24 - Enhancing business Chinese writing with AI: A comparative analysis of independent and collaborative writing outcome

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Abstract

As artificial intelligence (AI) tools increasingly integrate into education, their role in enhancing business communication skills warrants investigation. This study examines the impact of AI-assisted writing, focusing on business Chinese courses at a Hong Kong university. Third- and fourth-year students in accounting and finance were divided into control and experimental groups: one completed tasks independently, while the other used AI tools like ChatGPT to generate drafts and refine them. The study evaluates the outputs based on grammatical accuracy, communicative effectiveness, and situational awareness, alongside an analysis of students' interactions with AI. Findings reveal that AI-assisted students demonstrated improved organization, grammar, and situational awareness but often struggled to align AI-generated texts with the intended communicative purpose. Revision of drafts highlighted gaps in logical thinking, linguistic proficiency, and practical experience. The study underscores the potential of AI tools in improving writing skills while emphasizing the importance of structured revision and critical thinking in teaching strategies. Recommendations include integrating AI tools into curricula to optimize their benefits and preparing students for professional business communication.

Keywords: AI-Assisted Writing, Business Communication, Business Chinese, Revision Strategies, Generative AI

1. Introduction

With the rapid development of artificial intelligence (AI) and its integration into the global economy, efficient business communication has become a cornerstone of corporate success. Business letters, as a widely used form of communication, require precise language, professional formatting, and clarity—elements that significantly impact the transmission of information and corporate image. In university education for business majors, business Chinese writing is a critical skill. However, traditional teaching methods, which rely on manual writing, example analysis, practical exercises, and teacher feedback, are often time-consuming and may fail to address the demands of modern professionals.

Al technology offers transformative possibilities for business communication. Tools leveraging natural language processing can generate initial drafts, adjust text style and tone, and significantly enhance writing efficiency. They also provide grammar and structural suggestions, enabling students to effectively revise and refine their work. Understanding the distinctions between Al-assisted and traditional manual writing is essential for improving teaching methods and preparing students to excel in a competitive, technology-driven workplace.

This study investigates the effectiveness of AI tools in business letter writing, with a focus on improving efficiency and teaching outcomes. By assigning students to experimental and control groups, it compares performance in business letter writing tasks completed with and without AI assistance. Through text analysis and performance evaluation, this study assesses the practicality of AI-generated drafts and their potential impact on business communication and business Chinese writing instruction.

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2. Significance of the Study

2.1 The Importance of AI in Writing Instruction

Generative AI tools, powered by deep learning models, have shown remarkable capabilities in understanding and generating natural language texts, finding extensive applications across societal domains. These tools reduce the burden of communication by comprehending and responding to basic user needs. From automated customer service interactions to drafting documents such as resumes, reports, and business letters, AI is revolutionizing traditional practices. In the educational sector, these tools have demonstrated significant potential.

Al tools provide instant grammar, spelling, and style suggestions, offering personalized feedback that enhances learning efficiency and writing skills (Vall & Araya, 2023). They promote autonomy by tailoring exercises to students' proficiency levels (Haristiani, 2019), a benefit that extends to Chinese language learning (Fu et al., 2020). These tools not only support skill development but also make writing tasks more engaging and accessible.

Al-assisted writing has been shown to improve writing structure (Gayed et al., 2021) and stimulate interest (Alharbi, 2023). Many users report that these tools boost confidence and streamline communication, reducing the time spent drafting while allowing greater focus on revisions (Coman et al., 2024; Shakked & Zhang, 2023). However, concerns remain regarding the accuracy of Al-generated content and risks of over-reliance.

In educational contexts, AI tools excel at producing grammatically correct texts, prompting educators to rethink the role of grammar instruction in writing classes. Strategic integration of AI can enhance grammatical accuracy and overall proficiency. However, AI-generated texts often fall short in addressing complex business logic, subtle communication etiquette, and cultural nuances, which are critical in business communication. Educators must focus on teaching these elements to address the limitations of AI tools and ensure students are prepared for real-world applications (Coman et al., 2024).

