



Self-Regulated Learning in the Age of GenAI: How Undergraduate EFL Students Engage with Chat-Based AI in Essay Writing

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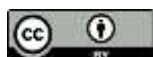
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Abstract: This study explores how undergraduate EFL students use chat-based AI tools in essay writing through the lens of Self-Regulated Learning (SRL), focusing on the forethought, performance, and self-reflection phases. A qualitative research design was used, and data were collected through semi-structured interviews with 12 English Education students selected through purposive sampling based on their experience using chat-based AI tools. The data were analyzed using thematic analysis with both deductive and inductive coding. The findings show that in the forethought phase, students mainly set simple goals such as completing essays quickly, getting good grades, and meeting academic requirements. They also used AI to help generate ideas and organize essay structure when they had difficulties. In the performance phase, students used chat-based AI for brainstorming ideas, improving grammar and vocabulary, and developing their writing. However, they did not fully depend on AI output and often rewrote and checked the content to maintain originality and clarity. In the self-reflection phase, students viewed AI as helpful for improving writing speed, ideas, and language quality, but they also expressed concerns about overuse and dependence. Despite this, most students reported improvements in their writing skills and planned to continue using AI carefully. The study concludes that chat-based AI supports students in essay writing, but its effectiveness depends on how students regulate its use across SRL phases. The findings show that students are starting to apply self-regulated learning strategies, although their writing is still strongly influenced by task completion goals and academic demands.

Keywords: Chat-Based AI, EFL, Essay Writing, Self-Regulated Learning, Undergraduate Students

Introduction

In academic contexts, essay writing plays an essential role because it develops students' logical thinking, analytical skills, and ability to express ideas clearly (Rozikjonovich & Sanjarovna, 2025). However, it is also one of the most challenging skills for English as a foreign language (EFL) students because it requires both linguistic competence and critical thinking. Previous studies consistently show that EFL students encounter difficulties throughout the essay writing process, including generating and

organizing ideas, developing coherent paragraphs, revising drafts, and applying appropriate grammatical structures ([Bisriyah, 2022](#); [Munawwaroh et al., 2026](#)). To address these challenges, learners frequently seek external learning resources, guided feedback, model texts, and increasingly technology-assisted writing support ([Munawwaroh et al., 2026](#); [Rifai et al., 2024](#)). As digital learning technologies continue to evolve, students increasingly turn to generative AI to support different stages of essay writing.

The emergence of generative AI (GenAI) has transformed the essay writing process. More broadly, generative AI has been recognized as a transformative technology for teaching and learning, offering opportunities to enhance productivity and learning while simultaneously raising concerns regarding bias, misinformation, transparency, and ethical use ([Dwivedi et al., 2023](#)). Recent evidence further suggests that GenAI can enhance learning outcomes, behavioral engagement, and self-regulation when integrated as a collaborative educational partner rather than a replacement for teachers ([Memon & Kwan, 2025](#); [Xiaoli Han et al., 2025](#)).

Within academic writing, GenAI is increasingly used to support multiple stages of the writing process ([Li & Wu, 2025](#)). Empirical studies consistently show that students perceive GenAI as improving writing efficiency, providing immediate feedback, and enhancing language accuracy, coherence, and writing fluency ([Deep & Chen, 2025](#); [Male et al., 2025](#); [Selvi, 2024](#)). From learners' perspectives, GenAI is valued not only as a text generator but also as a brainstorming partner, facilitator of ideas, and writing support tool ([Sen et al., 2025](#)). Similarly, Sari (2025) revealed how EFL students use GenAI in their writing process. Their findings showed that students leverage GenAI to develop their ideas, evaluate their drafts, and make their writing more cohesive and coherent. Studies further suggest that although students are generally aware of academic integrity concerns, they continue to integrate GenAI into academic writing for a variety of purposes, highlighting the need to understand how learners make decisions about AI use during writing ([Hysaj et al., 2025](#)). Collectively, these studies suggest that GenAI has become increasingly embedded in students' academic writing practices, functioning not merely as a text generator but as a collaborative writing partner throughout the writing process.

Despite its growing adoption in academic writing, the educational benefits are not guaranteed. A recent study demonstrated that while chat-based AI offers clear advantages in terms of efficiency, adaptability, and incidental learning during the planning and drafting stages, it simultaneously poses severe threats to textual integrity, originality, and learner independence ([Hasanbaşoğlu & Baloglu, 2026](#)). More broadly, Sessler et al. (2023) argue that the educational value of large language models depends not only on the technology itself but also on learners' ability to critically evaluate AI-generated responses, verify information, and exercise appropriate human judgment. Therefore, successful AI-assisted writing requires learners to actively regulate when, how, and why they use GenAI rather than relying on it uncritically. This highlights the importance of understanding how learners plan, monitor, and evaluate their interaction with GenAI throughout the writing process. Such capabilities are commonly conceptualized as self-regulated learning (SRL), which

refers to learners' active regulation of their cognition, motivation, behavior, and learning resources in pursuit of learning goals (Pintrich, 1999).

