



Journal of Arts & Humanities

Volume 15, Issue 04, 2026: 01-12

Article Received: 19-01-2026

Accepted: 07-05-2026

Available Online: 30-06-2026

ISSN: 2167-9045 (Print), 2167-9053 (Online)

DOI: <http://dx.doi.org/10.18533/journal.v15i4.2658>

Second Language Learners' Attitudes towards AI-assisted English Writing in China

Hongguo Xue¹, Ziyang Zhang², Zihan Liu³

ABSTRACT

The rapid integration of artificial intelligence (AI) technologies has profoundly transformed pedagogical practices, particularly in the field of second language acquisition. Against this backdrop, this study investigates the attitudes of 192 graduate students towards the application of AI in their English writing in a Chinese university. The findings reveal that the majority of participants exhibited positive attitudes as AI tools facilitate the improvement of their overall writing abilities. Furthermore, this paper discusses the key challenges encountered during the AI usage process, along with the implications for designing targeted English writing teaching strategies.

Key words: Attitudes, AI application, English Writing, Second language learner

This is an open access article under Creative Commons Attribution 4.0 License.

1. Introduction

Artificial intelligence is defined as a digital system that can execute cognitive functions akin to human thought, such as problem-solving and learning (Hou et al, 2025). Distinguished by its excellent cognitive functions, artificial intelligence is increasingly becoming a key component of human existence and is applied in numerous everyday activities. It is especially applicable to the field of education, as educational activities, such as teaching and learning, are knowledge-intensive cognitive processes. In addition, it has revolutionized people's way of teaching and learning. A growing body of research has examined the role of AI in language education, with particular attention to its effects on learning outcomes, learner engagement, and attitudes toward technology use. Wang et al (2024) made a systematic review of 125 papers about the application of

¹ School of Foreign Studies, Northwestern Polytechnical University, Xi'an, China. Email: xuehongguo@nwpu.edu.cn

² Northwestern Polytechnical University, China. Email: 3233732896@qq.com

³ Northwestern Polytechnical University, China. Email: liuzihan@mail.nwpu.edu.cn

artificial intelligence in education and found a wide spectrum of AI applications in education, encompassing adaptive learning, personalized tutoring, intelligent assessment and management.

Despite the increasing volume of research, several gaps remain. First, prior studies have largely focused on general AI applications or isolated aspects of language learning, with limited attention to AI-assisted English writing as a specific and complex learning task. Second, although learners' attitudes toward AI have been widely explored, relatively few studies have examined how students interact with AI tools during the writing process. Third, empirical research focusing on graduate students, particularly non-English major students in China's university remains insufficient (He & Yao, 2025; Huang et al., 2026).

1.2 The application of AI in language learning

AI has been widely used in language teaching and learning, and more and more studies have been done about it. Wang (2024) conducted research on the application of generative artificial intelligence (GenAI) in college English writing course reform. Moorhouse (2023) explored the application of generative artificial intelligence chatbots, such as ChatGPT, in language teaching. Lu and Li (2023), taking LingNet as an example, introduced the characteristics, architecture, and application scenarios of knowledge graphs in foreign language disciplines, laying a foundation for the development of digital technology-empowered foreign language education.

As the research develops, studies about the artificial intelligence shift to the effect of applying AI in language teaching and learning and students' attitudes to it. Alsaaswi et al (2025) studied the use of chatbots in Saudi Arabia and found that most participants held favorable attitudes towards AI chatbots in language learning. Zhi and Wang (2024) explored the connections among EFL students' feelings about artificial intelligence, teachers' communicative immediacy, the rapport between teachers and students, and the students readiness to communicate. Their research revealed that AI technologies held promise for improving language learning results, and they emphasized the critical role of cultivating good teacher-student relationships in encouraging students to communicate effectively in the digital age. In addition, a few investigations have focused on the utilization of AI for writing development. Khalifa and Albadawy (2024) claimed that using artificial intelligence was an essential tool in academic writing and that it could revolutionize academic writing and recommend the broader integration of AI tools in research. For example, ChatGPT is a reliable and dependable writing tool, which can provide timely and adaptive feedback and enable learners to improve linguistic accuracy and stylistic appropriateness (Barrot, 2023). Moreover, studies also focused on writers' engagement with ChatGPT (Teng & Huang, 2025).

