A Case Study on College Students' Strategies for Employing Artificial Intelligence in Writing Second Language thesis

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Abstract:

As artificial intelligence (AI) technology proliferates, its impact on second language education, has garnered significant attention. This study explores the strategies adopted by university students in utilizing AI tools, including machine translation and generative AI, during their second language thesis writing process. By conducting semi-structured interviews with Japanese majors, the study delves into students' utilization strategies, perceptions, and their desired assistance when applying AI tools for academic writing. The findings reveal that students frequently rely on machine translation for comprehension and initial translation, while generative AI aids in summarizing, outlining, and refining language. While acknowledging the efficiency and quality enhancements AI brings, students also note limitations such as translation quality issues and potential misunderstandings with generative AI. Participants express needs for instructor guidance, training, and recommendations for suitable AI tools. This study concludes that AI tools hold promise for enhancing academic writing but underscores the importance of future research on larger scales to evaluate their long-term effects on writing skills and creativity. Furthermore, developing user-centered AI tools and integrating AI into writing curricula are recommended to maximize the educational benefits of AI-assisted writing.

Keywords: AI, ChatGPT, Higher Education, Machine Translation, L2 writing

1. Introduction

As artificial intelligence (AI) technology advances rapidly, natural language processing tools such as generative AI and machine translation (MT) tools have raised considerable concerns in education. In recent years, there has been a gradual increase in researchers' attention about the application of AI in higher education. It is known that in language learning, students do use advanced text generation tools such as ChatGPT and online machine translation including DeepL and Youdao Dictionary to assist in completing writing or language assignments. However, the understanding of how university students utilize AI writing tools and their perceptions of the impact of these tools on second language learning still needs to be improved. Accordingly, this study was carried out to investigate the strategies employed by college students when utilizing AI tools in second language thesis writing. By examining students' strategies, perceptions, and desired assistance, we hope to gain insights into how students navigate the benefits and challenges posed by generative AI and machine translation tools.

2. Literature Review

In recent years, the application of generative AI and online machine translation, has gained substantial attention in higher education, with a growing emphasis on its roles in assisting academic writing assistance. Previous studies mainly focus on three aspects: the functions and advantages of AI-assisted writing, its associated problems and solutions, and future trends. While substantial progress has been made in both breadth and depth, differences in emphasis and perspectives exist. Within the perspective of second language acquisition (SLA), studies on AI-assisted academic writing in higher education center on generative AI and machine translation tools.

2.1 Generative AI applied in Student Writing

Multiple studies have been conducted on how generative AI assists student in writing. Scholars have extensively discussed its integration into higher education and SLA, summarizing its functions, benefits, and limitations.
Atlas (2023) mentions that ChatGPT demonstrates robust writing assistance in higher education, encompassing text generation, summary writing, outline creation, and translation, effectively enhancing writing skills and language proficiency for both students and teachers[2]. PS Aithal & S Aithal (2023) emphasize ChatGPT's potential in academic research, facilitating data analysis, idea generation, literature search, and hypothesis formulation, thereby optimizing research processes and fostering innovative discoveries[1]. Barrot (2023) focuses on second language

writing, explaining how ChatGPT instantly provides feedback in areas such as language form, coherence, and sentence connection[4]. This study also explores integrating ChatGPT into second language writing classrooms, offering guidance on teaching approaches, practical training, teacher-student collaboration, fostering student communities, continuous support for AI usage, emphasizing collaborative processes, and leveraging ChatGPT's editing functions. Strobl et al. (2024) empirically validate ChatGPT's positive role in second language learning. Their study involves 22 university students writing essays in German and comparing their own summaries with those generated by ChatGPT 3.5, based on a scoring rubric. The results demonstrate that ChatGPT enriches language learning experiences and effectively promotes critical thinking during writing and revision stages[12].

However, there remains controversy surrounding whether ChatGPT can truly enhance students' writing quality and efficiency effectively. Studies have highlighted limitations in the usage of ChatGPT and proposed targeted strategies to address them. Bašić et al. (2023) compared the final grades of two groups of students: one using ChatGPT as a writing aid and the other relying on traditional writing methods. The results revealed that while ChatGPT provided assistance to students in their writing, it did not significantly improve their writing proficiency or efficiency. This study emphasized that the effectiveness of ChatGPT heavily relies on users' prior knowledge and skills, suggesting that inexperienced users might encounter confusion and even experience a decline in writing performance[5]. Furthermore, Dempere (2023) elaborated on the risks associated with the use of ChatGPT in teaching, including plagiarism, privacy breaches, biases, stereotypes, and the dissemination of false information, mentioning the need for further refinement of artificial intelligence to ensure safety, protect privacy, and minimize erroneous information[6].

Recent researches also delve into ChatGPT's impact on teaching, highlighting benefits, issues, and suggested remedies. Wei, S., & Li, L (2023) analyze ChatGPT's advantages in grammar correction, punctuation, vocabulary substitution, and more, while noting limitations in logic and metaphor comprehension[13]. Mao, W., Xie, D., & Lang, H. (2023) also mentioned the application of ChatGPT in Japanese teaching, emphasizing its advantages in broadening thinking and assisting evaluation, but also reminding of potential risks and defects[9].

