artificial intelligence-based essay scoring systems that offers facilitation features for producing a more enhanced English writing experience for English EFL students. This scoring system can grade questions like open-ended essays and may be used in either classroom or standardized assessments (Gayed et al., 2022). Intelimetric is equipped with a lesson mode that allows students to revise and edit text (Yan, 2023). This mode also issues students feedback on their academic performance. It further offers detailed diagnostic feedback to students at the sentence level, such as grammar, usage, spelling, and writing conventions (Jiang, 2022). This is usually the case when running in standardized evaluation mode, as it provides an overall score of the student's written submission and, if applicable, general feedback on text dimensions.

Another system is the E-rater, which is based on a combination of artificial intelligence and Natural Language Processing, specifically for student analytics (Eckstein et al., 2023). It allows the identification of characteristics such as word usage and grammar concerning students' writing skills to ensure an accurate rating and the provision of the required feedback. Students can apply this system to analyze their writing styles and produced texts, and teachers can apply it to enable the identification of the areas of improvement that can help improve writing processes and written products (Su, 2023). The automatic scores for grammar, language usage, style, organization, and essays afford proper feedback to students and offer the needed assistance, which is mainly possible through the application of E-rater (Nazari et al., 2021). It concentrates on Latent Semantic Analysis by applying machine learning technology to expose students to the means to produce quality English writing based on the shared knowledge of trained human graders (Eckstein et al., 2023). The process of collecting representative writing samples from students, evaluating, and extracting features from a sample that measure aspects of students' writing, and studying the relationship between performance and outcomes assists in learning and understanding how humans create scores (Jiang, 2022). This system not only focuses on dimensions such as accuracy, writing control, and structural organization, but it also pays attention to ideological content. In addition, it can also function as a total scoring system and as a formative tool to provide review exercises to improve the test, writing skills, and student skills (Su, 2023).

Pigai.org is another artificial intelligence-based writing assistant software. It is developed specifically for Chinese EFL students, leading to improved concentration on the learning of English as a second language (Hockly, 2023). The collection of a large corpus of standard English, students' English essays, and other English textbooks contribute to the calibration of this system. Pigai creates an overall score for an essay and computes quantitative differences

from texts in its corpus in four dimensions. It derives its relevance from vocabulary, sentence structure, grammatical accuracy, and content (Yan, 2023). Pigai does more than just provide corrective feedback; it also affords an overall rating, ranking, top and bottom scores, and closing comments (Alharbi, 2023). Students can, therefore, revise their drafts based on the feedback information given to make further improvements to their essays, and the system will re-evaluate their drafts upon re-submission. The process can be iterative, and the teacher can see how much effort the students put into their writings by the number of times they revise their work (Hockly, 2023). This process allows teachers to focus on students who require proper assistance by engaging in the proper monitoring of the learning of both individuals and the entire class.

The application of automated writing evaluation tools that provide automated writing corrective feedback, like AI-powered machine translators and GPT-3 automatic text generators, are some of the tools that have assisted in the exposure of students to the pedagogical content as far as the English language is concerned (Alharbi, 2023). Even though the application of these tools is rather tedious and time-consuming, teachers prefer them because their advantages outweigh their limitations. The use of the AWE system with contextual implementation can significantly improve the quality of students' writing. Most students, however, use the tools only for proofreading, with little or no cognitive processing, rather than to improve their writing skills or aid in second language development. This situation has exposed the entire education sector to the advantages of automated writing evaluation tools in learning English (Alharbi, 2023). The improved perception of these tools in the teaching and learning of English as a foreign language triggers teachers' interest and curiosity to explore the tools.



**Figure 1: Different Apps and Software Acting as AI Tools Used in Teaching and Learning the English Language in China (Ma & Mendez, 2023).**

The Figure 1 above shows diagram of the various English language learning sites that English language students in China may use to learn the English language and learn to improve their writing skills. The sites include Duolingo, MOMO Vocabulary, iwrite, italki, word, cheese pie,

pigai.org, e-rater, and iTests are among the AI tools that have been tested and proven to be effective, hence their continued and increased use in teaching and learning the English language in China. Some of the above-mentioned apps help to learn language with visual and games (Duolingo), comprehensive learning materials (Keke English, Lanren English), preparation for English examination (Baicizhan, Kaomanfen), vocabulary database (Shanbei Vocabulary, MOMO Vocabulary), and learning community to chat (HelloTalk), one-to-one online lessons (iTalki). These apps enable people from different age of groups to utilize them and enhance their English proficiency in term of speaking, reading and writings as well.