1.2 Technology Acceptance Model

To better understand students' acceptance of AI tools, this study adopts the Technology Acceptance Model (TAM) as its theoretical framework (Davis, 1989). By applying TAM to the context of AI-assisted English writing, this study aims to examine graduate students' use of AI tools, with a particular focus on their usage patterns, attitudes, and concerns. TAM is one of the most widely employed frameworks for explaining technology adoption and posits that two key beliefs determine an individual's acceptance of a technology: perceived usefulness (PU), defined as the belief that using the technology will enhance one's performance, and perceived ease of use (PEOU), defined as the belief that using it will be free of effort (Davis, 1989). These beliefs jointly influence users' attitudes toward the technology, which in turn shape their behavioral intention and actual usage. Subsequent research further confirms that perceived ease of use not only directly affects behavioral intention but also indirectly influences it through perceived usefulness, highlighting the internal mechanism of the model (Davis et al., 1989; Venkatesh & Davis, 2000).

Over time, extensions of TAM have incorporated additional determinants such as social influence, facilitating conditions, and experience, suggesting that technology acceptance is shaped not only by individual cognition but also by contextual and environmental factors (Venkatesh & Bala, 2008). These extensions indicate that users' perceptions of usefulness and ease of use may be influenced by external support, institutional environment, and social expectations. TAM has been extensively applied in educational technology research to understand learners' acceptance of various tools, including learning management

systems (Park, 2009), mobile learning (Al-Emran et al., 2018), and more recently, ChatGPT for self-regulated learning (Dahri et al., 2024). Meta-analyses have confirmed that perceived usefulness and perceived ease of use consistently explain a substantial portion of variance in technology acceptance across educational settings (Scherer et al., 2019).

In addition, learner-related factors such as self-efficacy and motivation have been found to significantly influence these core beliefs, thereby indirectly shaping behavioral intention (Teo, 2011; Schunk & DiBenedetto, 2020). Moreover, individual difference variables such as self-efficacy have been shown to indirectly influence learning behaviors by affecting perceived usefulness and perceived ease of use (Huang et al., 2026). With the rapid development of artificial intelligence, recent studies have increasingly applied TAM to examine learners' acceptance of AI tools. For example, studies on students' use of ChatGPT indicate that perceived usefulness remains the strongest predictor of behavioral intention, while perceived ease of use and teacher support also significantly influence adoption (He & Yao, 2025). Similarly, research on self-regulated learning with AI tools suggests that students' acceptance of technology plays a mediating role between motivational factors and learning engagement (Dahri et al., 2024).

In the context of AI-assisted English writing, TAM provides a valuable lens for interpreting students' attitudes and behavioral intentions. By applying TAM, this study offers a theoretically grounded interpretation of graduate students' attitudes toward AI-assisted writing in a Chinese university, while also acknowledging the role of contextual and individual factors in shaping technology acceptance.

2. The current study

Although there are some studies related to the application, effects, attitudes and other aspects of using AI in language teaching and learning, there are few studies on graduate students' experience and opinion of using AI in their English Writing. This study will provide an overview of how graduate students (non-English majors) interact with AI and their perception of AI application in their English writing. Specifically, this study addressed the following research questions:

- 1) How frequently do graduate students use AI tools in their English writing?
- 2) What are their attitudes towards using AI tools in their English writing?
- 3) What concerns do they have regarding the use of AI tools in their English writing?

3. Methodology

An integrated qualitative and quantitative approach was adopted in this study to provide a more comprehensive understanding of the research problem. Compared with using a single method, this mixed-methods design allows for a more complementary and in-depth analysis of the data, which were collected through a questionnaire and semi-structured interviews.

