

INVESTIGATING EFL STUDENTS' ENGAGEMENT IN GENAI-BASED COLLABORATIVE INQUIRY FOR DEVELOPING CRITICAL THINKING IN ARGUMENTATIVE WRITING

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Received: March 31, 2026

Accepted: September 18, 2026

Published: September 25, 2026

ABSTRACT

This study aims to investigate EFL students' engagement in GenAI-based collaborative inquiry for developing critical thinking in argumentative writing. It employed a descriptive qualitative research design that involved 14 third-semester undergraduate students from the English Education Study Program at STIT Miftahul Midad Lumajang who participated in collaborative argumentative writing tasks supported by GenAI tools. Data were collected through semi-structured interviews, classroom observations, and document analysis to examine students' engagement processes and the role of GenAI in their collaborative writing activities. The findings reveal that students' engagement is reflected through three interconnected themes, namely cognitive engagement through idea development and critical thinking, social engagement through collaborative interaction, and reflective engagement through AI-mediated feedback. These findings further indicate that GenAI serves as a mediational tool that facilitates not only idea development but also collaborative dialogue and metacognitive awareness. Variations in students' reliance on AI and their participation patterns highlight the need for pedagogical guidance to ensure meaningful engagement. Overall, the study suggests that integrating GenAI into collaborative inquiry can provide opportunities for students to promote active participation, critical evaluation, and reflective thinking in EFL writing contexts.

Keywords: *Argumentative writing, Collaborative inquiry, Critical thinking, EFL student's engagement, GenAI*

DOI: 10.31943/wej.v10i2.668

INTRODUCTION

The growing presence of digital technologies in education has redefined how learning is conceptualized and enacted, particularly in language learning contexts where technology-mediated instruction has transformed how students interact, communicate, and construct knowledge (Levin et al., 2025; Luo & Watts, 2025; Zhang & Yang, 2025). Rather than merely providing instructional support,

digital environments have evolved into dynamic spaces where learners actively construct knowledge through participation, collaboration, and sustained engagement. In EFL contexts, this shift has encouraged the adoption of more dialogic and learner-centered approaches that emphasize interaction, flexibility, and shared responsibility in learning processes. Within this evolving landscape, the emergence of Generative Artificial Intelligence (GenAI) has introduced a new dimension to language learning by enabling students to interact with intelligent systems capable of generating, refining, and organizing ideas in real time. Unlike earlier digital tools, GenAI not only facilitates access to information but also actively supports cognitive processing and idea development, thereby influencing how learners engage with tasks and construct knowledge (ElSayary, 2024; Song, 2025). This development raises important questions regarding the nature of student engagement, particularly when learning involves both peer collaboration and AI-mediated interaction. In writing contexts, where engagement is closely associated with cognitive effort and argument development, the integration of GenAI presents both opportunities and challenges that require further investigation. Consequently, examining how students engage within GenAI-supported collaborative environments becomes essential for understanding the evolving nature of writing practices in EFL education.

Within academic writing practices, argumentative writing represents a domain in which sustained engagement is closely intertwined with the development of critical thinking skills. As one of the most cognitively demanding forms of writing, it requires learners to construct logical reasoning, evaluate evidence, and articulate well-structured arguments. Such demands position students not merely as language users but as active thinkers who must engage deeply with ideas through analysis, evaluation, and synthesis. This level of engagement requires sustained cognitive effort, which may not be easily achieved without appropriate instructional support. In many cases, students struggle to maintain focus on higher-order thinking when linguistic demands simultaneously require attention (Chen et al., 2025; Heffington & Coady, 2023). As a result, the cognitive load experienced during writing can limit their ability to engage critically with content. However, many EFL learners encounter persistent difficulties in maintaining this level of engagement due to limited linguistic resources, low confidence, and minimal exposure to analytical writing practices. These constraints often reduce students' participation to task completion rather than meaningful intellectual involvement. In addition, difficulties in expressing complex ideas may further restrict students' ability to engage critically with content. Consequently, written outputs tend to remain descriptive rather than analytical, reflecting a disconnection between engagement and higher-order thinking. This condition signals the need for pedagogical approaches that can cultivate deeper engagement while supporting the development of critical thinking in writing (Xiong et al., 2025).