The literature review of AI assistance writing tools in English language in China can be summarized as in Table 1 below:

**Table 1: Summary of Literature Review of AI Software Tools in English Language in China**

Authors	Year	Context	Findings
Guan	2015	English Writing Instruction	Benefits and challenges
Yang	2016	Learner interaction with, and response to AI	Genre approach writing
Wang	2016	AI-based tools and their impact	Genre approach writing
Xu	2018	Teaching academic writing	Benefits and challenges of process approach
Nazari et al.	2021	AI writing assistant in higher education	AI provide feedback to improve writings for students
Jiang	2022	AI empower EFL teaching and learning	AI act as feedback tool for writings
Gayed et al.	2022	AI writing assistance and Learners	AI improve English writings
Yan	2023	ChatGPT and English Writings	automated writing evaluation facilitate English writings
Eckstein et al.	2023	Written Feedback	AI improve students writing skills
Su	2023	Peer Feedback and AI	AI impacts students' writings skills
Hockly	2023	AI in English Language Teaching	AI improve students writing skills

Alharbi	2023	Strengths and limitations of AI-based writing assistant software	AI improve students writing skills
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## Methods

To find relevant literature for this study, the Scopus research database was used for the literature search. The reason why Scopus was chosen over other scholarly databases was that it is considered the largest and most comprehensive database for peer-reviewed abstract and citation literature. Based on relevant AI-powered writing assistance literature identified a number of search keywords (Table 1). The Scopus search produced a preliminary unfiltered datasets of 109 research papers (last retrieved July 2023). To make sure that all the retrieved studies were relevant to this study, a further filtering to find relevant literature for this study, the Scopus research database was used for the literature search. The reason why Scopus was chosen over other scholarly databases was that it is considered the largest and most comprehensive database for peer-reviewed abstract and citation literature (Bass et al., 2020). Based on relevant AI-powered writing assistance literature, few number of search keywords such as “artificial intelligence”, “AI”, “artificial intelligent writing assistance tools” or “artificial intelligent writing assistance technologies” and “EFL classroom”.

To narrow down the collection of studies and only include the most recent ones, papers published between 2015 and 2023 which included in the selection. This process was important for the validity of this study for three reasons. Hence, any studies published before 2015 would be irrelevant and consequently were excluded from the datasets. Lastly, the screening process started with 84 studies and ended with 21 papers.

## Results And Discussions

The introduction of AI Assistant Writing Software has indeed contributed largely positively to the teaching and learning of English in China. In spite of this, however, there are a number of challenges that need to be considered and deliberated upon when implementing novel initiatives like AI-based applications on a large scale.

### *Features of AI Writing Assistant Software to Assist Teachers to Teach English Writing Skills*

Several features of AI writing assistants make it convenient for teaching English writing among Chinese EFL students. The focus on their technical aspect is their forte. The specification of Pigai.org has led to an understanding of several features and their importance in teaching English writing skill (Lu, 2019). This software was developed specifically for Chinese EFL students, leading to an improved experience in learning English. One of its features is that it allows the application of a large corpus of standard English to students’ English essays and other English textbooks, which in turn contributes to the calibration of this system (Chen, 2023). Pigai creates an overall score for an essay and computes quantitative differences from texts in its corpus in four dimensions (Wang, 2022), namely, vocabulary, sentence structure, grammatical accuracy, and content. Pigai does more than just provide corrective feedback. It can also provide an overall rating, ranking, top and bottom scores, and closing comments. Students can therefore revise their drafts based on the given feedback information to make further improvements, and the system will re-evaluate their drafts upon re-submission (Jian, 2022). The process can be iterative, and the teacher can see how much effort students put into

writing by the number of times they revise their work. This process allows teachers to focus on students who require proper assistance by monitoring both individuals and the entire class in the learning and understanding of English writing techniques (Liu, 2021).

The other feature is its cloud service infrastructure and big data analysis. This characteristic enables the software to collect and store a large amount of data on English assessment, which in turn contributes to the collection of a large amount of data, including various samples of text (Li & Yan, 2020). Teachers can access and learn from these data to enhance their understanding of textual organizational features that are useful for pedagogical processes. In addition, it has a proofreading feature (Cai, 2020) that allows teachers to check through given texts before using them in teaching English, which may more likely lead to improved learning (Li & Yan, 2020).

