

Understanding EFL learners' strategies in AI-assisted English writing: An activity theory perspective

TINGTING XU

Shanghai International Studies University, China

FANG HUANG (CORRESPONDING AUTHOR)

Shanghai International Studies University, China

TIMOTHY TEO

The Chinese University of Hong Kong, Hong Kong SAR

Received: 2025-02-15 / Accepted: 2025-07-19

DOI: <https://doi.org/10.30827/portalin.viXIII.32849>

ISSN paper edition: 1697-7467, ISSN digital edition: 2695-8244

ABSTRACT: Despite the growing interest in investigating the application of artificial intelligence (AI) in education, few studies unpacked strategies that English as a foreign language (EFL) learners have adopted when using AI to assist writing. The current study drew upon activity theory and explored EFL learners' strategies for interacting with AI in completing writing tasks. Screen shots, chat logs, and semi-structured interviews were collected and analysed. The findings indicated EFL learners adopted the following strategies in their writing processes: directly use L1 prompt or L1-L2 interchangeably to verify the appropriateness (Tools); switch among diverse digital tools to ensure authenticity and seek for perfection (Tools); insert specific requirements provided by teachers or instructors to direct AI in its processing (Rules); revise the AI-generated content to avoid being detected as "plagiarism" (Rules). The usefulness and concerns of using AI were also noted by EFL learners. The findings enriched people's understanding of activity theory in explaining AI-assisted writing strategies, and highlighted the importance of ethical use of AI in writing practices. Additionally, this study offered practical implications for learners and educators to leverage AI for writing in education.

Keywords: AI, Writing strategies, EFL learners, Activity Theory

Comprensión de estrategias de los estudiantes de EFL en la escritura asistida por IA

RESUMEN: A pesar del creciente interés por la IA en educación, pocos estudios han analizado las estrategias adoptadas por los estudiantes de inglés como lengua extranjera (EFL) cuando utilizan la IA para escribir. El estudio se basa en la Teoría de Actividad y explora las estrategias de los estudiantes para interactuar con IA en escritura. Se recopiló y analizaron grabaciones de pantalla, registros de chat y entrevistas semiestructuradas. Los resultados indicaron que los estudiantes adoptan directamente la instrucción L1 o L1-L2 de manera intercambiable para revisar la adecuación (Herramientas); utilizan diversas herramientas digitales para garantizar la autenticidad y buscar la perfección (Herramientas); comunican los requisitos específicos de instructores a la IA para dirigirla en su procesamiento (Reglas);

revisar los contenidos generados por la IA para evitar que sean detectados como “plagio” (Reglas). Los resultados enriquecieron la comprensión de la Teoría de la Actividad para explicar las estrategias de escritura asistida por IA, y subrayaron la importancia de la integridad académica en el uso de la IA para escritura de estudiantes. Este estudio también ofrece implicaciones prácticas para los estudiantes y los educadores a fin de aprovechar la IA para la escritura en educación.

Palabras clave: IA, Estrategias de escritura, Estudiantes de EFL, Teoría de la Actividad

1. INTRODUCTION

Writing facilitates the intellectual development and academic performance of language learners (Jin et al., 2025; Zare et al., 2025). In EFL learning, writing is considered one of the most important skills that fosters communication, as Woo et al. (2023) noted. Yet, due to its intricacy, it is often perceived as the most challenging skill to acquire (Nosratinia & Razavi, 2016; Zare et al., 2025). This complexity is reflected in various aspects, including idea generation and organization, word choice, and the use of rhetorical devices (Nosratinia & Razavi, 2016).

With the emergence of AI, AI-enabled writing has captured wide attention among researchers and practitioners for its potential to support writing in ideas and content generation, proofreading, and polishing (e.g., Imran & Almusharraf, 2023; Yan, 2023) that enhances EFL learners' writing performances (Barrot, 2023; Xiao & Zhi, 2023). While AI tools offer valuable opportunities, concerns and potential risks also emerged concerning inaccuracy, insecurity, and decontextualization (Derakhshan & Ghiasvand, 2024). The pitfalls of AI tools also highlight its detrimental impact in education, including academic integrity violation, cheating, plagiarism, unfairness, and copyright infringement (Susnjak & McIntosh, 2024).

While previous studies have noted these risks, including the potential for fostering an unhealthy reliance on AI (Fan et al., 2024) and diminishing creativity and critical thinking (Derakhshan & Taghizadeh, 2025; Tlili et al., 2023), these works often overlook the ways in which EFL learners engage with AI in writing processes (Jin et al., 2025; Nguyen et al., 2024), and the writing strategies that learners adopt during the processes. This gap in research is further compounded by challenges in detecting AI-generated content, as current detection tools remain inaccurate and prone to misidentifications, leading to uncertainty in instructors' decision-making (Almanea, 2024). By addressing this gap, instructors can gain valuable insights into how students utilize AI in their writing processes and provide effective tutoring to guide students to appropriately use AI in assisting their writing.

Similarly, in the Chinese context, although scholars expressed concerns about the potential threat of AI to academic writing integrity (Yan, 2023), EFL learners held positive attitudes toward AI adoption in writing (Xiao & Zhi, 2023; Zou & Huang, 2023), fostering its integration into writing practices. Despite its growing use, insufficient focus was placed on unpacking EFL learners' writing process and strategies when using AI (Jin et al., 2025), and it remains unclear how EFL learners engage with AI tools. Without knowing these, instructors could not effectively scaffold learners' writing, such as providing guidance on its proper use (Fan et al., 2024).

Therefore, following Guo et al. (2023), this qualitative study employs the activity theory (AT) to examine Chinese EFL learners' AI-assisted writing processes and strategies. As a

robust framework for analyzing human-chatbot interactions (Woo et al., 2025), AI enables us to systematically investigate how learners interact with AI while performing writing tasks and the complex relationship between learners and AI tools within the activity system (Guo et al., 2023). The qualitative study based on AI emphasizes the complex interplay between different elements within writing systems (e.g., Chen et al., 2022; Guo et al., 2023), and highlights the importance of capturing in-depth information that cannot be suggested in quantitative studies (Huang et al., 2019). The research questions were: (1) What strategies did Chinese EFL learners employ in their AI-assisted writing activities? (2) How did Chinese EFL learners perceive the outcome of using these strategies in writing?

