

EXPLORING EFL STUDENTS' USE OF AI AND THEIR RESPONSES TO AI FEEDBACK IN THE SELF-REGULATED WRITING PROCESS OF RESEARCH PROPOSALS

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Abstract: This study was conducted due to the increasing use of Artificial Intelligence (AI) among EFL students in writing academic texts. It aims to explore how students use AI and how they respond to AI feedback during their self-regulated writing process. Specifically, this study addresses the following questions: (1) How do EFL students use AI during the forethought, performance, and self-reflection phases of their self-regulated writing process? (2) How do EFL students respond to AI feedback during these three phases? This research uses a single qualitative case study design conducted at a private university in Malang. The participants were three students from the English Education Study Program who were taking the Research Proposal Seminar course. Research data were collected through an initial survey to identify the use of Artificial Intelligence (AI) by students, followed by in-depth interviews to explore their reasons and experiences in interacting with AI during the writing process. The interview data were analyzed using Thematic Analysis. Additionally, this research also uses documentation in the form of screenshots of students' interactions with AI tools. The documentation data is analyzed using adapted visual ethnography analysis to understand how students use AI during the writing process. The findings show that students use AI not only for surface-level tasks but also to generate ideas, explore vocabulary variations, and evaluate their writing. In responding to AI feedback, students do not accept all suggestions directly. Instead, they review, select, and adjust the feedback based on their needs. This indicates that students actively manage their self-regulated writing (SRW) process. In addition, the use of AI helps increase students' confidence, as long as they remain in control of their writing. In conclusion, AI has strong potential as a supportive tool in the process of writing research proposals. However, human support remains essential, especially in helping students develop critical thinking skills and maintain the originality of their ideas. Therefore, it is recommended that educators guide students in using AI wisely, so that AI can be used as a support tool rather than a replacement for independent thinking.

Keywords: AI feedback, self-regulated writing, research proposals, EFL students.

INTRODUCTION

Writing is a complex cognitive activity that involves more than just putting words on paper. According to Flower and Hayes (1981), writing is a recursive process involving planning, translating ideas into text, and reviewing the written work. Throughout this process, feedback plays an important role because it helps writers recognize weaknesses and improve their writing through interaction and support from others.

Traditionally, feedback has been provided by teachers and peers. This reflects Vygotsky's (1978) sociocultural theory, which emphasizes that learning develops through social interaction and external mediation. Through the concept of the Zone of Proximal Development (ZPD), teacher and peer feedback serve as scaffolding that helps students improve their writing beyond their current level of ability. In the digital era, however, the nature of writing feedback has changed. Besides teachers and peers, technology has become another source of support in the writing process. This development is also supported by the Technological Pedagogical and Content Knowledge (TPACK) framework, which highlights the effective integration of technology into teaching and learning (Mishra & Koehler, 2006).

One important technological innovation in writing is Automated Writing Feedback (AWF), which provides immediate feedback on grammar, vocabulary, sentence structure, and writing clarity (Li et al., 2015). With the rapid development of Artificial Intelligence (AI), AWF has evolved into AI-based feedback systems that provide more detailed and personalized suggestions. Beyond identifying language errors, AI feedback helps students improve idea organization, content development, and overall writing quality while encouraging them to revise independently before receiving teacher feedback (Shi & Aryadoust, 2024).

AI-based feedback is considered valuable because it supports self-regulated writing (SRW), allowing students to actively monitor and improve their own writing process (Liu et al., 2023). According to Zimmerman (2000), SRW consists of three phases: forethought, performance, and self-reflection. During these phases, students

plan their writing, monitor their performance while composing, and evaluate and revise their work after receiving feedback. Therefore, AI feedback has the potential to support students' cognitive, motivational, and behavioral regulation throughout the writing process (Umamah et al., 2022).

Despite its potential, the implementation of AI feedback in writing instruction remains at an early stage. Previous studies have reported that university students mainly use AI for surface-level revisions, such as grammar correction and vocabulary improvement, rather than for deeper writing processes such as planning, drafting, and reviewing (Amani & Bisriyah, 2025; Rafida et al., 2024). In addition, students still tend to depend on teacher feedback and demonstrate relatively low awareness of self-regulated writing strategies (Umamah et al., 2022). These findings indicate the need to investigate how EFL students actually use and respond to AI feedback throughout the SRW process.