3.1 Questionnaire items development

A questionnaire was designed to study students' engagement with AI in their writing. It contains 10 questions divided into two sections. The first section consists of four demographic questions, covering participants' gender, age, major, and English language skill. The second section comprises six items which addresses aspects like the frequency of AI tool usage, preferred AI tools, specific applications in writing, students' attitudes, perceived effects, and challenges encountered with AI tools during the writing process. The questionnaire was developed to investigate students' engagement with AI in English writing. The initial draft was informed by existing studies on technology acceptance in language learning (Alsaawi et al., 2025). To ensure content validity, the initial draft was reviewed by two experts who assessed the clarity, relevance, and comprehensiveness of each item. Minor revisions were made to wording and response options based on their feedback. No further modifications were deemed necessary. The questionnaire mainly adopted the formats of single-choice and multiple-choice questions. The complete questionnaire items in this study are provided in Appendix A.

3.2 Semi-structured interviews

After the participants completed their questionnaires, 20 of them were chosen at random to take part in semi-structured interviews to obtain a thorough understanding of their viewpoints. Although the interview questions were drafted in English, all interviews were conducted in Chinese to ensure the reliability and were audio recorded with the students' permission. The two interview questions are (1) What are the benefits of using AI to assist your English writing? and (2) What are the drawbacks of using AI in your English writing? Interview recordings were transcribed into text and analyzed using thematic analysis. The coding process involved initial open coding, followed by the identification of recurring themes, which were then reviewed and refined by the two authors to ensure consistency.

3.3 Participants and setting

The participants of this study consisted of first-year graduate students from a university in China. In total, 192 non-English major graduate students were selected randomly out of 462 students who took the same writing course. They were comprised of 128 male (66.67%) and 64 female (33.33%) students. Most of participants were 23-25 years old (86%), majoring in science and engineering (76.4%). They all passed CET-4 (CEFR B1), among which 68 students (32%) passed CET-6 (CEFR B2). They all also took a 16-week English writing course in the spring semester of 2024-2025 academic year and were allowed to utilize AI to assist them to proofread and edit their essays; however, they were required to write the first draft by themselves.

The study received approval from the university's ethics review board and consent from the participants who were voluntary to take the writing course and finish the questionnaire. The study could be considered as their reflections of using AI to help them improve their writing.

3.4 Procedure

At the end of 2024-2025 spring semester, after the participants finished the 16-week writing course, the questionnaire was distributed on Wenjuanwang (<https://www.wenjuan.com/>), a platform for designing questionnaires and collecting data. It took the participants approximately five minutes to finish it. All the participants filled out the questionnaires which were all collected and were valid. Then, 20 participants were interviewed to know their viewpoints about using AI in their writing tasks.

3.5 Data Analysis

Quantitative data were analyzed using descriptive statistics, including frequencies and percentages, to summarize students' responses to the questionnaire. These results were used to examine students' usage patterns and overall perceptions of AI-assisted English writing. After the questionnaire was conducted, the results were automatically calculated by the Wenjuanwang platform. In addition, interview recordings were transcribed and coded by the researcher. For the multiple-choice items, percentages represent the proportion of respondents who selected each option. Therefore, totals may exceed 100% due to multiple selections. Qualitative data from the interviews were transcribed and analyzed using thematic analysis. The coding process followed the procedures described above, ensuring consistency in the identification and interpretation of key themes.

4. Results and discussion

4.1 Questionnaire survey

Table 1. Frequency of using AI to assist English writing

Options	Number of participants	Percentage
A. Use AI everyday	58	30.21%
B. Frequently used AI (2-3 times every week)	117	60.94%

Options	Number of participants	Percentage
C. Occasionally used AI (2-3 times every month)	17	8.85%
D. Rarely used AI (1-2 times every 3 months)	0	0%
Total number	192	100%

Table 1 shows that over 90% of the graduates students often used AI to assist their writing. Whether it is writing a lab report, an academic essay or proposals, nearly one third of the students applied AI every day, and less than two thirds of the students utilized AI frequently, namely, 2 to 3 times a week. The following are the tools of AI that students utilized during their English writing. Students can choose more than one tool. It shows their reliance of AI in their writing. This is similar to the study result about the problem-solving skills of AI (Hou et al, 2025).

Students responded that they had employed different AI tools in their English writing. Here are the most commonly used AI tools.