One pedagogical perspective that has gained increasing attention in addressing such issues is collaborative inquiry, which situates learning as a socially mediated process of knowledge construction. Drawing on sociocultural theory, this approach emphasizes dialogue, negotiation, and scaffolding as key

mechanisms through which cognitive development is facilitated (Alghamdy, 2024; Xiao et al., 2025). Within collaborative settings, students are encouraged to question assumptions, exchange viewpoints, and jointly construct arguments, thereby extending their engagement beyond individual cognitive effort. Through these interactions, students are exposed to diverse perspectives that challenge their initial assumptions and stimulate deeper reflection. This process enables them to refine their reasoning and develop more coherent arguments over time. It is in line with Zwiars and Crawford (2023) that collaborative dialogue serves as a space for negotiating meaning and clarifying misunderstandings, which further supports cognitive engagement. Such interactions allow students to refine their reasoning while becoming more aware of alternative perspectives. Moreover, collaborative inquiry promotes a form of engagement that is both interactive and reflective, enabling learners to participate more meaningfully in academic discourse. In writing contexts, this approach reorients the process from solitary production to collective exploration of ideas. As a result, engagement is not only sustained but also deepened through continuous interaction. This makes collaborative inquiry particularly relevant for fostering critical thinking in EFL argumentative writing.

Recent developments in artificial intelligence further extend the possibilities of collaborative learning environments by introducing new forms of interaction between learners and digital systems. In this regard, Generative Artificial Intelligence (GenAI) can be understood as a mediational resource that supports idea generation, argument refinement, and the exploration of multiple perspectives. Its capacity to produce immediate and contextually relevant responses enables students to engage more actively in cognitive processes during writing tasks. Several recent studies have examined the role of AI in writing and learning contexts. For instance, Begmatova and Saydazimova (2025) found that AI-assisted writing tools can enhance students' idea development and organization. Similarly, Zhan et al. (2025) highlighted that AI can function as a cognitive partner that stimulates higher-order thinking when learners critically engage with generated content. In addition, Nasr et al. (2025) demonstrated that AI-supported environments encourage iterative cycles of reflection and revision, which are essential for developing critical thinking. Research by Li and Wilson (2025) further showed that AI tools can provide scaffolding that supports learners when generating and organizing ideas in EFL writing contexts. Moreover, Wang and Huang (2025) emphasized that digital technologies, including AI, can promote collaborative interaction and discussion among learners, thereby enriching the learning process.

Despite these contributions, the integration of GenAI also introduces complexities, particularly in relation to how students balance reliance on AI with independent reasoning. The presence of AI may reshape patterns of participation, influencing both the depth and distribution of engagement among group members. While digital tools have long been associated with enhanced collaboration, the specific role of GenAI in mediating engagement remains insufficiently understood, with existing research often prioritizing measurable learning outcomes and offering limited insight into the processes through which engagement and critical thinking are developed (Leahy et al., 2025). As a result,

the experiential and interactional dimensions of learning, particularly how students negotiate meaning, evaluate AI-generated input, and co-construct knowledge remain underexplored, especially in EFL writing contexts. Given the central role of engagement in learning, examining students' participation in GenAI-based collaborative inquiry is essential for evaluating its educational potential.