Previous research has primarily examined the effectiveness of AI feedback in improving writing quality and grammatical accuracy (Chan et al., 2024). However, limited attention has been given to students' cognitive responses to AI-generated feedback during the writing process (Henderson et al., 2025). Moreover, existing studies mainly focus on general academic writing (Al-Smadi et al., 2025; Chang et al., 2023), while research proposal writing, which requires higher-order thinking and academic organization, has received less attention (Retnawati, 2017). Methodologically, studies on self-regulated learning in EFL contexts are still dominated by quantitative approaches, providing limited understanding of students' actual writing experiences (Mazandarani, 2024). Therefore, a qualitative case study is needed to explore how EFL students utilize and respond to AI feedback during the self-regulated writing process.

Based on these gaps, this study investigates the role of AI feedback in supporting EFL students' self-regulated writing during research proposal writing. Specifically, it explores how students use AI feedback across the forethought, performance, and self-reflection phases and how they respond to the feedback they

receive. The findings are expected to contribute to a better understanding of AI integration in academic writing and provide practical insights for teachers, researchers, and students in promoting independent and reflective writing practices in EFL contexts.

Based on the research background, this study aims to explore how EFL students utilize AI feedback during the writing of their research proposals within the framework of self-regulated learning. Therefore, this research is guided by the following questions: 1) What are the types and functions of AI that EFL students use during the Forethought, Performance, and Self-reflection Phases of their Self-regulated Writing Process? 2) How do EFL students respond to and apply AI feedback during the forethought, performance, and self-reflection phases of their self-regulated writing process in writing a research proposal?

LITERATURE REVIEW

Writing Process

Writing is a complex cognitive activity involving planning, translating, and reviewing (Flower & Hayes, 1981). During the planning phase, writers generate, organize, and structure ideas before drafting (Wan et al., 2024). In the translating phase, ideas are transformed into written text while managing grammar, coherence, and idea development (Diep & Le, 2024). The reviewing phase involves evaluating and revising the text to improve its clarity, organization, and overall quality (Lu et al., 2024). Throughout these phases, feedback supports writers in planning, composing, and revising their work (Butler & Winne, 1995). This recursive writing process closely relates to self-regulated writing (SRW), which also emphasizes planning, monitoring, and reflection (Zimmerman & Bandura, 1994).

Writing Feedback and Technology

According to Lev Vygotsky (1978), feedback functions as scaffolding that supports students' writing development. Traditionally, feedback is provided by teachers and peers, while technology offers immediate assistance during the writing process

(Hyland & Hyland, 2006). Although technology provides timely support, it cannot fully replace human interaction. This view aligns with the TPACK framework, which emphasizes the effective integration of technology, pedagogy, and content knowledge (Mishra & Koehler, 2006).

Automated Writing Feedback (AWF) and AI-based Feedback

Automated Writing Feedback (AWF) is a technology that provides immediate feedback on grammar, vocabulary, sentence structure, and writing clarity (Bestgen & Granger, 2014; Li et al., 2015). With recent developments in Artificial Intelligence (AI), AWF systems have become more advanced by providing more contextual and personalized feedback. AI-based feedback not only identifies language errors but also supports idea development and writing organization while encouraging students to revise their writing independently before receiving teacher feedback (Li et al., 2015). From Vygotsky's perspective, AI-based feedback functions as technological scaffolding that helps students accomplish writing tasks beyond their current ability by providing immediate and specific guidance (Zhang, 2025). However, compared with teacher and peer feedback, AI feedback remains limited because it lacks discussion, negotiation, and emotional support that characterize human interaction (Woodworth & Barkaoui, 2020). Therefore, AI feedback is most beneficial when combined with human feedback.