Self-regulated learning has been conceptualized through several theoretical models, each emphasizing different aspects of learners' regulation (Panadero, 2017). Among these, (Zimmerman, 2002) proposed a cyclical model consisting of three interconnected phases: forethought, performance, and self-reflection (see Figure 1). This process-oriented model is particularly relevant to AI-assisted essay writing because it enables the examination of how undergraduate EFL students plan, monitor, and reflect on their interaction with chat-based AI throughout the essay writing process. Unlike broader conceptualizations of SRL that emphasize motivational and contextual dimensions, Zimmerman's cyclical model explicitly captures the temporal sequence of learners' planning, monitoring, and reflection. This makes it particularly suitable for examining how students regulate their interactions with chat-based AI throughout the recursive process of essay writing.



Figure 1 Phases and Subprocesses of Self-Regulation (Zimmerman & Campillo, as cited in Zimmerman, 2002).

In the forethought phase, learners set goals and plan strategies before beginning a task. During the performance phase, they monitor and regulate their learning while completing the task. Finally, in the self-reflection phase, learners evaluate their performance and use the outcomes to guide future learning (Zimmerman, 2002). In the context of AI-assisted essay writing, these three phases provide a useful framework for understanding how students decide when to use GenAI, regulate its use during writing, and reflect on its contribution to their learning outcomes.

Previous studies have examined the relationship between GenAI and SRL in EFL writing. Diasti & Murniati (2026) demonstrated that students employed self-regulation

strategies, such as goal setting, self-monitoring, and self-evaluation, while completing writing tasks with ChatGPT. Similarly, Linh et al., (2026) reported that EFL students actively integrated AI chatbots into different stages of the writing process and perceived them as beneficial for supporting productivity, language development, and self-regulation, despite concerns regarding overreliance and ethical issues. Likewise, Werdiningsih et al. (2024) found that postgraduate EFL students strategically interacted with ChatGPT through critical evaluation, peer consultation, and the use of external sources during writing.

Collectively, these studies consistently indicate that successful AI-assisted writing involves learners' active self-regulation rather than passive reliance on AI. However, they differ in their analytical focus. Diasti and Murniati (2026) primarily examined specific self-regulation strategies, Linh et al. (2026) emphasized students' perceptions of AI-supported self-regulation, whereas Werdiningsih et al. (2024) highlighted critical evaluation practices among postgraduate learners. Taken together, these studies provide valuable insights into particular aspects of self-regulation but offer only a fragmented understanding of how learners regulate their interaction with chat-based AI across the entire essay-writing process. Consequently, little is known about how undergraduate EFL learners move across the forethought, performance, and self-reflection phases while interacting with chat-based AI during authentic essay writing.

Understanding this process is particularly important in undergraduate EFL contexts, where students are expected to produce increasingly independent academic writing while simultaneously navigating the opportunities and challenges introduced by GenAI. Moreover, most existing studies conceptualize GenAI use as a collection of writing strategies or technology-assisted practices, rather than as a dynamic learning process that evolves throughout the completion of a writing task. This leaves unanswered questions regarding how learners make decisions before engaging with AI, regulate its use while writing, and evaluate its contribution after completing the task.

Addressing this gap requires examining AI-assisted writing as an evolving learning process rather than as a collection of isolated strategies or perceptions. Accordingly, this study conceptualizes students' engagement with chat-based AI as a dynamic self-regulated learning process that unfolds across the forethought, performance, and self-reflection phases of essay writing. Rather than focusing only on learners' perceptions or identifying isolated SRL strategies, this study investigates how students actively regulate and negotiate their use of GenAI throughout an authentic essay-writing task. By adopting this process-oriented perspective, the study explains not only whether students regulate AI use, but also how that regulation evolves across successive phases of writing, thereby extending current understanding of learner agency in AI-mediated academic writing. Based on the research objectives, this study addresses the following research question: How do undergraduate EFL students engage with chat-based AI in essay writing across the three phases of self-regulated learning?

Methodology

Research Design

This study employed a qualitative research design to explore how undergraduate EFL students engage with chat-based AI during essay writing through the lens of SRL. A qualitative approach was considered appropriate because the study seeks to understand students' processes in depth, particularly how they plan, monitor, and evaluate their learning when interacting with generative AI tools.

