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Timely introduction of AI teaching practices: an auxiliary tool for Chinese proposal writing

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ABSTRACT

The rapid adoption of artificial intelligence (AI) is reshaping Chinese writing instruction in higher education, posing the risk of over-reliance on AI-generated text and exposure to biased content. To address these issues, this study applied scaffolding learning theory to design a writing instructional approach. This approach first uses scaffolding instruction to develop students' foundational skills and then integrates iterative proposal writing with human-computer interaction using ChatGPT. Over a semester, more than 100 undergraduate students from three departments participated in a university writing course focused on event proposals. Students first wrote their own drafts, which were then refined through AI-assisted optimization. Two versions of the teacher evaluations were analyzed using statistical package for the social sciences (SPSS). A valid sample of 139 students revealed that novice writers benefited most from structured support, achieving above-average writing proficiency. Later, in-depth ChatGPT interaction led to higher-level content acquisition. This study confirms that combining scaffolding with guided AI can improve learning outcomes. This integrated scaffolding and AI instructional approach can foster independent writing skills and reduce inappropriate reliance on AI.

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1. INTRODUCTION

A study conducted by the Massachusetts Institute of Technology (MIT) demonstrated that ChatGPT reduced writing time by an average of 40% while significantly improving output quality by 18% [1]. The study also indicated that feedback provided by ChatGPT can enhance learners' writing skills [2]. In the professional business world, customized proposals are often essential tools for addressing problems, expanding operations, developing clientele, securing sponsorships, enhancing marketing efforts, and fostering innovation. Therefore, learning to draft proposals in university writing courses helps students develop critical thinking and problem-solving skills. In this context, learning to use artificial intelligence (AI) as an important support tool is also crucial.

Many scholars are working to explore the potential impact of large-scale language models of AI on skills such as writing [3], while taking into account the ethical issues and practical challenges that may be faced [4]. Regarding the application of ChatGPT in writing teaching, can it improve students' writing ability? Some scholars are cautious and believe that it should be re-examined [5]. However, there are also studies that support its use, believing that it has a positive impact on students' writing motivation, self-efficacy and

participation [6]. Scholars believe that when ChatGPT is used as a writing aid, meta-cognitive awareness and critical thinking skills should be strengthened [7].

In terms of writing creativity, some studies have shown that ChatGPT can inspire writing inspiration and enhance human writing creativity [8]. However, the application of generative AI (GenAI) in creative writing should reconceptualize the attribution of creativity to human and non-human subjects [9]. Although in the field of literary creation, ChatGPT cannot replace the author's personal experience, knowledge, intuition, and reflection, it has considerable application potential and has become a valuable tool for writers to provide concept development, supporting materials, summaries and creative writing [10].

How to appropriately integrate AI into the educational process to enhance teaching effectiveness, while also promoting more creative applications of AI in instruction, deepening learning, and fostering learners' growth, has become an important topic of discussion. Scholars have explored this issue from multiple perspectives in educational research. However, incorporating AI assistance in the writing process has shown positive effects on aspects such as textual organization, coherence, grammar, and vocabulary [11]. However, discussions from the students' perspective highlight both advantages and disadvantages. At the same time, there are concerns about learners becoming overly dependent on AI [12].

While AI represented by ChatGPT demonstrates significant pedagogical potential, it is not without limitations [13]. Before adopting ChatGPT in higher education, both instructors and students must develop the ability to discern potential biases or inappropriate content in AI-generated outputs [14]. Consequently, AI-assisted teaching necessitates the prior development and implementation of new pedagogical strategies [15]. Furthermore, scholars maintain that AI cannot replace the role of educators in the teaching process nor alter the fundamental nature of education [16].

To address the potential challenges of diminished learning ability or over-reliance on AI in human-computer interaction, this study strategically employed scaffolding theory to construct a writing foundation. This approach facilitates the integration of ChatGPT as a human-computer interaction tool into university-level writing courses, thereby more constructively improving writing skills. Although research on the collaborative application of scaffolding theory and ChatGPT as a Chinese writing support tool remains limited, this study aims to explore how GenAI tools can be appropriately utilized to improve instruction and support students' learning of potential Chinese writing instructional models.

2. LITERATURE REVIEW

2.1. Basic knowledge of writing should be acquired before using AI to assist writing

Faced with AI-generated tools that significantly improve writing efficiency, research shows that university teachers are increasingly expected to have a deep understanding of tools such as ChatGPT and actively promote their use [17]. How to consciously integrate digital literacy into curriculum design and redefine learning objectives and teaching processes is crucial to meeting the ever-changing needs of learners [18]. At the same time, academic research emphasizes that teaching design must help students understand the basic principles and techniques of text writing so that they can effectively guide ChatGPT to complete relevant tasks [19]. In addition, scholars have proposed that the integrity of AI-generated content must be avoided, such as generating redundant or false information, which may hinder the development of learning ability and lead to superficial learning [20]. It can be seen that how to appropriately use ChatGPT as a writing auxiliary tool to help students consolidate newly learned knowledge and thus improve writing results is a key issue.