Exploring students' AI-assisted writing processes and strategies offers valuable insights into how AI influences the way learners approach writing tasks and captures their cognitive processes throughout the writing stages. This research is essential for helping EFL learners monitor their writing and actively engage in metacognitive processes during writing (Fan et al., 2024). It also provides implications for educators to design effective writing instruction that incorporates technology and nurtures learners' cognitive skills.

2. LITERATURE REVIEW

2.1. AI in language learning

In the context of AI, various tools have been introduced to English writing practices, including AI-based translation, automatic corrective feedback, and paraphrasing applications (Yan, 2023). Previous studies have shown the effectiveness of these tools in improving writing accuracy (Yan, 2023), offering feedback (Xiao & Zhi, 2023), providing learning materials, and addressing learners' diverse needs (Huang & Zou, 2024). Among these tools, AI chatbots, especially those empowered by large language models, stand out due to their ability to facilitate human-like conversations and generate coherent responses in natural language (Aydin & Karaarslan, 2023). These capabilities position it as a highly promising tool for enhancing the learning experience (Labadze et al., 2023).

Previous research on AI chatbots suggested benefits and potential challenges that EFL learners perceived. For example, Labadze et al (2023) indicated that AI chatbots were conducive to language learning, given they supported personalized learning and aided learners' skills development. Studies also proposed the advantages of utilizing AI chatbots to enhance students' learning achievements (e.g., Guo et al., 2022). From a psychological perspective, Alsager (2024) suggested that using AI chatbots improved Saudi Arabian EFL learners' motivation and reduced their language learning anxiety, while simultaneously fostering their autonomy. This aligns with the findings of Derakhshan (2025) that AI tools foster emotional engagement by providing individualized, interactive, and autonomy-supporting learning experiences. However, the findings contradicted those of Deng and Yu (2023), which concluded that AI chatbots negatively impacted students' critical thinking ability. The challenges and risks of using AI chatbots also include learners' over-reliance, data security, privacy concerns, and biased content (Crompton & Burke, 2023). These discrepancies may stem from varying ways learners navigate AI chatbots (Labadze et al., 2023), highlighting the need for further investigation into learner-chatbot interactions.

2.2. AI-assisted English writing

The effectiveness of AI in improving EFL writing performance has been widely recognized (Woo et al., 2025; Wu et al., 2021). For example, studies have shown that AI chatbots help EFL writers overcome writing blocks and enhance language skills through timely, personalized feedback, making writing more rewarding (Yan, 2023). AI chatbots foster supportive writing environments, boosting learners' interest and efficiency (Guo et al., 2023), and AI-assisted writing improvement depends on learners' self-regulation (Jin et al., 2025).

Despite the benefits mentioned above, the negative impacts of AI chatbots warrant caution among EFL learners when they use AI in writing. When provided with prompts, AI chatbots can generate content for EFL learners, potentially hindering their writing skill development and undermining cognitive, linguistic, and socio-emotional competencies that traditional EFL learning aims to foster (Yeo, 2023). Barrot (2023) suggested that AI use threatens students' critical thinking and problem-solving abilities. Further, AI chatbots may jeopardize academic integrity concerning authorship and plagiarism (Cotton et al., 2023; Yeo, 2023). These concerns are further exacerbated by the unreliability of AI detectors, highlighting the need for ongoing research into the ethical use of AI (Chaka, 2024).

The use of AI chatbots for English writing among Chinese EFL learners has garnered wide attention. AI chatbots were used at various stages of the writing process and fostered self-learning (Zou & Huang, 2023). Similar to previous studies suggesting concerns of AI usage, studies in the Chinese EFL contexts noted that potential challenges might remain in the threats to academic integrity (Yan, 2023), learning loss (Zou & Huang, 2023), and metacognitive laziness (Fan et al., 2024), suggesting the significance of understanding how EFL learners use AI in their writing. However, most studies relied on self-reported data (Zou & Huang, 2023), with limited research being found on how Chinese EFL learners engage with AI chatbots in authentic writing (Jin et al., 2025), leaving the dynamics of utilization a significant gap (Nguyen et al., 2024). Analyzing learners' interactions with AI chatbots offers valuable insights into their writing processes, aiding both learners in managing their writing and educators in providing targeted support (Zou & Huang, 2023).

2.3. Activity theory (AT)

AT, grounded in Vygotsky's (1978) concept of mediation, provides a robust framework for analyzing human behavior in social contexts. Leont'ev (1981) expanded this by emphasizing different levels of activity, while Engeström (1987) further developed the theory, highlighting its dynamic and collective nature (Kim & Kim, 2021; Li & Xu, 2023). The activity system encompasses six essential components, as visualized in Figure 1. Among them, the subject(s) are the agent(s) of the activity, and the object(s) refers to the purpose of the activity. Tools refer to both the physical instruments (e.g., computers) and conceptual elements (e.g., language) that mediate the actions of subjects in their pursuit of the object (Guo et al., 2023). Rules encompass the norms and regulations that guide behavior of subjects and other members of the community (Kim & Kim, 2021). Community refers to the group to which subjects belong, as well as the broader social context in which the activity occurs (Guo et al., 2023; Kim & Kim, 2021). The division of labor involves the distribution

of tasks and roles among community members as they work together to achieve the object (Guo et al., 2023). AT theory suggests activity is mediated by tools, rules, community, and division of labor (i.e., the distribution of tasks and roles) (Engeström, 1987; Li & Xu, 2023). In the context of AI-facilitated writing, students are the subjects who engage in the writing activity, with the goals of completing specific writing tasks and improving their writing skills (object). To achieve these, they utilize various tools, including AI chatbots and other digital resources. The writing activity unfolds within a structured, rule-governed community that encompasses students themselves, their peers, teachers, and AI technologies (Chen et al., 2022). The rules may include grammatical rules, established writing conventions, grading rubrics provided by teachers, and learner beliefs, and all of them shape the writing experience (Chen et al., 2022; Guo et al., 2023).