Self-Regulated Writing (SRW)

Self-regulated writing (SRW) refers to writers' ability to regulate their thoughts, feelings, and actions to achieve writing goals (Hwang, 2025). Self-regulated writers actively plan, monitor, and evaluate their writing throughout the writing process. According to Zimmerman (2000), SRW consists of three interconnected phases: forethought, performance, and self-reflection. During the forethought phase, students set writing goals, analyze tasks, select strategies, and build motivation before writing begins. The performance phase involves implementing writing strategies while

continuously monitoring writing progress through self-control and self-observation. Finally, the self-reflection phase focuses on evaluating writing performance through self-judgment and self-reaction, allowing students to recognize their strengths and weaknesses and improve future writing strategies. Through these phases, students develop greater independence and strategic regulation in writing.

Writing Feedback and Self-Regulated Writing (SRW)

Feedback is an essential component of both the writing process and self-regulated writing (SRW). According to Flower and Hayes (1981), feedback supports writers during planning, translating, and reviewing by helping them organize ideas, improve language use, and revise their writing (Conijn et al., 2022). Similarly, Zimmerman (2000) explains that feedback facilitates goal setting, monitoring, and self-evaluation across the forethought, performance, and self-reflection phases. Therefore, feedback should be viewed as a continuous process that promotes reflective, strategic, and independent writing rather than merely as a final correction after writing is completed (Vandermeulen et al., 2023)

METHOD

This study employed a qualitative method with a single-case study design to explore EFL students' experiences in using AI and responding to AI feedback during the Self-Regulated Writing (SRW) process. A qualitative approach was appropriate because the study focused on participants' perceptions, experiences, and reflections rather than numerical data (Creswell, 2013). The study was conducted in the English Language Education Study Program at a private university in Malang, where students in the Seminar on English Language Teaching (ELT) course were required to write a research proposal while receiving feedback from lecturers and supervisors and were also allowed to use AI tools. Participants were selected through purposive sampling based on four criteria: (1) seventh-semester students, (2) frequent users of AI feedback during proposal writing, (3) obtaining an A (80–100) in the Seminar on ELT course,

and (4) willingness to participate in interviews and provide evidence of AI use. Based on these criteria, three participants were selected because they could provide rich and relevant information (Creswell, 2013).

The study used both primary and secondary data. Primary data were collected through semi-structured interviews adapted from Inan-Karagul and Seker (2021) and Xu (2021), consisting of 13 main questions covering the forethought, performance, and self-reflection phases of SRW, with follow-up questions when necessary. To facilitate participants' understanding, the interview questions were translated into Indonesian and validated by experts in self-regulation and writing. Each participant was interviewed two to three times in a face-to-face setting, and all interviews were audio-recorded with participants' consent and transcribed verbatim (Babchuk, 2017). Secondary data consisted of screenshots documenting participants' interactions with AI feedback during the research proposal writing process to support and validate the interview findings.

The interview data were analyzed using the six phases of thematic analysis proposed by Clarke and Braun (2016): familiarization, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report. Documentation was analyzed alongside the interview data following Pink (2007) to strengthen the interpretation of participants' experiences by connecting screenshots with interview findings. To ensure trustworthiness, credibility was established through member checking (Lincoln & Guba, 1985), in which interview transcripts and preliminary interpretations were returned to participants for confirmation and clarification, thereby reducing researcher bias and enhancing the credibility of the finding

FINDINGS AND DISCUSSIONS

To answer the first research question, the findings are presented according to the three phases of self-regulated writing: forethought, performance, and self-

reflection. Each phase begins with a table summarizing the AI tools used by the participants and their functions, followed by a narrative explanation.

What are the types and functions of AI that EFL students use during the Forethought, Performance, and Self-reflection Phases of their Self-regulated Writing Process?

1. Forethought Phase

The interview findings showed that all participants used AI during the forethought phase to generate ideas and develop the initial structure of their research proposals. Table 1 summarizes the AI tools used and their functions.

