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Students' Perceptions of an Eight-Step Writing Model Incorporating Machine Translation and Writing Support Tools: A Narrative Case Study in a Japanese EFL Context



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Abstract

Despite the increasing availability of AI-assisted writing tools, the pedagogical frameworks that guide the ethical use of these tools in L2 writing instruction remain underdeveloped. This qualitative narrative case study examines the perceptions of Japanese university students regarding English as a Foreign Language (EFL) writing within a structured eight-step writing model in which AI-assisted writing tools, specifically machine translation and writing support tools, are systematically integrated. Nine students participated in a semester-long writing course in which they progressed through the stages of independent drafting, AI-assisted revision, back-translation for meaning verification, peer review, oral presentation, and reflection. Semi-structured interviews revealed that learners' perceptions of these tools shifted over time. Initial resistance rooted in ethical concerns gradually shifted toward an understanding of AI-assisted writing tools as legitimate mediational resources. The structured procedure supported learner agency and authorship by requiring students to articulate ideas independently before selectively engaging with AI-assisted writing tools. Back-translation helped learners evaluate whether the AI-generated output aligned with their intended meaning. Peer review and presentation fostered social accountability and audience awareness. Overall, the findings suggest that embedding AI-assisted writing tools within a process-oriented instructional sequence can mediate learners' behavioral, affective, cognitive, and social engagement. This structured approach may help lower-proficiency EFL writers to maintain ownership of meaning while producing more communicatively effective texts.

Keywords: Machine translation, AI-assisted writing, student engagement, L2 writing, pedagogical scaffolding

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Introduction

In the context of rapid technological advancement, artificial intelligence (AI) has fundamentally altered the landscape of second language (L2) education. AI-assisted writing tools, including machine translation (MT) and writing and editing support tools (e.g., DeepL and Grammarly), have introduced features such as contextual paraphrasing and tone modulation, which are increasingly accessible for L2 writing tasks. Learners increasingly rely on AI-assisted writing tools as part of a broader shift toward digitally mediated and personalized learning. However, teachers do not always share this enthusiasm; many remain uncertain about the educational value of MT and its implications for academic integrity (Clifford et al., 2013). While learners frequently perceive MT as beneficial, concerns persist that its regular use without pedagogical guidance may limit critical reflection and independent language development (Deng & Yu, 2022). Echoing these concerns, Matthews (2024) warns that unguided AI use can lead to learner disorientation and overreliance on AI-assisted writing tools as shortcuts. Consequently, students' self-determination may be compromised by the passive effects of machine intelligence.

In particular, recent developments in neural machine translation (NMT) have significantly reshaped the role of MT in L2 writing. Since its emergence in late 2016, NMT has become markedly more accurate and relevant to L2 writing (S.-M. Lee & Briggs, 2021). This shift has transformed MT from an error-prone tool primarily used to identify mistakes into a reliable support resource for L2 writers (Jolley & Maimone, 2022; Kirchhoff, 2024). Despite these developments, a gap persists between teachers' beliefs and students' practices. While many teachers remain concerned about the implications of MT use for academic integrity (Ata & Debreli, 2021; Ducar & Schocket, 2018), students often perceive MT as a pragmatic aid that reduces language anxiety and supports linguistic development (Almusharraf & Bailey, 2023; S.-M. Lee, 2020; Tsai, 2022). Recent scholarship argues that prohibition alone is insufficient and emphasizes the importance of developing MT literacy through strategic and pedagogically guided use of these tools (Briggs, 2018; Urlaub & Dessein, 2022). Despite the growing body of research on MT use and perceptions, limited attention has been paid to how such tools are pedagogically integrated into structured, step-by-step writing instruction, particularly for low-proficiency learners of English as a Foreign Language (EFL).

This gap underscores the need for clear pedagogical guidance on the effective and responsible use of AI-assisted writing tools, particularly for low-proficiency EFL learners. Although some Japanese institutions have introduced structured approaches (Yamanaka, 2024), support for classroom implementation remains limited. Many learners recognize MT as effective for completing writing tasks but lack support for using it strategically for language development, which may increase the risk of overreliance and reduce opportunities for independent learning (Briggs, 2018; Ngan & Le, 2025). Moreover, despite growing calls to integrate MT into writing instruction, few studies have examined learners' sustained experiences of step-by-step instructional models, as most research has focused on one-time interventions or initial acceptance rather than reflective engagement over time (Y.-J. Lee, 2021; Ryu et al., 2022).

In this study, the expression "AI-assisted writing tools" serves as an umbrella term referring to digital tools that support learners' writing through automated language-processing technologies. These include MT tools, which convert text between languages, and writing and editing support tools (e.g., grammar and style checkers) that assist with revision without necessarily involving translation. While both types of tools contribute to writing support, MT is foregrounded in this study as a key mediating resource for meaning-making and cross-linguistic regulation within the instructional design.

To address this gap, the present study investigated students' perceptions of a structured eight-step writing model implemented in an EFL course at a Japanese national university. This study aimed to

explore how Japanese university students perceive writing instruction in which AI-assisted writing tools are integrated, and how a structured instructional procedure mediates their engagement in English writing activities. To address this objective, later operationalized as RQ2, this study conceptualized the support provided by instructional procedures in terms of student engagement, examining how the procedure shapes learners' behavioral, affective, cognitive, and social engagement during AI-assisted writing. With these objectives in mind, the following research questions (RQs) were formulated:

RQ1. How do university students perceive the use of AI-assisted writing tools in English writing?

RQ2. How does a structured writing procedure incorporating AI-assisted writing tools shape students' behavioral, affective, cognitive, and social engagement in English writing?