In addition to supporting individual writing processes, GenAI may reshape how students participate in collaborative inquiry. In collaborative writing, students can use AI-generated suggestions as resources for discussion, comparison, negotiation, and decision-making with peers. GenAI may help students generate arguments, explore alternative perspectives, clarify ideas, and organize texts; however, its educational value depends on how students evaluate and use the generated information. When AI-generated suggestions are discussed with peers, students have opportunities to question arguments, compare viewpoints, and negotiate ideas. This process is particularly relevant to argumentative writing, which requires students to establish positions, provide reasons and evidence, consider alternative perspectives, and construct logical arguments. Collaborative inquiry provides a social space for students to make their reasoning visible, encounter different perspectives, and reconsider their assumptions. In this context, AI-generated content can serve as a stimulus for inquiry when students critically evaluate, challenge, and modify the information provided. This is consistent with the view that collaborative dialogue supports meaning negotiation and critical thinking (Zwiers & Crawford, 2023), while peer interaction and knowledge co-construction can contribute to critical thinking in writing activities (Xia & Xu, 2024). Thus, combining GenAI with collaborative inquiry may support cognitive, social, and reflective engagement in EFL argumentative writing.

However, the integration of GenAI into collaborative writing does not automatically lead to deeper engagement or critical thinking. While AI provides rapid access to ideas and linguistic support, students may engage only superficially if they accept AI-generated suggestions without questioning them. In contrast, students who compare AI outputs with their own knowledge, discuss them with peers, identify inconsistencies, and revise them according to the writing task demonstrate more active engagement. Thus, student engagement involves not only the use of technology but also how students participate, make decisions, and regulate their learning. In GenAI-supported writing, engagement can be observed through students' processes of generating ideas, interacting with peers, evaluating information, revising their writing, and reflecting on AI-generated content. The lecturer also plays an important role in ensuring that GenAI functions as a mediational resource rather than a substitute for students' thinking. Structured collaborative tasks can encourage students to justify their acceptance or rejection of AI suggestions, compare them with their own ideas, and negotiate decisions with peers. Previous studies have shown that AI can support idea development, organization, reflection, and higher-order thinking, although these benefits depend on students' active and critical engagement with AI-generated content (Begmatova & Saydazimova, 2025; Li & Wilson, 2025; Nasr et al., 2025).

Therefore, examining engagement requires attention not only to writing outcomes but also to how students use, evaluate, and transform AI-generated input. This study consequently examines how cognitive, social, and reflective engagement emerge in EFL students' GenAI-based collaborative inquiry during argumentative writing, providing insight into how GenAI mediates students' participation and critical thinking.

In this study, engagement is conceptualized as encompassing cognitive, social, and reflective themes, each of which contributes to the development of meaningful learning experiences. In technology-enhanced environments, these themes become increasingly complex due to the interplay between learners, peers, and digital tools, requiring students to continuously regulate their participation and make informed decisions about how to interact with both human and technological resources. In response to these considerations, this study investigates EFL students' engagement in GenAI-based collaborative inquiry for developing critical thinking in argumentative writing, aiming to provide in-depth insights into how engagement is enacted, mediated, and sustained through interactions with both peers and GenAI in writing activities. Accordingly, this study addresses two research questions: (1) How is EFL students' engagement manifested through cognitive, social, and reflective themes in GenAI-based collaborative inquiry for developing critical thinking in argumentative writing? and (2) How does GenAI mediate EFL students' engagement and the development of critical thinking during collaborative argumentative writing activities?

RESEARCH METHOD

This study employed a descriptive qualitative research design to investigate EFL students' engagement in GenAI-based collaborative inquiry for developing critical thinking in argumentative writing. It was considered appropriate as it enables an in-depth exploration of learning processes within authentic classroom settings, where interactions among students, peers, and digital tools naturally occur (Creswell & Creswell, 2023). Descriptive qualitative research focuses on understanding social phenomena without relying on statistical procedures, allowing the researcher to generate rich and contextually grounded data (Ary et al., 2019). A naturalistic perspective was adopted to capture how engagement is enacted and mediated in AI-supported collaborative writing contexts. In addition, this design provides flexibility in capturing participants' perspectives as they emerge throughout the research process and supports a deeper examination of contextual factors influencing engagement in technology-enhanced learning environments, and enables the identification of nuanced patterns of interaction and engagement that might remain less visible in quantitatively oriented investigations.