Table 1. AI Tools Utilization: Forethought

Code	Forethought	
	Tools	Use
P1	ChatGPT, DeepL, Quillbot, Consensus AI	Brainstorming ideas, developing an outline, translating, paraphrasing, searching references
P2	ChatGPT	Generating and organizing an outline
P3	ChatGPT, Grammarly, QuillBot	Understanding the research topic, developing an outline, initial language checking

At this stage, AI mainly functioned as a brainstorming and outline-generation tool. All participants used ChatGPT to develop the initial structure of their proposals. P2 also expressed a similar statement:

“First, I use ChatGPT to... create an outline.” (P1, interview, 04:21–05:30)

Similarly, P2 used ChatGPT to organize the proposal when unsure how to begin, while P3 used it to understand the research topic and obtain an overall picture of the proposal.

Although all participants relied on ChatGPT, they differed in their use of supporting AI tools. P1 additionally used DeepL for translation, QuillBot for paraphrasing, and Consensus to search for references. Meanwhile, P3 used Grammarly for initial language checking and QuillBot for limited paraphrasing. In contrast, P2

mainly relied on ChatGPT because she already understood her research topic. Overall, these findings indicate that AI supported planning, proposal structuring, and initial language assistance during the forethought phase, although the variety of tools differed across participants.

2. Performance Phase

During the performance phase, AI use shifted from idea generation to improving the quality of the draft. Participants mainly used AI for grammar checking, coherence, academic language, and reference searching.

Table 2. AI Tools Utilization: Performance

Code	Performance	
	Tools	Use
P1	ChatGPT, DeepL, Quillbot, Consensus	Grammar checking, improving academic words, paraphrasing, and selecting relevant references
P2	Perplexity, Jennie AI, Grammarly, QuillBot	Searching references, understanding terms, grammar, and punctuation checking, simplifying vocabulary
P3	ChatGPT, Grammarly	Reviewing coherence and grammar, revising drafts

P1 continued using the same AI tools as in the forethought phase but with more specific functions for language improvement

“It is basically ... the same as in the forethought phase. First, I use ChatGPT to create an outline. ... Then, I use DeepL to translate the outline. I use QuillBot to look for synonyms and paraphrases. I also use Consensus to search for relevant articles or references.” (P1, WhatsApp interview)

Similarly, P2 used Perplexity and Jenni AI to search for references and understand unfamiliar terms, while Grammarly and QuillBot were used for grammar checking and vocabulary improvement. Meanwhile, P3 mainly used ChatGPT and Grammarly to review specific sections of the proposal, such as the background and research questions, and to check grammar, coherence, and academic tone. As P3 explained,

“In this phase, AI functions as an editor and reviewer, rather than as the main source of ideas.” (P3, interview, 13:26-14:10)

Overall, AI functioned as a language editor, coherence checker, and reference assistant during the performance phase, supporting participants in improving the quality of their drafts.

3. Self-Reflection Phase

In the self-reflection phase, AI was mainly used for final reviewing before proposal submission. Table 5 summarizes the AI tools and their functions.

Table 5. AI Tools Utilization: Self-reflection phase

Code	Self-reflection phase	
	Tools	Use
P1	ChatGPT	Final Grammar and punctuation review
P2	Rarely AI	Final review mainly conducted by the lecturer
P3	ChatGPT, Grammarly (+ QuillBot)	Evaluating clarity of arguments, coherence, and paraphrasing

P1 only used ChatGPT to conduct the final review of the proposal.

“I use ChatGPT to check grammar, pronouns, and punctuation. Usually, I send parts of my writing or copy sections of the draft into ChatGPT and ask for revision suggestions. I revise the proposal chapter by chapter so the process is more efficient and detailed. I apply the same process for Chapters 1 to 3. The prompts I use are like, ‘Please revise the grammar, structure, language use, and punctuation.’ (P1, WhatsApp interview)

This finding indicates that P1 systematically used ChatGPT as a final checking tool to improve grammar, structure, and language quality before consultation with the supervisor. Unlike P1, P2 rarely used AI during this phase and relied mainly on feedback from the supervising lecturer for the final review. Meanwhile, P3 continued using ChatGPT, Grammarly, and QuillBot to evaluate argument clarity, coherence, academic tone, and alternative paraphrases rather than generating new content.

