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Research on AI Application in English Writing Instruction

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Abstract: With the enhancement of AI technology and the emergence of numerous AI tools that can assist in English writing, traditional English teaching methods have experienced both challenges and opportunities. This study analyzed the positive impacts and existing problems of AI-based English writing teaching. Through analysis of the findings of the empirical studies, conclusions are drawn on the following aspects. First, AI-based English writing teaching has a positive impact on personalized writing feedback, vocabulary and grammar enhancement, and improvement in writing capabilities. Nevertheless, problems such as over-reliance, feedback inaccuracy, misguidance, and cultural and linguistic limitations are seen in AI-based English writing teaching. Therefore, this study argues that AI tools can be integrated into student writing grading to reduce stress on teachers and, more importantly, provide in-depth and timely feedback that helps expand students' knowledge of the topic and write more effectively, correct their grammatical mistakes, and provide vocabulary choices. Moreover, suggesting students use prompts can aid them in generating ideas and writing, which accelerates innovation and creativity. By contrast, solutions to the declining critical thinking and over-reliance of students require a supervision mechanism to guide students to use AI tools correctly. Meanwhile, promoting the optimization of AI technology by professionals to improve the accuracy and reliability of feedback is significant. Lastly, cultural and linguistic barriers needed to be diminished by localization strategies and multilingual support.

Keywords: Artificial Intelligence, English Writing Instruction, Writing Pedagogy

1. Introduction

1.1. Research background

English, used as a universal language around the world, is studied worldwide by different age groups from K12 classrooms to universities. Thus, improving English language skills and writing capabilities is important for both L1 and L2 learners of all ages and backgrounds. In recent years, the application of artificial intelligence (AI) tools in education has experienced a constant increase, especially in the English writing instruction field [1]. With the advancement of AI technologies such as ChatGPT, Grammarly, Kimi, etc., English writing teaching witnessed new opportunities and challenges [2,3]. AI tools can provide writing feedback, generate writing prompts, and assist in grammar and vocabulary improvement [4-6]. Nevertheless, ethical issues and integrity problems emerged [7]. In the meantime, some limitations such as a lack of personal style [8], over-reliance [9-11], possible impediments to critical thinking and independent writing [12], as well as the scarcity of efficiency in

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a language other than English [13], present.

1.2. Research purpose

This article enjoys three research focuses: positive impacts of AI on higher education and K12 writing instruction; emerging problems in AI-based writing instruction in higher education and K12 writing; pedagogies for integrating AI in English writing instruction in higher education and K12 writing instruction and solutions to existing problems. This study intends to highlight English writing pedagogies using AI and provide an understanding of issues and solutions.

2. Positive impact of AI on English writing instruction

2.1. Personalized feedback

Firstly, AI tools are efficient in offering personalized feedback, which is tailored to the individual needs of students when detecting different problems. For instance, an AI chatbot called Eva was utilized as part of an online peer review system in a study. The study had a participant number of 124 undergraduate students from China who were separated into an experimental group utilizing Eva for personalized feedback and a control group that only received writing prompts. The result came to be prominent. Significantly higher scores were seen in the experimental group in the quality of peer feedback, particularly in the aspects of description, identification, justification, and productiveness [5]. This indicates that AI is efficient in correcting students' writing styles and errors, providing salutary suggestions as well as improving their writing. In other words, AI usage assists in ameliorating individual writing shortcomings, accelerating learning efficiency, and improving writing skills by providing personalized feedback.

2.2. Creativity improvement through AI-generated writing prompts

Writing prompts generated by AI tools are versatile in motivating students' creativity. In a study, 47 American undergraduate students used ChatGPT in their writing assignments. They realized that ChatGPT could provide multiple different prompts, integrating individual experiences and offering descriptions on diverse topics. This, on the one hand, enlarges students' writing perspectives and thoughts, and on the other hand, inspires them to adopt a more novel approach to thinking about the topic. An example in this study is that students can utilize ChatGPT to create templates for a variety of genres and writing assignments, and they can be stepping-stones for their success in their innovation and creation while writing [14]. Therefore, by supplying students with individualized and topic-related prompts, AI tools empower students to explore new views and angles and add to their creativity in writing expression.

2.3. Vocabulary and grammar enhancement

AI tools also play a significant role in students' vocabulary and grammar enhancement. Nowadays, AI tools such as Linggle Write and Write & Improve are used to aid students in these aspects. For instance, a six-week teaching module using ChatGPT was carried out among 200 Malaysian secondary school students. Students showed notable improvements in vocabulary range, writing accuracy, and accurate word usage in contexts after the teaching lessons. These improvements in vocabulary and grammar contribute to their higher-quality writing performances. [15]. Students can thus express their ideas and views more accurately by grasping diverse grammatical expressions and vocabulary ranges, making their writing more appealing and effective.