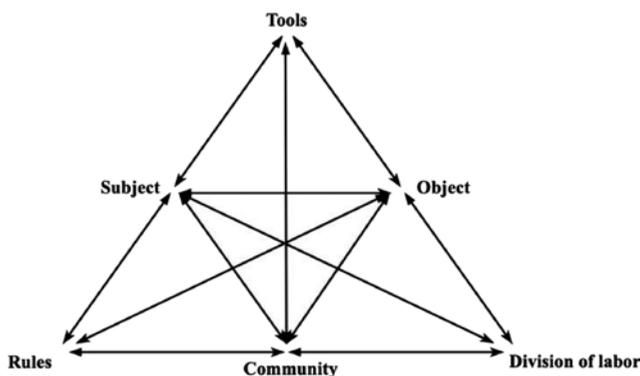


Figure 1. Activity system (Engeström, 1987)

The application of AT in language education (e.g., English writing) has grown significantly in recent years. However, these studies were contextualized in basic technological environments, such as automatic writing evaluation tool (Chen et al., 2022). While valuable in deepening learner-tool interaction, findings may not be sufficient and valid in explaining learners' AI usage in English writing, considering AI has great potential to generate contents (Guo et al., 2023). AI chatbots, with their advanced content generation capabilities, challenge traditional views of tool-mediated activity by reshaping the learning processes (Karanasios et al., 2021). Thus, Woo et al. (2025) call for future research to explore the application of AT in AI-assisted contexts. Furthermore, these studies often concentrate on specific learner groups, such as secondary school students (Woo et al., 2025), limiting their relevance to the broader educational contexts, including university undergraduate and graduate learners who have diverse writing purposes and requirements.

This study seeks to address this gap by contextualizing AT within the generative AI-assisted writing context, specifically focusing on EFL learners' strategies when interacting with AI chatbots in the EFL writing process. By doing so, it not only enriches people's understanding of AT but also offers valuable insights into how AI tools assist learners' writing processes and their roles in writing. In practice, understanding these interactions equips educators with sufficient knowledge to effectively guide their teaching.

3. METHOD

3.1. Participants

This study involved sixteen EFL learners from various universities across China. Participants were purposively selected for their extensive experience using AI chatbots (e.g., ChatGPT, ERNIE Bot) to complete English writing tasks. They varied in gender, major, and educational level. Pseudonyms were used to protect their identities. Ten participants were from key universities (identified in the *Double First-Class Initiative* by the Ministry of Education of China in 2017), and six were from non-key universities, ensuring a diverse representation. Table 1 provides detailed participant information.

Table 1. *Demographic information of participating students*

STUDENTS	GENDER	UNIVERSITY TYPE	MAJOR	EDUCATIONAL LEVEL
S1	Male	Key	Information Management and Information Systems	Undergraduate-Year 4
S2	Female	Key	English Translation	Undergraduate-Year 4
S3	Female	Key	Education	Undergraduate-Year 4
S4	Female	Key	English Language and Literature	Postgraduate -Year 2
S5	Female	Key	English	Undergraduate-Year 3
S6	Female	Key	English	Undergraduate-Year 2
S7	Female	Non-key	Industrial Design	Undergraduate-Year 4
S8	Female	Non-key	Business English	Undergraduate-Year 4
S9	Male	Key	Foreign Linguistics and Applied Linguistics	Postgraduate -Year 1
S10	Male	Non-key	Teaching English as a Foreign Language	Postgraduate -Year 1
S11	Male	Non-key	Marketing	Undergraduate-Year 3
S12	Male	Key	Civil and Hydraulic Engineering	Postgraduate -Year 1
S13	Female	Key	Communication Studies	Postgraduate -Year 2
S14	Female	Non-key	English	Undergraduate-Year 4
S15	Female	Key	Law	Postgraduate -Year 2
S16	Female	Non-key	Translation	Undergraduate-Year 1

Participants' interactions with AI reveal the dynamics of human-AI task negotiation. They initiated the process with broad prompts (e.g., "*Give me an outline of a study on feminism,*" Figure 2), provided further requirements based on AI-generated outputs (e.g., "*Can you explain further the first point you provided?*" Figure 3). As the writing progressed, participants engaged in multiple rounds of refinement, utilizing AI and additional tools. Before submitting their writing, they proofread the drafts meticulously, reviewing each word for accuracy and coherence.

3.2. Instrument and data collection

The instruments used in this study included the screen recordings of participants' writing processes with AI chat bots, and an interview protocol to unpack students' strategies of using AI in writing as well as their perceptions. Data collection was conducted after we received participants' consent, which ensured that participants were informed of their rights to withdraw or decline from this study. To ensure privacy and confidentiality, all identifying information of the participants was removed from results report. All digital traces were securely stored and accessible only to the researchers for research purposes.

They were asked to record English writing process by themselves, share and explain their methods of using AI and their perceptions, and demonstrate examples of chat logs that provided detailed textual records of student-AI interactions, including students' queries and responses received. This way, researchers are able to observe participants' behaviors, capture their thinking and strategies, and understand their decision-making processes. Additionally, semi-structured interviews were employed to understand participants' strategies when using AI in their writing. The interview protocol consisted of two sections: the first gathered demographic information (e.g., major, educational level) and the second encompasses a series of questions about AI usage in the writing process to capture learners' strategies, experiences and perceptions. Interviews were conducted individually via Tencent Meeting, a widely used video conferencing platform in China. We used Chinese language for better understanding since Chinese is the native language. Each interview lasted about 30 minutes. All interviews were transcribed verbatim and the transcripts were then sent to participants for confirmation. All interviews were completed within one month.



Figure 2. Screenshot of the chat (S14)

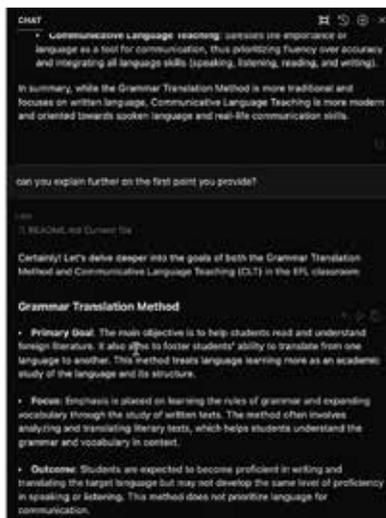


Figure 3. Screenshot of the chat (S10)

Data from recordings, interviews and screen shots (chat logs with AI) were triangulated to achieve a deep understanding of EFL learners' strategies and perceptions of AI chatbots

usage in English writing (Creswell & Creswell 2022). To be specific, recordings of students' writing process were firstly analyzed to capture their thinking and writing behavior. Following that, we reviewed and examined chat logs that demonstrated students' specific interactions with AI, including the strategies used to complete their writing tasks. In addition, interviews provided further insights into participants' strategies, perceptions, emotions, attitudes, and concerns of their AI usage. The triangulation procedure ensured that each data type complemented the others (Patton, 1999), contributing to a more robust and holistic understanding of students' AI-assisted writing practices.

