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A Literature Review of How L2 Learners Engage with Generative AI in Translation

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Abstract. Generative Artificial Intelligence (GenAI) has been widely integrated into second language (L2) learning, but studies concerning how L2 learners interact with GenAI are still in early stages, and there is also a lack of a review of existing studies.This study systematically reviews the existing literature on empirical studies in GenAI-assisted translation via a four-dimensional engagement framework: cognitive, behavioural, emotional, and agentic engagement, aiming to define the manifestations of the above-mentioned four dimensions of engagement with GenAI in translation and probing for probable factors contributing to changes in engagement. Cognitively, GenAI facilitates learners to stimulate deeper insights into the text and to allocate resources while translating. Behavioural engagement differs according to language proficiency. Translation students use GenAI as compensation, whereas professionals use it as optimization. The positive or negative characteristic of emotional engagement is largely decided by whether GenAI is used as an assistant or a substitute. Learners demonstrate awareness of the potential drawbacks and risks of GenAI as a representation of agentic engagement. Yet only a few follow up with the exploration of their agentic actions. This review offers a unified analytical framework for the following section of analysis of learners' engagement with GenAI in translation. It also points out the implications for more empirical studies on learners' agentic actions, taking translation types into consideration.

Keywords: GenAI in L2 translation, cognitive engagement, behavioural engagement, emotional engagement, agentic engagement

1. Introduction

Since the emergence of ChatGPT in 2022, GenAI has been widely employed in L2 learning and teaching. Previous studies have concentrated on the role of GenAI in enhancing specific L2 skills, such as writing, speaking and listening, and vocabulary and grammar [1,2]. Besides these basic language skills, GenAI's capability in deep learning from enormous online corpora and adjusting to different styles based on prompts facilitates L2 learners to finish various translation tasks more smoothly. Despite the recognition of GenAI's extensive potential and its wide use among users, we see a void in examining how exactly L2 learners collaborate with GenAI during translation tasks. Therefore, it is of vital importance to understand the engagement patterns of GenAI and L2 learners to better understand how we utilize this emerging tool and how to improve such engagement.

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Engagement includes four aspects: cognitive, behavioral, emotional and agentic. Fredricks et al. [3] first put forward the first three kinds of engagement in the context of school studies. Cognitive engagement refers to students' psychological investment and their metacognition of the task. Such observable actions as obedience to rules, effort in school work and participation in extracurricular activities can be defined as behavioural engagement. Emotional engagement focuses on students' attitudes and emotions towards school members. Despite its advances in summarizing students' action modes, the original framework overlooked taking their agentic modification to the learning environment [4]. Therefore, the agentic engagement is also taken into consideration, thus forming a four-dimensional analytical framework for engagement. Given that translation is also a common form of L2 learning, it is plausible to apply this framework as the theoretical basis in this literature review.

Furthermore, studies on AI-mediated translation tend to be result-oriented. They focus on the quality of translation outcomes and the pedagogical potential of GenAI in translation training for L2 learners, whereas engagement as an indicator of the translation process is frequently neglected. Research on how AI tools such as ChatGPT and DeepL influence EFL students' translation skills and emotional engagement mainly touches on the advances in translation quality, but neglects the engagement of using GenAI tools [5].

In terms of methodology, previous studies tend to utilize empirical research. Participants needed to fill in questionnaires and take interviews to self-report their perceptions, use frequency, and attitudes toward GenAI. Comparative analysis is employed to assess evaluate the translation performance of various AI tools. Experiments are used to measure how effective GenAI tolls can enhance key L2 skills particularly writing and vocabulary learning. Meanwhile, process-tracing approaches, such as screen recording, are adopted to track the real-time interaction patterns between learners and GenAI. It is certain that these studies advance the understanding of learners' interaction with GenAI in specific aspects related to translation, but they tend to focus on discrete research aspects and lack a systematic literature review.

Therefore, this paper attempts to review and synthesize previous major findings of how GenAI interacts with L2 learners in translation. It carries out a literature review of students' cognitive, behavioural, emotional and agentic engagement in the use of GenAI for translation tasks. This analysis seeks to provide researchers with a clear overview of the research directions and methodologies in past studies and map out future research directions in this field.