2.2 The Significance of Revision in Improving Writing Skills

Revision is a critical step in the writing process and a key component of developing strong writing abilities. It involves not only refining grammar and word choice but also improving expression and structure. Systematic revision instruction significantly enhances writing quality, particularly in academic contexts (Wischgoll, 2017). Purposeful revision exercises help students refine grammar, vocabulary, and overall structure, making them essential for academic and professional writing.

In business writing instruction, revision helps students convey information clearly and effectively. By re-examining and refining their work, students learn to identify and correct errors, improve sentence structure, and optimize information transmission.

Yuknis (2014) highlights that revision requires advanced skills, such as distinguishing between purposes and meanings, correcting errors, adding information, and adjusting tone. Integrating revision into writing education fosters critical thinking, enhances writing skills, and elevates text quality. A structured revision process enables teachers to better support students in improving their writing, deepening their understanding of communication contexts, and becoming independent, proficient revisers.

3. Research Methodology

3.1 Research Design

This study employs a randomized assignment to form experimental and control groups with the aim of comparing the effectiveness of traditional business letter writing (control group) and Al-assisted letter writing (experimental group) on student learning outcomes. The participants are university juniors and seniors enrolled in a Business Chinese course, with majors including Accounting

and Finance. To ensure the accuracy of the experiment, the students in both groups have similar scores on their language proficiency tests.

Thirty students participating in this study are randomly assigned to two groups, with 15 students in each group. Group A (control group) independently completes the writing of a business invitation letter; Group B (experimental group) uses AI tools to generate a draft, which the students then revise to complete the text. Additionally, Group B students are required to submit the full interaction record with the AI tool (the choice of AI tool is not restricted).

Before the study begins, all students will attend a lecture on business letter writing. The lecture will cover communication contexts and letter content, letter formatting, language features, and writing structures. The instructor will also explain the grading criteria (see Appendix). Concurrently, the instructor will provide an additional 30-minute training session on AI tool usage for Group B, introducing basic questioning techniques and text revision methods.

One week later, the instructor will ask students from both groups to complete a business invitation letter of no more than 600 words within 90 minutes. The writing task will provide a specific communication context, including the type of letter, the identities of the sender and recipient, and relevant background information. This information will be presented in dialogue form, requiring students to extract useful information from the conversation records to complete their writing.

3.2 Data Collection and Revision Marking

All submitted essays will be graded according to pre-established criteria, which cover three aspects: content, language, and structure. Additionally, this study categorizes revision behaviors into eight types based on behavior and purpose.

Revision	Error	Error Type Description	Specific Explanation
Attribute	Code		
Behaviour	А	Addition	Adding words, phrases, or sentences
	D	Deletion	Deleting words, phrases, or sentences
	V	Movement	Moving words or phrases
	R	Replacement	Completely replacing a word in the text with another
			word or phrase of equivalent function
Purpose	G	Grammar and Language	Grammar errors, sentence structure, language fluency
	L	Logic and Coherent	Connections and coherence of text paragraphs and
			ideas
	F	Information Accuracy	Accuracy of facts, data, and citations
	S	Style and Identity awareness	Text style suitable for specific readership and writing
			purposes

Table 1 - Revision Types

Subsequently, the study will classify the revisions made by Group B students based on the Algenerated drafts. The frequency and count of revisions will be recorded to understand how students interact with Al tools and their revision strategies

4. Data Analysis

First, this study calculates the mean and standard deviation of the overall scores, content, language, and structure for both Group A and Group B. An independent samples t-test is then conducted to determine whether there are statistically significant differences between the scores of the two groups.

Second, to evaluate the effectiveness of AI-assisted practical writing and understand the correlation between revision types and text performance, the texts from Group B are subjected to correlation and regression analyses. This aims to determine whether there is any systematic relationship between the two.

Additionally, the study considers the students' proficiency in using AI tools, including their ability to articulate commands, pose questions, and make requests, as well as the quality of the AI-generated drafts and the impact of the revision process.

Through the above analyses, this study aims to comprehensively assess the effectiveness of Alassisted practical writing and explore the potential application of AI tools in writing instruction.