Participants

The participants of this study were undergraduate students enrolled in an English Education program at a public university in Makassar, Indonesia. A total of 12 students were selected using purposive sampling based on their experience in using chat-based AI tools such as ChatGPT for essay writing tasks. The final number of participants was determined based on data saturation, where data collection was stopped when no new information emerged from the interviews (Ahmed, 2025). All participants had prior experience in using AI tools to support their academic writing. The anonymized interview data are available from the corresponding author upon reasonable request.

Data Collection

Data were collected through semi-structured interviews. The interview protocol was developed based on Zimmerman's (2002) SRL framework, consisting of forethought, performance, and self-reflection phases. In the forethought phase, questions focused on students' goal setting, planning strategies, and decisions to use chat-based AI before writing. In the performance phase, questions explored how students monitored and regulated their writing while interacting with AI-generated outputs. In the self-reflection phase, questions examined how students evaluated the usefulness of AI tools after completing their essays.

All interviews were conducted in Indonesian to allow participants to express their ideas more naturally. The interviews were audio-recorded and later transcribed for analysis.

Data Analysis

The data were analyzed using thematic analysis. The analysis combined deductive and inductive coding. Deductively, initial codes were developed based on the SRL framework (forethought, performance, and self-reflection). Inductively, emerging themes outside the predefined framework were also identified. The analysis process included familiarization with the data, initial coding, theme development, and theme refinement.

Results and Discussion

Forethought Phase

The findings show that before using chat-based AI tools, undergraduate EFL students engaged in goal setting and simple planning strategies to prepare their essay writing

process. Most students focused on completing the task efficiently, meeting academic requirements, and producing well-structured essays.

Theme 1: Goal-oriented writing strategies

The data indicate that students approached essay writing with clear performance-oriented goals, mainly focusing on completing assignments quickly, achieving good grades, and following lecturer instructions.

"Saya ingin menyelesaikan esai dengan cepat dan mendapatkan nilai yang baik, serta memenuhi struktur yang diminta dosen." (P1)

(I want to finish the essay quickly, get a good grade, and follow the structure the lecturer requested.)

"Tujuan saya menyelesaikan tugas dengan struktur yang benar." (P2)

(My purpose is to complete the task with a correct structure.)

"Saya ingin menulis esai yang sesuai standar akademik dan cepat selesai." (P12)

(I want to write an essay that meets academic standards and can be completed quickly.)

Goal setting in this phase was predominantly performance-oriented, with participants emphasizing efficient task completion, compliance with lecturer expectations, and achievement of satisfactory academic outcomes.

Theme 2: AI as a planning support tool

Another finding shows that students used chat-based AI at the early stage of writing, especially when they had difficulties generating ideas or organizing structure. AI was used as a support tool to help them start the writing process more easily.

"Saat saya mulai kesulitan mencari ide dan struktur, biasanya langsung pakai ChatGPT." (P1)

(When I start having trouble coming up with ideas and a structure, I usually turn to ChatGPT right away.)

"Saya biasanya membuat outline sederhana dulu, lalu menentukan poin utama tiap paragraf." (P1)

(I usually make a simple outline first, then determine the main points of each paragraph.)

"Saya siapkan topik dan keyword saja sebelum pakai AI." (P12)

(I only prepare the topic and keywords before using AI.)

Planning before AI use was generally limited to preparing topics, keywords, or simple outlines. Rather than engaging in extensive pre-writing strategies, students appeared to introduce AI when they encountered difficulties in generating ideas or organizing content.

Students' planning was primarily shaped by immediate academic demands rather than long-term writing development. Although participants engaged in goal setting and basic planning, their goals emphasized task completion, grades, and compliance with lecturer expectations instead of broader writing improvement. From an SRL perspective, this suggests that the forethought phase was present but relatively limited, with planning directed more toward completing the assignment than developing writing competence.

This finding both supports and extends previous research. Similar to Diasti and Murniati (2026), students engaged in goal setting before writing. However, unlike the postgraduate participants reported by Werdiningsih et al. (2024), undergraduate students mainly used AI to overcome initial difficulties in idea generation and organization. This suggests that AI functioned as a cognitive scaffold (Reiser, 2004), structuring the early stages of writing while allowing learners to remain actively involved in planning decisions.

Taken together, the forethought phase illustrates that students regulated AI use before writing began by making deliberate decisions about when AI should be incorporated into the planning process. This early decision-making reflects the initial expression of learner agency in AI-mediated writing. This emphasis on task completion may also reflect the assessment-oriented context in which undergraduate students complete writing assignments, where meeting course requirements often becomes a more immediate priority than developing long-term writing competence.