2. Cognitive engagement with GenAI in translation

Cognitive engagement entails the mental work and strategic processing involved in language comprehension and production [3]. In terms of translation, it refers to the effort devoted to understand the translation task as a whole, such as finding background information, metacognitive awareness of translation tasks, and sensitivity to meaning of language between lines.

To start with, GenAI assists L2 learners in gaining background information since its training corpus has integrated almost all publicly available information.

What's more, GenAI enables translators to have better metacognitive abilities for the translation task by providing them with effective strategies for self-regulation. By consulting GenAI on how to accelerate the translation process, learners are better able to plan, monitor, and control their translation process, ultimately fostering a comprehensive understanding of the task. For example, GenAI helps analyze and define language styles, coordinate the translation process and allocate resources in a more efficient manner [6]. Enhanced metacognition can further improve translation performance [7] and critical thinking skills, both of which are beneficial for learners to distinguish

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the cultural differences between two languages. It can thus be inferred that metacognition, a form of cognitive engagement, can elevate learners' overall translation competence.

Moreover, GenAI deepens general comprehension and analysis of the source text by deconstructing sentence structures and capturing contextual meaning. Current GenAI tools are able to analyze the syntax, semantics and pragmatics in the text, and also construct meaning through inference and contextual reasoning.

In this scenario, there could be two possibilities. If learners have no idea of the source text, they will resort to GenAI for basic and superficial insights. GenAI acts as an assistant in their cognitive engagement, offering several possible directions for textual interpretation. If learners already have their own basic understanding, GenAI will be a collaborator in testing whether humans and machines share a similar understanding. If consistent, learners will seek a more advanced understanding, such as identifying metaphors and imagery in the text.

On the contrary, learners will challenge the accuracy and adequacy of GenAI's translation or give further prompts to question the reason why GenAI translates in this specific way, and they may defend their own ideas. In the process of exchanging ideas with GenAI and defending the original subjective perceptions of the source texts, L2 learners become cognitively more engaged in the task, because their opinions have been tested in collision with others'.

In a word, cognitive engagement in GenAI-assisted translation is characterized by iterative learning cycles in which understanding, reasoning, and self-monitoring interact dynamically. The integration of AI amplifies these cycles by making learners' implicit cognition more explicit through rounds of dialogues with the tool, transforming translation from a mere linguistic activity into an active cognitive development.

3. Behavioural engagement with GenAI in translation

Behavioural engagement in school studies means students' active participation in various learning-related activities [3]. In the context of GenAI-assisted translation, behavioural engagement is defined as the observable actions and interaction patterns that users exhibit, namely, decisions on when and how to integrate AI into the workflow. Analysis of the existing literature finds two dominant elements of behavioural engagement: generating drafts and revising translation. The nature and frequency of these actions are significantly differentiated by learners' L2 proficiency and professional experience.

For students, they usually employ GenAI to produce an initial draft in compensation for linguistic deficiencies, effectively lowering the cognitive barrier to text production and accelerating their translation efficiency [8]. A study of Australian and Chinese postgraduate students majoring in translation reveals that 59.86% of them use GenAI to draft and transfer L1 to L2 [9]. They often use GenAI to provide a reference for the full text or some paragraphs that are difficult to understand. Another study on Chinese university students also draws a similar conclusion, showing that the frequency of drafting translation ranks second among the four major functions of GenAI [10].

However, surveys of professional translators reveal a distinct difference [11]. Only 29.4% of them report having used GenAI, with even a majority of them never using GenAI to translate the entire text for subsequent post-editing. This low rate of engagement with full draft generation reflects that for those with a good expertise of L2, behaviour engagement is optimizing rather than compensating. They use GenAI to search word definitions in a specific context to boost efficiency rather than to overcome linguistic barriers.

In terms of revision or rephrasing, both students and professional translators report a high level of engagement with GenAI, but with different focuses. A considerable number of students engage in

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revisions by prompting the AI to correct basic grammar or suggest improved word choices to achieve mere accuracy [9,10]. Moreover, as for the language polishing part, student participants in the survey revise their translation work based on GenAI's feedback, whereas only 13.6% of the professionals occasionally use this function [11]. Meanwhile, university students tend to request GenAI to re-translate rather than revise the draft, indicating that their behavioural engagement relies largely on GenAI for a feasible solution instead of deliberate revision strategies, which corresponds to researchers' concerns about students' reduced effort in double-checking whether GenAI has any fallacies. On the other hand, professionals engage GenAI in translation to address smaller, more subtle and more complex aspects, such as selecting words that match the register and tone of the source text or other audience-fitting requirements, making full use of GenAI for strategic refinement.