2.2 Translation Software in Second Language Writing

Scholars have conducted researches through methods such as questionnaires to analyze the advantages of ma-

chine translation and to examine the feasibility of applying MT in teaching contexts, focusing specifically on the evaluation of MT quality. They have also delved into students' attitudes towards the use of translation software. Maleki (2017) underscores that the introduction of computer-aided translation (CAT) tools within the translation field enhances productivity, efficiency, and quality of translation work. With the assistance of CAT, translators can more effectively optimize translation quality, thereby gaining a competitive edge[8]. From an instructional design perspective, Korol (2022) argues that technology-assisted translation curricula, characterized by their high practicality, personalization, efficiency, and diverse formats, have breathed new life into translation education. Furthermore, the concepts of interactive learning and student-centered teaching facilitate the achievement of translation goals[11]. Niño's (2020) study, which adopts a student-centric approach, reveals that students generally hold a positive attitude towards machine translation, believing it aids in drafting, vocabulary expansion, and grammatical processing[10]. Similarly, Jolley(2022) highlights the frequent use of machine translation (MT) tools by students during writing tasks, primarily for looking up words and phrases. Notably, despite recognizing the limitations of MT, students still perceive it as beneficial for language learning[7]. Moreover, Zhang (2022) explores the integration of the crowdsourcing concept into translation teaching practices through a combination of classroom observations, case studies, and questionnaires[16]. The findings indicate that students' experience in translating real-world projects fosters a shift from „passive" to „active" learning, enhancing their sustainable development capabilities in the field of translation.

Some scholars advocate translation software in classrooms and also note issues with machine translation-assisted writing, emphasizing the need for awareness of limitations and strategies to mitigate drawbacks. Xu(2021) highlights the importance of integrating human-machine intelligence to improve writing skills[15]. Bao(2017) notes the popularity of „translate-then-write" strategies, cautioning against over-reliance that could compromise originality and critical thinking[3]. Wu(2022) emphasizes maintaining originality and critical thinking in the future development of MT-assisted second language writing[14].

In summary, considerable researches have been conducted on generative AI and MT in academic writing, However, most studies tend to emphasize technical aspects of AI tools' influence on writing, research related to college students' actual attitudes and perceptions of AI tools is not enough. Moreover, few studies have employed qualitative approaches. Incorporating qualitative methods would enrich our understanding of the practical situations and psychological mechanisms underlying university students' utilization of AI tools in L2 thesis writing. This study, employing semi-structured interviews with Japanese majors, is expected to improve the theoretical level in the field of second language education.

3. Methods

Applying a semi-structured interview and content analysis approach, this study aims to examine university students' strategies of using machine translation and generative AI tools, the frequency of use as well as their perceptions and preferences towards these tools during the thesis writing process.

3.1 Participants

The study was conducted among 15 senior students majoring in Japanese from Chongqing university, aged between 21 and 23 (Mean: 22.06). 9 of them were female while 6 of them were male. The participants' native language is Chinese and They all finished their theses in Japanese. Furthermore, all of them have successfully completed their graduation thesis and graduated in June of 2024.

3.2 Materials

The participants in this study were subjected to semi-structured interviews lasting 20-25 minutes, conducted via WeChat voice calls or face-to-face interactions. The interview questions centered primarily around three questions: What are the strategies and processes employed by senior students when utilizing AI in second language thesis writing? How do they perceive the benefits and negative impacts brought about by artificial intelligence in their thesis writing? What kind of guidance would they like to receive in writing instruction in the future? The sessions were recorded on phone and transcribed.

4. Discussion

4.1 Strategies and Preferences in AI Usage

4.1.1 Machine Translation

The study found that all participants utilized translation software with a relatively high frequency of usage during their thesis writing process. In the preparatory phase, students confronted with vast amounts of Japanese and English literature often resorted to translation software to facilitate comprehension and maintain motivation. For instance, one participant stated, „Due to my limited language proficiency, I frequently encountered unfamiliar words while reading, leading to frequent dictionary lookups that dampened my enthusiasm. Even after struggling

through a paper, I found myself focusing on vocabulary rather than content, leaving me mentally exhausted." (Participant 3). During the previous research translation, DeepL (12/80%) and Google Translate (5/33%) emerged as the most frequently used tools among the participants. Similarly to Bao(2017)'s analysis, most students opted to first draft their thesis in Chinese, their native language, and then relied on translation software to convert it into Japanese. The frequency of translation software use during this translation process varied according to students' language abilities. Those with weaker Japanese skills tended to heavily rely on machine translation, feeding their entire Chinese drafts into the software and making minor adjustments afterward. In contrast, students with higher Japanese proficiency preferred to translate by themselves, using translation software for polishing or checking grammatical errors. For translations, most students combined DeepL for the main body of their thesis with other tools like Moji dictionary and Youdao Translate for vocabulary verification and nuanced language refinements.