2.2. Using scaffolding theory as a framework for writing instructional design

2.2.1. Using scaffolding theory to strengthen basic writing skills

For learners with insufficient learning motivation or learning ability, this study adopts the framework of constructivist learning theory to help students understand the basic concepts and writing principles of activity planning through a dynamic practice process to shape and construct knowledge. The scaffolding theory was proposed by Wood *et al.* [21] in 1976 and mainly provides teaching strategies to guide students' learning when they acquire new skills or new concepts. The characteristics of this method are that after assessing the students' learning starting point, teachers break down or simplify the learning content according to the target tasks, highlight the key points, and guide students through demonstrations or explanations. This reduces the learning burden (reduces the degree of freedom) and enables students to focus and engage in learning more effectively [22]. Like scaffolding in a building, the theory provides systematic and step-by-step support. After students master the basic skills, they are expected to use what they have learned to independently expand their potential and complete related tasks [23], [24].

2.2.2. Scaffolding theory proposes expanding learners' proximal development zone

The scaffolding theory further expands the learner's development potential, which echoes the concept of the "zone of proximal development (ZPD)" proposed by Vygotsky [25]. The ZPD represents the gap between the learner's ability to complete tasks independently and the level achieved with further guidance. However, whether the learner can make progress depends on the degree of development of his or her potential [26]. At this stage, the instructor must adopt appropriate teaching strategies and provide effective learning resources [27]. Gradually transfer the responsibility of learning to the learner, helping the learner to enter the ZPD, develop a certain degree of autonomy, and cultivate adaptability and ideal writing skills. Scholars point out that digital technology can enhance students' thinking and problem-solving abilities [28] and improve the quality and efficiency of copywriting [29]. However, learners must first prepare basic writing skills to help them judge whether the content generated by ChatGPT is accurate, thereby avoiding the problem of ambiguous information being misunderstood or plagiarized [30], [31]. This study introduced an AI-assisted optimization step after the learners completed the initial writing results, which is an attempt to expand the proximal development zone.

3. METHOD

This study aimed to answer the following questions:

i) Does a scaffolding approach help students build fundamental cognitive understanding based on the activity plan, thereby achieving a certain level of writing proficiency?
ii) Can students provide appropriate instructions to the AI, specifically demonstrating its effectiveness in further optimizing their writing outcomes?

3.1. Research subjects

The research subjects were first-year students at a private university in Central Taiwan. The study included 68 students from the Department of Architecture, 62 from the Department of Marketing, and 39 from the Department of Air Transportation, for a total of 169 students. Due to factors such as absenteeism and incomplete data, the final valid sample consisted of 56 students from the Department of Architecture, 48 from the Department of Marketing, and 35 from the Department of Air Transportation, for a total of 139 students. Students in the Department of Architecture showed the highest level of learning motivation, followed by those in the Department of Marketing. Students in the Department of Air Transportation showed the lowest level of learning motivation, often experiencing mental fatigue and a lack of participation.

3.2. Data collection

This methodology outlines a structured, scaffolded process for developing practical writing skills, integrating direct instruction, collaborative learning, and iterative refinement with AI tools. As shown in Table 1, teachers will grade the essay twice, using a three-dimensional scoring system (5-6 points for excellent, 3-4 points for average, and 1-2 points for failing). Students will be graded based on the originality of their topic (whether it is engaging), the completeness of their structure (specificity and feasibility), and the clarity and conciseness of their language. Figure 1 presents the data collection process.

Table 1. A three-week framework for AI-assisted writing development

Step	Objective	Activities	Illustrate
Phase 1: foundational Instruction and Scaffolded Initiation (week 1)	Establish core writing principles and initiate the writing task with guided support.	Direct instruction	The instructor explicates key writing techniques and conventions using exemplar texts.
		Collaborative verification	Learners engage in small-group discussions to reinforce comprehension of the instructional content.
		Guided application	With instructor scaffolding, learners sequentially begin the writing task, starting with a manageable component (e.g., the title section).
Phase 2: draft completion and AI tool exploration (week 2)	Critically revise the draft based on feedback and AI-generated input to enhance quality, feasibility, and professionalism.	Draft finalization	Learners complete their initial drafts based on the previous week's work.
		AI integration training	The instructor provides guided practice in formulating prompts for the AI tool. Applications include brainstorming activity themes, researching practical details (e.g., budget), and identifying potential activity benefits.
Phase 3: iterative refinement and AI-assisted revision (week 3)	Critically revise the draft based on feedback and AI-generated input to enhance quality, feasibility, and professionalism.	Formative feedback	The instructor evaluates the first draft, providing targeted feedback on content, grammar, and structure.
		AI-augmented revision	Learners independently use the AI tool to supplement and refine their drafts. Revisions are explicitly documented (e.g., using colored annotations) to track changes.
		Submission for re-evaluation	The revised drafts, optimized with AI assistance, are submitted for a second-round evaluation, completing one full cycle of the iterative writing process.