Table 2. Most commonly used AI tools among participants and their application

Options	Number of participants	Percentage
A. ChatGPT	114	59.38%
B. Grammarly	17	8.85%
C. DeepL Write	33	17.19%
D. Baidu Translation Writing Assistant	47	24.48%
E. Youdao Writing	54	28.12%
F. ERNIE Bot	67	34.90%
G. Doubao	103	53.65%
H. DeepSeek	141	73.44%
I. Other tools	6	3.12%

This table shows that the most frequently used tools is DeepSeek, which accounts for 73.44% of the students. Since DeepSeek is easily available in China and a powerful AI tool, it is the first choice of the students surveyed. The next popular tool is ChatGPT which also covers a high percentage (59.38%). The third frequently used tool is Doubao, covering 53.65%. This indicates that students are familiar with these tools and frequently used them to help them improve their English writing. These AI tools can offer a range of features, from translation service to interactive language learning, such as, grammar checking, sentence rewriting, correcting essays and helping students with editing their papers. Their application of AI tools was demonstrated in table 3.

Table 3. Application of AI tools

Options	Number of participants	Percentage
A. Writing assignments	173	90.10%
B. exam	38	19.79%
C. research paper	103	53.65%

Options	Number of participants	Percentage
D. Creative writing out of interest (like diaries and stories)	69	35.94%
E. Other writing	6	3.12%

Table 3 illustrates what the students utilize AI tools for. As we can see from the table that the vast majority of students used AI for daily assignments (90.1%), followed by academic papers (53.7%) and writing for personal interest (35.94%). Nearly one fifth of the students even use AI tools in exams. This finding may reflect the use of AI for take-home or open-ended exam questions, but it also raises ethical considerations regarding academic integrity, which are discussed later.

Table 4. Students' Attitudes of Using AI in English Writing

No.	Statement	Number of participants	Percentage
1	Using AI has helped me to improve the accuracy, fluency and logic of writing and raised my writing scores.	179	93.22%
2	AI has noticeably improved my overall English writing ability.	165	86.93%
3	AI has no noticeable help for my English writing.	5	2.60%
4	AI has improved the grammatical accuracy of my writing.	137	71.35%
5	AI has expanded my vocabulary.	135	70.31%
6	AI has increased my writing efficiency (e.g., reduce writing time).	168	87.50%
7	AI has provided writing ideas and inspiration.	138	71.86%
8	AI has improved article structure and logic.	140	72.92%
9	AI has Enhanced the naturalness of language expression.	148	77.08%
10	AI has boosted my writing confidence (e.g., dare to take on more complex writing tasks)	145	75.52%

Table 4 illustrates the students' attitudes and the efficacy of using AI to assist the students' English writing. 86.93% of the students believed that AI had helped them to improve their English writing abilities. Similarly, 93.22% of them reported that it also helped them better the accuracy, fluency and logic of their writing. In addition, more than 70% of the students thought that AI tools had helped them to accurately use grammar and expand their vocabulary. A significant portion of students, precisely 87.5%, believed that AI had improved the efficiency of their English writing. This finding aligns with the research conducted by Professor Wang in 2024. For content and structure, over 70% of the students considered that AI tools had provided some ideas or inspiration for them and helped them to organize and connect these ideas logically so that their writing can achieve the coherence and cohesion of their writing. With the assistance of AI, more than three fourth of the students thought that AI had also enhanced the naturalness of their English expression and boosted their confidence of writing. All these survey results indicate students valued the use of AI to help their English writing and had better experience of it. This aligns with Essel et al.'s (2022) study, revealing that chatbots can provide a better language learning experience and lead to higher achievement among learners.

Table 5. Impacts of using AI in English writing

Options	Number of students	Percentage
A. Very positive, with a significant improvement in writing effectiveness	27	14.06%

Options	Number of students	Percentage
B. Positive, with a certain promoting effect on writing	130	67.70%
C. Little, with no obvious effect	29	15.10%
D. With some negative impact on writing	4	2.08%
E. Very negative, seriously hindering writing	2	1.04%

Table 5 illustrates the students' general evaluation of the impact of using AI to assist their writing. The vast majority (81%) of the students thought AI had very positive or positive effect on their English writing. This is similar to the finding in table 4, for AI tools had helped them to increase their writing abilities and efficiency. However, 29 students thought AI tools had little or no positive effect; 6 students thought that AI had some negative, or very negative effect, even hindering their English writing. This may be because that they were not familiar with AI tools, and some ideas given by AI were too broad and general, which are not very helpful for students' writing. They also met some problems when they applied AI tools to assist their writing, which are shown in the following table.

