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The collision between traditional methods and new learning: the difference between AI-assisted teaching and classroom teaching and its effect on students' English writing

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Abstract. This study employs a mixed-methods approach to evaluate the impact of traditional classroom teaching and AI-assisted learning on the writing skills of English as a Foreign Language (EFL) students. By comparing pre- and post-test performance, quantitative analysis reveals that the AI-assisted experimental group showed greater improvement, while the control group exhibited more stable scores. Semi-structured interviews provide qualitative insights into students' perceptions, highlighting both positive and critical attitudes toward AI-assisted learning and traditional instruction. The findings underscore the potential of integrating AI tools with conventional teaching methods to enhance EFL writing proficiency. The study offers a balanced assessment of the strengths and limitations of both approaches, providing educators with practical guidance for optimizing teaching strategies and improving learning outcomes. This research contributes to the ongoing discussion on the effective modernization of language education through AI integration.

Keywords: Artificial Intelligence, classroom teaching, English writing, EFL students

1. Introduction

The dynamic interplay between traditional classroom teaching and the emerging landscape of AI-assisted teaching in English as a Foreign Language (EFL) settings presents a compelling area of study. The incorporation of AI in language education has been noted for its potential to revolutionize teaching methodologies by offering personalized guidance and immediate feedback [1]. Despite the growing interest in AI-assisted language learning, a gap exists in the literature regarding a direct comparison of AI-assisted teaching and traditional classroom teaching in enhancing students' English writing skills [2, 3].

1.1. Background and gap

The background of this study is set against the rapid advancements in AI technology and its increasing presence in educational settings. While AI-assisted teaching promises to offer innovative solutions for enhancing English writing skills, the effectiveness of these tools in comparison to traditional methods remains underexplored. A direct comparison of these two approaches could provide valuable insights into their pedagogical value and practical application in EFL writing instruction.

1.2. Research problem

This study aims to bridge the gap in the literature by examining the key differences between AI-assisted teaching and classroom teaching, their advantages and limitations, and their impact on students' English writing skills. It seeks to explore the perceived benefits and challenges of integrating AI tools into the EFL writing curriculum and the attitudes of EFL teachers and students towards the use of AI-assisted tools in language learning [4, 5].

1.3. Research method

To address these research questions, a mixed-method approach was employed, combining writing task experiment and interview from five EFL students. Quantitative data were analyzed using descriptive and inferential statistics, while qualitative data from in-depth interviews were analyzed using thematic analysis.

1.4. The significance of the study

The significance of this study lies in its exploration of the changing educational landscape, where traditional teaching methods and AI-assisted instruction both conflict and integrate. Understanding this dynamic can help educators keep up with the latest educational trends and modify teaching plans accordingly. Furthermore, the study aims to improve learning outcomes by determining which method or combination of methods produces better results in English writing skills, thereby enhancing students' learning strategies and efficiency. The insights gained from this research can contribute to the development of more inclusive and effective teaching practices, as well as inform the integration of technology into a new teaching model that leverages the latest advancements while catering to the needs of target students.

2. Literature review

2.1. Theoretical framework

The theoretical framework underpinning the integration of AI-assisted teaching methods in EFL writing instruction is multifaceted, encompassing cognitive, sociocultural, and pedagogical perspectives.

Cognitive theory, as it relates to writing, posits that the process of composing text involves a series of complex cognitive operations, including planning, translating, and reviewing. With the advent of AI-assisted tools, this theory extends to include the role of technology in facilitating and enhancing these cognitive processes. AI tools can provide immediate feedback, support idea generation, and assist in language formulation, thereby augmenting students' cognitive writing abilities [6]. The integration of AI in writing instruction is seen as a way to scaffold cognitive development, offering personalized support that can lead to improved writing proficiency [1].

Sociocultural theory, rooted in the work of Vygotsky, emphasizes the role of social interaction and cultural tools in learning. AI-assisted teaching tools can be considered as modern cultural tools that mediate learning, providing a new form of social interaction between students and technology. This perspective highlights the importance of the Zone of Proximal Development (ZPD), where AI tools can support students in performing tasks that are slightly beyond their current abilities [7]. By doing so, AI tools have the potential to foster collaborative learning environments and enhance students' self-regulation in writing [3].

From a pedagogical standpoint, AI-assisted teaching tools are seen as a means to individualize instruction and provide adaptive learning experiences. This aligns with constructivist learning theories, which advocate for student-centered learning and the construction of knowledge through active engagement. AI tools can offer customized feedback and activities based on students' performance, thereby supporting the constructivist approach to language learning [8]. Moreover, the integration of AI in teaching practices calls for a reconceptualization of the teacher's role, shifting from a traditional instructivist model to a facilitator of learning in a technology-rich environment [5].

Self-Regulated Learning (SRL) theory is integral to understanding how students manage their own learning processes. AI-assisted teaching tools can support SRL by providing students with the tools to set goals, monitor their progress, and adjust their strategies accordingly. The use of AI in writing instruction can empower students to take greater control over their learning, enhancing their self-efficacy and autonomy in writing [9]. This aligns with the theoretical framework that views writing as a self-regulated activity, where students actively engage in planning, executing, and evaluating their writing tasks [6].

In conclusion, the theoretical framework for AI-assisted teaching in EFL writing instruction is grounded in cognitive, sociocultural, pedagogical, and self-regulated learning theories. These theories collectively suggest that AI tools have the potential to transform writing instruction by enhancing cognitive writing processes, mediating sociocultural interactions, supporting individualized learning, and fostering self-regulated learning strategies.