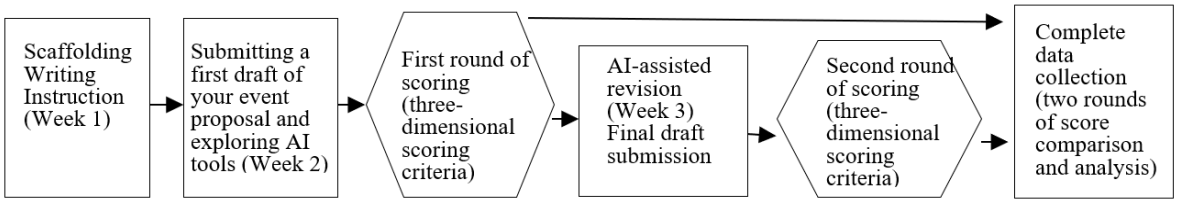

Figure 1. Process of data collection

3.3. Data analysis

A total of 139 valid samples were collected for this study. Statistical analysis was conducted using statistical package for the social sciences (SPSS) statistical software based on pre- and post-assessment data from teachers on writing outcomes.

3.3.1. Reliability analysis

Reliability analysis of the pre- and post-test data showed that the correlation coefficients between the items and the total score were all above 0.64 (0.666 and 0.647, respectively), indicating a high degree of consistency with the scale as a whole and a significant contribution to its reliability.

3.3.2. Mean and standard deviation

The pre-test average score of students' writing performance was 4.314. These data indicates that scaffolded writing instruction helped students achieve a certain level of writing proficiency. Furthermore, the post-test average score was 5.260, an increase of 0.946 points after AI-assisted optimization.

3.3.3. Independent sample t-test

As shown in Table 2, based on the results of the independent sample t-test, Levene's test for homogeneity of variance and t-test for homogeneity of means were conducted on the pre- and post-analysis data. The results showed a significant difference between the two groups ($p<0.05$). However, the difference for "AI-assisted optimization" was significant ($p\approx0.05$). This suggests that while using AI for text optimization may have potential benefits, the effectiveness of such improvements has not been clearly or conclusively demonstrated and requires further research.

Table 2. Independent samples t-test results

Variable	Assumption	Levene's F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. Error difference	95% confidence interval of the difference
Guided writing	Equal variances assumed	0.567	0.453	-2.501	137	0.014	-0.4060	0.1624	[-0.7270, -0.0850]
	Equal variances not assumed			-2.522	135.704	0.013	-0.4060	0.1610	[-0.7243, -0.0877]
AI-assisted optimization	Equal variances assumed	2.287	0.133	-1.950	137	0.053	-0.2823	0.1447	[-0.5685, 0.0040]
	Equal variances not assumed			-1.931	126.289	0.056	-0.2823	0.1462	[-0.5715, 0.0070]

3.3.4. Bivariate analysis

As shown in Table 3, a positive correlation (coefficient of +0.702) was observed, indicating a strong positive correlation between scaffolding and using AI-assisted optimization. Notably, the two-tailed significance (Sig. 2-tailed) was 0.000, or $p<0.01$, indicating a high statistical significance for this correlation. This result suggests that individuals who actively engage in scaffolding are more adept at AI-assisted optimization, potentially reflecting a greater acceptance of new technologies or a tendency to pursue higher efficiency and quality.

3.3.5. Regression model summary

As shown in Table 4, the overall model was statistically significant ($p=0.046$), reaching a meaningful level of statistical significance. The corresponding F-test value $(2, 136)=3.150$ further supports this significance. However, the effect sizes were limited ($R^2=0.044$, Cohen's $f^2\approx0.046$), with R^2 indicating

that only 4.4% of the variance was explained, suggesting relatively weak explanatory power. The standard error of the estimate was 0.492, which may indicate a moderate level of prediction error in the model. Although the overall explanatory power of the instructional design is limited, it remains statistically significant. This suggests that the teaching process from "scaffolded instruction" to "AI-assisted optimization" still has some influence on learners' copywriting outcomes.