Behavioural engagement also depends on how L2 learners use prompts when interacting with GenAI. Researchers often measure efficiency by the number of conversational turns.Studies show that L2 learners often write prompts independently rather than relying on GenAI embedded CAT tools [11]. The promots usually adopt a colloquial tone. They often combine two languages, and follow unclear or inconsistent standards. Intriguingly, researchers observe that L2 learners typically require fewer turns with GenAI [9] when they ask it to translate the whole passage or paragraph, yet more turns when revising a single sentence or phrase. One explanation links it to weak prompt engineering. Users' vague standards lead to translations that fail to yield the intended result, thus requiring more corrections and clarifications.

The analysis above indicates that behavioural engagement in GenAI-mediated translation is proficiency-dependent. Learners with lower acquisition levels of the second language rely on more conversational turns to compensate for gaps in linguistic and translation competence, whereas experts utilize GenAI as a supplementary tool for brainstorming more possible alternatives.

4. Emotional engagement with GenAI in translation

Fredricks defines emotional engagement as learners' affective responses [3]. When it comes to the domain of translation, emotional engagement with GenAI particularly refers to L2 learners' attitudes toward GenAI and their mood toward the task, including their motivation and interest, enjoyment or anxiety, and confidence. Recent studies have shown that they generally hold positive attitudes toward integrating AI tools into their translation processes. For some learners, GenAI serves as a catalyst that strengthens their sense of self-efficacy when facing complex translation tasks. It reduces anxiety, increases interest and enhances motivation. Yet those who excessively depend on GenAI for translation without careful consideration tend to indulge in anxiety about being replaced by GenAI.

GenAI is particularly effective in stimulating learners' motivation and intrinsic interest in translation and language learning [12,13]. Researchers found that a student's motivation to learn increased significantly after receiving GenAI feedback compared to feedback from tutors and peers. One of the reasons may be that GenAI responses are usually grammatically accurate and consistent in style, which helps learners better understand the criteria for translation evaluation. Hence, with the help of GenAI feedback, they can further improve the quality of translation [14]. The instant and interactive responses provide learners with a variety of translation possibilities, which in turn enhances their ability to independently learn how to use GenAI to modify translated work [15]. Learners find AI tools helpful, informative and engaging, which prompts them to devote more time and effort to their translation activities. In addition, L2 learners show greater curiosity in an environment mediated by GenAI, whose special algorithms are able to provide personalized

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responses [16,17]. The supportive and encouraging feedback can thereby form a virtuous circle. Leaners feel more comfortable, so they can boldly conduct language experiments in translation. Ultimately, GenAI creates a lasting sense of pleasure and sustained interest that continues to inspire more translation attempts.

Furthermore, emotional engagement can also be regulated by cognitive engagement [18]. With GenAI's advice to help learners understand complex sentence structures, idioms and culture-specific items with less apprehension, their cognitive engagement has increased, and their anxiety has decreased. In this way, the fear of translation challenges is alleviated, which is also a manifestation of positive emotional input [10]. This indicates a lower level of awe towards translation tasks, which is also a manifestation of positive emotional engagement.

Finally, GenAI boosts learners' self-confidence in the translation process. With its aid, learners are often able to surpass their own capabilities [10,19], and these results are reinforced through extensive dialogue with GenAI. In this respect, L2 learners begin to feel they are competent enough to tackle complex language challenges, which is consistent with the results of several surveys [20].

However, these benefits only become apparent when learners utilize GenAI in a proper manner. By collecting and analyzing students' learning patterns, a study on Spanish major students in China collects and analyze students' learning patterns [21], and researchers conclude that when learners completely substitute GenAI's output for their own drafts without hesitation, their emotional engagement shows a negative tendency. Learners will have an overreliance on GenAI and will be voluntarily deprived of the opportunity for independent thinking [18]. In this regard, a vicious cycle forms: poor translation performance leads to anxiety about job-seeking advantages, inducing a higher dependency on GenAI for better versions, which eventually diminishes learners' independent learning ability. On the contrary, when GenAI acts as a reliable partner who just provides a possible perspective for reference, learners show elevated cognitive engagement, more positive emotional engagement, and better translation performance. It can be concluded that emotional engagement is determined by learners' relationships with GenAI.