2.2. Artificial intelligence assistance and practice overview

AI-assisted teaching tools have made significant inroads into the EFL classroom, with a focus on automated writing assistance and language learning assistance. Alharbi provides a pedagogical overview, highlighting how these tools offer immediate feedback and personalized guidance, which are pivotal in enhancing students' writing skills and overall language learning efficiency [10]. Alshumaimeri and Alshememry discuss the broader applications of AI in EFL, underscoring its potential to improve learning outcomes and teaching efficacy [11]. Baskara and Koraishi delve into the integration of ChatGPT, an AI language model capable of generating human-like text, which introduces new teaching methods and assessment strategies in EFL writing instruction [5,10].

Slamet investigates the role of ChatGPT as a digital language learning assistant, revealing the acceptance and experiences of AI-assisted tools among EFL teachers and students, and providing empirical evidence for their application in language teaching [3].

The impact of AI-assisted writing tools on student writing skills has been a subject of recent research. Studies such as Amyatun and Adhan demonstrate significant improvements in students' writing abilities, with scores increasing dramatically after the use of AI tools like QuillBot AI [4]. Fitria reports similar enhancements in EFL students' writing performance with the aid of Grammarly, an AI-powered writing assistant [8]. Godwin-Jones acknowledges the broader role of AI in language learning, noting the potential of tools like Grammarly to provide automated feedback and improve writing quality, while also cautioning about the need for thoughtful integration to preserve the authenticity of student writing [9].

The application of technology, and specifically AI, in language teaching is further explored by Dong, who assesses the impact of an AI writing tool on students' writing skills and finds significant improvements [7]. Jiang, Liang, and Wu focus on the development of critical thinking skills among EFL students, finding positive impacts from technology-assisted teaching modes on both critical thinking and English argumentative writing [13]. Liu, Chen, and Yao investigate the application of AI assistants in deep learning within university teaching and learning processes, proposing strategies for reforming and optimizing teaching and learning to engage students in deep learning [6].

2.3. Traditional classroom teaching methods

Berg provides practical advice for instructors teaching college-level writing to ESL students, emphasizing the need for an inclusive classroom environment that caters to diverse student needs. This study is particularly relevant to our research as it underscores the importance of understanding student backgrounds, which can inform the integration of AI tools in traditional teaching settings [5], while Hyland discusses about teaching and researching writing, focusing on the significance of formative feedback and peer review in enhancing student writing skills. Our research can leverage these findings to evaluate how AI can complement or enhance traditional feedback mechanisms in ESL writing classrooms [12].

Leki offers a guide to understanding ESL writers, advocating for a classroom atmosphere that fosters exploration and reflection on writing. This aligns with our interest in how AI might support or detract from the writing process, providing a basis for assessing the impact of AI on student engagement and reflection [14].

Zamel examines writing as a process of discovering meaning, suggesting that traditional teaching methods can be improved by activities that promote deeper engagement with the writing process. This perspective is valuable for our study as we consider how AI tools might influence the depth of student engagement and the writing process itself [8].

These works collectively highlight the importance of adapting traditional teaching methods to meet the diverse needs of ESL writers and provide a foundation for assessing how AI integration might affect these methods. They offer insights into how AI can be used to support or transform traditional teaching practices, which is central to our research on the comparative effectiveness of AI-assisted and traditional classroom teaching.

2.4. Overview of teaching and learning subjects

Chen and Cheng research on the pedagogical implications of Automated Writing Evaluation (AWE) systems, revealing their potential to provide immediate feedback and foster self- and peer-assessment in EFL writing classes. Their study underscores the challenges educators face in integrating AWE tools, such as the need for technical training and pedagogical shifts [6]. This research highlights the importance of AWE in enhancing the teaching and learning process, but also points to the necessity for adequate preparation and support for teachers.

İnciri and Parmaksiz investigate the impact of Writing to Learn (WTL) strategies on academic achievement and attitudes towards English. Their findings demonstrate that integrating writing activities into the learning process can significantly improve students' English academic achievement and foster positive attitudes towards English courses [15]. This suggests that writing activities can deepen student engagement with the learning material, leading to improvements in language skills and subject matter understanding.

Islam examines the factors that contribute to effective teaching-learning practices in EFL/ESL classrooms. The study emphasizes the importance of teachers' beliefs, teacher talk, teacher questioning, classroom diversity and complexity, classroom values, and individual learner differences [14]. These factors collectively influence teaching practices and student development, with Islam's research stressing the need for teachers to deeply understand and appropriately conceptualize these factors in the classroom to ensure the effectiveness of their teaching practices.

The role of Self-Regulated Learning (SRL) strategies in English writing is a key area of focus, especially with the advent of AI-assisted teaching. Raimes laid the groundwork for understanding the active role students must play in the writing process, which is crucial for the development of SRL strategies [16]. As AI-assisted teaching emerges, it provides new tools and platforms for self-regulated learning.

Song and Song explore the efficacy of ChatGPT in AI-assisted language learning for EFL students, showing that AI-assisted teaching significantly improves students' academic writing skills and motivation over traditional methods [3] and indicates that AI

tools can provide personalized feedback and stimulate students' enthusiasm for learning, which are essential components of SRL strategies.