The participants of this study were 14 undergraduate students in their third semester from the English Education Study Program at STIT Miftahul Midad Lumajang. A purposive sampling technique was used to select participants who had prior experience in engaging with GenAI-supported collaborative writing

activities as part of their classroom learning. These participants were intentionally chosen because they are generally at a transitional stage where they begin to engage more intensively with academic writing, particularly argumentative essays. In addition, they possess sufficient foundational knowledge of English writing conventions, which enables them to participate actively in collaborative inquiry and critical thinking processes. The selection of a relatively homogeneous participants allowed for a more focused and contextually grounded exploration of students' engagement within similar learning conditions. All participants had been exposed to the use of GenAI tools under the lecturer's guidance, particularly for brainstorming, idea development, and peer discussion. This ensured that participants shared comparable experiences in interacting with both peers and AI during writing activities. Consequently, this participant selection facilitated the collection of rich and relevant data regarding how engagement is experienced and negotiated in GenAI-based collaborative inquiry.

Data of this study were collected through semi-structured interviews, classroom observations, and documentation to obtain a comprehensive understanding of students' engagement in GenAI-based collaborative inquiry. The interviews served as the primary data source, consisting of guiding questions that explored students' cognitive, social, and reflective engagement, as well as their interactions with GenAI and peers during argumentative writing tasks. Each interview was audio-recorded and fully transcribed to ensure precise representation of participants' responses. Furthermore, observations were conducted to capture authentic interaction patterns and collaborative behaviors, while documentation such as students' writing drafts, AI-generated outputs, and peer feedback was used to support data triangulation. Subsequently, the data were analyzed in three stages as proposed by Miles et al. (2014), which includes data condensation, data display, and conclusion drawing. In the first stage, the data were organized and reviewed to gain a comprehensive understanding. In the second stage, the data were coded and categorized into themes related to student engagement and critical thinking, while irrelevant data were reduced. In the final stage, the findings were interpreted and linked to relevant theoretical frameworks, and then presented in descriptive and thematic forms. This systematic process ensured the credibility and depth of the analysis.

FINDING AND DISCUSSION

Finding

The findings of this study reveal that EFL students' engagement in GenAI-based collaborative inquiry for developing critical thinking in argumentative writing is manifested through three interconnected themes: (1) cognitive engagement through idea development and critical thinking, (2) social engagement through collaborative interaction, and (3) reflective engagement through AI-mediated feedback. These themes emerged from the analysis of interview transcripts, classroom observations, and documentation, which were systematically coded and categorized. Across the three themes, GenAI functioned as a cognitive scaffold for idea generation and argument development, a

mediating resource for collaborative interaction and decision-making, and a source of feedback that encouraged reflection and revision. Thus, the findings address both research questions by illustrating how students' engagement was manifested across cognitive, social, and reflective themes and how GenAI mediated their engagement and the development of critical thinking during collaborative argumentative writing activities.

EFL Students' Engagement in GenAI-Based Collaborative Inquiry

The first finding concerns how EFL students' engagement was manifested through three interconnected themes in GenAI-based collaborative inquiry for developing critical thinking in argumentative writing. The analysis identified three themes of engagement: cognitive engagement through idea development and critical thinking, social engagement through collaborative interaction, and reflective engagement through AI-mediated feedback. To provide a clearer representation of these findings, the themes, indicators, descriptions, and representative excerpts are presented in Table 1.