5. Agentic engagement with GenAI in translation

The main distinction between substitutive and auxiliary reflects the importance of agentic engagement. Learners no longer passively accept teachers' instruction, but intentionally and actively strive to make the learning environment and content more in line with individual preferences. Agentic engagement in AI-assisted translation refers to L2 learners' proactive reflection on GenAI's translation draft [4]. It is manifested by regulating prompts to get better answers, scrutinizing, and questioning information in GenAI's translation.

Existing studies reveal an emerging awareness of the importance of prompt engineering. Many learners admit in interviews that poor GenAI performance may be due to the lack of knowledge in prompt engineering, and they show a strong desire for professional guidance [10]. This indicates that learners begin to recognize their agency in shaping and optimizing AI performance to ensure high-quality drafts.

In addition, L2 learners have gradually become aware of AI hallucination. Their agency appears in the evaluative judgement of GenAI's output, in which students have to understand the assessment criteria and make fair judgements based on them [22]. As for GenAI-mediated translation, learners need to evaluate the credibility and reliability of information. However, agentic engagement in this dimension is far from satisfaction. 66.7% of the translation students who have reported using GenAI rely entirely on GenAI to complete assignments, indicating a low level of agentic action on translation [23].

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Furthermore, the level of L2 learners' agentic engagement is dependent on the task category. When faced with highly creative content, learners would be more likely to question the acceptability of GenAI's translation draft, whereas learners tend to completely believe in GenAI's suggestions on more systematic and regular parts, like grammar correction. Yet they hold a skeptical attitude towards its refinement on full sentences or paragraphs, fearing that GenAI may falsely paraphrase the original meaning [21,24]. Around one-third of the interviewees from the translation major in the research show skepticism in GenAI's ability regarding complex issues [23].

What's more, current studies on L2 learners often suffer from a research gap between awareness and action. Although some studies point out that learners would not fully agree with GenAI's suggestions, few studies examine subsequent conduct during translation tasks. Interview-based studies often document learners' anxieties about AI misuse or overreliance. Whether L2 learners can initially react to GenAI's draft and polish it remains a question that anticipate for further research.

6. Conclusion

In conclusion, this literature review aims to integrate the four-dimensional engagement framework proposed and supplemented by Fredricks et al. [3] and Reeve and Tseng [4], to systematically review the existing empirical research concerning translator engagement with GenAI and examine the possible causes for the increase or decrease in engagement.

L2 learners demonstrate distinct engagement patterns in GenAI-mediated translation. Cognitive engagement shapes how learners make sense of the texts and the distribution of time and energy, which further determines behavioural engagement. Learners use GenAI either as a substitute to generate the entire draft or as an assistant to optimize human-generated drafts. Emotional engagement is, in turn, influenced by behavioural patterns. Those who use GenAI as a substitute feel more anxious about their ability and career prospects, while those who view it as an auxiliary tool undergo positive emotions. On top of that, agentic engagement is the fundamental factor that determines learners' engagement with GenAI in translation. Some learners have consciously realized the underlying problems when using GenAI, and their agentic engagement is based on different task types.

Theoretically speaking, the four-dimensional engagement framework in this paper complements a perspective to understand how cognition, behaviour, emotion and agency jointly affect learners' interactions with GenAI in translation. Practically, the distinct engagement modes displayed by learner groups indicate that L2 instructional design should cater to the unique usage habits of GenAI tools. L2 learners need constructive instructions to help them learn how to use GenAI wisely in translation. Tasks that require learners to justify translation choices, revise AI-generated drafts, or compare AI results may help sustain cognitive and emotional engagement while preventing excessive dependence on AI.

Despite a growing number of research on GenAI-assisted translation, several gaps still remain. Few studies literally focus on L2 learners' agentic engagement in translation. Some data on agentic engagement is about the self-reported awareness concerning GenAI-mediated translation, while it remains underexplored at the behavioural level how learners will react to such issues. More analyses are needed to capture how learners intervene in AI-generated drafts in real life. In addition, translation tasks in previous studies are generally assumed to be homogeneous, ignoring that the type of source texts can also contribute to engagement patterns in translation. Therefore, future research could further categorize translation tasks by text type and complexity, and examine how engagement patterns shift across contexts.

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