Literature Review and Theoretical Framework

Sociocultural Theory

This study is grounded in sociocultural and process-writing theories and utilizes the framework of multidimensional engagement as an analytical lens. A sociocultural perspective based on the seminal work of Vygotsky (1978) considers human learning to be a socially situated process mediated by cultural tools and social interactions. In the context of L2 writing, AI-assisted writing tools serve as mediators. Such tools enable learners to function within their zone of proximal development, bridging the gap between their current linguistic abilities and potential development through guided support. Lantolf and Thorne (2006) emphasized that language is the most powerful mediational tool for regulating mental activity, suggesting that the first language (L1) can be strategically used through MT to negotiate meaning. Furthermore, Swain and Lapkin (2001) highlighted the role of collaborative dialogue in social interaction, in which learners co-construct knowledge and reflect on language use, a concept central to the peer review stage of the model used in the study.

Recent research empirically supports the relevance of a sociocultural perspective on AI-assisted writing. Wang (2024) demonstrated that learners' use of MT and generative AI tools in EFL writing is shaped not only by individual cognitive regulation, but also by sociocultural factors such as peer interaction, instructor guidance, and classroom norms. These findings underscore the role of AI-assisted writing tools as socially mediated resources rather than autonomous writing agents. Similar arguments have been advanced in recent AI-in-education research, which conceptualizes AI-assisted writing as a form of mediated action embedded in social interaction and instructional practices rather than an isolated cognitive process (Ai, 2017; Y.-J. Lee, 2024).

Process Writing Theory Through the Lens of Student Engagement

Process-writing theory complements sociocultural theory in viewing writing as a nonlinear, recursive cognitive activity. In their classical model, Flower and Hayes (1981) identified three primary phases: planning, translating ideas into text, and reviewing. Hayes (2012) extensively revised this model to emphasize the interaction among cognitive processes, motivation, working memory, and the task environment, specifically highlighting the critical roles of "transcription technology" and "collaborators." Within this framework, writing is viewed as a dynamic system in which cognitive and environmental factors interact to shape the final outcome. By utilizing technological and social scaffolding to manage the cognitive load of transcription, writers can allocate more cognitive resources to higher-order reflection. Metacognitive awareness, defined as the ability to monitor and regulate these cognitive operations, is a critical factor that enables writers to move from simple sharing of knowledge to its transformation. Teng (2021) suggested that explicit instruction in metacognitive strategies improves

writing efficiency by providing learners with an internal regulatory mechanism that guides and supports their decision-making.

To analyze how students navigate these processes, this study adopts the construct of student engagement. Engagement is recognized as a multidimensional construct with three interlocking dimensions: behavioral, affective, and cognitive engagement (Zhang & Hyland, 2018, 2022). Behavioral engagement refers to students' physical reactions to feedback, including their revisions and the time spent on the task. Affective engagement comprises students' emotional and attitudinal reactions to feedback ranging from reduced anxiety to a sense of guilt regarding the use of AI-assisted writing tools. Finally, cognitive engagement is reflected in the use of metacognitive strategies, such as noticing discrepancies between a draft and the MT output or conducting back-translation to verify meaning. Recent work on AI-mediated feedback further underscores the centrality of engagement, arguing that the effectiveness of automated feedback depends less on the provision of information than on how learners attend to, interpret, and act upon it (Hyland, 2026). Scholars have expanded this framework to include social engagement, defined as learners' active involvement in collaborative interactions and relationships with peers (Philp & Duchesne, 2016; Svalberg, 2018). A large-scale study of 434 Japanese university students found that while behavioral and cognitive engagement were often high among CEFR A2-level EFL learners, social engagement and the collaborative use of digital tools remained consistently weak, suggesting a need for more interactive instructional designs (Yuasa & Takeuchi, 2026).

Empirical Research on MT Effectiveness: CALF and Proficiency Effects

Recent empirical work further demonstrates the impact of MT on the quality of L2 writing, often using the framework of Complexity, Accuracy, Lexical Diversity, and Fluency (CALF). Tsai (2022) provided a detailed account comparing English majors (EM) and non-English majors (NEM). The study found that while NEM students expressed less information in manual drafts, their revised versions after MT-assisted editing reached almost equivalent levels across multiple writing parameters. Specifically, in lexical categories, NEM students showed improvement rates of 31.6% to 90.8% compared to EM students who showed rates of only 1.4% to 15.9%. This suggests that MT serves as a safety net for helping lower-proficiency learners close the skill gap between themselves and their more advanced peers.

However, conflicting findings exist regarding which learners benefit most; learners' L2 proficiency heavily mediates the impact of MT. Some studies argue that AI-assisted writing tools are most appropriate for advanced learners with sufficient metalinguistic knowledge to detect and correct machine errors. Chung (2020) found that high-proficiency Korean learners reconstructed whole sentences during post-editing, whereas low-proficiency learners focused almost exclusively on local word-level changes such as pronouns or names. Furthermore, S.-M. Lee and Briggs (2021) noted that students with limited proficiency often struggle with global errors (e.g., sentence structures) and are more likely to accept incorrect MT outputs if they lack basic grammatical knowledge. Their data showed that higher-proficiency groups successfully corrected 28.9% of their original errors, whereas low-proficiency groups corrected only 10%.

Despite these challenges, many researchers have emphasized the cognitive relief MT provides to beginners. Garcia and Pena (2011) demonstrated that beginners produced significantly longer texts (average of 60 words) with MT assistance than without it (average of 44 words). Sasaki et al. (2025) compared Teacher Corrective Feedback (TCF) with MT feedback among Japanese university students. Their results revealed that TCF was more effective than MT feedback in improving syntactic complexity, whereas MT feedback was more effective in enhancing accuracy and fluency. Similarly, Chung and Ahn (2022) reported that while MT improved accuracy and clause length, it led to reduced subordination and lexical sophistication as students defaulted to simpler, machine-friendly structures.