Table 1. Themes of Students' Engagement in GenAI-Based Collaborative Inquiry

No	Themes	Indicators	Description	Representative Excerpts
1	Cognitive Engagement through Idea Development and Critical Thinking	Idea generation, argument development, critical evaluation	Students actively used GenAI to generate ideas, organize arguments, and evaluate information critically during writing tasks	<i>"GenAI really helped me to start my writing because sometimes I don't know how to begin my argument. From the suggestions, I can develop my ideas further."</i> (S3) <i>"Using GenAI helps me organize my ideas more clearly, especially when I want to make my argument more logical and structured."</i> (S7) <i>"When I use AI, I can see different perspectives about the topic, so I try to compare them and choose the most relevant one for my argument."</i> (S11)
2	Social Engagement through Collaborative Interaction	Peer discussion, negotiation of meaning, collaborative writing	Students interacted with peers and negotiated ideas while integrating AI-generated input into group discussions	<i>"When my friend and I have different ideas, we use AI to check which argument is stronger, then we decide together."</i> (S2) <i>"Sometimes AI gives a different opinion, so we debate about it and that makes our discussion deeper."</i> (S6) <i>"GenAI helps us to support our arguments during discussion, so we can explain our ideas more clearly to others."</i> (S10)
3	Reflective Engagement through AI-	Self-reflection, revision,	Students reflected on AI suggestions,	<i>"GenAI makes me more careful because I need to think again whether the information is correct or not."</i>

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	Mediated Feedback	evaluation of AI output	revised writing, critically assessed the relevance and accuracy of generated content	their and the and of	(S1) "After using AI, I usually compare it with my own writing to see which one is better and why." (S6) "GenAI helps me realize my mistakes, especially in organizing ideas, so I can improve my writing step by step." (S8) "Sometimes the AI answer is not accurate, so I try to analyze it again and make my own conclusion." (S12) "I don't just copy the AI answer, but I check if it is suitable for my topic and then I revise it based on my understanding." (S14)
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Cognitive Engagement through Idea Development and Critical Thinking

The findings indicate that students demonstrated strong cognitive engagement through their active involvement in idea generation, argument development, and critical evaluation during argumentative writing tasks. GenAI played a significant role in facilitating this process by providing initial prompts, alternative perspectives, and structural support that helped students organize their thoughts more effectively. Many participants reported that AI-generated suggestions enabled them to overcome difficulties in starting their writing and to expand their arguments more systematically. For instance, one student stated, "GenAI really helped me to start my writing because sometimes I don't know how to begin my argument. From the suggestions, I can develop my ideas further" (S3). This suggests that GenAI functioned as a cognitive scaffold that supported students in initiating and developing their ideas.

In addition, students demonstrated the ability to engage in critical evaluation by comparing and selecting relevant information from AI-generated outputs. This is reflected in another student's response, "When I use AI, I can see different perspectives about the topic, so I try to compare them and choose the most relevant one for my argument" (S11). Such responses indicate that students were not merely relying on AI-generated content but actively processing and evaluating it to construct meaningful arguments. Furthermore, students also showed awareness of the importance of organizing ideas logically, as illustrated by the statement, "Using GenAI helps me organize my ideas more clearly, especially when I want to make my argument more logical and structured" (S7). Overall, these findings demonstrate that cognitive engagement was manifested through students' ability to generate, evaluate, and structure ideas critically with the support of GenAI.

Social Engagement through Collaborative Interaction

The findings also reveal that students' engagement was shaped through collaborative interaction, particularly in peer discussions, negotiation of meaning, and shared decision-making processes. Students actively participated in group discussions where they exchanged ideas and worked together to construct arguments. The integration of GenAI further enriched this interaction by providing additional input that students could discuss, evaluate, and negotiate collaboratively. For example, one student explained, *"When my friend and I have different ideas, we use AI to check which argument is stronger, then we decide together"* (S2). This indicates that GenAI served as a mediating tool that supported collaborative decision-making.

Moreover, students used AI-generated content to strengthen their arguments during discussions, as reflected in the statement, *"GenAI helps us to support our arguments during discussion, so we can explain our ideas more clearly to others"* (S10). This suggests that GenAI contributed to more confident and structured communication among students. In addition, the presence of differing perspectives generated by AI often led to deeper discussion and critical engagement. As one student noted, *"Sometimes AI gives a different opinion, so we debate about it and that makes our discussion deeper"* (S6). These findings highlight that social engagement was not only characterized by interaction but also by active negotiation, collaboration, and shared construction of knowledge. The combination of peer interaction and AI mediation created a more dynamic and interactive learning environment.