Performance Phase

The performance phase refers to the stage where students start writing and actively use AI during drafting and revising. The findings show that students integrated AI in several parts of their writing process, especially for generating ideas and improving language use.

Theme 1: AI-assisted idea generation and writing development

Students reported using AI to help them generate ideas, develop content, and build paragraphs when they experienced difficulties in writing.

"Saya gunakan AI untuk brainstorming dan mencari ide." (P1)
(I use AI for brainstorming and coming up with ideas.)

"Saya ambil ide dari Perplexity lalu saya parafrase." (P3)
(I get ideas from Perplexity and then paraphrase them.)

"Saya minta AI buatkan esai lengkap lalu saya edit." (P6)
(I ask the AI to write a complete essay, and then I edit it.)

AI primarily functioned as an idea-development partner during drafting. Rather than replacing students' writing entirely, it was commonly used to overcome moments of uncertainty and expand developing arguments.

Theme 2: Language improvement and rewriting process

Students also used AI to improve grammar, vocabulary, and sentence structure. However, most students did not directly copy AI output and preferred to rewrite it using their own words.

"Saya gunakan AI untuk memperbaiki grammar dan variasi kalimat." (P1)
(I use AI to improve my grammar and sentence variety.)

"Saya selalu rewrite dengan bahasa sendiri." (P12)
(I always rewrite it in my own words.)

"AI membantu vocabulary tapi saya kadang ragu kebenarannya." (P3)
(AI helps with vocabulary, but I sometimes doubt its accuracy.)

Language support emerged as another important function of AI. Participants frequently relied on AI to refine grammar, vocabulary, and sentence structure, yet they generally retained responsibility for rewriting the generated text.

Theme 3: Self-monitoring and checking process

Students also showed awareness in checking and reviewing their writing, especially when using AI-generated content. They monitored their work by rereading and revising paragraphs to ensure clarity and originality.

"Saya selalu rewrite dengan bahasa sendiri supaya tidak sama dengan AI." (P1)
(I always rewrite it in my own words so it doesn't sound like it was generated by AI.)

"Saya baca ulang setiap paragraf untuk cek alur." (P1)
(I reread each paragraph to check the flow.)

"Saya bandingkan hasil AI lalu saya edit." (P9)
(I compare the AI-generated text and then edit it.)

Checking and revision remained central to students' writing process. Participants repeatedly reread, compared, and revised AI-generated content before incorporating it into their essays, suggesting that evaluation continued throughout drafting rather than occurring only after writing was completed.

During the performance phase, AI became integrated into students' ongoing regulation of writing rather than functioning merely as a text generator. Students selectively used AI to develop ideas, improve language, and revise drafts while continuing to monitor and modify the generated content. These behaviours reflect Zimmerman's self-control and self-

observation processes, in which learners actively regulate strategies while completing a task.

This pattern partly supports previous studies (Diasti & Murniati, 2026; Linh et al., 2026; Werdiningsih et al., 2024) but it also reveals an important distinction. Rather than using AI solely for linguistic assistance, participants continuously negotiated whether AI-generated content should be accepted, revised, or rejected. Such decision-making demonstrates learner agency (Bandura, as cited in Snijder et al., 2026), as students retained ownership of their writing throughout the drafting process instead of accepting AI output uncritically. From the perspective of Cognitive Load Theory (Sweller, 2011), AI appeared to reduce the extraneous cognitive load associated with generating ideas and formulating language. As a result, students could allocate more cognitive resources to higher-order writing processes, such as organizing arguments, monitoring coherence, and revising their drafts.

Overall, the performance phase demonstrates that AI functioned as an interactive writing partner whose educational value depended on learners' continuous monitoring, evaluation, and strategic decision-making throughout the writing process. This pattern may also reflect the characteristics of undergraduate EFL learners, who often experience greater linguistic and cognitive demands during academic writing than more experienced writers. Consequently, AI was used not merely for convenience but as a strategic resource for managing these challenges.

Self-Reflection Phase

The self-reflection phase involves how students evaluate their writing process and the role of AI after completing their essays. The findings show that students reflected on both benefits and limitations of using AI tools.

Theme 1: Perceived usefulness of AI tools

Most students viewed AI as a helpful tool that improves writing speed, idea generation, and language quality.

"Sangat membantu karena ide lebih banyak dan writing lebih cepat." (P1)

(It is very helpful because it generates more ideas and speeds up the writing process.)

"AI sangat membantu struktur dan grammar." (P8)

(AI is very helpful for structure and grammar.)