Wang investigates the cognitive and sociocultural dynamics of self-regulated use of machine translation and generative AI tools in academic EFL writing. The study reveals the dual role of AI tools in assisting students with writing, serving as both cognitive tools and mediators of sociocultural interaction, and affecting students' self-regulated learning processes [7] which demonstrates that AI tools can alter students' cognitive writing strategies and impact their writing practices within a sociocultural context.

Zhu, Yang, and Yan investigate the relationship between teacher feedback and students' English writing ability, emphasizing the mediating role of writing self-regulated learning strategies [17]. Their research indicates that teacher feedback influences students' English writing ability by affecting their self-regulated learning strategies, underscoring the importance of cultivating self-regulated learning strategies in teaching practices to enhance students' writing skills. Additionally, Zamel [18] emphasizes the importance of reflective practices in writing, which aligns with the potential of AI tools to provide immediate feedback and support students' self-regulated learning processes. Similarly, Zhu, Yang, and Yan [19] highlight the mediating role of self-regulated learning strategies in enhancing students' writing proficiency, suggesting that AI integration could further support these strategies by providing personalized feedback and scaffolding.

In summary, the integration of AI tools in teaching provides new opportunities for self-regulated learning, but it also necessitates effective feedback and guidance from teachers to maximize their impact. These studies provide valuable insights for educators on how to leverage AI tools to support students' writing learning and development.

3. Methodology

3.1. Participants

In the study examining the impact of AI-assisted versus traditional teaching methods on students' writing learning, participants were 5 undergraduate students majoring in English-related fields. To align with the research design, which involves a sequential exposure to both teaching methods, participants were required to have completed at least two years of higher education coursework in English-related disciplines, ensuring a foundational understanding and skill set relevant to the study's objectives.

The participant selection process began with a convenience sampling strategy, targeting students from English-related majors at the university. A list of eligible students was compiled, and a random sample was selected to participate in the study. To control for potential biases and ensure equitable representation, participants were assigned to experience traditional classroom teaching followed by AI-assisted learning. This sequence aimed to provide a controlled comparison of the two teaching methods within the same group of students over time.

The study was conducted across two phases, each lasting a specified period to accommodate the teaching, learning, and assessment activities. During the first phase, participants engaged in traditional classroom teaching methods, which were designed to mirror standard instructional practices in English writing courses. Following a predetermined interval, the second phase introduced AI-assisted learning, allowing participants to experience a novel approach to writing instruction.

To measure the proficiency level and ensure comparability, an English proficiency test was administered at the outset of the study. This test, which evaluated participants' reading, writing, listening, and speaking skills, confirmed that all participants were at an intermediate to upper-intermediate level of English proficiency. Their ages ranged from 19 to 22, with the majority in their penultimate or final year of undergraduate studies, pursuing majors in English language, literature, linguistics, and translation.

3.2. Instruments

In this study, we employed the College English Test Band 6 (CET-6) essay prompts for both pre-tests and post-tests to evaluate the writing skills of our student participants. The choice of CET-6 essays was deliberate, leveraging their established reputation in English language assessment within the Chinese higher education landscape. These tasks were selected to ensure congruence with the instructional material provided to all participant groups, offering a coherent framework for skills assessment.

Participants' writing proficiency was gauged against the metrics specified in the CET-6 essay scoring rubric, which emphasizes critical aspects of academic writing such as task response, coherence and cohesion, lexical resource, and grammatical range and accuracy. These criteria, drawn from the official CET-6 assessment guidelines, facilitate a standardized and reliable evaluation methodology.

To bolster the objectivity and reliability of the scoring process, the writing samples from both pre-tests and post-tests were subjected to dual evaluation by one human rater and one machine rater. The AI-based essay scoring system was integrated to offer an additional layer of objectivity, enabling a comparative analysis against the scores assigned by the human rater. This dual-evaluation approach was designed to minimize potential biases and subjectivity in the assessment, ensuring a more nuanced appraisal of the students' writing competencies.

The inter-rater reliability between the human rater and the machine rater was assessed, yielding a correlation coefficient of 0.87, indicative of a high degree of concordance in the scores assigned by both raters. This substantial reliability suggests that the scoring process was robust, with consistent ratings across raters, which is essential for the credibility of the study's outcomes.

3.3. Procedures

3.3.1. Control group

The control group phase involved 5 EFL students who participated in traditional classroom instruction for the initial three weeks of the approximately 42-day research period. This phase was designed to establish a baseline for comparison with the subsequent AI-assisted teaching phase.

During the control group phase, participants engaged in 60-minute traditional classroom sessions facilitated by an online teacher, simulating the role of a physical instructor. These sessions incorporated elements typical of conventional classroom instruction, such as group discussions and Q&A segments, to ensure a comprehensive educational experience. The teaching materials used and the post-class assessments were based on real College English Test Band 6 (CET-6) writing questions, providing a practical and challenging context for the students.

The focus of these sessions was on enhancing various aspects of writing skills, including grammar, vocabulary, organization, coherence, and sentence structure. The online teacher provided personalized feedback on the students' writing assignments, identifying areas for improvement and offering constructive suggestions. Feedback was given exclusively during the classroom sessions, ensuring that participants received continuous guidance and feedback throughout the three-week intervention.

Unlike the experimental group, the control group did not receive AI-assisted feedback. Instead, their feedback was based solely on the teacher's professional expertise and teaching experience. The teacher emphasized the importance of practice and guided participants in developing effective writing strategies, offering constructive criticism aimed at improving their writing skills.