These findings suggest that MT allows learners to produce linguistically appropriate outputs with less cognitive strain but requires careful guidance to avoid the fossilization of simple structures.

While providing a comprehensive review of textual analysis studies is beyond the scope of this paper, prior studies using textual analysis have shown that MT can influence learner-produced writing in terms of accuracy, fluency, lexical choice, and syntactic complexity. These studies generally demonstrate improved overall accuracy (Cancino & Panes, 2021; Chon et al., 2021; S.-M. Lee, 2020; Yang et al., 2023), although effects on complexity vary according to proficiency level and task conditions (Chung & Ahn, 2022; S.-M. Lee & Briggs, 2021; Sasaki et al., 2025; Tsai, 2022). These studies provide important quantitative evidence of how MT may shape textual outcomes. However, the present study focuses on learners' perceptions and engagement rather than on textual analysis. Consequently, less is known about how learners experience pedagogically structured MT use over time and how such procedures shape their engagement, decision-making, and sense of authorship.

Pedagogical Scaffolding and the Translanguaging Perspective

The effective integration of MT requires explicit pedagogical scaffolding to ensure that MT supports learner agency rather than replacing it. While empirical research has shown that learners who actively engage with MT may benefit from its use under certain conditions, teacher-focused studies have consistently documented concerns about academic integrity and students' overreliance on machine-generated output (Ata & Debreli, 2021; Briggs, 2018; Ducar & Schocket, 2018). The absence of clear institutional policies further intensifies these concerns. Therefore, some instructors adopt detection- or prohibition-oriented approaches (Groves & Mundt, 2021).

Drawing on Davis's (1989) concept of perceived usefulness, this divergence reflects differences in how students and instructors evaluate the pedagogical usefulness of MT despite its perceived ease of use. Importantly, research suggests that strict prohibition is largely ineffective and may instead encourage unreflective or clandestine use, highlighting the need for instructional mediation rather than restrictions. From this perspective, MT literacy has been proposed as a pedagogical goal, and learners' ability to determine when, how, and to what extent MT should be strategically and ethically used has been emphasized (Bowker & Buitrago-Ciro, 2019). Recent pedagogical discussions emphasize that MT literacy involves explicit instruction in post-editing strategies and the critical evaluation of machine output, positioning MT use as a learnable academic practice (Enkin & Mejías-Bikandi, 2016; Zhang & Torres-Hostench, 2022).

To address these concerns, researchers have proposed instructional models to scaffold MT use through explicit guidance and staged-writing procedures. Models such as the Guided Use of MT emphasize systematic training in tool affordances, limitations, and ethical considerations, particularly for lower-proficiency learners (Ryu et al., 2022). Such approaches have been shown to help students move beyond word-level reliance and engage more critically with the MT output. Process-oriented designs that require an initial manual draft before consulting MT further support learners' sense of language ownership, promote their awareness of linguistic gaps, and reinforce the view that writing is a recursive, rather than a single-stage, process (S.-M. Lee, 2020).

A crucial component of pedagogically mediated MT use is the role of L1, which is reframed from a translanguaging perspective. Traditionally viewed as a source of negative transfer, L1 use is now recognized as a strategic resource for meaning making. Translanguaging theory views multilingual learners as active meaning-makers (Li, 2018) who employ their agency to draw on their entire semiotic repertoire, including digital tools, to express meaning and voice (Yu & Jiang, 2025). Access to MT tools provides learners with greater agency to construct meaning independently, shifting from

relatively passive participation to more agentive roles as meaning makers (Hell et al., 2021). Recent empirical work further demonstrates that such repertoires are linguistically and digitally mediated. Zhou et al. (2022) showed that students in transnational higher education strategically integrated MT into their academic-writing practices, critically evaluating, rather than surrendering control to, machine output. Yu and Jiang (2025) identified several patterns of MT use within this framework, including its function as a language bridge, an error-detection aid, a critical tool for evaluating machine output, and a creativity springboard that enables learners to move beyond conventional L2 writing norms through critical and creative engagement.

Pedagogical designs that incorporate social interaction can further support this mediation. Sakamoto (2022) demonstrated that when Japanese students prepared MT-assisted texts for oral presentations, their expectation of addressing their peers fostered a greater sense of responsibility for linguistic choices, discouraged uncritical copying, and encouraged closer alignment between wording and intended meaning. Similarly, integrated feedback environments, in which automated feedback is combined with feedback from peers and teachers, promote learners' deeper revision and sustained engagement in writing tasks (Zhang & Hyland, 2018, 2022). In sum, studies suggest that MT becomes pedagogically productive not through access alone, but through its integration within instructional frameworks that foreground reflection, interaction, and learner agency.

Methodology

Research Design

This study employed a qualitative case study design informed by narrative inquiry. This approach was chosen to gain an in-depth understanding of how a small number of participants experienced academic writing using AI-assisted writing tools within a specific EFL classroom context. The study was conceptualized primarily as a case study because it focused on a bounded group of university students participating in a particular instructional intervention (Casanave, 2015). Within this bounded case, narrative inquiry served as a sensitizing framework for foregrounding learners' evolving experiences and meaning-making processes (Clandinin & Connelly, 2000; Riessman, 2008). This choice shaped the analysis by directing attention to how students narrated changes in their perceptions, engagement, and sense of authorship over the course of the eight-step writing process. Interview data were analyzed using reflexive thematic analysis.

Research Setting

This study was conducted in a required first-year English course at a Japanese national university. The course was designed and taught by the first author, who also served as the classroom teacher. Given this dual role, researcher reflexivity was maintained throughout the study and is described in greater detail in the data analysis section. Eight 90-minute lessons were devoted to writing tasks integrating AI-assisted writing tools. Students selected passages from a university-wide English textbook and wrote responses based on personal interests to foster agency and reflective engagement.