"AI sangat efektif untuk mempercepat proses menulis." (P6)

(AI is very effective at speeding up the writing process.)

Efficiency emerged as the most consistently reported benefit of AI use. Beyond saving time, participants believed that AI contributed to clearer organization and improved language quality during essay writing.

Theme 2: Awareness of limitations and overuse

Although students recognized the benefits of AI, they also expressed concerns about overdependence and reduced effort in thinking when using AI too frequently.

"Kadang bisa bikin terlalu bergantung." (P5)

(Sometimes it can make you too dependent.)

"AI bisa bikin malas berpikir." (P11)

(AI can make you lazy when it comes to thinking.)

"Saya takut ketergantungan." (P9)

(I am afraid of becoming dependent.)

Despite recognizing these advantages, participants also acknowledged that frequent AI use could weaken independent thinking and increase reliance on automated assistance.

Theme 3: Skill improvement and future use

Students also reported improvements in vocabulary, fluency, and writing structure. Most of them stated that they would continue using AI but with more caution.

"Iya, terutama vocabulary saya meningkat." (P7)

(Yes, my vocabulary has improved the most.)

"Writing saya jadi lebih cepat dan lancar." (P12)

(My writing has become faster and more fluent.)

"Tetap akan digunakan tapi harus hati-hati." (P10)

(I will still use it, but I have to be careful.)

Participants viewed AI as contributing not only to immediate task completion but also to gradual improvement in vocabulary, fluency, and essay organization. Nevertheless, most emphasized that future use should remain cautious and purposeful.

Students' reflections demonstrate that they evaluated AI not only in relation to writing outcomes but also in terms of its influence on their own learning habits. Although participants appreciated AI for improving efficiency and language quality, many simultaneously recognized that excessive reliance could weaken independent thinking.

These findings are consistent with previous studies reporting concerns about AI dependency (Diasti & Murniati, 2026; Linh et al., 2026). However, the present study further suggests that awareness of these risks did not discourage students from using AI. Instead,

participants actively negotiated a balance between benefiting from AI assistance and maintaining responsibility for their own learning.

Interestingly, although students expressed concerns about dependency, these concerns did not lead them to abandon AI. Instead, participants continued using AI while intentionally modifying and evaluating its output, suggesting that awareness of potential risks may coexist with active self-regulation. This finding indicates that recognizing the limitations of AI does not necessarily reduce its use, but may instead encourage more deliberate and strategic engagement with AI-supported writing.

From an SRL perspective, these reflections represent more than simple satisfaction with AI. They demonstrate adaptive self-reflection, in which learners evaluated the outcomes of their strategic decisions and adjusted their intentions for future writing tasks. Although these reflections remained largely focused on practical concerns, they indicate the emergence of reflective judgment regarding appropriate AI use.

More broadly, these findings suggest that successful AI-supported learning extends beyond immediate writing performance. Students increasingly viewed AI as a resource that requires critical evaluation rather than as an autonomous writing solution. Collectively, the self-reflection phase reinforces the idea that effective AI integration in higher education depends not only on access to AI technologies, but also on learners' ability to regulate, evaluate, and intentionally integrate AI into their writing process. This underscores the central role of learner agency in AI-mediated academic writing. Students' concerns about dependency may also reflect the increasing institutional attention to ethical AI use in higher education, encouraging learners to remain cautious despite recognizing AI's benefits.

Conclusion

This study explored how undergraduate EFL students engage with chat-based AI tools in essay writing through the lens of Self-Regulated Learning (SRL), focusing on the forethought, performance, and self-reflection phases. The findings show that students' engagement with chat-based AI is closely connected to how they manage their writing process from planning to evaluation. Overall, the findings suggest that chat-based AI plays a supportive role in students' essay writing process, but its effectiveness depends on how students regulate its use across different SRL phases. Rather than relying on AI uncritically, students used it to support planning, idea generation, language improvement, monitoring, and evaluation while maintaining responsibility for revising and assessing AI-generated content. This study extends the application of SRL theory to AI-mediated academic writing by demonstrating that effective AI use is characterized not merely by access to AI tools, but by learners' capacity to make strategic decisions regarding when, why, and how AI should be incorporated into the writing process. Nevertheless, this study is limited by its relatively small sample size and qualitative case study design, which restrict the generalizability of the findings to broader EFL contexts. Future research could involve larger and more diverse participant groups, employ mixed-methods approaches to examine the relationship between AI use and SRL quantitatively and qualitatively, and adopt longitudinal designs to investigate how students' self-regulation and AI-mediated writing practices develop over time. Such research would provide a more comprehensive understanding of how AI can

support the long-term development of self-regulated and responsible academic writing among EFL learners.

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