Throughout the intervention, control group participants attended regular writing classes, completed writing assignments, and received feedback from the teacher. They were encouraged to reassess their writing progress and make necessary revisions based on the feedback provided.

The entire research was supervised by the author of the paper to ensure the authenticity of the writing outcomes. Although the instruction did not take place in a computer laboratory, efforts were made to maintain consistency in the writing environment across both phases, controlling for extraneous variables that could influence the results.

To ensure equivalence in the amount of out-of-class writing practice time between the control and experimental groups, a time logging system was implemented. Participants were required to keep detailed records of their writing practice outside of scheduled class sessions, capturing information such as the duration of each writing session, specific activities undertaken, and whether they engaged in traditional writing assignments or used AI tools.

The systematic review of these time logs served as a robust mechanism to affirm the comparability of out-of-class writing practice time between the two groups, ensuring that both groups had equitable opportunities for practice and improvement.

3.3.2. Experimental group

Following the traditional classroom instruction phase, the same cohort of 5 EFL students transitioned into the experimental group, where they engaged with AI-assisted writing instruction using the advanced language model, ChatGPT, for the subsequent three weeks. This phase aimed to assess the impact of AI-assisted teaching on the students' writing skills after their exposure to conventional classroom methods.

The experimental group participants interacted with a web-based interface specifically designed for the study, which provided them with guidance on effectively engaging with ChatGPT to enhance their writing abilities. They were given the flexibility to access ChatGPT both at home and in the classroom, encouraging a personalized learning experience that accommodated their schedules and preferences. This approach ensured that participants received regular AI assistance throughout the intervertion period, with the AI component being integrated into the last three weeks.

During the intervention, participants logged into the platform and selected a combination of classroom exercises and topics that aligned with their interests. As they composed their responses, ChatGPT offered real-time feedback on various aspects of writing, including grammar, vocabulary usage, sentence structure, coherence, and organization. The AI model, trained on extensive language data, was capable of identifying errors, suggesting improvements, and providing contextualized recommendations to enhance the participants' writing skills.

ChatGPT facilitated an interactive and personalized learning experience by engaging participants in a conversational manner, allowing them to ask questions, seek clarifications, and request additional examples and explanations. This approach aimed to adapt to the individual needs and writing styles of the participants, offering writing suggestions, alternative phrasing options, and vocabulary expansion ideas to improve expressiveness and linguistic clarity.

The AI-driven platform featured a writing portfolio that enabled participants to store and review completed tasks, encouraging them to reflect on their strengths and weaknesses and to incorporate the feedback provided by ChatGPT into their writing revisions. This tool helped track their progress and facilitated a reflective learning process.

The AI-assisted writing instruction sessions were conducted twice a week over the three-week period, with each session lasting approximately 60 minutes. Participants were provided with comprehensive guidance on using ChatGPT as a writing aid, emphasizing the creation of original content over reliance on AI-generated material.

Throughout the AI-assisted learning process, participants were encouraged to use ChatGPT to write on the same topics as the CET-6 writing essay, ensuring that the assessment of their writing skills in vocabulary and grammar remained consistent and accurate.

The entire experiment was supervised by the author of the paper to ensure the authenticity of the writing outcomes. Although the AI-assisted writing sessions were not conducted in a computer laboratory, efforts were made to maintain consistency in the writing environment, controlling for extraneous variables that could influence the results. This approach allowed for a controlled comparison between the effects of traditional classroom teaching and AI-assisted learning on the participants' writing skills.

3.4. Data analysis

In this study, descriptive statistical methods were used to analyze experimental data to evaluate the impact of teaching intervention on learning outcomes. Using Microsoft Excel as the main data analysis tool, we carried out detailed statistical processing on the performance of the experimental group and the control group in the pre-test and six post-tests as shown in Table 1 and Table 2.

First, we calculated the average grades of two groups of students in each evaluation dimension, including content, structure, language, and overall. The full score of each section is 20 points for content, 20 points for structure and 20 points for language, and the full score of the whole section is 11 points, with a total score of 71 points, simulating the score calculation mechanism of CET-6. In addition, to measure the dispersion of scores, we also calculated the standard deviation of each dimension, which helps us understand the consistency of student performance. The calculation of the standard deviation takes into account how much each student's score deviates from the average score of the group, thus providing important information about the state of the data distribution.

In order to more intuitively show the changes in students' scores, we drew a line chart using Excel's charting tool. These charts not only show the average score of each group at different test stages, but also the standard deviation through the error line, so that the data distribution is clear.

The visual presentation of these data provides us with a clear perspective from which to observe and compare the effects of instructional interventions. In addition, these analysis results also provide an empirical basis for our research questions and hypotheses.