Table 3. Correlation analysis

Correlation	Scaffolded instruction and writing	AI-assisted optimization
Pearson correlation	1	0.702**
Sig. (2-tailed)	–	0.000
N	139	139
Pearson correlation	0.702**	1
Sig. (2-tailed)	0.000	–
N	139	139

**p<0.01

Table 4. Model summary

Model	R	R square	Adjusted R square	Std. error of the estimate	R square change	F change	df1	df2	Sig. F change
1	0.210a	0.044	0.030	0.492	0.044	3.150	2	136	0.046

4. DISCUSSION

4.1. Scaffolding teaching helps improve writing skills

For students with low writing motivation, scaffolding teaching strategies focus on detailed guidance, which helps learners understand and progress, and ensures that the first draft demonstrates certain writing skills [32], thereby making the average score higher than the median.

4.2. ChatGPT demonstrates effectiveness in optimizing writing outcomes

Scholars have pointed out that AI tools can indeed provide personalized support and interactive learning experiences [33], which can enhance active learning and enable students to more effectively identify areas that need revision. This can strengthen metacognitive writing skills and transform AI into a valuable partner in the writing process [17]. Therefore, this study shows that ChatGPT is effective in optimizing writing outcomes. Although in the second round of evaluation, it was found that students with a low-to-medium level (score ≤4 points) were less persistent in asking questions repeatedly, and students with a medium or higher level were more active, overall, it still demonstrated effectiveness.

4.3. AI-assisted writing can help reduce writing frustration

This study also found that AI-assisted writing can reduce the frustration learners experience when they have vague concepts, limited vocabulary, or lack inspiration [34]. This allows them to complete content without blank, rough, incomplete, or misspelled content. However, efforts should also be made to study how to avoid the problem that AI tools may cause learners to stop learning or weaken their intelligence [35].

4.4. AI-assisted writing should improve application literacy

Many studies have shown that AI tools can be a valuable resource for improving writing instruction [36]. This study found that it is important to cultivate students' relevant application literacy. This is because developing writing education that meets students' contemporary needs [29] can indeed make the acquisition of writing skills easier and faster [37]; and improve language accuracy, content summarization, and creative writing ability [38]. However, there are still potential differences and contradictions in the application of AI tools in writing [39]. Further research is needed in related areas such as skills, cognitive development, knowledge acquisition, and learning motivation [40], as well as exploring potential ethical issues that may arise [19] and possible solutions such as integrity issues [41].

4.5. Writing instruction should still focus on basic cognition

The core intention of this teaching research is that before introducing AI as a writing aid, it is necessary to establish basic academic cognition so that learners can maintain a dominant position in human-computer interaction and achieve people-oriented writing goals. In addition to focusing on how to combine AI functions with specific learning needs [42], it is actually more important to emphasize personal participation and independent thinking in the process of human-computer interaction [43]; how to develop effective teaching strategies to cope with the challenges brought by AI [44]. In this process, the role of

teachers should be redefined and teachers' professional development should be continuously promoted to overcome current obstacles [45].

5. CONCLUSION

Many studies have explored the application of AI in writing, but few have combined scaffolding with AI for Chinese copywriting. This study's results suggest that scaffolding can indeed improve students' writing skills, and fostering their use of the ChatGPT tool also offers room for further optimization. However, this study also identified some limitations. For learners with stronger writing skills, more targeted human-computer interaction guidance should be provided to meet their needs, helping them further develop their creative thinking and create more distinctive and engaging activity proposals. Furthermore, to prevent students from the over-reliance on AI, teachers recommend training them on effective prompts and requiring them to record their revisions and reflections to monitor their learning trajectory. Furthermore, students should learn to identify potential errors and distortions in AI-generated content. Developing multimodal assignments that allow students to integrate digital or multimedia skills in their creations can further reduce the risk of plagiarism.

The impact of AI on student writing skills warrants long-term exploration. This will allow for more precise observation of the development of students' independent writing skills, critical thinking, and in-depth creative expression after using AI-assisted writing. Future research could also test AI collaboration models across a wider range of writing styles to understand both the versatility and limitations of AI-assisted writing, thereby exploring potential teaching strategies for diverse genres. Furthermore, the effectiveness of integrating AI collaboration with other teaching methods could be explored.

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Tsui-Feng Huang	✓	✓			✓	✓	✓		✓		✓	✓	✓	✓
Sheng-Chieh Chou	✓	✓	✓	✓	✓		✓	✓		✓	✓			

C : **C**onceptualization
M : **M**ethodology
So : **So**ftware
Va : **Va**lidation
Fo : **Fo**rmal analysis
I : **I**nvestigation
R : **R**esources
D : **D**ata Curation
O : Writing - **O**riginal Draft
E : Writing - Review & **E**diting
Vi : **Vi**sualization
Su : **Su**pervision
P : **P**roject administration
Fu : **Fu**nding acquisition

CONFLICT OF INTEREST STATEMENT

No potential conflict of interest was reported by the authors.

DATA AVAILABILITY

The data that support the findings of this study and will be available upon request.

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