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Enhancing Student Engagement and Critical Thinking through the AERO Staged Pedagogy in EFL Higher Education

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ABSTRACT

This study investigates the implementation of the AERO (Activation → Exploration → Reflection → Outcome) framework as a staged pedagogy to enhance student engagement and critical thinking skills among English as a Foreign Language (EFL) learners at Universitas Muhammadiyah Enrekang, Indonesia. Employing a mixed-method design with a pre-experimental one-group pretest–posttest approach, the research involved 22 undergraduate students enrolled in an academic writing course. Quantitative data were collected through a student engagement questionnaire and a critical thinking test adapted from the Watson–Glaser Critical Thinking Appraisal (WGCTA), while qualitative data were obtained from classroom observations and focus group discussions (FGD). Results revealed moderate to high engagement across cognitive, affective, and behavioral dimensions, supported by qualitative evidence of increased participation, motivation, and collaboration during the staged activities. Although the improvement in critical thinking test scores (M_pre = 3.73; M_post = 4.27) was not statistically significant ($p > .05$), qualitative findings demonstrated notable cognitive shifts toward analytical, evaluative, and reflective reasoning. The AERO stages fostered progressive scaffolding, transferring learning responsibility from teacher to student while promoting reflective, evidence-based argumentation. Theoretically, this study contributes to EFL pedagogy by linking three engagement dimensions with four critical thinking subskills within a coherent process model. Practically, AERO offers a replicable design framework for fostering student-centered learning, reflective inquiry, and critical literacy in EFL classrooms. Recommendations for future research include extending the intervention period and exploring AERO's application in digital or hybrid learning contexts.

KEYWORDS
AERO framework, student engagement, critical thinking, staged pedagogy, EFL learning

Introduction

Student engagement and critical thinking are two foundational pillars in English as a Foreign Language (EFL) education, particularly in the context of higher education where students are expected to develop both communicative competence and intellectual maturity. Engagement is not limited to physical presence in class but involves three

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interconnected dimensions: cognitive, affective, and behavioral. Cognitive engagement reflects students' mental investment in understanding and integrating knowledge; affective engagement includes motivation, interest, and emotional connection to learning; and behavioral engagement is manifested through active participation, effort, and persistence (Fredricks et al., 2004, 2019). When students are engaged across these dimensions, they are more likely to achieve academic success (Lei et al., 2018), display higher learning retention, and respond better to complex academic and professional demands (Pang, 2022; Pu, 2021; Yan, 2021)

At the same time, critical thinking has been widely recognized as one of the essential 21st-century skills needed to thrive in a globalized and information-driven society. Critical thinking allows learners to analyze information, evaluate evidence, and construct logical arguments, rather than relying solely on rote memorization or surface-level understanding (Facione & Facione, 2013). Within EFL learning, critical thinking is particularly important because it enables students not only to comprehend texts or oral communication but also to critically evaluate sources, synthesize perspectives, and articulate their reasoning in English (Yan, 2021). Thus, the integration of engagement and critical thinking becomes central to preparing students for academic and professional challenges that demand communicative accuracy, analytical reasoning, and reflective judgment.

Globally, the challenges of low engagement and insufficient critical thinking skills have been highlighted in various reports. UNESCO (2004, 2022) underscored the mismatch between graduate competencies and labor market needs, identifying critical thinking, problem-solving, and foreign language proficiency as the most common gaps. Similarly, the Dixit et al. (2021); Dumitru & Halpern (2023) listed analytical thinking, active learning, and complex problem-solving among the top skills for the future workforce. In developing countries, these challenges are even more pronounced due to the persistence of traditional, teacher-centered approaches, which position students as passive recipients of knowledge (Song et al., 2025; Yu, 2025; Zhang, 2018). Abubakar et al. (2017); Hameli et al. (2025) meta-analysis on student engagement in Asian higher education further revealed that although pedagogical innovations are increasingly introduced, sustaining meaningful engagement remains a major challenge, particularly in EFL learning contexts.