Reflective Engagement through AI-Mediated Feedback

Another significant finding is the emergence of reflective engagement, where students actively engaged in self-reflection, revision, and evaluation of AI-generated outputs. Students reported that GenAI helped them identify weaknesses in their writing and provided alternative ways to improve their arguments. This encouraged them to reflect on their work and revise it accordingly. For instance, one student stated, *"I don't just copy the AI answer, but I check if it is suitable for my topic and then I revise it based on my understanding"* (S14), indicating a conscious effort to evaluate and adapt AI-generated content.

Additionally, students demonstrated awareness of their own writing limitations and used AI as a tool for improvement. This is reflected in the statement, *"GenAI helps me realize my mistakes, especially in organizing ideas, so I can improve my writing step by step"* (S8). Students also showed critical awareness of the limitations of AI, as illustrated by the response, *"Sometimes the AI answer is not accurate, so I try to analyze it again and make my own conclusion"* (S12). Furthermore, reflective practices were evident when students compared AI outputs with their own writing, as noted by one participant: *"After using AI, I usually compare it with my own writing to see which one is better and why"* (S6). Another student added, *"GenAI makes me more careful because I need to think again whether the information is correct or not"* (S1). These findings indicate that reflective engagement involved not only revision but also critical evaluation and

metacognitive awareness, demonstrating how GenAI supported deeper engagement in the writing process.

GenAI-Mediated Engagement and Critical Thinking in Collaborative Argumentative Writing

The second finding addresses how GenAI mediated students' engagement and critical thinking during collaborative argumentative writing. Across the three themes identified above, GenAI functioned as a cognitive scaffold, a mediating resource for collaborative interaction, and a source of feedback that encouraged reflection and revision. At the cognitive level, students used GenAI to generate ideas, explore alternative perspectives, and organize arguments while selecting information relevant to their writing. This is reflected in a student's statement, *"When I use AI, I can see different perspectives about the topic, so I try to compare them and choose the most relevant one for my argument"* (S11). At the social level, AI-generated suggestions became resources for discussion, comparison, negotiation, and collaborative decision-making among peers. As one student explained, *"When my friend and I have different ideas, we use AI to check which argument is stronger, then we decide together"* (S2). At the reflective level, students evaluated AI-generated content and revised their writing based on their own understanding. One student stated, *"I don't just copy the AI answer, but I check if it is suitable for my topic and then I revise it based on my understanding"* (S14).

These processes indicate that GenAI mediated students' critical thinking by encouraging them to question information, compare different perspectives, evaluate the suitability of suggestions, and make independent decisions about the content they incorporated into their arguments. Students did not simply accept AI-generated information but engaged with it through comparison and evaluation. For example, one student stated, *"Sometimes the AI answer is not accurate, so I try to analyze it again and make my own conclusion"* (S12). Another student reported, *"GenAI makes me more careful because I need to think again whether the information is correct or not"* (S1). These responses demonstrate that GenAI provided students with information that became an object of critical examination, encouraging them to consider accuracy, relevance, and alternative perspectives before incorporating AI-generated content into their arguments.

However, the findings also show that meaningful engagement depended on students' active involvement in processing and evaluating AI-generated information rather than simply accepting or copying it. GenAI supported students' engagement and critical thinking when it was integrated into collaborative inquiry as a resource for questioning, discussion, evaluation, and revision. This active process is illustrated by a student who stated, *"After using AI, I usually compare it with my own writing to see which one is better and why"* (S6). Similarly, another student explained, *"GenAI helps me realize my mistakes, especially in organizing ideas, so I can improve my writing step by step"* (S8). These findings suggest that the pedagogical value of GenAI lies not merely in providing immediate answers, but in creating opportunities for students to interact with ideas, peers, and AI-

generated input in ways that promote active and reflective engagement in argumentative writing.