3.3. Data analysis

Data were thematically analyzed using Braun and Clarke's (2006) framework of thematic analysis by following the six steps summarized by Xin and Derakhshan (2025). Specifically, the first and second authors immersed themselves in the data by reading them multiple times. They coded independently by identifying key statements reflecting students' writing processes and strategies. Following this, the two coders met to discuss the codes they developed and resolved discrepancies through a thorough review of the data. The agreed-upon codes were then merged and categorized into larger themes that were mapped to elements of activity theory (AT). For example, when interviewees mentioned using "search engines" and "academic article databases" to verify AI-provided content authenticity, the concept of digital tools emerged as a theme matching "Tools" in the original AT. Subsequently, all the authors reviewed the themes to ensure the data were clearly presented. Finally, the themes were labeled with concise phrases through in-depth discussion among the three authors. Generally, the inter-coder reliability analysis showed a Cohen's Kappa coefficient of 0.90, indicating satisfactory reliability. The authors engaged in intensive discussions regarding the disagreements in an effort to arrive at a consensus. For instance, some students frequently used L1 prompt when interacting with AI, the first author initially categorized it into "Rules", while after intensive discussion, the authors reached an agreement that "Tools" is a better choice, since they indicate measures or strategies that subjects take to achieve goals, and the prompt is a type of tools (Guo et al., 2023).

4. FINDINGS

4.1. Strategies Chinese EFL learners employ in their AI-assisted writing activities

According to the original AT, the community indicates "other learners" who learn together with the learner themselves, as well as teachers and other staff. In other words, the community refers to the participants who complete the learning process together with the learner, and it plays an important role throughout the process, sometimes guiding and sometimes participating. The community constantly influences the subject and provides the resources or support needed by the subject.

When AI technology is integrated, it facilitates students' English writing (Liang et al., 2024). Strategies implemented by the participants were substantially impacted by their perceptions of AI tools within the writing process. Data analysis suggested, Chinese EFL

learners generally consider AI tools as good writing companions and strategies include: (1) directly using L1 prompts or L1-L2 interchangeably to verify the appropriateness; (2) switching among diverse digital tools to ensure authenticity and seek for perfection; (3) inserting specific requirements provided by teachers or instructors to direct AI in its processing and (4) revising the AI-generated content to avoid being detected as “plagiarism”. More details are elaborated in the following paragraphs.

Strategy 1: Directly L1 prompt or L1-L2 interchangeably to verify the appropriateness

Participants emphasized the significance of prompts in the AI-assisted writing process. A notable strategy that emerged was the frequent L1 use (Chinese) for prompting AI chatbots, echoing measures or artifacts to support goal achievement, which aligns with “Tools” in the original AT theory (Guo et al., 2023). Seven participants (S1, S2, S3, S4, S6, S9, S11) used Chinese, given that they perceived native language enabled them to express thoughts and intentions clearly to AI chatbots, and was very time-saving. But if the output did not meet task requirements to a good extent, participants shifted to English prompts. Anyway, L1 (Chinese) is a participants' preference, English is employed when greater precision is needed. For instance, S4 and S9 said respectively as follows:

I usually communicate with AI in Chinese because it's very efficient and fast. (S4)

I prefer to provide Chinese prompts. Only when the output doesn't meet the task requirements, I switch to English. (S9)



Figure 4. Screenshot of the chat (S11)

Note: 翻译以上全文: Please translate the above text.

Interestingly, some participants (S1, S6, S8, S11, S16) also used the back-translation strategy (L2-L1) to assess the appropriateness of AI-generated output. As shown in Figure 4, S11 asked the AI chatbot to translate the essay provided by AI into Chinese, although reading the text word by word was time-consuming.

Strategy 2: Switching among diverse digital tools to ensure authenticity and seek for perfection

Although AI assistance was viewed as indispensable by learners, with S3 describing it as “*a life-saving straw*”, participants expressed dissatisfaction (e.g., lack of depth) or concerns (e.g., reliability) with AI-provided content. To deal with these problems, they employed various digital tools during the writing process, indicating “Tools” in AT. Specifically, participants utilized search engines, such as Baidu browser, to verify the content authenticity provided by AI chatbots, which significantly influences the quality of their work. Many participants (S4, S5, S7, S9, S12, S13, S14, S15) also referred to academic articles to improve the depth of their writing, noting that the content provided by AI was often shallow and lacked clarity. As S13 described the AI output as “*something an undergraduate student in his first or second year produced*” and highlighted the need for additional sources to enhance the content. This approach illustrated a more active engagement with AI, where learners utilized additional resources to enhance their writing.

I need to write academic papers in English. When I need to explain a term “photovoltaic power generation”, AI provides instant feedback, but you know, research is very serious, I cannot fully trust the answers from AI, so I seek for more information online to verify its authenticity. (S12)

In my book review task, I need to review Madness and Civilization written by Michel Foucault. The AI-provided book summary lacks historical background, so I search baidu for it to enrich the content. (S4)

The responses from AI cover many dimensions, for example, when I ask AI what is the self-determination theory, AI provided descriptions of its dimensions (Intrinsic, identified, introjected, external and amotivation), but I am still confused about the deep meaning of these dimensions and how I can apply this theory into my academic research task. So I need to resort to published articles for further information. (S13)

Strategy 3: Insert specific requirements provided by teachers or instructors to direct AI in its processing

Rules refer to the conventions and norms that guide the behavior of individuals within a community (Guo et al., 2022). These rules establish a framework for action and guide how tools are used, ensuring that participants work towards their ultimate goals.

In the context of AI-assisted writing, rules include writing task requirements from teachers and their own beliefs about good writing (Chen et al., 2022; Guo et al., 2023). Participants (S1, S3, S6, S9, S13, S15) treat writing task requirements as rules and inserted detailed requirements from teachers to guide AI in its processing; in doing so, AI would

produce more relevant responses to the task requirements. For instance, S15 provided detailed steps when she uses AI for writing.