To support learners with limited confidence and proficiency, the tasks were designed to be accessible while remaining intellectually engaging. Connected to the reading passages, the tasks encouraged reflection on social and personal themes. For example, students wrote about life choices, expressed opinions on ethical dilemmas, and reflected on cultural perspectives over time.

An eight-step writing model developed by the first author guided the process. Based on process writing principles and adapted for beginner-to-intermediate EFL learners, it drew on Flower and

Hayes's (1981) cognitive model of planning, translating, and revising. Students moved from drafting to revising with AI-assisted writing tools before presenting their final texts. As shown in Table 1, digital, collaborative, and reflective elements were integrated to ensure that technology supported rather than replaced active thinking.

The model aimed to promote language ownership, metacognitive awareness, and the thoughtful use of AI-assisted writing tools. AI-assisted writing tools were integrated in a pedagogically structured way. Specifically, DeepL was used for translation, and DeepL Write was used for English text editing. In Step 1, students engaged in small talk and topic-based activities to activate prior knowledge and prepare for writing. In Step 2, students used DeepL only for word-level reference. In Step 3, they revised their drafts with DeepL Write. In Step 4, they used back-translation to check the alignment of the written output with their intended meaning. In Steps 5 and 6, DeepL and DeepL Write could be used optionally to finalize the texts.

Table 1. *Eight-Step Writing Model Overview*

Step	Purpose and activities
Step 1: Interaction	To activate participants' prior knowledge and enhance their readiness to write, engage in small talk and topic-based oral introductions, and optionally watch related videos or read a short text.
Step 2: Writing a first draft	To foster participants' autonomy and ownership of writing, raise their awareness of linguistic challenges, and help them write independently using DeepL as a reference tool. (Only word-level translations are allowed.)
Step 3: Writing a second draft	To improve the first draft by revising it with DeepL Write.
Step 4: Self-reviewing	To check the alignment of the output with the intended meaning, back-translate the revised English and compare it with the Japanese result. (Back-translation is performed using DeepL.)
Step 5: Peer-reviewing	To provide peer feedback by pre-commenting on third drafts in Japanese using Google Docs. (From Step 5 onward, students may continue to use DeepL and DeepL Write in a supplementary manner as needed.)
Step 6: Final editing	To help participants complete their writing, the draft is revised based on peer feedback and prior steps; edits may continue after Step 7.
Step 7: Oral presentation	To promote ownership of language and content, students present their drafts in pairs or groups, and peers confirm the main ideas in English and Japanese.
Step 8: Reflection	To develop metacognitive awareness, students submit a written reflection on the learning process via Google Forms.

Participants

Nine first-year Japanese university students were selected as participants from a cohort of 26 students who enrolled in a required English course. Their English proficiency levels ranged from CEFR A1 to A2 as assessed by the GTEC, a four-skill standardized English proficiency test developed by the Benesse Corporation in Japan. According to a pre-study questionnaire using a four-point Likert scale, the students responded to items such as "I am good at English" and "I like English." None of the students selected "Strongly agree" or "Agree" for either item, which indicated their limited confidence in and relatively negative attitudes toward English. Purposeful sampling (Patton, 2002) was employed to identify participants who showed notable improvements in their GTEC writing scores over the

course of the semester. The selection criterion, based on GTEC writing scores, targeted students whose scores increased by more than 15 points from pre- to post-test, a strategy known as criterion sampling. Although this criterion was based on a quantitative measure, it was used not to make claims about proficiency gains, but to identify learners who showed observable improvement during the instructional period. The participants were therefore considered information-rich cases (Patton, 2002), as their experiences could provide insight into how learners who showed such improvement while participating in the eight-step model experienced shifts in their perceptions, engagement, and agency. This criterion-based sampling supports analytic transferability rather than statistical generalization.

Methods of Data Collection and Analysis

Semi-structured interviews were conducted after the completion of the course. Seven students were interviewed individually, and two were interviewed in pairs. Interview questions focused on students' perceptions of using AI-assisted writing tools, their actions at each step of the instructional intervention model, and their thoughts on future English learning. Each interview lasted approximately one hour. This study was approved by the institutional ethics review board of the first author's university. All procedures were conducted in accordance with established ethical guidelines for research involving human participants. Prior to the interviews, participants were informed that their participation was voluntary, and each participant completed an informed consent form. All interviews were conducted in Japanese to allow participants to express their experiences and reflections in the language in which they felt most comfortable. Interviews were transcribed verbatim.

A reflexive thematic analysis following the six-phase process outlined by Braun and Clarke (2022) was used to analyze the data. In line with a reflexive approach, we recognized our active roles as researchers in meaning-making and engaged in ongoing reflections on how our perspectives shaped the analytic process. This thematic approach allowed us to capture narrative shifts in student perceptions and engagement through the step-by-step instructional process.

The first author, who served as the classroom practitioner (emic), brought firsthand experiential knowledge into the pedagogical context. In contrast, the second author, who was not involved in the classroom implementation of the model, contributed a more distanced (etic) analytical perspective. This difference in positionality created opportunities for productive dialogue throughout the analysis. Engaging multiple researchers with varied positionalities can enhance the depth and trustworthiness of qualitative analyses by introducing complementary viewpoints and challenging implicit assumptions (Holmes, 2020). Such collaboration enables researchers to co-construct meaning more critically and reflexively, especially when one researcher is embedded in the field while the other maintains a greater interpretive distance (Berger, 2015).