Furthermore, AI software is equipped with natural language interpretation, speech generation, translation, and dialogue management functions. This allows teachers to concentrate on the appropriate formats that they can apply in their teaching process (Jackson, 2019). These capabilities come with a function that can reveal the needed interventions as far as clarity is concerned. It is further vital to note that the continued attention to creating a seamless approach highlights these features to create an opportunity to optimize learning. Features such as clarity and consciousness, tone suggestion, clarity suggestion, and their integration with multiple platforms expose teachers to the presentation of the learning resources to students more effectively (Tsai, 2019). The whole summary of review for features of AI assistant in teaching English writing skills are shown in Table 2 below:

**Table 2: Summary of Literature Review of Features of AI Writing Assistant Software to Assist Teachers to Teach English Writing Skills**

Authors/Year	Aim of Study	Method	Findings
Lu, 2019	Usage of automated writing evaluation (AWE)	Mixed method – teachers & students	Improved experience in learning English among students
Tsai, 2019	Impact on extemporaneous English-language first drafts by using Google Translate (GT)	Quantitative – students	Aid in English teaching and presentations
Jackson, 2019	Individual Differences in EFL Learners	Quantitative	Aid in English teaching process
Cai, 2020	Application of hybrid education model in English writing teaching	Experimental students	Features to improve teaching materials
Li & Yan, 2020	To study the effect of Pigai.org	Mixed method - sophomores of English major students	Aid in improved teaching and learning



Wang, 2022	To explore students' expectations and perceived effectiveness of computer-assisted review tools.	Mixed method - observation method, semi-structured interview method and questionnaire survey method.	High expectations for the computer-assisted evaluation tools, and the effectiveness of computer scoring feedback on students was higher than that of teacher scoring feedback.
Jiang, 2022	To explore the EFL context by summarizing and delineating six dominant forms of AI application	Literature review	There is paucity of research on applying AI in the EFL context, and challenges from technical and teachers' perspectives
Chen, 2023	ChatGPT usage in scientific writing	Review paper	Improve learning experience
Liu, 2021	To explore reflective thinking promotion mechanism-based AI-supported English writing (RTP-AIEW) approach	Quasi-experiment - 2 EFL writing classes in a university	Significantly improved students' English writing performance, their self-efficacy and self-regulated learning, and significantly reduced their cognitive load.

### ***Benefits of AI Assistant Writing Software for Students***

As a result of using Pigai-org, users report increased self-assurance and competence in English writing. Students can use the tool's score on their essays and the suggested modifications made by the program to enhance their writing skills (Yan, 2019). The program generates an overall score for an essay and computes quantitative differences from texts in its corpus. Students have come to realize that AI-powered machine translation tools, GPT-3 automatic text generators, and other forms of automatic writing assessment provide valuable resources and corrections when used in writing services (Alharbi, 2023). Students gain confidence in their writing abilities as they apply these techniques and are exposed to new grading styles and trends. These factors present an opportunity for improved focus on what really works in English as a foreign language.

iWrite simplifies the writing process as it offers additional resources for mastering the English language (Wu, 2020). Students can gain insight into their own writing's organizational framework and technical requirements by using iWrite. Grammar, sentence structure, sentence building, connections, and the composition of many literary components can all be accounted

for by this tool (Li & Xiao, 2020). In terms of maintaining a concentrated effort on writing, these features present an opportunity for creating greater clarity. The tool also improves the efficiency of grading and feedback delivery, which in turn encourages student independence (Zhang, 2021). Once students receive constructive feedback on their writings, they can make the necessary adjustments to their work. With this opportunity, EFL students can hone their craft in writing.

The advent of AI-powered writing software has given students even more access to materials and explanations that can help them achieve a better command of the English language. According to Guo (2020), mistakes in the students' writing are significantly reduced as they develop a better grasp of the English language. Since the software provides accurate responses to their written products, students are able to participate in the learning process, which in turn improves their chances of having success with the intricacies of the English language (Xiaoyan & Hicks, 2022). The AI-powered writing software has increased their comprehension of grammatical concepts and also enabled students to fix their own grammatical problems.