Discussion

Students' engagement in GenAI-based collaborative inquiry demonstrates a complex and multifaceted process through which critical thinking is cultivated in argumentative writing. Cognitive engagement was prominently manifested in students' active involvement in idea generation, argument development, and critical evaluation, with GenAI serving as a scaffold that facilitated the organization and expansion of their thoughts. Students reported that AI-generated prompts and alternative perspectives helped them overcome initial writing difficulties and develop their arguments more systematically. This finding is consistent with the students' accounts that GenAI helped them begin their writing, organize their ideas, and compare different perspectives before selecting information for their arguments. Such engagement suggests that GenAI did not simply provide ready-made content but supported students in processing and developing ideas. This finding is aligned with Chang and Yang (2023), who highlight that digital tools can enhance cognitive engagement by providing scaffolding that promotes deeper processing and structured knowledge construction. In the present study, however, the cognitive value of GenAI was particularly evident when students actively evaluated and selected AI-generated information rather than accepting it automatically. Thus, cognitive engagement in AI-mediated writing extends beyond task completion to involve higher-order processes of comparison, evaluation, and decision-making.

Social engagement emerged as another important theme, shaped by collaborative interaction and peer negotiation within the GenAI-mediated learning environment. Students participated in group discussions, exchanged ideas, debated different perspectives, and negotiated meaning while considering AI-generated contributions. GenAI provided additional input that students could use as a basis for discussion and collaborative decision-making. For example, students reported using AI when they had different ideas and then deciding together which argument was stronger. This indicates that GenAI functioned as a mediating resource within peer interaction rather than as an isolated writing tool. The presence of alternative AI-generated perspectives could also stimulate further discussion among group members. This finding supports Xia and Xu (2024), who found that peer interaction and knowledge co-construction contribute to the development of critical thinking in writing tasks. The present findings further suggest that the interaction between students and GenAI can create opportunities for students to explain, question, and negotiate ideas with their peers. Consequently, social engagement was closely connected to cognitive engagement because collaborative discussion provided students with opportunities to test and reconsider their reasoning before incorporating ideas into their writing.

Reflective engagement was also a salient feature of students' learning, particularly through the evaluation, revision, and reconsideration of AI-generated content. Students demonstrated awareness that AI-generated information might not always be accurate or appropriate for their writing. Rather than directly

copying AI responses, they compared the suggestions with their own writing, assessed their relevance, and revised the content according to their understanding. This process reflects an active form of reflection in which students monitored both the quality of their writing and the usefulness of AI-generated feedback. The finding is consistent with Azizah et al. (2025), who suggest that Generative AI can provide opportunities for learners to reflect, generate ideas, and clarify their understanding. It also corresponds with previous research emphasizing the role of reflection and feedback in fostering metacognitive awareness and self-regulated learning (Arefian, 2022; Lee & Bonk, 2023). In the present study, reflective engagement was particularly evident when students questioned the accuracy of AI-generated information and made their own conclusions. This suggests that interaction with GenAI can encourage students to become more aware of their strengths and weaknesses in writing while maintaining responsibility for the final decisions. The iterative process of evaluating AI output, comparing it with existing ideas, and revising the draft therefore strengthened the reflective dimension of engagement.

Beyond these three themes, the findings demonstrate that GenAI mediated students' engagement and critical thinking in interconnected ways. GenAI functioned as a cognitive scaffold when students used it to generate and organize ideas, as a mediating resource when AI-generated suggestions became part of peer discussion, and as a feedback resource when students evaluated and revised their writing. These roles correspond directly with the three forms of engagement identified in the study. At the cognitive level, alternative perspectives generated by GenAI provided material for comparison and evaluation. At the social level, these perspectives became resources for discussion and negotiation among peers. At the reflective level, students evaluated the accuracy and relevance of AI-generated information and decided whether and how to incorporate it into their writing. Therefore, the mediating role of GenAI was not limited to providing linguistic or informational assistance. It became part of a broader inquiry process in which students interacted with technological input and transformed it through their own reasoning and peer collaboration. This finding extends the understanding of GenAI-supported writing by showing that its contribution to critical thinking may emerge through the interaction between AI-generated input, student judgment, and collaborative dialogue. This interpretation is supported by Song and Song (2023), who found that ChatGPT can provide support throughout the EFL writing process and influence students' cognitive engagement with writing tasks. Similarly, Tran et al. (2025) reported that ChatGPT-supported writing activities, including brainstorming and peer review, can facilitate students' engagement in critical-thinking-oriented writing. Huang and Wang (2024) further highlighted the potential of Generative AI to function as a collaborative companion in EFL writing, particularly through interaction and peer feedback. Rather than replacing students' cognitive activity, GenAI can provide materials that students critically examine and negotiate, thereby creating opportunities for deeper engagement with argumentative content.