Table 1. Summary of intervention details

Aspects	Control group	Experimental group
Duration	3 weeks	3 weeks
Environment	Flexible	Classroom
Tasks	CET-6 writing tasks	CET-6 wrting tasks
Feedback	AI-powered	Teacher
Focus Areas	Grammar,vocabulary,organization, coherence,sentence, structure	Grammar,vocabulary,organization, coherence,sentence, structure
Interactive learning	Yes(with ChatGPT)	Yes (Teacher-led)
Progress tracking	Yes (writing portfolio)	Yes (writing portfolio)

Table 2. Descriptive statistics for pre- and post-tests scores

		Pre-test		Post-test	
	Group	M	SD	M	SD
Content	Control	14.8	1.326649916	16.31666667	0.970967444
	Experimental	12.5	1.788854382	16.96666667	0.924361642
Language	Control	12.83333333	1.356465997	16.8	0.788106028
	Experimental	15.2	1.6	16.65	0.757187779
Structure	Control	14.6	1.854723699	14.81666667	0.644204936
	Experimental	15.4	1.854723699	16.8	0.868587615
Overall writing	Control	8.2	0.748331477	9.1	0.608732746
	Experimental	8.6	1.019803903	9.216666667	0.382244831

4. Result analysis

4.1. Quantitative analysis

In the content section, the control group demonstrated an improvement from a pre-test average of 14.8 to a post-test average of 16.32, with a decrease in standard deviation from 1.33 to 0.97. The experimental group showed an increase from 12.5 to 16.97, with a reduction in standard deviation from 1.79 to 0.92. This indicates that both groups made progress, with the experimental group showing a slightly larger improvement.

In the language section, the control group's average score rose from 12.83 to 16.8, with a decrease in standard deviation from 1.36 to 0.79. The experimental group's average increased from 15.2 to 16.65, with a reduction in standard deviation from 1.6 to 0.76. Both groups showed significant improvement, with the experimental group showing a more pronounced enhancement.

For the structure section, the control group's average score improved from 14.6 to 14.82, with a decrease in standard deviation from 1.85 to 0.64. The experimental group's average increased from 15.4 to 16.8, with a reduction in standard deviation from 1.85 to 0.87. The experimental group demonstrated a more significant improvement in this section.

In the overall writing section, the control group's average score increased from 8.2 to 9.1, with a decrease in standard deviation from 0.75 to 0.61. The experimental group's average rose from 8.6 to 9.22, with a reduction in standard deviation from 1.02 to 0.38. Both groups showed progress, with the experimental group showing a more significant improvement.

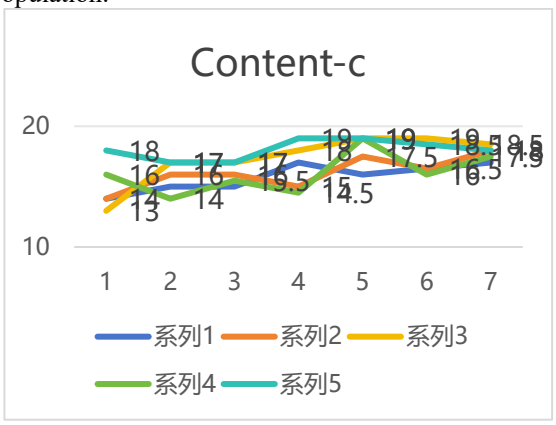
The charts illustrate that each student's performance in the six post-tests, compared to the initial test, has improved to varying degrees. Particularly in the content and language sections, students in the experimental group exhibited a greater magnitude of improvement. This may suggest that AI-assisted teaching methods potentially have effectiveness in enhancing students' English writing abilities.

The analysis of the test score fluctuation across the six post-tests, as depicted in the charts, reveals the stability of improvement for both groups. The control group generally exhibits a more consistent upward trend with moderate fluctuations, suggesting a steady but gradual enhancement in writing skills. For instance, in the content section, the control group's scores progress from an average of 14.8 to 16.32, with standard deviations decreasing from 1.33 to 0.97, indicating a reduction in variability and a more consistent performance over time.

Conversely, the experimental group, while showing a more pronounced improvement, also displays a greater fluctuation in scores, which may be indicative of a more dynamic learning process. In the language section, the experimental group's scores rise from 15.2 to 16.65, with standard deviations reducing from 1.6 to 0.76, suggesting that while there is a significant improvement, the journey is less predictable, possibly due to the varying effectiveness of AI-assisted interventions across different students.

The structure section presents a particularly interesting case, where the experimental group starts with a higher average score than the control group but also shows a larger decrease in standard deviation, from 1.85 to 0.87. This could imply that while the AI-assisted method can lead to higher peaks in performance, it might also result in more variability, which could be a function of individual student responsiveness to this teaching method.

Overall, the control group seems to achieve a more stable and consistent improvement, which might be preferable in a traditional educational setting where consistency is often valued. However, the experimental group, despite the greater fluctuation, shows a significant overall improvement, suggesting that AI-assisted teaching can be particularly effective for certain students or under specific conditions. The choice between these methods may depend on the specific educational goals and the targeted student population.



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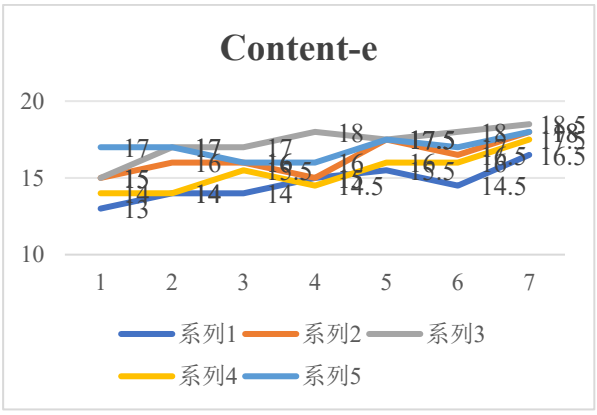