Overall, these findings indicate that AI functioned as a final checking tool for grammar, coherence, argument clarity, and writing quality during the self-reflection phase. However, participants differed in their level of dependence on AI, with P1

focusing on language correction, P2 relying primarily on lecturer feedback, and P3 using AI as a comprehensive reflection tool for evaluating the overall quality of the proposal

How do EFL students respond to and apply AI feedback during the forethought, performance, and self-reflection phases of their self-regulated writing process in writing a research proposal?

This section presents the findings on EFL students' responses to AI feedback across the forethought, performance, and self-reflection phases of self-regulated writing. Each phase is introduced with a table summarizing participants' responses, followed by a narrative explanation..

1. Forethought Phase

During the forethought phase, all participants showed selective responses toward AI feedback. Rather than directly copying AI-generated suggestions, they read, evaluated, and modified the feedback before applying it to their research proposals. Table 4 summarizes participants' responses.

Table 4 Students' Responses to AI Feedback

Participant	Forethought
P1	Reading the feedback first and modifying the text as necessary.
P2	Selecting suitable ideas from the feedback
P3	Critically comparing feedback & discussing it with peers

P1 explained that she did not directly copy the output generated by ChatGPT. Instead, she first reviewed the feedback, translated it using DeepL, and adjusted the wording with QuillBot to better fit the academic context.

"I do not directly copy the results from ChatGPT. I read them first, then translate them using DeepL. If there are words that feel less academic, look for synonyms through QuillBot and adjust them using my own words." (P1, interview, 10:06-12:30)

Similarly, P2 carefully selected AI suggestions that matched the focus of the study and made necessary adjustments before using them. Likewise, P3 compared AI feedback with the research objectives and only adopted suggestions that were considered relevant. Unlike P1 and P2, P3 also discussed AI-generated suggestions with peers to obtain additional validation before revising the proposal. In short, these findings indicate that all participants responded selectively to AI feedback by reviewing, evaluating, and modifying the suggestions before applying them. However, while P1 and P2 mainly relied on individual evaluation, P3 combined AI feedback with peer discussion as an additional form of social regulation.

2. Performance Phase

Participants' responses became more critical during the performance phase, although the depth of evaluation varied among individuals.

Table 5 Students' Responses to AI Feedback

Participant	Performance
P1	Selectively accepting grammatical suggestions
P2	Being highly critical, checking validity, and modifying the prompt (reflective)
P3	Selective; evaluate the feedback and Reflective; rethinking the quality of writing

P1 stated that she did not directly copy AI results but first reviewed, translated, and adjusted them to fit academic needs, while also selecting relevant references from Consensus. P2 showed the most critical response in this phase.

"I do not directly copy the results from ChatGPT. I read them first and then translate them using DeepL. If there are words that feel less appropriate academically, I look for synonyms through QuillBot and adjust them using my own words. For Consensus, I first select which articles are relevant to my research, and once I find suitable ones, I use them as references." (P1, WhatsApp interview)

This finding indicates that P2 not only selected AI suggestions but also evaluated source validity, modified prompts when necessary, and carefully reviewed grammar corrections before accepting them. Similarly, P3 wrote the draft first based on his own

understanding and then used AI to evaluate clarity and coherence. When feedback indicated problems, he revised the text using his own words, showing a selective and reflective response to AI feedback.

In short, these findings indicate that none of the participants accepted AI feedback without evaluation. However, their responses differed in depth: P1 focused on language and reference selection, P2 showed the most critical evaluation by checking validity and revising prompts, and P3 used AI as a tool to review and rewrite drafts in his own language

3. Self-Reflection Phase

In the self-reflection phase, AI was mainly used for final revision, although participants responded differently to the feedback. Table 8 summarizes their responses.

Table 8 Students’ Responses to AI Feedback

Participant	Self-Reflection
P1	Partially accepting suggestion (grammar) and being selective for punctuation
P2	Rarely using AI and relying more on the lecturer
P3	Being fully selective and reflective in responding to feedback

P1 explained that not all AI feedback was directly applied.