Table 6. Problems of using AI tools in English writing

Options	Number of students	Percentage
A. The generated content contains factual errors.	81	42.19%
B. Language expression is stiff and unnatural.	93	48.44%
C. Insufficient understanding and generation ability of specific fields or professional content	140	72.92%
D. Privacy and copyright issues	32	16.67%
E. Inconsistent with writing style	62	32.29%
F. Other problems	1	0.52%

This is a multiple-choice question. Students can give more than one answer. Most of the students who filled out the questionnaires were majoring in science and engineering. They may ask some questions about their profession, AI did not understand the professional language and could not help them with their writing or only gave some general information. Therefore, 72.92% of them believed that AI tools were inadequate for fully grasping and generating information in specialized fields. Moreover, nearly half of the students thought that some expressions produced by AI were stiff and unnatural, and AI even gave wrong information. A little more than one third of the students thought the writing style of AI might not be in agreement with the writing style of student writers. 16.67% of the students encountered the privacy and copyright issues, which AI tools might lead to. These findings suggest that while AI tools are useful, they are not without limitations, particularly in terms of accuracy, contextual appropriateness, and personalization, privacy and copyright issues. Students should use them appropriately and wisely in their writing.

4.2 Semi-structured interviews

One week after students completed the questionnaires, 20 students were selected at random for subsequent interviews, during which they discussed their views and experience of AI-assisted writing, including its benefits and drawbacks. All of the 20 students reported an enhancement in their English writing skills. They thought that AI tools had helped them to master English grammar more skillfully, use more precise words, strong verbs in their writing, which are all beneficial for the naturalness of their expressions, fluency, and accuracy of their English writing. It also boosted their confidence of writing in English and were

not afraid of English writing any more. As one student stated, "Before using AI, I was always worried about making grammar mistakes and afraid of writing. Now, I can write more freely because I know AI will help me polish it." Moreover, 16 of them (80%) indicated that AI tools could deal with more complicated writing assignments, such as research papers.

Although AI has great potential in helping students to improve their English writing, several drawbacks were also identified when used in English writing. Four students said that AI produced some fake or inaccurate information, such as AI provided two articles as references which did not exist when they were writing a paper. This result corresponds to Barrots' study (2023). In addition, AI gave unintelligent or irrelevant responses. For example, when one student asked AI what the features of academic writing style are, it responded "Descriptive Writing, Narrative Writing, Expository Writing, Argumentative Writing, APA style and MLA style". These answers are about the different types of writing and citation styles, not the typical features of academic writing. In addition, AI is capable of delivering general comments on student compositions; however, it falls short of offering in-depth and truly specific advice for paper improvement. Eight students also worried about the impact of the long-term reliance on AI tools to assist their writing. They were anxious about the reduction of their writing abilities and critical thinking abilities. One interviewee expressed, "I'm worried that if I always rely on AI, my own thinking will become lazy. I might not be able to write well without it." 16 students expressed that they would like to actively use AI in their writing, while four students decided not to use AI tools in their writing any more, for they wanted to develop their own critical and creative thinking. This aligns with Alsaawi's finding (2025).

5. Conclusion

This study employed a mixed-methods design, combining a questionnaire and semi-structured interviews to explore the attitudes of non-English major graduate students towards using Artificial Intelligence (AI) in their English writing assignments in a Chinese university. The results indicate that students generally hold positive attitudes toward AI-assisted writing. Drawing on the Technology Acceptance Model (TAM), these positive attitudes can be interpreted in terms of both perceived usefulness and perceived ease of use. Specifically, students perceived AI tools as highly useful in improving their writing efficiency, accuracy, and confidence, while their frequent use of AI without extensive training reflects a high level of perceived ease of use. The results further suggest that AI tools have substantial potential in supporting English writing. They have helped the students in the sample to improve their overall English writing abilities. Specifically, students reported that they can use correct grammar, precise vocabulary, proper coherence and cohesion devices to express and organize their ideas more logically. The majority of the students thought that AI tools had exerted positive impacts on their writing and had enhanced their confidence in writing in English.