4.1 Data Results

4.1.1 Descriptive Statistics of Evaluation Scores

This study analysed the performance of Group A and Group B's essays across four evaluation categories: overall score, content, language, and structure. The results are presented in Table 2.

Category	Group A (Mean± Standard Deviation)	Group B (Mean± Standard Deviation)
Content	30.1 ± 2.1	30.6 ± 1.8
Language	22.0 ± 1.2	23.0 ± 1.4
Structure	22.6 ± 1.2	23.1 ± 1.5
Total	74.7 ± 3.9	76.7 ± 4.4

Table 2 - Descriptive Statistics of Scores
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As shown in Table 2, Group B's average scores in all categories surpass those of Group A, with the most notable differences in language and structure. This indicates that using AI-generated drafts followed by student revisions may outperform independent writing in specific areas. The AI drafts likely offer a stronger starting point, encouraging students to focus on structural coherence and information sufficiency.

In contrast, Group A's texts display several deficiencies, including vague identity and context awareness, lack of content detail, verbose language, grammatical errors, and weak coherence and paragraph structure. Group B's final drafts suggest that AI-generated content can improve language fluency and prompt students to enhance paragraph structure and stylistic appropriateness.

However, Group B's scores show significant variance, indicating that while AI tools can elevate text quality, performance remains inconsistent. This may stem from over-reliance on AI drafts or ineffective revisions. While some students effectively refined the AI-generated content, others struggled, highlighting differences in language organization skills and revision proficiency.

4.1.2 Differences in Students' Scores Between Groups

This study used the t-test method to analyze whether there are significant differences in the average scores of content, language, structure, and overall scores between Group A and Group B (p < 0.05). The results (see Tables 3, 4, and 5) show that there is a statistically significant difference in language expression between the two groups. This suggests that AI-assisted drafts combined with human revisions are more effective in improving the quality of language expression. However, this may also be influenced by the students' language abilities, such as the accuracy of word choice, conciseness of expression, adherence to the stylistic features of practical writing, and considering the writer's identity and language environment.

In other aspects, the differences are not significant, which may be related to the sample size and other factors affecting text performance, such as the students' revision skills.

	Group A	Group B	
Mean	74.56	76.93	
Variance	15.05	19.38	
Observations	15.00	15.00	
Pooled Variance	17.22		
Hypothesized Mean Difference	0.00		

Table 3 - t-Test Results for Overall Scores of Group A and Group B

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Degrees of Freedom	28.00	
t Statistic	(1.57)	
P(T<=t) One-Tail	0.06	
Critical Value: One-Tail	1.70	
P(T<=t) Two-Tail	0.13	
Critical Value: Two-Tail	2.05	

Table 4 - t-Test Results for Content Scores of Group A and Group B

	Group A	Group B
Mean	30.11	30.84
Variance	4.48	3.29
Observations	15.00	15.00
Pooled Variance	3.88	
Hypothesized Mean Difference	0.00	
Degrees of Freedom	28.00	
t Statistic	(1.01)	
P(T<=t) One-Tail	0.16	
Critical Value: One-Tail	1.70	
P(T<=t) Two-Tail	0.32	
Critical Value: Two-Tail	2.05	

Table 5 - t-Test Results for Language Scores of Group A and Group B

	Group A	Group B
Mean	21.95	22.98
Variance	1.43	1.85
Observations	15.00	15.00
Pooled Variance	1.64	
Hypothesized Mean Difference	0.00	
Degrees of Freedom	28.00	
t Statistic	(2.20)	
P(T<=t) One-Tail	0.02	
Critical Value: One-Tail	1.70	
P(T<=t) Two-Tail	0.04	
Critical Value: Two-Tail	2.05	

Table 6 - t-Test Results for Structure Scores of Group A and Group B

	Group A	Group B
Mean	22.49	23.11
Variance	1.39	2.15
Observations	15.00	15.00
Pooled Variance	1.77	
Hypothesized Mean Difference	0.00	
Degrees of Freedom	28.00	
t Statistic	(1.28)	
P(T<=t) One-Tail	0.11	
Critical Value: One-Tail	1.70	
P(T<=t) Two-Tail	0.21	
Critical Value: Two-Tail	2.05	