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2.4. Improvement in writing fluency and overall performance

It is students' writing fluency as well as overall writing performance that can be improved by AI-enhanced writing teaching according to an empirical study, in which 44 South Korean college students used ChatGPT 3.5 for narrative writing assignments. The study discovered that students' writing fluency, measured by the number of words and T-units, was prominently increased. Their overall writing performances were also improved, which were assessed and evaluated by a narrative writing scoring rubric [10]. This demonstrates that AI can offer real-time assistance during writing tasks, helping students overcome writer's paralysis and express their thoughts more smoothly.

3. Negative impact of AI on English writing instruction

3.1. Over-reliance and declining critical thinking

The most prominent problem that students are inclined to over-rely on AI tools in English writing can cause their ability for critical thoughts to deteriorate. Students in Hong Kong considered it possible for them to over-rely on AI writing tools like Poe Feedback. They were concerned that if they used these tools excessively, it could hinder their ability to write on their own. Teachers, meanwhile, were equally concerned that so much were students over-relying on AI that it might impair their capacity for critical thought [16]. Things do not come singly but in pairs, some Chinese sophomore students who used ChatGPT in their writing also worried about the possibility of over-reliance [9]. Therefore, if students get used to relying on AI to correct their assignments and generate ideas, they might lose the ability to analyze and evaluate their writing critically. There are risks that they might not develop the necessary skills to identify and correct their mistakes independently. Neither could they think deeply about the content and structure of their writing. This over-reliance ultimately undermines students' long-term writing development.

3.2. Feedback inaccuracy and misguidance

AI-generated feedback can also result in misguidance because the content generated by AI can sometimes be erroneous. Take contrasted Ginger Software, QuillBot, and Grammarly as examples. One study revealed that these tools performed inconsistently and had differing degrees of error detection and repair [17]. To illustrate, they could also give inaccurate or inappropriate feedback if they don't understand the context of a student's writing in languages other than English. This is supported by the performance of ChatGPT in Greek short essays. It had problems with language usage and feedback, and it misunderstood some of the proper content in Greek essays [13]. Thus, students may make incorrect changes to their writing, especially for young learners, leading to a decline in writing skills. This inaccuracy in feedback can be a major setback for students who rely on AI to enhance their writing.

3.3. Cultural and linguistic limitations

AI tools are usually unable to avoid cultural and linguistic limitations due to the background of the AI developers, especially in non-English-speaking countries. As shown in the Greek study, ChatGPT performed poorly when dealing with Greek short essays compared with handling English essays. ChatGPT in the study lacked Greek language knowledge and misjudged appropriate content due to its inability to grasp the content in the Greek language, which can lead to inefficiency when answering questions asked in other languages [13]. Similarly, Chinese teachers also found it necessary to adjust AI-generated content to students` level and they tend to use Chinese as the language to get prompts and feedback, which may require modifications from teachers to better suit the Chinese language

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context. [18]. Thus, Students from diverse backgrounds may face substantial challenges due to AI tools' potential paucity in cultural adaptation and language understanding. These limitations may deter students' writing ability by exposing them to false answers.

4. Suggestions for reinforcing positive impacts

4.1. Enhance personalized learning experience

Leveraging personalized feedback generated by AI tools to customize more personalized learning plans for students is an ideal way to provide personal guidance to improve students' writing. A study shows that the AI chatbot Eva integrated into the online peer review system EvaluMate provided personalized feedback, tremendously improving the quality of peer feedback in dimensions such as description, identification, justification, and productivity [5]. Hence, educators ought to take advantage of AI's personalized feedback function to develop personalized learning plans according to students' writing characteristics and needs. This not only helps students improve their writing skills more efficiently as they can focus on their drawbacks and receive precise guidance but also helps teachers be released from the arduous work of writing correction. However, as mentioned in some studies, the feedback provided by AI tools is sometimes inferior to teacher feedback, which is worth attention, and more professional teachers should engage in the field of developing AI feedback tools to ensure the accuracy of feedback [19].

4.2. Stimulate students' creativity

Utilizing diverse writing prompts generated by AI to guide students in expanding their writing ideas and cultivating innovative thinking is also tremendously effective. Students using ChatGPT for writing tasks found that it could integrate personal experiences, connect to topics, and generate templates, providing them with rich writing inspirations [14]. Thus, teachers can encourage students to use AI-generated writing prompts rationally and critically during writing tasks, guiding them to think from different perspectives and stimulating their innovative thinking. By doing this, students can obtain more creativity in their writing, enhancing its content richness and uniqueness through their individualized interactions with AI tools.