“Not all feedback is applied directly. I still choose what fits best and combine it with my own words. For grammar, I usually copy and paste the corrections. However, for punctuation, I still double-check it myself because sometimes it does not fully match what I want.” (P1, interview, 21:31-22:40)

This finding indicates that P1 selectively accepted AI feedback, applying grammar corrections more directly while continuing to evaluate punctuation and contextual appropriateness. Meanwhile, P3 viewed AI as a source of input rather than the main writer. P3 read, evaluated, and revised the text using their own words before applying AI suggestions. P3 also reflected on the impact of AI feedback on personal development.

“AI feedback makes me more aware of recurring mistakes and also of the progress I have made.” (P3, interview, 18:31-19:40)

This finding suggests that AI feedback supported not only writing improvement but also metacognitive awareness of recurring errors and writing progress. Unlike P1 and P3, P2 rarely used AI during the self-reflection phase and relied primarily on feedback from the supervising lecturer for final revisions.

Overall, these findings indicate that AI functioned as a final review tool during the self-reflection phase. However, participants responded differently to AI feedback: P1 focused mainly on technical language corrections, P3 used AI as a reflective tool to improve writing quality and self-awareness, whereas P2 relied more on lecturer feedback than AI.

The findings indicate that AI supports EFL students throughout all phases of self-regulated writing, namely forethought, performance, and self-reflection. This finding supports Bella et al. (2025) and is consistent with Zimmerman's (2000) self-regulated writing model. In the present study, ChatGPT mainly supported idea generation and outlining during the forethought phase, Grammarly and similar tools assisted monitoring and revision during the performance phase, and ChatGPT was used to evaluate writing quality during the self-reflection phase. These findings are also consistent with the writing process model of Flower and Hayes (1981), Umamah and Cahyono (2020), and Li et al. (2015), indicating that AI supports planning, revising, and reviewing while extending its role beyond linguistic improvement to support students' self-regulation. This role can also be explained through Vygotsky's (1978) scaffolding theory and Mishra and Koehler (2006), who argue that technology functions as a pedagogical tool that supports independent learning.

Regarding students' responses to AI feedback, all participants demonstrated selective responses by evaluating and modifying AI suggestions before applying them, reflecting Zimmerman's (2000) concepts of self-monitoring and self-evaluation. This finding supports Heriyawati and Romadhon (2025) and Alnemrat et al. (2025), who reported that students compare AI feedback with their own understanding before

making revisions. However, participants differed in their level of reflection. P1 mainly used AI for grammar and language improvement, whereas P2 and P3 demonstrated deeper cognitive engagement by checking source validity, revising prompts, rewriting AI suggestions in their own words, and showing greater metacognitive awareness. This finding is consistent with Moon (2001), Nisak et al. (2023), and Zhai et al. (2023), suggesting that reflective strategies and self-regulation are not necessarily reflected in writing scores but play an important role in students' learning.

Compared with Amani and Bisriyah (2025), who found that AI was mainly used for grammar checking, paraphrasing, translation, and idea generation, the present study shows that students used AI more actively by evaluating, modifying, and selectively applying AI feedback throughout the writing process. This difference may be related to the research proposal writing context, which requires students to identify research problems and justify research significance, encouraging more critical evaluation of AI feedback. Unlike previous studies that examined self-regulation dimensions, this study investigated AI use across Zimmerman's (2000) three phases of self-regulated writing, providing a clearer understanding of how students use and respond to AI before, during, and after writing. Although AI supported the writing process, participants continued to rely on lecturers and peers to validate their ideas, supporting Luo et al. (2024), who argue that AI complements rather than replaces human guidance. Overall, these findings suggest that AI functions as a scaffolding tool whose effectiveness depends on students' self-regulation strategies and cognitive engagement.

CONCLUSION AND SUGGESTIONS

This study explored how EFL students used AI and responded to AI feedback throughout the self-regulated writing (SRW) process of research proposal writing. The findings showed that AI supported students across the forethought, performance, and self-reflection phases by assisting idea development, language revision, reference searching, and writing evaluation. Students responded to AI feedback selectively by evaluating and adapting suggestions before applying them, demonstrating active self-

regulation and critical engagement. These findings suggest that AI is most effective as a tool that supports, rather than replaces, lecturers' and peers' guidance. Future studies should involve participants from different institutions and examine the long-term effects of AI on writing quality, critical thinking, and self-regulated writing.

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