In Indonesia, similar issues have been documented. Research indicates that many university students struggle with active classroom participation, the ability to construct arguments, and the confidence to express critical opinions in English (Cahyono & Mutiaraningrum, 2015; Yosintha & Yunianti, 2021). Even when academic achievement such as GPA or basic English proficiency is relatively high, students often remain hesitant to engage in discussions, critical debates, or argumentative writing. At Universitas Muhammadiyah Enrekang (UNIMEN), this challenge is evident among English Education Study Program students. Despite showing satisfactory academic outcomes, classroom observations reveal that students tend to remain passive in interactive tasks, avoid voicing critical perspectives, and face difficulties in organizing arguments in academic English. These patterns underscore the urgency of developing teaching strategies that can simultaneously enhance student engagement and strengthen critical thinking.

The relationship between engagement and critical thinking is theoretically compelling. Engagement, especially cognitive and affective, provides the motivational and attentional resources necessary for higher-order thinking, while critical thinking

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reflects the cognitive outcomes of deep engagement (Kolleck, 2019). When students are engaged behaviorally through active participation, cognitively through critical analysis, and affectively through motivation, they are more likely to practice and internalize critical thinking processes. In other words, engagement serves as both a prerequisite and a catalyst for critical thinking development (Appleton et al., 2008; Yan, 2021).

Staged pedagogy offers a promising framework for operationalizing this relationship. Building on L. Vygotsky (2012, 1978), concept of the zone of proximal development and Miia Rannikmäe, Jack Holbrook (2020); Sinclair et al. (2013) scaffolding theory, staged pedagogy emphasizes structuring the learning process into manageable phases that gradually transfer responsibility from teacher to student. Van de Pol et al. (2010) further argued that effective scaffolding requires sequenced guidance that fades over time, enabling learners to internalize higher-order skills. In the EFL context, this scaffolding is particularly relevant because students often require step-by-step guidance to build confidence, explore content, reflect critically, and eventually produce academic outputs independently (Dooly & Sadler, 2020; Han, 2021).

The AERO model (Activation → Exploration → Reflection → Outcome) represents an application of staged pedagogy tailored to EFL learning. Each stage is designed to address both engagement and critical thinking: Activation stimulates cognitive readiness and confidence; Exploration promotes collaboration and the exchange of perspectives; Reflection facilitates critical evaluation and metacognition; and Outcome consolidates learning through products such as debates, peer-reviewed essays, or academic presentations. Theoretically, this framework integrates the three dimensions of engagement (cognitive, affective, behavioral) with four subskills of critical thinking (analysis, inference, evaluation of arguments, and reflection).

International studies provide empirical support for staged and student-centered approaches. Tomaszewski et al. (2024) found a positive correlation between EFL teachers' critical thinking and student engagement, suggesting that reflective and staged instruction can significantly enhance student participation. Pang (2022) demonstrated that flipped learning strategies, which inherently involve staged activities, increased both motivation and critical thinking in EFL learners. Similarly, Song et al. (2025) and Zhang (2018) showed that repeated reflection and structured peer review improved Chinese students' critical writing skills.

In the Indonesian context, research has highlighted similar benefits. Ismail (2025) reported that collaborative learning through digital peer editing fostered more active participation and improved critical feedback quality among EFL students. Lee & Martin (2020); Samad et al. (2025), through a CLIL-based approach, demonstrated that integrating language and content not only enhanced students' academic writing but also their conceptual understanding. While these studies confirm the effectiveness of student-centered strategies, few have explicitly examined staging activities as a systematic framework for connecting engagement with critical thinking in Indonesian higher education. This gap provides the rationale for the present study.