4.3. Facilitate vocabulary and grammar learning

Employing AI tools to strengthen students' vocabulary and grammar learning and improving the accuracy and professionalism of writing is especially meaningful in English writing teaching. For example, Malaysian secondary school students significantly improved their vocabulary range, writing accuracy, and word usage ability after a six-week educational module based on ChatGPT [15]. As a result, teachers can recommend AI tools like ChatGPT, Linggle Write, Grammarly, etc., to students for vocabulary and grammar learning. These tools can provide instant feedback and suggestions, helping students accumulate vocabulary and master correct grammar usage, thereby enhancing the quality and professionalism of their writing.

5. Suggestions to alleviate negative impacts

5.1. Prevent over-dependence

Establishing a supervision mechanism to guide students to use AI tools correctly and avoid over-reliance is crucial. For instance, both students and teachers were concerned that over-reliance on AI would weaken students' independent writing and critical thinking abilities in a Hong Kong study [16]. Accordingly, Schools and teachers can set up clear rules for AI use, limiting the time and scope of

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students' usage of AI during the writing processes. Furthermore, teachers are supposed to strengthen guidance for students, cultivating their ability to think independently and write autonomously, and making students realize that AI is only an auxiliary tool and cannot replace their thinking and efforts.

5.2. Improve feedback accuracy

Promoting the optimization of AI technology to improve the accuracy and reliability of feedback is the fundamental and most urgent aspect of improving AI content accuracy. For example, it is pointed out that different AI tools had differences and inconsistencies in error detection and correction, such as the varying performances of Grammarly, QuillBot, and Ginger Software [17]. Hence, AI developers should persistently improve algorithms to enhance the language understanding and analysis capabilities of AI tools, guaranteeing the accuracy of feedback. Simultaneously, educators should evaluate the feedback quality when selecting AI tools, recommend reliable tools to students, and teach students to think critically about AI feedback instead of accepting it blindly.

5.3. Overcome cultural and linguistic barriers

A study shows that ChatGPT performed poorly when dealing with Greek short essays, and it has obstacles in language and cultural understanding [13]. Consequently, it is necessary to promote the localization and multilingual support of AI tools to meet the needs of students from different cultural and linguistic backgrounds. That is to say, AI research and development teams should increase investment in multilingual and cross-cultural research, enabling AI tools to better understand and adapt to the characteristics of different languages and cultural backgrounds. Educators from non-English speaking countries can combine local language and cultural characteristics to supplement and adjust the feedback of AI tools instead of asking students to inquire about it by themselves, to provide more suitable writing instruction for students.

6. Conclusion

This paper researched the application of artificial intelligence (AI) in English writing instruction, covering various educational levels from K12 to higher education. It explores the positive and negative impacts of AI in this field and puts forward corresponding suggestions.

AI tools enjoy considerable positive impacts on English writing instruction. To begin with, it provides personalized feedback to each student. Furthermore, AI-based writing prompts stimulate students' creativity. Additionally, AI tools play a significant role in expanding vocabulary and grammar knowledge. However, AI also has some negative impacts, too. One of the most prominent problems is students' over-dependence on AI tools, which may result in a decline in critical thinking and independent writing skills. The other problem is the inaccuracy of AI-generated feedback. Additionally, AI tools face cultural and linguistic limitations, especially in non-English-speaking countries.

To address these issues, several suggestions are proposed. To reinforce the positive impacts, educators should make full use of AI's personalized feedback function to design personalized learning plans, encourage students to use AI-generated writing prompts rationally and recommend AI tools for vocabulary and grammar learning. To mitigate the negative impacts, schools and teachers should establish clear rules for AI use to prevent over-reliance, AI developers should optimize algorithms to improve feedback accuracy, and AI research and development teams should increase investment in multilingual and cross-cultural research. Educators can also combine AI-generated feedback with their corrections to add to feedback quality and accuracy.

In conclusion, AI in English writing instruction has both advantages and disadvantages. Future research should, on the one hand, focus on optimizing the integration of AI in writing pedagogy to

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enhance the quality and effectiveness of English writing instruction. On the other hand, avoiding possible harm to students` personal and writing development when using AI tools, since technology is a double-edged sword. In addition, current researches are only conducted on a short-term basis and more longitudinal studies are needed to further understand the long-term impacts of AI tools on students' English writing and personal development.

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