However, several challenges were also identified when using AI tools in students' writing. AI tools may generate inaccurate or fabricated information, including non-existent references. In addition, AI tools may not fully understand the directions or prompts given by students; therefore, they may provide irrelevant response. Students also worried about their privacy and copyright issues. Moreover, over-reliance on AI may reduce their critical thinking abilities and creativity.

These findings have several pedagogical implications. First, professors can guide students to use AI as a tool for specific stages of writing (e.g., brainstorming, outlining, feedback) while maintaining the first draft as an independent task to preserve cognitive engagement. They can guide students to effectively use AI tools throughout their whole writing process. They can ask students to select a topic for an argumentative essay with the help of AI and discuss it with their classmates. Then, they are required to use AI's help to write an outline for the essay. After that, students write the first draft according to the outline. At this stage, students are not allowed to use AI. They have to write the first draft independently and edit and proofread it on their own. Then they can ask AI to offer feedback on the draft, and they refine their essays according to AI's feedback. Second, explicit instruction in AI literacy including how to critically evaluate AI-generated content and avoid plagiarism is essential. Professors should remind the students to check the content given by AI and make sure that they use the reliable sources and avoid plagiarism. Finally, the finding that nearly 20% of students reported using AI in exams highlights the urgent need for institutional discussions on

academic integrity policies in the AI era. Institutions may need to clarify acceptable AI use and consider alternative assessment formats.

While this study has provided some insights for using AI in English writing, it possesses several limitations. First, the sample size was limited and drawn from a single university, with most participants majoring in science and engineering, which limits the generalizability of the findings. Second, the study relied primarily on descriptive statistics due to the nature of the questionnaire data, which limited the application of inferential statistical analyses. Third, the investigation solely focused on self-reported perceptions of AI's role in English writing rather than objective performance data. Finally, due to the questionnaire's predominant use of single-choice and multiple-choice formats, traditional reliability analyses and construct validity tests were not conducted. While this limits the depth of statistical analysis, the findings provide valuable descriptive insights into students' attitudes towards using AI tools in their English writing. To address these limitations, future research might engage a larger number of students from diverse universities and different academic backgrounds and incorporate pre-test and post-test to measure actual writing improvement and develop validated Likert-scale instruments to enable more robust psychometric evaluation of AI acceptance in language learning contexts. Additionally, more research can also be conducted on AI's applicability in different facets of language education.

Conflict of Interest Disclosure

The authors declare no conflict of interest.

Funding statement

The publication of this paper is supported by 2025 Shaanxi Provincial Social Science Fund (Research on Construction and Influence Mechanism of College English Writing Knowledge Graph Empowered by Digital Intelligence Technology. Grant No: 2025K113).

References

- Ai, X. H., Cheng, S. H., & Huang, Y. X. (2024). On the construction and application of knowledge maps of college English in the context of language intelligence. *Education Research Monthly*, 10, 84-90.
- Alsaawi, A., Almoaily, M., Almulhim, F., Alahmadi, N., & Alshengeeti, H. (2025). Attitudes to the use of artificial intelligence in language learning: the case of chatbots in Saudi Arabia. *International Journal of Computer-Assisted Language Learning and Teaching*, 15(1), 1-17. <https://doi.org/10.4018/IJCALLT.376344>
- Al-Emran, M., Mezhyuev, V., & Kamaludin, A. (2018). Technology acceptance model in M-learning context: A systematic review. *Computers & Education*, 125, 389-412.
- Barrot, J. S. (2023). Using ChatGPT for second language writing: Pitfalls and potentials. *Assessing Writing*, 57, 100745. <https://doi.org/10.1016/j.asw.2023.100745>
- Bigum, C., Knobel, M., Lankshear, C., & Rowan, L. (2003). Literacy, technology and the economics of attention. *L1-Educational Studies in Language and Literature*, 3, 95-122.
- Dahri, N. A., Yahaya, N., Al-Rahmi, W. M., Aldraiweesh, A., Alturki, U., Almutairy, S., Shutaleva, A., & Soomro, R. B. (2024). Extended TAM based acceptance of AI-Powered ChatGPT for supporting metacognitive self-regulated learning in education: A mixed-methods study. *Heliyon*, 10(8).
- Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, 13(3), 319-340.
- Essel, H. B., Vlachopoulos, D., Tachie-Menson, A., Johnson, E. E., & Baah, P. K. (2022). The impact of a virtual teaching assistant (chatbot) on students' learning in Ghanaian higher education. *International Journal of Educational Technology in Higher Education*, 19(1), Article 57. <https://doi.org/10.1186/s41239-022-00362-6>
- Farah, C. S., & Maybury, T. (2009). Implementing digital technology to enhance student learning of pathology. *European Journal of Dental Education*, 13(3), 172-178.
- Hou, C. Y., Zhu, G. X., Sudarshan, V., Lim, F. S., & Ong, Y. S. (2025). Measuring undergraduate students' reliance on Generative AI during problem-solving: Scale development and validation. *Computers & Education*, 234, 105329. <https://doi.org/10.1016/j.compedu.2025.105329>