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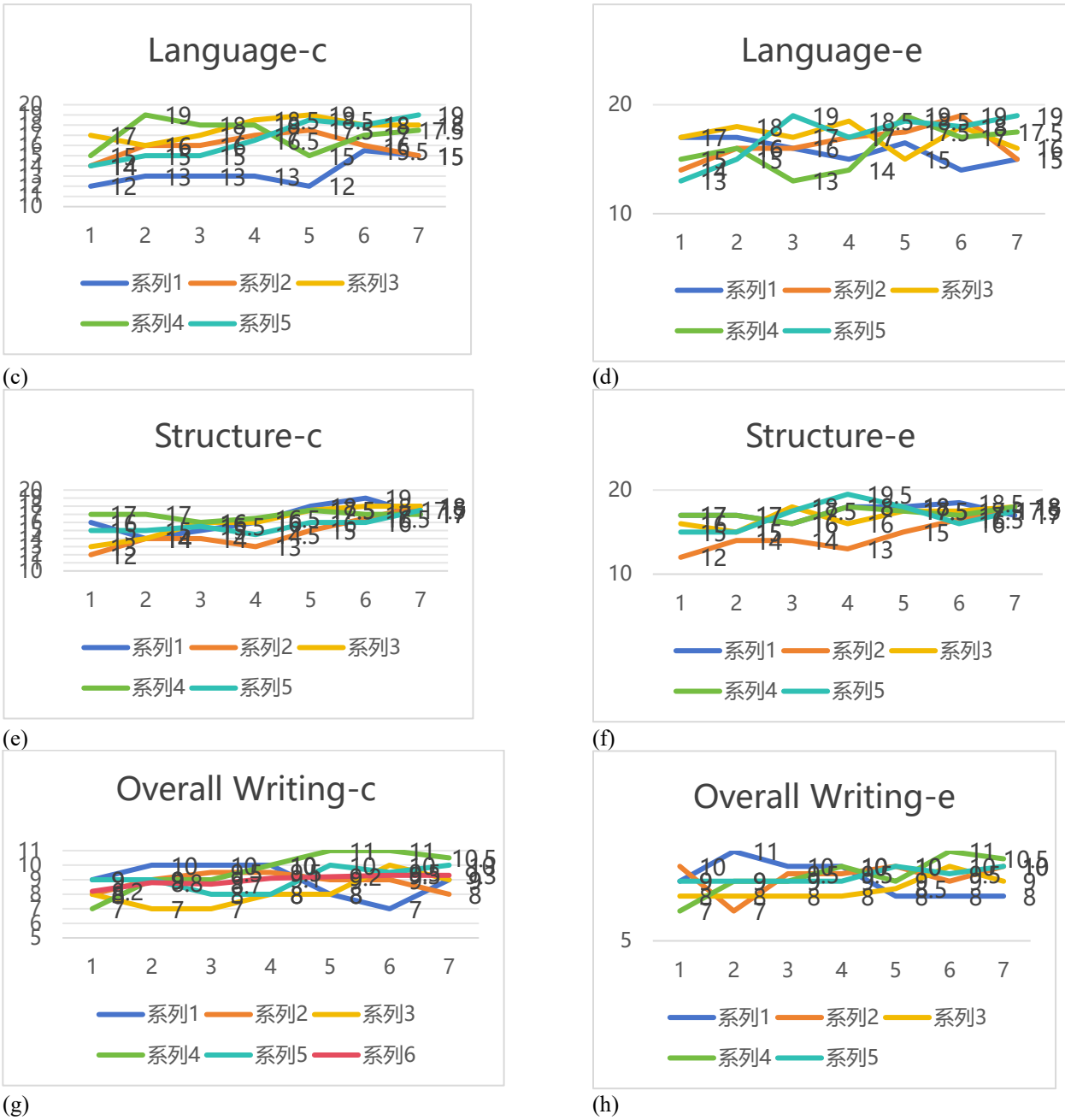

(c) (d) (e) (f) (g) (h)

Figure 1. Test score fluctuation charts

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4.2. Qualitative analysis

4.2.1. Writing skill enhancements

In exploring the impact of AI-assisted writing tools on improving English writing skills, feedback from sample students revealed multiple positive effects. S1 found that the AI tool provided significant help in the use of grammar and sentence patterns, especially in the use of complex sentence patterns, while standardizing the use of words in a particular style. S2 felt that AI's advantage in dealing with grammar and spelling errors enabled it to focus more on the framework and meaning of writing. S3 experienced the role of AI in stimulating creativity and enriching expression, enhancing the creativity and richness of copywriting. S4 felt the improvement in the grasp of article structure and the enrichment of vocabulary expression. S5 believed that AI improved the relevance and structural relevance of the content and made the writing logic clearer. Overall, AI AIDS have provided substantial help to students in improving their writing skills, especially in grammar, word choice, and essay organization.

4.2.2. Recognized advantages of two methods

The sample students had different views on the advantages of AI-assisted instruction versus traditional instruction. S1 believes that the advantages of AI lie in rapid feedback and personalized tutoring, while traditional teaching is based on teacher experience and school choice and has a deep foundation. S2 emphasized that AI teaching materials are comprehensive and rich, while traditional teaching is more "human touch" and humanistic care. S3 prefers AI's personalized demand response, but also points out that the truth and falsity of AI need to be determined by themselves. S4 believes that AI provides immediate feedback while traditional teaching is more accurate and effective. S5 believes that AI can provide timely feedback and is targeted. These views reflect students' different preferences and perceptions of the two teaching methods, with AI-assisted teaching having advantages in immediacy and personalization, while traditional teaching is superior in providing deep personalized feedback and humanistic care.