Both authors read the interview transcripts repeatedly to become familiar with the data and engaged in collaborative interpretation from the second phase onward. Inductive coding was then conducted using MAXQDA, with analytic memos being used to document the emerging insights. The codes were iteratively clustered into candidate themes, which were reviewed, refined, and clearly defined in relation to the research questions. Finally, an analytic narrative was developed by integrating the themes with illustrative excerpts, and we reflexively acknowledged our role in the meaning-making process.

Results

This section presents interview-based findings on students' experiences with AI-assisted writing tools embedded in an eight-step writing procedure. Five themes were identified, describing shifts in the use of AI-assisted writing tools and authorship, the social demands introduced through peer review and

oral presentation, and the remaining interactional and proficiency-related challenges. The first two sections primarily address RQ1, the next two address RQ2, and the final section presents challenges that cut across both RQs.

Reduced Resistance to AI-Assisted Writing Tool Use

Several students reported that prior to the course, they had avoided using AI-assisted writing tools because they associated their use of these tools with “cheating” or other inappropriate and ethically questionable practices rather than with a legitimate part of language learning. They also reported that participating in the course reshaped how they viewed tool use and reduced their reluctance to write in English:

Writing in English was quite challenging for me. However, after using these tools in class, I realized that if I try, I can actually write. At first, I hesitated to use the tools, but now I feel less hesitant and more confident. I will probably continue to use them and follow a step-by-step process. (Student K)

Such accounts suggest a shift from viewing AI-assisted writing tools as something to be avoided to regarding them as resources that expanded students’ perceptions of their ability to write in English. Several students attributed this reduced reluctance to the procedural principle of first drafting independently and using the tools during later revisions, which helped position tool use as a legitimate rather than a dishonest practice. They also noted that knowing that support from AI-assisted writing tools would be available at the revision stage lowered the barrier to getting started. Overall, these students described a transition from moral unease and reluctance to greater confidence in using AI-assisted writing tools with the support of the course procedure.

AI-Assisted Writing Tools as Support for Autonomous Self-Expression

The students reported viewing AI-assisted writing tools primarily as resources for expressing their ideas rather than as substitutes for their thinking. They emphasized that the final text should convey their message, and they accepted AI-assisted writing tools when the tools supported meaning without replacing their effort or ownership. One student said, “If you depend completely on these tools, it feels like it’s not really your own work being evaluated. That’s why I try to include as much of my effort as possible” (Student Y).

Consistent with this stance, the findings show that students started writing independently to keep their texts grounded in what they could do and what they wanted to say. They said that writing their drafts without initially relying on AI-assisted writing tools supported more autonomous self-expression. This helped them keep their intended meaning in view and reduced the risk that the AI-generated output would move beyond expressions they could understand and use. Some students explained that if they inserted Japanese into a translation tool and accepted the English output without modification, it could produce expressions beyond their ability. In contrast, they described their first independent draft and the later use of AI-assisted writing tools for revision as producing texts closer to what they intended to say.

Regarding the practical criteria for adopting suggestions from AI-assisted writing tools, the students prioritized expressions they could understand and read aloud. They assumed that such expressions would also be readable to others and reported discomfort when AI-generated output felt “too complex” because it could reduce clarity.

Back-translation further supported this orientation toward self-expression by providing an additional check on meaning in the first language. The students back-translated their English into Japanese and used the Japanese output to determine whether the English they had written matched what they intended to say. When they noticed mismatches, they reported adjusting the wording, reselecting options, regenerating sentences, and checking the meaning again.

DeepL Write gave me multiple options; I back-translated the revised English I had selected and also back-translated my original English into Japanese using DeepL, then compared the two Japanese outputs and chose the one that was closer to what I wanted to say. (Student O)

The students described back-translation as a meaning-checking move that supported their choices among possible expressions, especially when they were uncertain whether a revised sentence conveyed their intended message. Students also described repeating cycles of comparison and revision until they found the words that they felt best aligned with their intentions and intended use.

Peer review added a social dimension. Partners' drafts offered clearer wording, useful expressions, and organizational alternatives, which students adapted in their later writing. Peers thus expanded students' options for expression, while AI-assisted writing tools supported revision and consistency. Taken together, the students' accounts depict AI-assisted writing tools and peer interaction as resources for refining expression while maintaining control over meaning and authorship. The audience-oriented accountability fostered through peer review is discussed in the penultimate subsection.

Instructional Procedure as Scaffolding

The students suggested that the eight-step procedure functioned as scaffolding because it provided a clear route for drafting, revising, and checking meaning, especially when students felt uncertain about their English language proficiency. Students described the procedure as a structured path that helped them keep moving through the writing task rather than stopping when they became unsure about vocabulary, wording, or accuracy. They also described this sequence as making the overall process more manageable because each move clarified the next stage of the process:

I felt that Steps 1–8 would actually work best for people who struggle with English. Many of us find writing and reading English difficult, so even a small step-by-step structure or support for these tasks makes a significant difference. This procedure was helpful for beginners or those who are not good at English. (Student A)

Students reported that the step-by-step design scaffolded the task by breaking it into manageable steps and providing opportunities to verify meaning and refine expressions. They used AI-assisted writing tools to bring their drafts to a level they could understand and present, and to check whether their writing conveyed their intended meaning. Some students also described how completing small steps created a sense of achievement and supported their sustained motivation. Since progress was visible in small increments, the task was less overwhelming and easier to continue. Another recurring point was that predictable steps reduced students' uncertainty about future steps, helping them focus on improving their expression rather than becoming stuck during the drafting or revising.

Some students also described the eight-step sequence as valuable and suggested that the procedure influenced how they approached writing, rather than simply functioning as a classroom routine for task completion. They reported that the sequence helped them align meaning and wording through repeated checking and adjustment and that they would still want to use the steps even if the writing

task were not graded. Overall, the students viewed the eight-step approach as a scaffold that sustained their engagement by helping them decide when and how they would use AI-assisted writing tools to complement, rather than replace, their efforts.