The urgency of integrating engagement and critical thinking also resonates with broader global agendas. The United Nations' Sustainable Development Goal 4 (SDG 4) emphasizes inclusive and equitable quality education, with a particular focus on equipping learners with relevant skills for sustainable development. Critical thinking, collaboration, and communication

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are explicitly recognized as essential competencies for achieving these goals. Moreover, the Framework for 21st-Century Learning Abed (2022); Pompa (2007) highlights the "Four Cs" (critical thinking, creativity, collaboration, and communication) as indispensable for learners to succeed in the modern knowledge economy.

In addition, the digital transformation of education—accelerated by global shifts in online and blended learning—has underscored the importance of reflective and staged learning. Digital EFL environments often pose challenges of reduced attention span and limited interaction, making structured, stage-based pedagogies like AERO particularly relevant. By combining interactive and reflective stages with opportunities for collaborative and technology-mediated tasks (e.g., peer editing via digital platforms, online debates, or collaborative essay writing), AERO responds to the realities of digital EFL learning while aligning with global educational priorities.

The purpose of this study is to explore the implementation of staging activities (AERO) in EFL instruction at UNIMEN. The study focuses on examining how staging activities can enhance student engagement across cognitive, affective, and behavioral dimensions, as well as investigating their impact on the development of students' critical thinking skills, measured both quantitatively through pretest–posttest scores and qualitatively through classroom observation and focus group discussion (FGD). This research contributes theoretically by positioning AERO as a staged pedagogy that integrates engagement and critical thinking in EFL contexts, and practically by providing instructors and curriculum designers with a replicable model to foster more interactive, reflective, and effective learning. The findings are expected to inform teaching strategies in Indonesian higher education and beyond, helping bridge the gap between passive learning practices and the global demand for active, critical, and communicative graduates.

Method

This study employed a pre-experimental design with a one-group pretest–posttest model, namely a design involving a single group of subjects that received a treatment in the form of staging activities and whose engagement and critical thinking skills were measured before and after the treatment. This design was chosen because it aligns with the research objective of identifying the effect of implementing staging activities on improving student engagement and developing critical thinking skills, even without a comparison group.

The participants were 22 fourth-semester students of the English Education Study Program at Universitas Muhammadiyah Enrekang in the 2024/2025 academic year. This study was conducted within the context of regular instruction in two core courses, namely Public Speaking and Presentation and Essay Writing. These courses were chosen because they inherently require active student engagement in articulating ideas orally and in writing, and they encourage students to develop critical thinking skills in constructing arguments, organizing ideas, and delivering academic presentations effectively.

The research instruments included a student engagement questionnaire adapted from Fredricks et al. (2004), covering cognitive, affective, and behavioral dimensions with Cronbach's alpha reliability above 0.80. Critical thinking skills were measured using a test based on the Watson–Glaser Critical Thinking Appraisal (WGCTA) that assesses analysis, inference, evaluation of arguments, and reflection. In addition, student engagement was observed using a classroom observation sheet with indicators of participation in discussions, initiative in asking questions, and consistency in completing assignments. To enrich the quantitative data, this study also conducted a focus group discussion (FGD) with several

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students from the experimental class to explore their experiences in following the staging activities in the two courses.

This study was conducted over six meetings. At the initial stage, students were given a pretest to measure their levels of engagement and critical thinking skills. Subsequently, students participated in an intervention in the form of implementing staging activities with the acronym AERO, which consists of four main stages. The Activation stage focuses on activating students' prior knowledge through brief discussions, trigger questions, or brainstorming before presentations or writing. The Exploration stage is carried out by involving students in exploring materials, texts, or academic issues collaboratively in small groups to deepen understanding. In the Reflection stage, students are invited to conduct critical analysis of the results of exploration, which are then expressed in the form of short presentations, reflective discussions, or drafting of essays. The final stage, namely Outcome, encourages students to further develop ideas through debates, peer feedback, essay revisions, or other academic products that reflect the final achievement of learning.