4.1.3 Analysis of Revision Types

This part analysed the revision behaviours of two groups of students in their writing, including addition(A), Deletion (D), Component Replacement (V), Movement (R), Language and Grammar (G), Logic and Coherence (L), Informational Accuracy (F), and Style and Sense of Identity (S), and collected data on a total of 840 revisions. The absolute number and percentage of amendments in each category are shown below:

Table 7 - Frequency of Modified Behavior in Group B

Revision Type	Frequency	Percentage	
Behavioural Revisions			
Addition	192	22.9%	
Deletion	122	14.5%	
Movement	21	2.5%	
Replacement	100	11.9%	
Purpose Revisions			
Language and Grammar	116	13.8%	
Logic and Coherence	71	8.5%	
Information Accuracy	87	10.4%	
Style and Identity Awareness	131	15.6%	
Total	840	100%	

The statistical results showed that, first, adding revisions (A) was the most common type of revision, indicating that students added more content to the AI text to improve the completeness and richness of the text, but also in some ways helping to generate a text with insufficient information. Second, revisions on stylistic style were also more frequent, which may reflect that students were more concerned about the relationship between discourse, identity awareness, and stylistic style than they were when writing independently. Third, the high proportion of deletion (D) revision behaviours and language and grammar (G) revisions may indicate that the AI-generated first drafts were not good enough in terms of word usage and expression, which may be related to how students guided the AI-generated texts to explicitly state the requirements regarding language expression in business correspondence. At the same time, students did not often use move (V) as a revision method or were influenced by revision shabits. Some of them tended to delete the text and use the whole-sentence transcription as a revision strategy. This indirectly led to a higher number of additions (A) and deletions (D). Finally, fewer revisions were made to the logic and contextualization of the essays, which may reflect that the AI-generated first drafts performed better in this aspect, and that the revisions in this area required more logical thinking skills from the students themselves.

It can be seen that AI tools are effective in generating first drafts and assisting business letter writing, prompting students to pay more attention to the validity of the content, as well as the relationship between context and identity awareness and the text, but the effectiveness of the students' use of AI tools and the appropriateness of their revision behaviours remain to be explored.

4.1.4 The relevance of the revised behaviour to the presentation of the text

According to the results of linear regression analysis, there is a significant positive relationship between the number of revisions and scores. Specific results are as follows:

Source	Degrees of	Freedom	SS		MS	F	Signifi	cance F
Regression	8		231.25		28.91	4.32	0.04	1556
Residual	6		40.12		6.69			
Total	14		271.37					
Variable	Coefficient	Standard Error	t-Statistic	P-Value	Lower 95%	Upper 95%	Lower 95.0%	Upper 95.0%
Intercept	70.74	2.28	31.06	0.00	65.16	76.31	65.16	76.31
Addition	0.43	0.27	1.61	0.16	-0.23	1.10	-0.23	1.10
Deletion	0.51	0.28	1.82	0.12	-0.18	1.20	-0.18	1.20
Movement	1.69	0.67	2.52	0.05	0.05	3.33	0.05	3.33
Replacement	-0.24	0.39	-0.62	0.56	-1.18	0.70	-1.18	0.70
Language and Grammar	-0.32	0.28	-1.14	0.30	-1.00	0.37	-1.00	0.37
Logic and Coherence	-1.04	0.34	-3.06	0.02	-1.88	-0.21	-1.88	-0.21
Information Accuracy	0.26	0.47	0.56	0.60	-0.88	1.41	-0.88	1.41
Style and Identity Awareness	0.16	0.42	0.37	0.72	-0.88	1.19	-0.88	1.19

Table 8 - Regressior	Analysis of Re	evision Behaviour	s and Text Performance
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According to the regression analysis, the F-statistic of the model is 4.323 which is statistically significant (p=0.0455<0.05) which indicates that there is a significant effect of certain revision strategies on grades. According to the regression coefficient analysis, it can be seen that in terms of revision behaviour, the order of moving words and phrases significantly affects students' grades. In fact, the relationship between the number of revisions and scores is more complicated. On the one hand, deletion and addition of information, as well as revisions for information accuracy and text style and morphology have a positive effect on performance; on the other hand, however, revisions for logic and contextualization may have a negative effect on performance.