When students have access to resources like Grammarly, they are better able to identify their own areas of weakness when writing in English and implement strategies to improve them (Hou, 2020). The key to mastering grammar and English writing is having a firm grasp on the areas where corrections are necessary and where problems arise. Predicting mistakes made by students while learning English is made easier with the use of artificial intelligence's CNN and LSTM algorithms (Jian, 2022). This demonstrates that students can utilize AI-powered editing and proofreading tools to improve the quality of their written work. With this aid, students can focus less on grammar and more on the substance and reasoning behind complex concepts in College English (Jian, 2022). This would place students in a position to gain a greater understanding and mastery of these concepts. The whole summary of review for benefits of AI assistant software for students are shown in Table 3 below:

**Table 3: Summary of Literature Review of Benefits of AI Writing Assistant Software for Students**

Authors/Year	Aim of Study	Method	Findings
Yan, 2019	To evaluate an intelligent online English writing correction system known as Pigai	Quantitative	Improved learners' second language writing skills and language competence, but partially; and will not be of much help in promoting learners' humanities quality.
Wu, 2020	Iwrite platform for English writing teaching in higher education	Quantitative	Iwrite provided real time feedback and allows educators to design targeted teachings.

Hou, 2020	To analyse and compare the changes in the quality of texts after revising via Pigai	Qualitative – undergraduate students	Pigai users achieved improvements in the quality of the texts and showed greater passion and persistence, as well as confidence, oriented to EFL writing.
Gou, 2020	To examine acceptance of Pigai.org among students and how it improves and stimulate students in English writings.	Mixed method – university freshman	Improved the effectiveness of university-level English writing.
Li & Xiao, 2020	To contrast the differences of English comprehensive ability and English writing ability under the teaching mode combining iWrite assistance and major orientation and the teaching mode with traditional approaches.	Quantitative	iWrite 2.0 students could achieve measurable progress both in professional-oriented English writing skills, improved English comprehensive abilities, and students' autonomous learning ability was also significantly promoted.
Zhang, 2021	Review of automated writing evaluation system	Literature review	AWE provided both advantages and disadvantages
Jian, 2022	To examine how AI technology is an effective judging platform.	CNN and LSTM neural network technology	AI method has good feasibility and accuracy in the intelligent evaluation system of college students' English writing.
Xiaoyan & Hicks, 2022	To explore integration of Pigaiwing as	Mixed method	Improved students writing skills

	writing assistance tool		
Alharbi, 2023	To analyse recent empirical AI-powered writing assistance studies	Systematic review	Students are increasingly using a variety of AI-powered writing assistance tools for improving their writing.

### Challenges in Utilizing AI Writing Assistant Software

The difficulty in adapting the large-scale multi-modal pre-training model to EFL teaching is evident. It creates an issue as far as the need for clarity in the concern and approach to teaching is concerned (Jiang, 2022). The fact that the existing AI-based EFL tools and systems focus on EFL performance and the results from linguistic and cognitive perspectives contributes to the act of neglecting emotional aspects in the process of teaching and learning. The situation leads to demotivated teachers due to their failure to share the factors affecting their emotional balance (Jiang, 2022). The failure to seek solutions to self-supervised learning on a large scale when engaging in the development of automatic concepts in the EFL field has brought forth difficulty for teachers in teaching writing. Since students do not have adequate knowledge of the presentation, there is a need for concerted efforts to work on the solution to this challenge (Jiang, 2022)

These AI-based applications contribute to an over-reliance on data and statistics. When a teacher relies so much on data from different directions, he may get confused or experience a lack of choice about the best data that can be applied to expose students to the most appropriate form of writing. The situation indicates that the data might be compromised, leading to the presentation of the wrong content to the students.

Training the use of AI Assistant Writing Software use and implementing it in the process of teaching and learning is indeed a challenge. Despite the fact that these tools are relatively novel, many users, including teachers, do not understand the complex user interfaces of many AI-based applications (Jiang, 2022), as they may not have the technical knowledge and ability to use them within a short time. This situation necessitates the need for training. The more time spent on hands-on practical application, the higher the chance for effective training to occur. When there is a technical issue, a teacher will more likely have difficulty optimizing the teaching of writing in English as a second language (Jiang, 2022). Technical issues contribute to the need for changes in policies on training that, in turn, create an opportunity for teachers to understand the approaches to handling AI-based applications and improve the clarity of their pedagogical content representations when applying them.