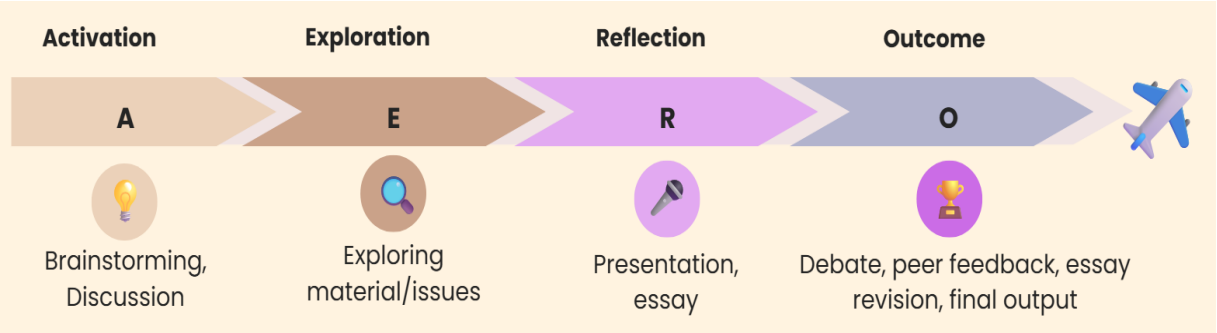

Figure 1. The AERO Model of Staging Activities in Enhancing Engagement and Critical Thinking

After the entire AERO sequence was completed, students were given a posttest to measure changes in engagement and critical thinking skills. As a complement, a focus group discussion (FGD) was conducted with several students to explore their perceptions regarding the effectiveness of AERO implementation in the two courses, namely Public Speaking and Presentation and Essay Writing.

Quantitative data were analyzed using a paired sample t-test to determine the significant difference between pretest and posttest scores. This analysis was used to assess the effectiveness of staging activities in improving student engagement and critical thinking. Meanwhile, qualitative data from the FGD and classroom observations were analyzed using thematic analysis to identify key themes related to students' experiences and the factors that support or hinder engagement and the development of critical thinking.

Results and Discussion

1. Student Engagement through AERO

The analysis of the student engagement questionnaire administered to 22 students revealed that the majority of participants were in the medium category across the three dimensions of engagement: cognitive, affective, and behavioral. Descriptive statistics are presented in Table 1.

Table 1. Descriptive Statistics of Student Engagement Questionnaire (N = 22)

Dimension	Mean	Std. Dev	Low	Medium	High
Cognitive	14.45	3.60	4	15	3
Affective	14.91	3.31	2	17	3
Behavioral	14.55	3.08	3	17	2

Most students (70–77%) were categorized as medium, with only a small proportion reaching the high category, while

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about 10–15% remained in the low category. The distribution of engagement levels across dimensions is illustrated in Figure 1.