- Hu, Z. L. (2023). ChatGPT's talk about foreign language education. *Foreign Languages in China*, 3, 12-15.
- Huang, H. B., Xu, L., Tang, L. J., & Cui, Y. (2026). MOOC-based English writing learning under the background of digital transformation in education: An integrated model incorporating self-efficacy and technology acceptance. *Technology Enhanced Foreign Language Education*, 1, 64-70.
- Huai, J. P. (2024). Working together to promote the application, sharing and innovation of digital education. *China Education Network*, 1, 1-3.
- Khalifa, M., & Albadawy, M. (2024). Using artificial intelligence in academic writing and research: An essential productivity tool. *Computer Methods and Programs in Biomedicine Update*, 5, 100145. <https://doi.org/10.1016/j.cmpbup.2024.100145>
- Kohnke, L., Moorhouse, B. L., & Zou, D. (2023). ChatGPT for language teaching and learning. *RELC Journal*, 54(2), 537-550.
- Li, J., & Liu, L. (2021). Large-scale education and personalized training of technology-empowered higher education: logical necessity and practical mechanism. *China Educational Technology*, 8, 55-62.
- Li, M. L. (2022). Research on 5G technology empowers smart classroom teaching. *Jiangsu Science and Technology Information*, 18, 57-59.
- Li, Z. W. (2023). Features, construction and application of knowledge graph for foreign language disciplines. *Foreign Languages in China*, 2, 70-76.
- Lo, C. K. (2023). What is the impact of ChatGPT on education? A rapid review of the literature. *Education Sciences*, 13(4), 1-15.
- Negroponte, N. (1996). *Being digital*. Vintage.
- Pan, H. Y., & Niu, B. G. (2025). Surveying GenAI-enhanced foreign language learners' writing feedback literacy. *Technology Enhanced Foreign Language Education*, 1, 94-101.
- Park, S. Y. (2009). An analysis of the technology acceptance model in understanding university students' behavioral intention to use e-learning. *Educational Technology & Society*, 12(3), 150-162.
- Peterson, M. W., Gordon, J., Elliott, S., & Kreiter, C. (2004). Computer-based testing: initial report of extensive use in a medical school curriculum. *Teaching and Learning in Medicine*, 16(1), 51-59.
- Scherer, R., Siddiq, F., & Tondeur, J. (2019). The technology acceptance model (TAM): A meta-analytic structural equation modeling approach to explaining teachers' adoption of digital technology in education. *Computers & Education*, 128, 13-35.
- Schunk, D. H., & DiBenedetto, M. K. (2020). Motivation and social cognitive theory. *Contemporary Educational Psychology*, 60, 101832.
- Setiadi, D., Nurhayati, S., Ansori, A., Zubaidi, M., & Amir, R. (2023). Youth's digital literacy in the context of community empowerment in an emerging society 5.0. *Society*, 11(1), 1-12.
- Teo, T. (2011). Factors influencing teachers' intention to use technology: Model development and test. *Computers & Education*, 57(4), 2432-2440.
- Teng, M. F., & Huang, J. (2025). Incorporating ChatGPT for EFL writing and its effects on writing engagement. *International Journal of Computer-Assisted Language Learning and Teaching*, 15(1). <https://doi.org/10.4018/IJCALLT.367874>
- Venkatesh, V., & Bala, H. (2008). Technology acceptance model 3 and a research agenda on interventions. *Decision Sciences*, 39(2), 273-315.
- Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science*, 46(2), 186-204.
- Wang, S., Wang, F., Zhu, Z., Wang, J. X., Tran, T., & Du, Z. (2024). Artificial intelligence in education: A systematic literature review. *Expert Systems with Applications*, 252, 124167. <https://doi.org/10.1016/j.eswa.2024.124167>
- Yao, M. He, & Yao, S. L. (2025). Acceptance of ChatGPT-assisted grammar learning: A study based on the technology acceptance model. *Technology Enhanced Foreign Language Education*, 5, 67-72.
- Yao, S. Y., Wang, R. Y., Sun, S., Bu, D. R., & Liu, J. (2020). Joint embedding learning of educational knowledge graphs. In *Artificial intelligence supported educational technologies* (pp. 209-224). Springer.