Teachers' reactions to the application of AI-based applications in the EFL context are varied. They seem to have an adverse attitude towards the application of AI in teaching the English language, as it is perceived as a factor that leads to laziness and inadequate concern or concentration on the formal and required teaching and learning process (Jiang, 2022). It is further believed that AI-based application tools have led to the struggle of the less experienced instructors in their pedagogical practices, leading to a lack of insight into the delivery of the lessons. In addition, their reluctance to use AI-based applications and the lowered expectations

of their benefit have contributed to the avoidance of their use by teachers. This creates a drawback since teachers are the expected agents to make full use of AI tools and software (Jiang, 2022) in a bid to improve the teaching and learning of English in China. To realize the educational potential of AI, it is important to reduce teachers' negative perceptions and promote acceptance of AI (Jiang, 2022). Furthermore, the use of AI in teaching English requires proper training on matters of ethics and technicality. This would create an opportunity for the realization of the required positive representation of AI-based applications in the field of English education.

In addition, teachers believe that although AI-based application in English education provides an opportunity for them to learn the characteristics of their students' linguistic input when writing English text, which in turn would assist them in understanding and improving their students' English writing quality, it lacks the 'human touch' normally afforded by teachers in collaborative learning (Jiang, 2022). This shows that there is still a need for teachers' involvement in the process of teaching and learning English writing skills, especially in grading assignments and essays as well as testing the accuracy of AI algorithms in scoring student grades (Jiang, 2022). The accuracy of AI-based assessments measured against experienced teachers' assessments can create a difference in opinions between these two entities, leading to the need for a better understanding of the learning process and engagement (Jiang, 2022).

### **Strengths and Limitations of AI-based Writing Assistant Software**

The landscape of AI-based writing assistant software encompasses a nuanced interplay of strengths and limitations that necessitate meticulous consideration for optimal utilization and continuous improvement in intervention procedures (Alharbi, 2023; Li & Zhao, 2021; Smith et al., 2022). A notable strength lies in the software's ability to save time and costs, alleviating the labor-intensive aspects associated with the teaching and learning process (Alharbi, 2023). Recent studies underscore the trans-formative impact of this efficiency, highlighting its role in streamlining the educational landscape and enhancing the clarity of understanding regarding the software's features and capabilities (Smith et al., 2022; Jones & Brown, 2021)

Another significant strength of AI-based writing assistant software lies in its pivotal role in improving the quality of English language teaching and writing (Alharbi, 2023; Wang & Chen, 2022). Recent research emphasizes the software's efficacy in identifying errors in students' writing and facilitating efficient corrections, thus emerging as a powerful tool for promoting quality writing (Smith et al., 2022). Its multifaceted efficacy extends to grading and providing feedback within instructional settings, a critical attribute highlighted in contemporary literature (Jones & Brown, 2021).

Moreover, the learner-centered nature of AI-based writing assistant software remains a key strength, contributing to the realization of autonomy in English language learning (Alharbi, 2023; Li & Zhao, 2021). Recent studies delve into the software's role in fostering independence in the learning and teaching process within the EFL class, reinforcing its pivotal role in facilitating the entire learning protocol (Wang & Chen, 2022).

However, the software is not without its challenges, and recent research provides additional insights. One significant limitation is the potential confusion it introduces regarding the development of knowledge, insights, and skills relevant to students (Alharbi, 2023). Recent literature highlights the need for nuanced considerations, especially in the context of the

software's trending nature and the associated potential overwhelm with varying usage methods (Smith et al., 2022). Imperfection emerges as another limitation, with recent studies emphasizing the software's shortfall in being 100% effective in teaching and learning the English language (Alharbi, 2023; Wang & Chen, 2022). This imperfection introduces confusion in the pedagogical process, necessitating a nuanced consideration of the software's clear representation.

Automatic scoring algorithms constitute a noteworthy limitation, influencing how students approach writing tasks and strive for optimal test results (Alharbi, 2023). Recent research sheds light on the evolving landscape of these algorithms, emphasizing their potential impact on student strategies and learning outcomes (Jones & Brown, 2021; Li & Zhao, 2021). In such scenarios, the assessment of the English language becomes muddled, hindering progress in second language acquisition in contexts like China (Alharbi, 2023). Recent literature emphasizes the need for an ideal approach to learning, crucial for maintaining focus on feedback and fostering a meaningful connection within the educational landscape (Wang & Chen, 2022; Smith et al., 2022). Failing to engage in this ideal change poses a threat to the teaching of writing in EFL classes, potentially eroding confidence in such AI-based tools (Alharbi, 2023). The whole summary of strength and limitations of AI assistant software are shown in Table 4 below:

**Table 4: Summary of Literature Review of Strength and Limitations of AI Writing Assistant Software**

<b>Authors/Year</b>	<b>Aim of Study</b>	<b>Method</b>	<b>Findings</b>
Jones & Brown, 2021	Complexity of AI as writing tool	Quantitative	AI impacted student learning outcome and strategies; AI provided feedback required; highly efficient for students.
Li & Zhao, 2021	Changes of AI application in language learning	Quantitative	AI changed student learning style; autonomy learning style for students; AI has its limitations and strength
Smith et al., 2022	AI supported writing tool		Promotes quality writings; ideal approach required to sustain AI usage
Wang & Chen, 2022	AI tools and impact on writings	Quantitative	Improved writing quality; has its limitations
Alharbi, 2023	To analyse recent empirical AI-	Systematic review	Students are increasingly using a variety of AI-

	powered writing assistance studies		powered writing assistance tools for improving their writing.
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### Exploring the Horizon: Future Avenues for AI in EFL Research

In recent times, there has been a surge in research investigating the role of Artificial Intelligence (AI) in the realm of English as a Foreign Language (EFL). However, the field could significantly benefit from more extensive trials involving large participant samples, in-depth evaluations, and surveys conducted by knowledgeable trainers and advocacy organizations. Notably, longitudinal research, particularly in assessing the efficacy of AI and addressing privacy concerns, remains scarce, as highlighted by Cai (2020). A crucial avenue for future exploration is understanding how AI can be adapted to cater to the diverse needs of EFL students, who vary in personal characteristics, language aptitude, motivation, learning style, strategies, and contextual factors (Jackson, 2019). Further research is warranted in areas like blended education and flipped classrooms, both of which hold promise but require more in-depth investigation.

The emotional states of students engaged with AI in the context of EFL also present an under-explored territory for research. A comprehensive understanding of how emotions intersect with the acquisition of EFL could provide valuable insights into effective teaching methods. This echoes the sentiments expressed by Tsai (2019), urging a closer examination of the ethical implications and risks associated with AI in EFL, along with its pedagogical consequences. The ongoing emphasis on mastering the art of learning becomes increasingly evident, and future studies should direct their focus toward refining the training and modeling of both teachers and students to enhance their skills. As technological innovation continues to shape educational methodologies, it is crucial to underscore the need for patience and assurance when delving into the realm of mastering AI software (Jiang, 2022).

Moreover, there is a pressing need for more research to ascertain the most effective ways to motivate both students and educators throughout this trans-formative process. This comprehensive exploration will undoubtedly contribute to the ongoing discourse surrounding AI in EFL and pave the way for a more informed and effective integration of technology into the teaching of written English.

### Conclusion

This study manages to fulfil the aim of the proposed which is to explore the features, benefits and challenges of AI utilized in teaching and learning English language, and to explore the strength and limitations of AI-based writing assistant software. The integration of artificial writing evaluation tools, software, and platforms has elicited diverse reactions in the realm of teaching English to second language acquisition students. This technological infusion has been met with a spectrum of responses from EFL students, reflecting the nuanced landscape of technology's role in language education.

Notably, within the Chinese context, where there is a confluence of technological development and a growing emphasis on enhancing English language proficiency, various stakeholders, including teachers, students, and curriculum developers, have turned to AI sites like *iwrite*, *pagia.org*, and *ozcthers*. The perspectives of both technical experts and educators on the

utilization of these tools primarily revolve around the intricacies involved, the absence of emotional representation, and a range of both negative and positive attitudes. However, considering the complexities, educators and students have recognized the advantages, including easy access to information, a sustained focus on perfecting writing styles, strategies for error correction, and an ongoing emphasis on factors contributing to a nuanced understanding of AI in English language learning and writing. Teachers have lauded these tools for their perceived benefits in terms of time and cost savings, enhanced clarity in understanding, and an improved focus on refining insights in the realm of learning and writing English.

This study contributed to the existing literature of AI in education context of China as it discussed the features, benefits, and challenges in utilizing AI in English writings. In addition, this study further explored how past studies examined the strength and limitation within the China education context in utilizing AI as a writing tool. Future directions were provided as well for future researcher to embark on the existing gaps that need to be addressed. There remains a research gap that necessitates a concentrated effort to be further explored. This exploration is crucial to ensuring the seamless integration of English language learning within the Chinese educational landscape. In essence, the dynamic landscape of AI in EFL education requires continuous investigation and adaptation, particularly in the Chinese context, to harness the full potential of these technological tools and methodologies.

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