My teacher asked us to compose an argumentative writing about whether the Antarctic Treaty System should be applied in the governance of contested maritime domains (Figure 5). To complete this task, I firstly provided introduction of Antarctic Treaty System to AI, followed by the detailed task requirement, namely, write this part in detailed and fluent paragraph encompassing principles of the Antarctic Treaty System and examples of successful application in governing Antarctica (Figure 6). (S15)

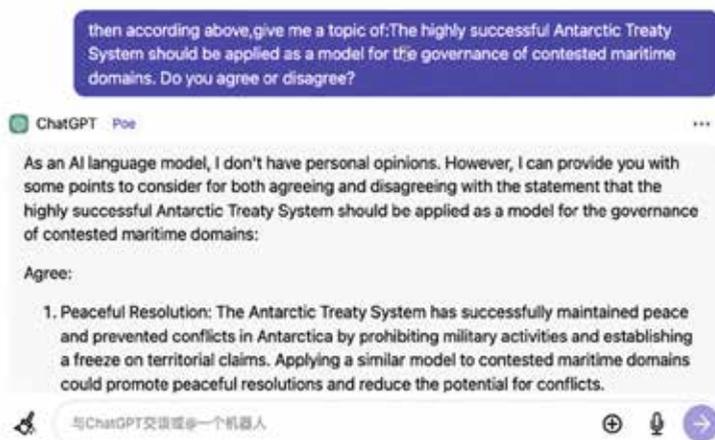


Figure 5. Screenshot of the chat (S15)

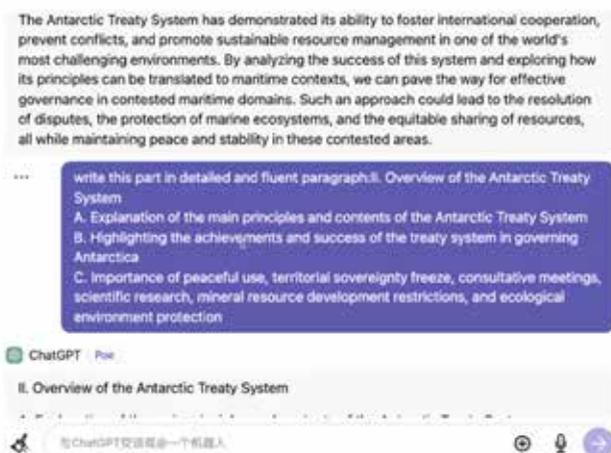


Figure 6 Screenshot of the chat (S15)

Strategy 4: Revise the AI-generated contents to avoid being detected as “plagiarism”

Academic writing emphasizes originality and integrity (Pongrácz & Camerlink, 2023), despite appropriate usage of technology demonstrates people’s information literacy (Huang, 2024). One strategy employed by learners is revising AI-generated content to minimize the risk of violating academic integrity. Many students (S2, S4, S5, S7, S8, S9, S10, S12, S14, S15) believed that revising the content allowed them to better tailor the outputs to their personal writing styles while avoiding plagiarism risk. As S8, S14 and S15 noted:

I use AI-generated content for inspiration, not as a final version to submit. I always add my own thoughts to AI-generated content. Otherwise, I am afraid of being detected as plagiarism because the AI-generated content is too perfect. (S8)

I often revise the content AI provided and incorporate my own ideas to enrich the content. (S14)

It’s important to revise the AI-generated content. If you use it directly, the high AIGC rate could lead to plagiarism. Also, there may be errors or awkward wording in the AI-generated text, so you should double-check and edit it. Additionally, academic writing requires proper citations. The references AI provided may not always be reliable, so you should review them or search for other literature, like from Google Scholar, and incorporate them into the content. (S15)

4.2. Perceived outcome of strategies used in writing

The interviews suggested that EFL learners generally perceived the effectiveness of using these strategies in writing tasks. Nonetheless, they voiced concerns, particularly the risk of over-dependence on AI tools, which could hinder the development of writing skills.

4.2.1. Efficient learner-AI interaction, improved content relevance, and “plagiarism-free” output

When interacting with AI, participants used L1 (Chinese) prompts, which was time-saving, given Chinese is the native language. Using L1 allowed them to express their writing needs more clearly and efficiently (Teo et al., 2019). For example, S6 indicated,

Actually, my English is not good. When communicating with AI in English, I find it quite difficult at times to come up with certain vocabulary...Chatting with AI in Chinese is convenient and efficient. (S6)

In addition to using L1 prompts, participants inserted detailed task requirements to guide AI processing. They (S1, S3, S6, S9, S15) emphasized that the more precise the input is, the more relevant the content AI provided is. This way, the information generated by AI met their expectations. For example, S9, who was expected to write a critique of a published paper, found that after entering the detailed task descriptions, AI provided structured responses that perfectly align with requirements outlined by his teachers. Using this strategy demonstrated Chinese EFL learners’ metacognitive awareness in prompt formulation (Tankelevitch et al., 2024).

My assignment is to write a critique of a published article. My teacher outlined three steps, including STEP1: identify the aims and objectives, research questions, methodology and key research findings, STEP 2: critically evaluate the methods used in terms of their strengths and limitations, and STEP 3: propose alternative research methods for future study if any, and explain your reasons. I inserted the article and these requirements into AI and found AI produced answers that exactly follow these steps. It was really good. (S9)

Moreover, participants noted that revising AI-generated content significantly enhances “originality” and makes it free from “plagiarism”. They have not been detected as “plagiarism” despite frequently using AI in writing (S4, S5, S7, S8, S9, S10, S12, S14, S15). Just as S14 stated,

I have never been caught for plagiarism because I often modify AI-generated content instead of copy-and-paste directly. Besides, I think most teachers don't check for plagiarism in writing assignments as the university did not provide AI detection service. (S14)

Furthermore, some (S2, S9, S13) mentioned the limitations and unreliability of AI detection tools. For example, S2 and S13 illustrate as follows:

AI detectors are often inaccurate. Also, there's an anti AI detection website that helps reduce the chances of being caught. (S2)

I was initially concerned that using AI would cause plagiarism. I always revise the content from AI and I do not worry about these issues. However, when I read a post describing that a human-written paragraph was flagged as AI-generated one, I began to question the reliability of AI detection tools. (S13)

4.2.2. The risk of over-dependence to diminish writing skills development

Participants noted that by following these strategies, their writing was “perfect” for most tasks. However, several participants (S3, S4, S5, S14) were concerned that, immediate access to AI-generated answers could cause disengagement in writing. The over-reliance on AI would hinder the development of cognition and writing skills. As S14 and S3 noted:

For me, AI sometimes serves as a time-saving tool for task completion. By simply outlining the writing requirements and making revisions to AI-generated content, I can get “plagiarism-free” work in a matter of seconds. But I think this approach could lead to dependency on such tools, which may hinder my cognitive abilities. (S14)

As I constantly use AI to complete many writing tasks, I might become dependent on it and would face greater difficulties in English writing exams. (S3)

5. DISCUSSION

5.1. Strategies and perceptions of AI usage in English writing

This study examined EFL learners' strategies and perceptions of AI-assisted English writing in the Chinese university context. Findings suggested that EFL learners adopted four different strategies when using AI chatbots in English writing, as detailed in the findings section. While learners generally perceived these strategies as effective, they also expressed concerns about the risk of over-reliance on AI tools, which would impede the development of their writing skills.