5. Discussion

5.1 Effectiveness of AI-assisted business letter writing

The statistical data in this paper show that AI assisted business letter writing is effective, especially in terms of language and structure.AI tools usually follow specific linguistic patterns and structural rules in generating text, which helps to ensure the grammatical accuracy and logical structure of the text. This is particularly important in business correspondence, where strict formatting and clear logic are emphasized, and the structural advantages of AI tools provide students with a good starting point for revising their texts, helping them to quickly construct a textual framework that follows basic business correspondence standards.

In addition, the language generation capability of the AI tool, especially its accuracy and richness in handling common expressions and professional terminology, may help to enhance the overall linguistic performance of the text, which can largely compensate for the inexperience of students or people entering the workplace. It also explains why the AI-assisted Group B was able to achieve better results than the independent human-written Group A on both linguistic and structural dimensions. At the same time, however, this may also be related to the fact that the participating students themselves had a slight lack of grammatical and structural mastery.

Regarding the variability of the scores, although Group B showed an advantage in several scoring dimensions, it also showed a greater variability in the scores. This variability may be related to the following factors:

First, students' familiarity with AI tools: Different students have different levels of mastery and utilization of AI tools, which may directly affect how they use the first drafts generated by these tools and make subsequent revisions. According to the conversation logs submitted by students, some students directly copied large portions of conversational information without effective filtering and organizing, which resulted in poor performance of AI tools in capturing effective information; some students misunderstood the context and information provided by the questions, which resulted in inaccurate information when giving instructions and affected the performance of the text.

Secondly, the results of AI tools may fluctuate when dealing with different topics or contents. Especially when dealing with complex or rare topics, the text generated by AI tools may not be accurate or detailed enough, and more manual revisions are needed.

Thirdly, students' revision skills: How students revise AI-generated first drafts, as well as their skills and judgment in the revision process, have a significant impact on the final performance of the text. Uneven revision ability of students may lead to high volatility of scores within the same group. Students may not have received more systematic, complete, and professional revision training, or may have made poor judgments about the accuracy of the text, which may have led some students to delete large portions of AI-generated phrases and complete the revisions by rewriting ("adding" revisions) instead.Some students in Group B may have been more adept at utilizing the resources provided by the AI and were able to effectively identify and correct deficiencies in the AI-generated content, while others may have been less aware of how to maximize the use of these tools, and may not have had the ability to use them to their advantage. understand how to maximize the use of these tools, or were overly reliant on AI-generated content and did not make enough revisions. This is partly a reflection that the first drafts were not good enough, and partly a sign that students did not make good use of the AI-generated first drafts. The above findings present specific challenges and opportunities for teaching. First, teachers need to help students better understand and utilize AI tools for writing in their teaching to increase students' proficiency; second, teaching should emphasize the development of students' critical thinking and text revision skills, so that they can effectively evaluate and enhance AI-generated first drafts; in addition, developers of AI tools should consider how to reduce the variability of the tools in their application, e.g., by improving the algorithms to enhance the stability and accuracy of the tools on different topics and content generation. In addition, developers of AI tools should consider how to minimize the variability in the application of the tools, such as by improving the algorithms to enhance their stability and accuracy in different topics and content generation.

Thus, the overall strength and significant variability in the scores of Group B reflect the potential of AI-assisted writing to enhance language and structure, while also pointing to the complexity of its application. When adopting AI-assisted writing tools, teachers should pay attention to the training of students and the adjustment of teaching strategies in order to utilize the writing function of AI tools and their educational value, to enhance students' overall performance and skill level in business letter writing, and more importantly, to improve the efficiency of business communication in the future workplace life.