Developing Responsibility to the Audience

During the interviews, the students described a gradual shift from treating writing mainly as personal practice to crafting messages with an audience in mind. The culminating oral presentation made them accountable to listeners and encouraged them to align their wording with their intended meaning, monitoring whether their English would be clear and understandable to their audience. One student said, “A big factor is that we present later... when I have to say it myself, I don’t want to say something different” (Student Y). In this emerging audience orientation, students described peer review as an early, low-stakes test of whether their intended meaning would reach another person. Students used peer interaction to gauge how much a listener understood and identified when their expressions did not align with their intentions. They also reported that reading a passage aloud revealed problems that silent rereading often missed, which in turn enabled more targeted revision of both content and wording. Thus, peer responses and reactions worked alongside AI-assisted revisions. Students increasingly oriented themselves not only to the “correctness” of their sentences but also to their partners’ understanding of what they meant.

Preparing to speak shaped both their selection of expressions and their delivery. Students reported retaining expressions they fully understood and could pronounce without losing track of their intended meaning, and they described replacing expressions that they could not read aloud or that did not align with their intended meaning. Some also described attending to delivery features such as pace and pauses between sentences, treating them as part of making their writing communicative. Students further linked the presentation to practicing how to read their texts aloud so that their messages reached the audience, and they focused more on how their writing would function in face-to-face interactions. Across accounts, peer review and oral presentation were described as fostering students’ sense of obligation to listeners and broadening their focus from producing correct sentences to ensuring that their English would be understandable through actual interaction.

Interactional and Proficiency-Related Challenges

Despite the step-by-step support, challenges remained, especially in the peer review and oral presentation steps. During peer review, introduced as a content- and organization-first activity, the students were encouraged to comment in Japanese on whether their partners’ ideas were clear and coherent. In contrast, surface accuracy was expected to be addressed indirectly through the later use of AI-assisted writing tools. However, during the interviews, several students reported difficulty participating in peer review discussions because they felt that “helpful feedback” meant grammar correction beyond what they believed they could do with their current English. One student explained, “I couldn’t correct others’ grammar and felt sorry. Using the Japanese translation, I could only suggest more logical wording and content-level advice” (Student K).

Students also described peer review as less effective when the interaction remained superficial or became time-consuming, suggesting that the activity did not always function as the intended content- and organization-first exchange. Additionally, students reported difficulty choosing and revising wording, particularly when suggestions from AI-assisted writing tools exceeded their productive range.

One student described struggling to find an appropriate revision even after noticing problems in the wording: “I could tell which phrases felt wrong, but when I tried to fix them, I didn’t know how. I even

re-entered Japanese and translated again, and still something was off several times” (Student N). This excerpt illustrates the gap between noticing and resolving issues. Back-translation and content-focused comments in Japanese helped students detect mismatches between intention and expression, but they did not always help students formulate an acceptable revision when the suggested wording exceeded their productive range. Consequently, students sometimes cycled through retranslation and reselection, and decision-making remained demanding even when the gap between intention and expression was visible. This challenge complements the interactional pressures described in peer review and the delivery demands that emerged during preparation for oral presentation.

Even when students noticed mismatches through Japanese comments or back-translation, making decisions about which option to adopt remained demanding, and several accounts indicated that students needed to repeat revision steps to reach the wording they could understand and use. The presentation requirement introduced a different set of demands. Students tried not to read verbatim and aimed to speak in their own words, which increased the demands associated with oral delivery and created heightened performance pressure. One student described how the presentation requirement changed revision priorities: “If it were only submission, I might leave words I couldn’t read. Because we had to present it, I reviewed, replaced unreadable words, and checked my pronunciation” (Student S). This focus on delivery led students to link sound, letters, and meaning; retain expressions they could read aloud with confidence; and distill their text into core ideas for listeners. While elements of the procedure—such as content-focused comments in Japanese, back-translation, and read-aloud expectations—helped to orient revision, peer review interactions and preparation for oral presentation still emerged as major pressure points, especially for lower-proficiency students.

Overall, the interview data suggest that students viewed tool use as legitimate and purposeful when it was embedded in the eight-step procedure; however, they still encountered interactional and proficiency-related hurdles, particularly around peer review and oral presentation.

Discussion

This study explored how Japanese EFL learners with CEFR proficiency levels ranging from A1 to A2 perceived and engaged with AI-assisted writing tools when these tools were embedded in a structured eight-step writing model. Using a qualitative narrative case study approach, this study aimed to illuminate learners’ subjective experiences of AI-assisted writing and examine how a carefully designed instructional procedure mediated their engagement and agency. Although the procedure was initially guided by Flower and Hayes’s (1981) cognitive model, the data revealed that learners’ engagement extended far beyond isolated cognitive processes. Therefore, Hayes’s (2012) revised framework was adopted to provide a more comprehensive interpretation of the findings, as it explicitly incorporates “transcription technology” and “collaborators” into the writing task environment. The following discussion is organized to clarify how the findings respond to RQ1 and RQ2.

Learners’ Perceptions of AI-Assisted Writing Tools

With respect to RQ1, the findings revealed that learners’ perceptions of AI-assisted writing tools were not static but evolved through participation in the structured writing process. Prior to the course, many students associated MT use with negative moral judgments, such as cheating or avoiding effort. These perceptions echo those identified by previous studies, which reported a persistent gap between students’ everyday tool use and institutional or instructional norms that discourage or prohibit MT (Ata & Debreli, 2021; Briggs, 2018). In such contexts, learners often experience tension between perceived usefulness and ethical unease, which can inhibit both tool use and engagement in writing tasks.