Zhi, R., & Wang, Y. X. (2024). On the relationship between EFL students' attitudes toward artificial intelligence, teachers' immediacy and teacher-student rapport, and their willingness to communicate. *System*, 24, 103341. <https://doi.org/10.1016/j.system.2024.103341>

Appendix A

Part one

1. How old are you?
 - A. 18–20 years old
 - B. 21–22 years old
 - C. 23–25 years old
 - D. 26–30 years old
 - E. 31–36 years old
 - F. 36 years and above
2. What is your gender?
 - A. Male B. Female
3. What is your major?
 - A. Liberal Arts
 - B. Science
 - C. Engineering
 - D. Arts
 - E. Others
4. What is your level of foreign language proficiency?
 - A. Has not taken any English proficiency tests yet
 - B. Passed College English Test Band 4 (CET-4)
 - C. Passed College English Test Band 6 (CET-6)
 - D. Passed TEM-4 (English Majors Band 4)
 - E. Passed TEM-8 (English Majors Band 8)
 - F. Other tests

Part two

5. How often do you use AI tools to assist your English writing?
 - A. Use AI everyday
 - B. Frequently used AI (2-3 times every week)
 - C. Occasionally used AI (2-3 times every month)
 - D. Rarely used AI (1-2 times every 3 months)
6. Which AI tools have you used for English writing? (Multiple choices allowed)
 - A. ChatGPT
 - B. Grammarly
 - C. DeepL Write
 - D. Baidu Translation
 - E. Youdao Writing
 - F. ERNIE Bot
 - G. Doubao
 - H. DeepSeek
 - I. Other tools
7. For what types of tasks do you use AI tools? (Multiple choices allowed)
 - A. Writing assignments
 - B. Exams
 - C. Research papers
 - D. Creative writing out of interest (e.g., diaries, stories)

E. Other writing

8. What is your attitudes towards using AI in English Writing? (multiple choices allowed)

A. Using AI has helped me to improve the accuracy, fluency and logic of writing and raised my writing scores.

B. AI has noticeably improved my overall English writing ability.

C. AI has no noticeable help for my English writing.

D. AI has improved the grammatical accuracy of my writing.

E. AI has helped me to expand my vocabulary.

F. AI has increased my writing efficiency (e.g., reduce writing time).

G. AI has provided writing ideas and inspiration.

H. AI has improved article structure and logic.

I. AI has enhanced the naturalness of language expression.

J. AI has boosted my writing confidence (e.g., dare to take on more complex writing tasks)

9. What is your evaluation of the impact of using AI?

A. Very positive, with a significant improvement in writing effectiveness

B. Positive, with a certain promoting effect on writing

C. Little, with no obvious effect

D. With some negative impact on writing

E. Very negative, seriously hindering writing

10. What problems have you encountered when using AI tools? (Multiple choices allowed)

A. The generated content contains factual errors.

B. Language expressions is stiff and unnatural.

C. Insufficient understanding and generation ability of specific fields or professional content.

D. Privacy and copy issues.

E. Inconsistent with writing style.

F. Others problems.