The sample students had different views on the advantages of AI-assisted instruction versus traditional instruction. S1 and S4 emphasize the advantages of AI in terms of immediate feedback, which is essential to quickly identify and correct errors. S2 and S3 value the humanistic care and personalized guidance in traditional teaching, which is difficult for AI to fully replicate at present. S5's answers show that AI's targeted feedback is a strength, but it also hints at the limitations that AI can have in terms of depth and personalization. Sample students generally believe that both teaching methods have advantages, with AI performing better in immediacy and resource richness, while traditional teaching is superior in deep personalization and humanistic care.

4.2.3. Limitation and consideration

Sample students encountered some challenges and difficulties when using AI-assisted writing tools. S1 mentioned problems with AI understanding instructions, as well as misinformation and word repetition in academic writing. S2 pointed out that domestic AI is inconvenient to use, and the answers are uniform and lack of differentiation. S3 encountered the problem that the AI could not understand the commands and tools and was too human. S4 believed that AI would hinder the development of autonomy and generate results that were not completely accurate. S5 indicated that AI did not improve efficiency and took time to revise the manuscript. These challenges show that despite the convenience provided by AI-assisted writing tools, there are still limitations in understanding user needs, maintaining stylistic consistency, and improving writing efficiency.

The challenges and difficulties encountered by the sample students in using AI-assisted writing tools reveal some of the key limitations of AI tools. The answers from S1 and S4 point to the AI's shortcomings in understanding user needs and generating accurate content, which may be related to the AI's algorithms and training data. The responses from S2 and S3 highlight the challenges of AI in maintaining consistency and personalization of writing style, which may be related to AI's lack of a deep understanding of human emotion and context. S5's answer highlights the limitations of AI in improving writing efficiency, which may be related to the user experience and functional design of AI tools.

4.2.4. Long-term impact and sustainability

The sample students' views on the long-term impact and sustainability of AI-assisted writing tools are as follows. S1 regards AI as a tool to improve efficiency, and believes that traditional teaching can promote stable improvement of writing level. S2 believes that AI plays a "miscellaneous" role and prefers the personalized suggestions and humanistic care of traditional teaching. S3

believes that AI will not take on the role of teacher, preferring to learn through traditional methods. S4 believes that AI will become a learning assistant in the long term, but the focus of learning should be on the subjective initiative of students. S5 sees AI as a technological aid outside of the classroom that contributes to development and progress in the process of self-study. These insights shed light on the supporting role of AI-assisted tools in long-term learning and the importance of traditional instruction in systematic learning and personalized development.

The sample students had different views on the long-term impact and sustainability of AI-assisted writing tools. Responses from S1 and S2 showed that they believe traditional instruction is more effective in improving writing in the long run, possibly because it provides a more systematic learning experience and a deeper level of personalized instruction. Responses in S3 and S4 emphasized the role of AI as an aid rather than as a replacement teacher, suggesting that students recognize the aid role of AI but are also aware of its limitations. S5's answer highlighted the role of AI in assisting the self-learning process.

5. In-text citations discussions

5.1. Discussion of quantitative analysis

The quantitative analysis provides a clear picture of the comparative effectiveness of AI-assisted teaching and traditional classroom teaching on EFL students' writing skills.

The control group's improvement in the content section, as evidenced by the increase in average scores and the decrease in standard deviation, suggests that traditional teaching methods are effective in enhancing students' abilities to develop and organize ideas in writing. This is consistent with the literature that emphasizes the structured and guided nature of traditional instruction, which can lead to steady progress in writing skills.The experimental group's more significant improvement in the same section indicates that AI-assisted teaching may offer additional benefits. The AI's capacity for immediate feedback and personalized suggestions could be particularly useful for students who need more targeted support in developing their content. This aligns with cognitive theory, which posits that immediate feedback can enhance cognitive writing processes such as planning and translating.

The language section scores show a similar pattern, with the experimental group demonstrating a more pronounced enhancement. This could be attributed to the AI's ability to provide specific linguistic feedback, thereby improving students' vocabulary usage and grammatical accuracy. The sociocultural theory suggests that AI tools, as modern cultural tools, can mediate learning and support students in performing tasks beyond their current abilities.

The structure section reveals that the experimental group not only started with a higher average score but also showed a larger decrease in standard deviation. This suggests that AI-assisted teaching might be more effective in helping students understand and apply structural elements of writing. The reduction in standard deviation indicates that while there is variability in individual responses, the AI-assisted method can lead to more focused improvements in writing structure.

The overall writing section scores indicate that both groups made progress, but the experimental group showed a more significant improvement. This aligns with self-regulated learning (SRL) theory, which emphasizes the importance of students taking control of their learning processes. The AI's role in this context could be to provide the tools for students to set goals, monitor progress, and adjust strategies, thereby enhancing their self-efficacy in writing.

The fluctuation in scores across the six post-tests for the experimental group suggests a dynamic learning process. This variability could be due to the AI's ability to adapt to individual learning paces and styles, offering a more personalized learning curve. However, it also suggests that not all students may respond uniformly to AI-assisted teaching, indicating the need for a tailored approach to using AI in education, while the control group's more consistent upward trend with moderate fluctuations suggests a steady but gradual enhancement in writing skills. This is indicative of the stability and reliability of traditional teaching methods, which may be more suitable for students who benefit from a structured and predictable learning environment.