5.2 Revised Behavior and Textual Representation

By analysing the revision behaviours of Group B students, this paper explores the specific effects of various types of revisions on text quality. The data show that the most common types of revisions include addition and deletion behaviours, as well as revisions that address aspects of text style and sense of identity.

First, addition revisions usually involved inserting new information or details into the text to improve its completeness and richness. The high frequency of this type of revision suggests that although AI tools are capable of generating well-structured texts, the content provided often lacks sufficient depth or breadth. For example, in the context of business correspondence, more specific data support or more detailed case studies may be required, which are difficult for AI to accurately generate without sufficient contextual information. Therefore, when teaching students to use AI tools, they may need to pay extra attention to the specific data that should be included in the instructions or require the AI to generate relevant information based on the specified context.

Second, deletion of revisions involves removing redundant or irrelevant content to enhance the conciseness of the text. the AI-generated text generates repetitive or secondary information, or information that does not adequately match the context or students' expectations. Looking at the revisions in Group B, most of the deletions occurred in the form of improperly formatted correspondence, slightly vague and poorly targeted information. For example, when encouraging the recipients to participate in the activity, the purpose of writing may not be directly mentioned in the textual information, and AI usually performs less well in handling this aspect of writing. Therefore, the frequent revisions made by the students to a certain extent indicate that the AI tools do not perform well in using Chinese to express more subtle and implicit manners or emotions, and that manual revisions are particularly needed, which should also be the focus of teaching attention.

Thirdly, the more frequent revisions in terms of style and sense of identity on the one hand indicate that AI-generated texts are not sufficient in meeting specific language styles or specific writing purposes, and at the same time, it also shows that when students look at the texts critically, they will pay more attention to the language style and sense of identity which are easy to be neglected when writing independently.

Fourthly, although there were fewer logical and coherent revisions, this paper found that these types of revisions had a negative impact on textual performance. First, logical and coherent revisions usually require students to have strong logical thinking skills and in-depth content comprehension. Differences in students' abilities may lead to variations in the effectiveness of the revisions, or they may not fit well with the "added" phrases, thus destroying the coherence of the text itself and leading to unsatisfactory text performance.

By analysing the relationship between the types of revisions and the quality of the text, we can better understand the potential and limitations of AI-assisted writing. This includes how to utilize AI

tools more effectively to provide guidance during the teaching process, and to strengthen the importance of revision skills, such as how to evaluate and improve AI-generated texts, which is also very important for cultivating students' critical thinking and editing skills.

6. Conclusion

This research paper shows the effectiveness of AI-assisted business letter writing, its challenges, and the relationship between revision behaviour and text quality.AI tools have demonstrated some potential in teaching business letter writing, especially in improving concise expression and clear text structure. However, the limitations of AI tools in terms of depth of content, personalization of expression, and handling of complex logic are also evident. In addition, how students utilize AI tools and make text-based revisions is a key concern for future instruction.

The study showed that although AI tools were able to provide clearly structured texts, students still needed to add a lot of content or delete information in order to achieve better textual performance. In addition, the frequent revisions of style and sense of identity reflected the limitations of AI-sanctioned texts in matching the writing style of business documents. Besides, although students did not make many logical and coherent revisions, such revisions had a significant impact on the quality of the text. Therefore, cultivating careful logical thinking and improving the ability to revise are the keys to future business correspondence writing. In conclusion, AI writing tools can play a greater role in improving students' writing skills and teaching effectiveness.

Although this paper provides a comparative analysis of AI-assisted versus manual independent writing in the field of business correspondence, there are some limitations. For example, the relatively small sample size may affect the broad applicability of the results. In addition, the diversity of participants' backgrounds and writing skills may have had an impact on the findings.

Future studies will increase the diversity of the sample and consider the background of the participants to validate the findings of this paper. In addition, students' subjective experiences of using AI tools, specific operational strategies, and the differences between the performance of the AI first draft and the revised final draft will also be included in the study to examine the effectiveness of the revisions. In addition, the effects of different types of AI writing tools on text quality and their applicability to different writing tasks need to be further discussed and analysed.

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