The findings further indicate that the pedagogical value of GenAI depends on how students engage with its output. Students demonstrated critical engagement when

they questioned information, compared alternative perspectives, checked the relevance and accuracy of AI-generated content, and made independent decisions rather than simply accepting or copying AI-generated responses. This finding suggests that the availability of GenAI alone does not guarantee meaningful learning. Without critical evaluation, students may become overly dependent on AI and reduce their cognitive effort. Conversely, when GenAI is incorporated into structured collaborative inquiry, students can be encouraged to treat AI-generated responses as resources for investigation rather than as final answers. In this context, the lecturer plays an important role in designing activities that require students to justify their decisions, discuss AI-generated suggestions with peers, identify possible inaccuracies, and explain the revisions made to their writing. Such pedagogical guidance can help maintain learner agency while enabling students to benefit from technological support. Begmatova and Saydazimova (2025) emphasize the potential of AI to support learners' higher-order thinking when students actively engage with AI-generated content. Similarly, Li and Wilson (2025) highlight the importance of critical interaction with AI in supporting meaningful learning processes. Nasr et al. (2025) also demonstrate that the educational benefits of AI depend on how learners engage with and evaluate AI-generated information. Overall, the findings suggest that GenAI is most educationally valuable when embedded within collaborative inquiry that requires students to generate, discuss, evaluate, and revise ideas. In this context, GenAI serves not as a substitute for students' thinking but as a mediational resource that can stimulate cognitive processing, collaborative dialogue, critical evaluation, and reflective learning in EFL argumentative writing.

CONCLUSION AND SUGGESTION

In relation to the findings of this study, it was confirmed that students' engagement in GenAI-based collaborative inquiry was manifested through three interconnected themes: cognitive, social, and reflective engagement. Cognitive engagement was evident in students' generation and evaluation of ideas, argument development, and critical consideration of AI-generated information. Social engagement was reflected in peer discussion, negotiation of meaning, and collaborative decision-making, while reflective engagement involved evaluating AI-generated outputs, comparing them with students' own ideas, and revising their writing. The findings further showed that GenAI mediated students' engagement and critical thinking by functioning as a cognitive scaffold, a resource for collaborative interaction, and a source of feedback for reflection and revision. The results also indicate that meaningful engagement depended on students' active evaluation and interpretation of AI-generated content rather than simply accepting or copying it. Accordingly, the integration of GenAI into collaborative inquiry requires learning activities that encourage students to question, discuss, evaluate, and transform AI-generated information during argumentative writing. Despite the research highlighting the potential of GenAI to support students' engagement and critical thinking in collaborative writing, several limitations of the present study should be acknowledged. The study involved a relatively small

and homogeneous group of third-semester EFL students within a specific institutional context, which may limit the transferability of the findings to other educational settings. In addition, the study focused on students' engagement processes and did not examine long-term changes in writing performance or measurable learning outcomes. Future research could investigate GenAI-based collaborative inquiry with larger and more diverse groups of EFL learners across different educational contexts. Longitudinal or mixed-method studies may also examine how students' engagement develops over time and how different forms of instructional guidance influence their use of GenAI, critical thinking, and argumentative writing development. Further research could explore specific pedagogical strategies for maintaining learner agency and encouraging critical evaluation when GenAI is integrated into collaborative EFL writing.

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