The quantitative analysis indicates that AI-assisted teaching can significantly enhance EFL students' writing skills, particularly in the areas of content development and language use. However, the greater variability in scores for the experimental group may indicate that while AI-assisted teaching can lead to higher peaks in performance, it may also result in more variability, which could be a function of individual student responsiveness to this teaching method. Traditional teaching, on the other hand, provides a more stable and consistent improvement, which might be preferable in educational settings where consistency is valued.

5.2. Discussion of qualitative analysis

The overall feedback from the sample students indicates that AI-assisted writing tools significantly enhance various aspects of English writing skills. AI tools are particularly beneficial in providing grammatical support, aiding in the use of complex sentence structures, and enriching vocabulary and expression. These tools also help students focus more on the higher-order aspects of writing, such as organization and content development, by addressing lower-level concerns like grammar and spelling errors. This suggests that AI can augment students' cognitive writing abilities by facilitating and supporting complex cognitive operations involved in composing text.

The sample students recognize the distinct advantages of both AI-assisted and traditional teaching methods. AI-assisted teaching is valued for its immediacy and personalization of feedback, which is crucial for rapid identification and correction of

errors. Traditional teaching, on the other hand, is appreciated for its depth of personalized feedback and the humanistic care it provides, elements that are currently challenging for AI to replicate fully. This indicates a preference for a blended approach that combines the immediacy of AI with the depth and nuance of traditional teaching.

Challenges encountered with AI-assisted writing tools include difficulties in understanding complex instructions, generating accurate content, maintaining stylistic consistency, and enhancing writing efficiency. These limitations suggest that while AI tools offer convenience, they may not yet be adept at capturing the complexities of human communication and the sociocultural context of language use. This points to the need for further development of AI tools to ensure they can provide more nuanced and contextually appropriate support.

The sample students' views on the long-term impact of AI-assisted writing tools suggest a complementary role for AI in language learning, rather than a replacement for traditional teaching. AI is seen as a supportive tool that can enhance efficiency and self-learning outside the classroom, while traditional teaching remains vital for systematic learning and personalized development. This indicates that the long-term sustainability of AI-assisted tools lies in their ability to augment, rather than supplant, human-led instruction.

6. Conclusion

This study aims to explore the impact of traditional and artificial intelligence (AI)-assisted approaches on students' English writing proficiency, with a focus on task-based writing. Quantitative results indicate that while both traditional classroom instruction and AI-assisted teaching objectively and positively affect students' writing, the latter demonstrates a more potent capacity for enhancement and promotion. AI-assisted teaching enables students to achieve higher levels of performance and assessment outcomes in writing elements such as content, language, and structure. Concurrently, it is observed that traditional methods possess a stronger ability to steadily facilitate students' improvement in writing proficiency. In the qualitative analysis, the study delves deeper into the attitudes and perceptions of the sample students towards the two teaching modalities through interviews and discussions. Learners uniformly display critical thinking and creative contemplation in the interviews, allowing us to gain insights into the respective strengths and limitations of both learning modes and to understand the unique roles AI assistance plays in enhancing learners' writing skills.

These investigations and analyses are beneficial for fostering a closer integration of traditional classrooms with new technologies in modern educational paradigms. For educators and policymakers, the effective use of AI tools can serve as a significant source of inspiration for promoting educational reform and innovation. On one hand, it provides personalized services tailored to each student's needs. On the other hand, AI assistance grounded in traditional teaching can better achieve the instructional goals of teachers and curricula while maintaining systematic teaching approaches. For learners, as mentioned by the sample students in the interviews, everyone may encounter weaknesses and deficiencies in the process of learning English writing. AI assistance can provide needed information and suggestions to students anytime, anywhere, without the constraints of time and space, significantly enhancing their learning efficiency. It can also offer timely and accurate learning records and feedback, which are effective and of significant importance in the writing learning process and the broader language learning journey.

However, the paper must acknowledge certain limitations. Firstly, the scope of the sample selection, the number of experiments conducted, and the duration of the experiments are relatively limited, which restricts the generalizability of the results. Additionally, during the data analysis process, the author employed relatively simple data processing methods for quantitative analysis, eschewing more sophisticated methods such as ANOVA and independent samples t-tests that are commonly used in similar studies. This results in a more rudimentary data analysis section that lacks in-depth analysis. It is also worth noting that the sequential design of the quantitative experiment may lead to the experimental results of the control group in the first three weeks impacting the writing outcomes of the experimental group in the subsequent three weeks, casting doubt on the validity of the experiment.

The study's findings have several implications for educational practice and policy. Firstly, the potential of AI-assisted teaching to enhance writing skills suggests that educators can integrate these tools into their curriculum to provide additional support for students, especially in areas such as grammar and vocabulary. Secondly, the recognition of the complementary roles of AI and traditional teaching implies that a hybrid approach may be most beneficial, allowing for the customization of learning experiences that cater to individual student needs.

The study also underscores the importance of teacher training in the effective use of AI tools and the need for continued research into the optimal integration of AI into language teaching and learning. Policymakers and educational administrators should consider the resources required to support this integration, including professional development for teachers and the infrastructure to support AI-assisted learning environments.

In conclusion, the study presents a snapshot of the dynamic interplay between AI-assisted and traditional teaching methods in EFL writing instruction. While AI-assisted tools show promise in enhancing certain aspects of writing skills, the human element of teaching remains indispensable. Future research should continue to explore the long-term effects of AI integration in language learning and the development of more inclusive and effective teaching practices that harness the potential of AI while preserving the essential human touch in education.

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