As for the strategies of using AI chatbots in English writing, the current study suggested that Chinese EFL learners utilized L1 (Chinese) prompts and referred to diverse tools (search engines, published articles) during writing, indicating "Tools" in activity theory. The strategy of using L1 to facilitate effective interaction with AI aligned with findings in the feedback literature (e.g., Lee, 2021; Yu & Lee, 2016). Moreover, learners utilized search engines and published articles for reference, and these strategies were also indicated by Chen et al. (2022) and Guo et al. (2023). To some degree, this strategy demonstrated students' digital competences in using diverse tools to accomplish tasks. In addition, EFL learners' critical evaluation of AI-provided content and problem-solving skills reflect the higher-order thinking and AI literacy, which may significantly influence learning outcomes (Guo et al., 2023; Ng et al., 2021). The study also found that students inserted detailed task requirements into AI and revised AI-generated content to avoid "plagiarism". These results align with the findings of Guo et al. (2023) and Chen et al. (2022) that emphasized the role of writing requirements and learners' views in shaping the writing process. Different from crafting or composing prompt as suggested by Woo et al (2025), participants in this study directly used writing requirements from their instructors as prompts to guide AI in its processing. This study also suggested participants were conscious of plagiarism, so they revised AI-generated content to ensure "plagiarism-free" output, echoing concerns raised by Almanea (2024) and Tlili et al. (2023). At the same time, learners were aware of the limitations of AI-detection tools. This may be due to their increased exposure to and usage of both AI tools and detection systems.

5.2. New understandings of activity theory

This study extended the application of the activity theory (AT) in the AI assisted writing context. AI chatbots served as more than mere mediating tools (Guo et al., 2023); they acted as active community members in the writing process. For example, learners may use AI chatbots not only to check grammatical errors in their drafts but also to guide their thinking, revise contents when necessary, and conduct further inquiries to obtain satisfying contents. In addition to these, AI chatbots function as writing companions, supporting students throughout the writing process. In this regard, AI chatbots become community members in the community (Guo et al., 2022). With their generative and interactive capabilities (Guo et al., 2023), AI chatbots not only suggest ideas and offer feedback, but also generate content, so that students could refine and expand upon it. This fosters a dynamic, bidirectional relationship between learners and AI (Labadze et al., 2023; Li & Tian, 2024), challenging

the traditional model in which the subject typically acts upon the object (Karanasios et al., 2021). Moreover, since AI played the role of writing companion, it alters the division of labor within the community. AI undertakes some tasks previously performed by students, such as generating outlines and drafting papers. As a result, a novel rule, concerns about over-reliance on AI, emerged within the activity system.

5.3 Pedagogical implications

The findings of the study offered practical implications for both learners and teachers. Although AI chatbots, as writing assistants, have potentials in supporting student writers with various writing tasks (Guo et al., 2023; Imran & Almusharraf, 2023; Yan, 2023), it is crucial for learners to critically evaluate AI-generated content and avoid relying solely on AI tools to complete tasks (Fan et al., 2025; Zhang et al., 2025).

The findings informed teachers of EFL learners' writing strategies when using AI and their perceptions of AI-assisted writing. Teachers should improve AI literacy and their knowledge of students' authentic English proficiency, so as to detect students' improper AI usage (Kamali et al., 2024). Teachers also have their duties to educate students to use AI ethically and responsibly. To reduce the risk of plagiarism, especially when AI usage is allowed in the low-stakes writing assignments (Kamali et al., 2024; Tlili et al., 2023), teachers should raise students' awareness of AI's limitations and the serious consequences of improper AI usage, and, if necessary, establish clear usage guidelines (Memarian & Doleck, 2023). For example, teachers can explicitly introduce the benefits and drawbacks of AI tools and provide strategies for managing their limitations (Almanea, 2024; Guo et al., 2023). It is also practical and important for teachers to collect students' multiple drafts, including the original drafts without AI usage and those with AI assistance, to gain better understanding of students' writing skills development with AI (Almanea, 2024).

6. CONCLUSION

Guided by the activity theory, this study examined Chinese EFL learners' strategies and perceptions of AI-assisted writing. Findings indicated EFL learners use L1 prompt or L1-L2 interchangeably to verify the appropriateness (Tools); switch among diverse digital tools to ensure authenticity and seek for perfection (Tools); insert specific requirements provided by teachers or instructors to direct AI in its processing (Rules); and revise the AI-generated contents to avoid being detected as "plagiarism" (Rules). Though learners noted the potential over-reliance on AI, they generally perceived the effectiveness of using these strategies in writing.

This study has some limitations. First, considering the current study did not specify students' writing purpose and genre, strategies suggested in this study might not be inclusive. Future studies might categorize strategies by specifying writing purposes and genres. In addition, while a qualitative design enabled researchers to gain deep understandings of students' AI adoption strategies and their perceptions, quantitative analysis might be needed to generalize students' perceptions and examine factors that influence learners' AI adoption in writing, which may exert impact on writing performances.

7. FUNDING INFORMATION

This study was supported by the Shanghai Social Science Planning Project 'Factors Influencing University Foreign Language Teachers' Acceptance of Artificial Intelligence and Intervention Mechanism: A Study in Shanghai' (2024BY008), and the Supervisor Academic Guidance Program of Shanghai International Studies University under Grant (2024DSYL012).