However, through engagement with the eight-step model, students gradually reinterpreted AI-assisted writing tools as legitimate resources for learning rather than as shortcuts. Importantly, this shift was not characterized by the unconditional acceptance of the technology. Instead, the learners consistently emphasized that writing should begin with their own ideas and linguistic resources. The students perceived AI-assisted writing tools as helpful when used after an initial attempt to express their ideas. This suggests that authorship and ownership remained central to their understanding of appropriate writing. This finding aligns with earlier research showing that learners value MT when it supports, rather than replaces, their thinking and expression (S.-M. Lee, 2020; Tsai, 2022).

Affective factors emerged as salient in learners' narratives about these perceptions. The vast majority of students described writing in English as emotionally demanding, given their limited proficiency and prior experiences of failure. Within this context, knowing that AI-assisted writing tools would be available at later stages of the process appeared to reduce anxiety and lower the psychological barriers to starting to write. Thus, AI-assisted writing tools seemed to serve as an effective safety net, allowing learners to take risks and attempt expressions without fear of producing incorrect English. This supports previous findings that MT can reduce language anxiety and increase lower-proficiency learners' willingness to write (Almusharraf & Bailey, 2023). However, the present study further shows that such affective benefits are closely tied to instructional framing.

However, the students' narratives indicated their limited and conditional trust in the MT output. Learners frequently expressed discomfort with expressions that seemed complex, unnatural, or beyond their understanding. Rather than accepting the MT output as authoritative, they evaluated it based on criteria such as whether they could read it aloud, explain it to others, or determine whether it aligned with their intended meaning. This evaluative stance suggests that learners were developing a critical orientation toward MT, consistent with recent arguments that effective MT use involves judgment, selection, and rejection rather than blind reliance (Urlaub & Dessein, 2022).

The use of back-translation further shaped learners' perceptions by enabling them to check the meanings of their writing through their L1. Several students compared the Japanese back-translations of different English drafts to determine which version best matched what they wanted to say. From a translanguaging perspective, this practice highlights how learners draw on their full linguistic repertoire to regulate meaning and maintain control over their expressions. Rather than viewing L1 use as a sign of deficiency, students came to view it as a strategic resource that supported accuracy, clarity, and voice. This finding supports recent research emphasizing that multilingual writers integrate digital tools into broader semiotic repertoires to construct meaningful sentences (Zhou et al., 2022).

Learners' perceptions of AI-assisted writing tools show that they were highly sensitive to the pedagogical context. When the use of AI-assisted writing tools was framed as part of a process that foregrounded authorship, reflection, and accountability, learners appeared more likely to perceive these tools as supportive mediational resources rather than as threats to academic integrity. These results underscore the importance of transcending simplistic dichotomies of "allowed" versus "banned" AI-assisted writing tools and attending to how learners experience and interpret MT within concrete instructional practices.

Instructional Mediation and Learner Engagement

In terms of RQ2, the findings suggest that the eight-step instructional procedure functioned as pedagogical scaffolding that mediated learners' behavioral, affective, cognitive, and social engagement with AI-assisted writing tools. Rather than focusing solely on the presence of technology, students repeatedly emphasized the importance of the procedure itself, describing it as a clear path that made the writing process more manageable and meaningful.

In terms of behavioral engagement, the step-by-step sequence promoted sustained engagement with writing activities. The students revisited their drafts multiple times, cycling between drafting, the use of AI-assisted writing tools, and checking the meaning of their writing. This recursive movement reflects the key principles of process-writing theory (Flower & Hayes, 1981) and contrasts with one-shot approaches to MT integration, in which immediate product improvements are emphasized. The procedure did not eliminate difficulty; instead, it structured how learners responded to difficulty by encouraging persistence rather than withdrawal.

Affective engagement was closely linked to the predictability of the instructional sequences. Consistent with Hayes (2012), who integrates motivation as a central component determining writers' willingness to engage and revise, awareness of the availability of AI-assisted writing tools at designated stages facilitated the students' independent writing (Y.-J. Lee, 2021). This finding suggests that affective support for lower-proficiency learners can be achieved through instructional design rather than through task simplification or unrestricted access to AI-assisted writing tools. The procedure offered what Y.-J. Lee (2024) terms "emotional reassurance" through human scaffolding, without undermining learners' responsibility for meaning-making.

Cognitive engagement was most evident in the students' use of comparison and monitoring strategies, particularly through back-translation. Using MT as a "transcription technology" (Hayes, 2012) reduced their working memory load, freeing cognitive resources for higher-order text interpretation. These practices prompted them to notice mismatches between intended meaning and linguistic form, functioning as an alarm bell for knowledge internalization (Yu & Jiang, 2025) and encouraging meta-cognitive reflection on their writing choices (S.-M. Lee, 2020). From a sociocultural perspective, MT functioned as a mediator by supporting learners' regulation of mental activity, rather than performing the task on their behalf (Lantolf & Thorne, 2006). The students' repeated checks and revisions suggest that the procedure may have fostered aspects of MT literacy grounded in evaluation and decision-making. Drawing on Matthews (2024), learner agency emerges from the complex interaction between human and machine capabilities. By critically evaluating AI output, the students successfully balanced their proactive self-determination against the passive influence of the tool, thereby establishing a collaborative cognitive process that preserved their authorship.