4.1.2 Generative AI tools

The interview found that fewer participants (11/73%) used generative AI compared to Machine Translation, mainly for summarizing references, outlining literature, and refining language. When reading previous researches in foreign languages, many used generative AI to organize article frameworks to enhance comprehension. Participant 6 explained it as follows: "Some articles are excessively long and entirely in foreign languages, making it difficult to identify their structures even with my own efforts and translation software. ChatGPT comes in handy at such times. By instructing it to organize the literature's outline and then asking more specific questions, I can receive clear summaries and precise answers from ChatGPT immediately."

Before translating, some students asked AI to outline a framework based on research to clarify writing logic. During writing, ChatGPT, ChatPDF, and ERNIE Bot were used to correct grammar and enhance Chinese drafts for clarity and fluency. Additionally, some polished initial Chinese drafts with generative AI tools to ensure fluent and accurate expressions.

4.2 Attitudes and Perspectives on AI-Assisted Academic Writing

4.2.1 The Benefits of AI in Facilitating Academic thesis Writing

During the interview, the participants were asked about the perceived benefits of artificial intelligence in the realm of academic writing. All respondents acknowledged the assistance of machine translation and generative AI in

completing academic thesis, primarily manifested in three aspects: enhancing writing efficiency, improving writing quality, and boosting writing motivation. Regarding efficiency, during the process of reviewing previous research, AI tools such as ChatGPT facilitated text summarization, thereby mitigating reading difficulty and enabling students to more efficiently grasp the framework of their articles. In terms of writing, the majority of participants believed that utilizing translation software to translate drafts from Chinese shortened the time required for thesis writing. As Participant 11 explained, "Since Japanese is not my native language, it poses certain challenges in constructing logical arguments in Japanese. However, with the aid of machine translation, my writing speed has improved a lot."

The enhancement of writing quality through generative AI assistance is primarily evident in the polishing capabilities of generative AI. 53% of the participants mentioned that AI tools enriched vocabulary diversity and accuracy based on the original draft, resulting in a more comprehensive logical flow in their writings. Furthermore, the use of AI-assisted writing effectively elevated students' writing motivation. By simplifying the tasks of organizing literature and translation, AI made the writing process more accessible for students.

4.2.2 Limitations and Challenges of Incorporating AI in the Writing Process

Participants were queried about the difficulties encountered when utilizing AI tools to assist in academic essay writing and the current shortcomings of AI in supporting second language writing. 86% of the participants mentioned the deficiencies in the quality of translations produced by machine translation, primarily in issues such as limited vocabulary, stilted language, and incorrect translation of specialized terminology. "The language output was found to be insufficiently formal and written, failing to meet the standards expected of academic prose. Specifically, when translating Japanese texts, the complexity arising from honorifics, polite forms, and plain speech poses significant challenges that machine translation often struggles to address. Besides, the vocabulary utilized tends to be monotonous, with repeated words being excessively used, resulting in instances where the machine-translated text was deemed inferior to that which could be achieved through manual translation. (Participate5)"

As for generative AI, participants mainly reflected that the main problem lies in unclear instructions leading to misunderstandings, and when summarizing literature, the framework provided is often vague and the views lack data support, so it needs to be used cautiously.

4.3 Desired Assistance

80% of the participants expressed their needs to receive

guidance on utilizing artificial intelligence to assist in academic paper writing during the writing course. Specifically, they hoped that the instructors could: 1) guide students in providing clear instructions to AI 2) incorporate more hands-on content to enable students to learn the operation of AI tools together, and 3) recommend translation tools and generative AI tools that are suitable for students to use.

5. Conclusion

During the writing process of second language graduation theses, most students leverage both translation software and generative AI for assistance. Machine translation tools were frequently utilized by participants during thesis writing, aiding in comprehending literature and translating drafts. Meanwhile, generative AI tools, though less frequently used, proved valuable for summarizing references, outlining literature, and refining language, enhancing students' writing processes and comprehension of foreign language research.

Data collected from interview sessions revealed that the students acknowledged the benefits of AI-assisted academic writing, particularly in enhancing efficiency, improving quality, and boosting motivation. However, they also highlighted some limitations and challenges, primarily related to the quality of machine translations and the potential for misunderstandings with generative AI. To fully harness the potential of AI tools, participants expressed their desires for guidance and support from instructors, including clear instruction-giving, hands-on training, and recommendations for suitable AI tools.

Finally, while the findings show the students' strategies and attitudes towards AI-assisted writing, they cannot be comprehensively explained through this small number of participants. Future research therefore needs to expand the sample to investigate on a larger scale. As AI is gradually incorporated into the higher education system, future research should focus on evaluating the long-term effects of AI tools on students' writing skills and creativity. Additionally, developing more user-centered AI tools tailored to students' specific needs and preferences, as well as exploring innovative teaching strategies that integrate AI into writing curricula, could further enhance the educational benefits of AI-assisted writing.

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