8. REFERENCES

- Almanea, M. (2024). Instructors' and learners' perspectives on using ChatGPT in English as a foreign language courses and its effect on academic integrity. *Computer Assisted Language Learning*, 1–26. <https://doi.org/10.1080/09588221.2024.2410158>
- Alsager, H. (2024). To look from another window in education: Artificial intelligence-assisted language learning and its reflections on academic demotivation, foreign language learning anxiety, and autonomy. *Computer Assisted Language Learning Electronic Journal*, 25(4), 124–147. <https://callej.org/index.php/journal/article/view/469>
- Aydin, Ö., & Karaarslan, E. (2023). Is ChatGPT leading generative AI? What is beyond expectations? What is beyond expectations? *Academic Platform Journal of Engineering and Smart Systems*, 11(3), 118–134. <https://doi.org/10.21541/APJESS.1293702>
- 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>
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Chaka, C. (2024). Reviewing the performance of AI detection tools in differentiating between AI-generated and human-written texts: A literature and integrative hybrid review. *Journal of Applied Learning and Teaching*, 7(1), 115–126. <https://doi.org/10.37074/jalt.2024.7.1.14>
- Chen, Z., Chen, W., Jia, J., & Le, H. (2022). Exploring AWE-supported writing process: An activity theory perspective. *Language Learning & Technology*, 26(2), 129–148. <https://doi.org/10.125/73482>
- Cotton, D. R., Cotton, P. A., & Shipway, J. R. (2023). Chatting and cheating: Ensuring academic integrity in the era of ChatGPT. *Innovations in Education and Teaching International*, 61(2), 228–239. <https://doi.org/10.1080/14703297.2023.2190148>
- Creswell, J. W., & Creswell, J. D. (2022). *Research design: Qualitative, quantitative, and mixed methods approaches* (6th ed.). Sage.
- Crompton, H., & Burke, D. (2023). Artificial intelligence in higher education: the state of the field. *International Journal of Educational Technology in Higher Education*, 20(1), 22. <https://doi.org/10.1186/s41239-023-00392-8>
- Deng, X., & Yu, Z. (2023). A meta-analysis and systematic review of the effect of chatbot technology use in sustainable education. *Sustainability*, 15(4), 2940. <https://doi.org/10.3390/su15042940>
- Derakhshan, A. (2025). EFL students' perceptions about the role of generative artificial intelligence (GAI)-mediated instruction in their emotional engagement and goal orientation: A motivational climate theory (MCT) perspective in focus. *Learning and Motivation*, 90, 102114. <https://doi.org/10.1016/j.lmot.2025.102114>
- Derakhshan, A., & Taghizadeh, M. S. (2025). Does artificial intelligence (AI) nurture or hinder language learners' higher-order thinking skills (HOTS)? A phenomenological study on L2

- learners' perspectives and lived experiences. *International Journal of Applied Linguistics*. <https://doi.org/10.1111/ijal.12824>
- Engeström, Y. (1987). *Learning by expanding: An activity theoretical approach to developmental research*. Orienta-Konsultit.
- Fan, Y., Tang, L., Le, H., Shen, K., Tan, S., Zhao, Y., Shen, Y., Li, X., & Gašević, D. (2024). Beware of metacognitive laziness: Effects of generative artificial intelligence on learning motivation, processes, and performance. *British Journal of Educational Technology*, 56(2), 489–530. <https://doi.org/10.1111/bjet.13544>
- Guo, K., Li, Y., Li, Y., & Chu, S. K. (2023). Understanding EFL students' chatbot-assisted argumentative writing: An activity theory perspective. *Education and Information Technologies*, 29(1), 1–20. <https://doi.org/10.1007/s10639-023-12230-5>
- Guo, K., Wang, J., and Chu, S. K. W. (2022). Using chatbots to scaffold EFL students' argumentative writing. *Assessing Writing*, 54, 100666. <https://doi.org/10.1016/j.asw.2022.100666>
- Huang, F. (2024). Examining foreign language teachers' information literacy: Do digital nativity, technology training, and fatigue matter?. *The Asia-Pacific Education Researcher*, 33(4), 901–912. <https://doi.org/10.1007/s40299-023-00797-z>
- Huang, F., & Zou, B. (2024). English speaking with artificial intelligence (AI): The roles of enjoyment, willingness to communicate with AI, and innovativeness. *Computers in Human Behavior*, 159, 108355. <https://doi.org/10.1016/j.chb.2024.108355>
- Huang, F., Teo, T., & Zhou, M. (2019). Factors affecting Chinese English as a Foreign Language teachers' technology acceptance: A qualitative study. *Journal of Educational Computing Research*, 57(1), 83–105. <http://dx.doi.org/10.1177/0735633117746168>
- Imran, M., & Almusharraf, N. (2023). Analyzing the role of ChatGPT as a writing assistant at higher education level: A systematic review of the literature. *Contemporary Educational Technology*, 15(4), ep464. <https://doi.org/10.30935/cedtech/13605>
- Jin, F., Lin, C.-H., & Lai, C. (2025). Modeling AI-assisted writing: How self-regulated learning influences writing outcomes. *Computers in Human Behavior*, 165, 108538. <https://doi.org/10.1016/j.chb.2024.108538>
- Kamali, J., Alpat, M.F., & Bozkurt, A. (2024). AI ethics as a complex and multifaceted challenge: decoding educators' AI ethics alignment through the lens of activity theory. *International Journal of Educational Technology in Higher Education*, 21(1), 62. <https://doi.org/10.1186/s41239-024-00496-9>
- Karanasios, S., Nardi, B. A., Spinuzzi, C., & Malaurent, J. (2021). Moving forward with activity theory in a digital world. *Mind, Culture, and Activity*, 28(3), 234–253. <https://doi.org/10.1080/10749039.2021.1914662>
- Kim, H. S., & Kim, T.-Y. (2021). Impact of motivational languaging activities on novice English teachers' motivation: An activity theory perspective. *Porta Linguarum An International Journal of Foreign Language Teaching and Learning*, 36, 139–157. <https://doi.org/10.30827/portalin.vi36.15909>
- Labadze, L., Grigolia, M., & Machaidze, L. (2023). Role of AI chatbots in education: systematic literature review. *International Journal of Educational Technology in Higher Education*, 20(1), 56. <https://doi.org/10.1186/s41239-023-00426-1>
- Lee, J. (2021). ESL learners' writing as a window onto discourse competence. *Porta Linguarum: revista internacional de didáctica de las lenguas extranjeras*, 35, 277–294. <https://doi.org/10.30827/portalin.vi35.15752>