Peer interaction and oral presentation appeared to support learners' social engagement. Hayes's (2012) model explicitly situates "collaborators and critics" within the task environment as crucial mediators of the writing process. The requirement to present their written work to peers positioned writing as a form of communication directed toward real audiences rather than as a private exercise. Audience awareness discouraged unreflective copying and encouraged students to select expressions that they could understand, explain, and deliver orally. In this respect, the presentation stage functioned as a natural form of accountability, aligning with findings from previous research that social goals enhance learners' sense of responsibility for language use (Sakamoto, 2022). Peer interaction further supported this process by providing opportunities to test whether meaning was successfully communicated to others. While AI-assisted writing tools supported linguistic revision, they did not address the interpersonal emotions and sense of responsibility that emerged during peer review. This finding resonates with Chen's (2026) claim that AI-assisted writing tools lack emotional connections and nuanced contextual understanding. In this respect, the integration of peer review and presentations aligns with Chen's (2026) "Student-Teacher-AI Collaboration Model," highlighting the importance of human interaction in mediating the emotional accountability and social dynamics of AI-assisted writing.

The findings suggest that the teacher's role may have contributed to how the instructional procedure mediated engagement. Because the first author designed and taught the course, this interpretation was examined reflexively through analytic memoing and discussions with the second author. Rather

than detecting inappropriate MT use, the teacher facilitated students' interactions with AI-assisted writing tools, peers, and their own texts. This mediation helped learners navigate uncertainties while maintaining control over the meaning of their output. Thus, the findings support calls for a shift from detection-oriented to integration-oriented pedagogy, in which teachers orchestrate learning processes and guide reflective use of AI-assisted writing tools rather than policing technology.

Overall, the findings related to RQ2 indicated that the usefulness of AI-assisted writing tools depends less on the tools themselves than on the pedagogical structuring of their use. Previous research suggests that lower-proficiency learners may struggle to discern the accuracy of their MT outputs without guidance (Chung & Ahn, 2022). The eight-step model provided a framework within which learners could experiment, reflect, and take responsibility for writing. By embedding AI-assisted writing tools in a process-oriented, socially grounded sequence, instructional design supports learner engagement and agency, suggesting that pedagogical mediation is key to productive use of AI-assisted writing tools in low-proficiency L2 writing contexts. However, interactional and proficiency-related challenges suggest the need for additional scaffolding, particularly in peer feedback and decision-making, when AI-generated output exceeds learners' productive range.

Implications and Conclusion

This study suggests that the eight-step writing model incorporating AI-assisted writing tools supports low-proficiency Japanese university learners' engagement and agency. The structured procedure functioned as a pedagogical scaffold that reduced psychological barriers to writing, while fostering a critical and recursive approach to composition. The inclusion of an oral presentation goal enhanced social accountability, encouraged students to take ownership of their language choices, and discouraged unreflective copying. Most importantly, the findings indicate that MT, when framed through a translanguaging lens, can function as a mediating resource that supports low-proficiency learners in expressing complex ideas and developing a sense of personal voice in L2 writing. Based on these findings, several pedagogical implications can be drawn regarding the integration of AI-assisted writing tools into L2 writing instruction, particularly for lower-proficiency learners.

First, the results highlight the importance of instructional design that regulates when and how AI-assisted writing tools are used during the writing process. In the eight-step model, AI-assisted revision was introduced after an initial self-generated draft and paired with back-translation and peer interaction. This sequencing enabled students to engage critically with AI-generated output while maintaining authorship. The presentation stage positioned AI-assisted writing within a meaningful social context, fostering accountability to real audiences. Taken together, these features suggest that the pedagogical value of AI-assisted writing tools lies not in unrestricted access to the tools but in their embedding in a structured, process-oriented sequence.

Second, the study underscores the need to reconceptualize the teacher's role as a mediator rather than a detector of MT use. Rather than monitoring students for possible overreliance on technology, teachers can facilitate learners' interactions with AI-assisted writing tools, peers, and their own texts. This implication is grounded in the classroom dynamics observed in this study, where teacher mediation helped connect tool use, peer interaction, and learners' own meaning-making processes. This mediation supported learner agency and the ethical use of AI-assisted writing tools, indicating that the pedagogically meaningful integration of AI-assisted writing tools depends more on teachers' abilities to orchestrate learning processes than on controlling technology.

Third, the findings highlight the value of framing AI-assisted writing tools from sociocultural and translanguaging perspectives. For lower-proficiency learners, legitimizing strategic L1 use through

MT may help reduce affective barriers and support engagement in cognitively demanding writing tasks. Viewing MT as a mediational resource allows learners to draw on their full semiotic repertoire to construct meaning and voice, suggesting that integration-oriented pedagogy should explicitly recognize translanguaging as a productive component of L2 writing development.

Despite these contributions, this study has methodological and scope-related limitations. Most notably, it relied on interviews with a small number of participants from a single instructional context. As a qualitative case study, it was intentionally designed to provide in-depth, context-sensitive insights into learners' meaning-making processes rather than to make claims about typicality or generalizability. Thus, the findings should be interpreted as analytically transferable insights into one bounded case, rather than as evidence of the general effectiveness of the eight-step model. Future research should examine how similar pedagogical designs are adopted across institutional, linguistic, or proficiency contexts with larger and more diverse participant groups and multiple data sources to explore the analytic transferability of the instructional principles identified here. Further, while learners' retrospective narratives illuminated the affective, cognitive, and agentic dimensions of AI-assisted writing tool use, future studies should incorporate process-oriented methods, such as screen recording or stimulated recall, to capture the moment-to-moment interactional dynamics. Furthermore, because the present study focused on learners' perceptions and engagement rather than linguistic outcomes, future research should conduct more systematic textual analyses of learner-produced writing. Such studies are needed to examine how engagement with AI-assisted writing tools directly relates to textual quality, complexity, accuracy, and communicative effectiveness. Finally, longitudinal research is required to investigate how MT literacy, authorship, and the agentic use of AI-assisted writing tools develop over time as AI technologies evolve.

Use of Generative AI

This manuscript made use of QuillBot to assist in improving the clarity of the text. No AI tools were used to generate research hypotheses or write the conclusions. The final manuscript was authored and reviewed by the listed authors without additional AI input.

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