- Leontöev, A. N. (1981). *Problems of the development of the mind*. Progress Press.
- Li, F., & Tian, L. (2024). Translation practice and competence enhancement in the age of AI: Applying ChatGPT to translation education. In Z. Kubincová et al. (Eds.), *Emerging technologies for education* (pp. 219–230). Springer. https://doi.org/10.1007/978-981-97-4243-1_17
- Li, X., & Xu, J. (2023). Understanding tertiary EFL teacher learning and identity development: a cultural-historical activity theory perspective. *Porta Linguarum: revista internacional de didáctica de las lenguas extranjeras*, 9, 251–271. <https://doi.org/10.30827/portalin.vi2023c.29652>
- Liang, J., Huang, F., & Teo, T. (2024). Understanding Chinese university EFL learners' perceptions of AI in English writing. *International Journal of Computer-Assisted Language Learning and Teaching (IJCALLT)*, 14(1), 1–16. <https://doi.org/10.4018/IJCALLT.358918>
- Memarian, B., & Doleck, T. (2023). Fairness, accountability, transparency, and ethics (FATE) in artificial intelligence (AI) and higher education: A systematic review. *Computers and Education: Artificial Intelligence*, 5, 100152. <https://doi.org/10.1016/j.caeai.2023.100152>
- Ng, D. T. K., Leung, J. K. L., Chu, S. K. W., & Qiao, M. S. (2021). Conceptualizing AI literacy: An exploratory review. *Computers and Education: Artificial Intelligence*, 2, 100041. <https://doi.org/10.1016/j.caeai.2021.100041>
- Nguyen, A., Hong, Y., Dang, B., & Huang, X. (2024). Human-AI collaboration patterns in AI-assisted academic writing. *Studies in Higher Education*, 49(5), 847–864. <https://doi.org/10.1080/03075079.2024.2323593>
- Nosratinia, M., & Razavi, F. (2016). Writing complexity, accuracy, and fluency among EFL Learners: Inspecting their interaction with learners' degree of creativity. *Theory and Practice in Language Studies*, 6(5), 1043–1052. <http://dx.doi.org/10.17507/tpls.0605.19>
- Patton, M. Q. (1999). Enhancing the quality and credibility of qualitative analysis. *Health Sciences Research*, 34, 1189–1208.
- Pongrácz, P., & Camerlink, I. (2023). Preserving ethics and integrity of scientific writing and reviewing after the advent of generative AI and AI-assisted technologies. *Applied Animal Behaviour Science*, 268, 106107. <https://doi.org/10.1016/j.applanim.2023.106107>
- Susnjak, T., & McIntosh, T. R. (2024). ChatGPT: The end of online exam integrity? *Education Sciences*, 14(6), 656. <https://doi.org/10.3390/educsci14060656>
- Tankelevitch, L., Kewenig, V., Simkute, A., Scott, A. E., Sarkar, A., Sellen, A., & Rintel, S. (2024). The metacognitive demands and opportunities of generative AI. In *Proceedings of the 2024 CHI Conference on Human Factors in Computing Systems* (pp. 1–24). Association for Computing Machinery. <https://doi.org/10.1145/3613904.3642902>
- Teo, T., Zhou, M., Fan, A., & Huang, F. (2019). Factors that influence university students' intention to use Moodle: a study in Macau. *Educational Technology Research & Development*, 67(3), 749–766. <https://doi.org/10.1007/s11423-019-09650-x>
- Tlili, A., Shehata, B., Adarkwah, M. A., Bozkurt, A., Hickey, D. T., Huang, R., & Agyemang, B. (2023). What if the devil is my guardian angel: ChatGPT as a case study of using chatbots in education. *Smart Learning Environments*, 10(1), 15. <https://doi.org/10.1186/s40561-023-00237-x>
- Vygotsky, L. (1978). *Mind in society: The development of higher psychological processes*. Harvard University Press.
- Woo, D. J., Guo, K., & Susanto, H. (2025). Exploring EFL students' prompt engineering in human-AI story writing: an activity theory perspective. *Interactive Learning Environments*, 33(1), 863–882. <https://doi.org/10.1080/10494820.2024.2361381>

- Woo, D. J., Wang, Y., Susanto, H., & Guo, K. (2023). Understanding English as a foreign language students' idea generation strategies for creative writing with natural language generation tools. *Journal of Educational Computing Research*, 61(7), 1464–1482. <https://doi.org/10.1177/07356331231175999>
- Wu, L., Wu, Y., & Zhang, X. (2021). L2 learner cognitive psychological factors about Artificial Intelligence writing corrective feedback. *English Language Teaching*, 14(10), 70–83. <https://doi.org/10.5539/elt.v14n10p70>
- Xiao, Y., & Zhi, Y. (2023). An exploratory study of EFL learners' use of ChatGPT for language learning tasks: Experience and perceptions. *Languages*, 8(3), 212. <https://doi.org/10.3390/languages8030212>
- Xin, Z., & Derakhshan, A. (2025). From excitement to anxiety: Exploring English as a Foreign Language learners' emotional experiences in the artificial intelligence-powered classrooms. *European Journal of Education*, 60(1), e12845. <https://doi.org/10.1111/ejed.12845>
- Yan, D. (2023). Impact of ChatGPT on learners in a L2 writing practicum: An exploratory investigation. *Education and Information Technologies*, 28(11), 13943–13967. <https://doi.org/10.1007/s10639-023-11742-4>
- Yeo, M. A. (2023). Academic integrity in the age of Artificial Intelligence (AI) authoring apps. *TESOL Journal*, 14(3), e716. <https://doi.org/10.1002/tesj.716>
- Yu, S., & Lee, I. (2016). Exploring Chinese students' strategy use in a cooperative peer feedback writing group. *System*, 58, 1–11. <https://doi.org/10.1016/j.system.2016.02.005>
- Zare, J., Ranjbaran Madiseh, F., & Derakhshan, A. (2025). Generative AI and English essay writing: Exploring the role of ChatGPT in enhancing learners' task engagement. *Applied Linguistics*. <https://doi.org/10.1093/applin/amaf045>
- Zhang, C., Ma, X., & Lee, I. (2025). Perspectives on potential plagiarism triggered by AI among Chinese university students. *The Asia-Pacific Education Researcher*. <https://doi.org/10.1007/s40299-025-01004-x>
- Zou, M., & Huang, L. (2023). To use or not to use? Understanding doctoral students' acceptance of ChatGPT in writing through technology acceptance model. *Frontiers in Psychology*, 14, 1259531. <https://doi.org/10.3389/fpsyg.2023.1259531>