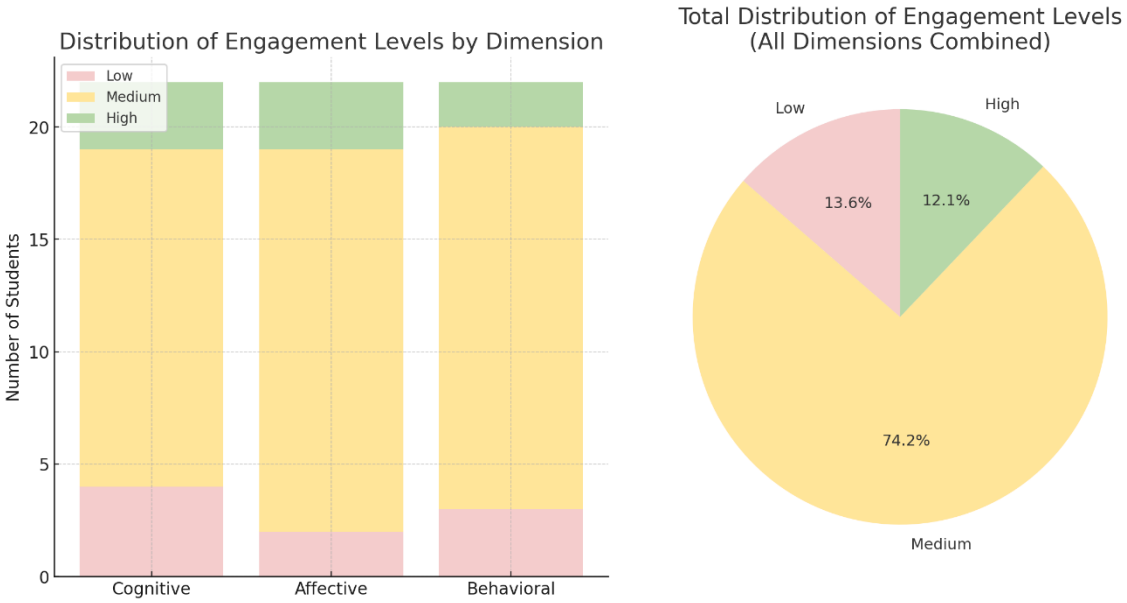

Figure 1. Distribution of Student Engagement Levels by Dimension (Cognitive, Affective, Behavioral)

Classroom observations confirmed that student engagement improved progressively during the implementation of AERO. At the beginning of the course, only 5–6 students actively participated in discussions; however, by the fifth session almost all students were involved. The initiative to ask questions increased substantially from an average of two students per session to 8–10 students during the final *Outcome* stage. Task completion also improved; while two students submitted late in the first meeting, all students became punctual in subsequent sessions. The FGD further enriched these findings by highlighting students' experiences at each stage of AERO:

The Activation stage is considered to build readiness and confidence:

> *"During brainstorming at the beginning, I felt more confident because I already knew the direction of the discussion." (FGD Respondent 3)*

The Exploration stage is considered to increase insight through collaboration:

> *"Group work in the exploration stage made me realize that my peers had different perspectives. This made the discussion more lively and broadened my understanding." (FGD Respondent 5)*

The Reflection stage encourages the courage to speak:

> *"At first, I was afraid to present because I might be wrong, but through reflection I gradually became more confident in expressing my arguments." (FGD Respondent 2)*

The Outcome stage adds value to the essay revision process:

> *"The debate and peer feedback at the end helped me see the weaknesses in my essay. After revision, I felt my essay was better and more critical." (FGD Respondent 7)*

The findings indicate that the AERO model (*Activation → Exploration → Reflection → Outcome*) successfully enhanced student engagement in a stepwise manner across the three dimensions.

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1) **Cognitive Engagement**

Students demonstrated an increase in active learning strategies such as linking new material with prior knowledge, analyzing information more critically, and using structured learning approaches. The *Activation* stage provided opportunities to recall and prepare knowledge, aligning with Sinclair et al. (2013) scaffolding concept and Northey et al. (2018) and Van de Pol et al. (2010), who emphasized that activation of prior knowledge is crucial for deeper processing. This finding supports Fredricks et al. (2004), who argue that cognitive engagement reflects students' effort to truly understand learning content rather than merely memorize it.

2) **Affective Engagement**

Motivation, enthusiasm, and confidence increased throughout the AERO stages. FGD data show that *Exploration* fostered enjoyment and interest through collaboration, while *Outcome* provided academic satisfaction via peer feedback and revision. This is consistent with Pang (2022), who found that staged strategies in flipped learning enhanced learners' emotional engagement and motivation. Similarly, Appleton et al. (2008) and Song et al. (2024) highlight that affective engagement is shaped by students' sense of relevance and meaning in learning activities, both of which were facilitated through AERO's sequential stages.

3) **Behavioral Engagement**

Behavioral engagement rose significantly, as evidenced by increased participation in discussions, more frequent questioning, and greater consistency in task completion. This corroborates (Ismail, 2025), who reported that peer editing and digital feedback fostered more active participation and accountability among EFL students. Within AERO, students not only attended class physically but also displayed consistent active behaviors that reflected discipline and collaborative learning habits.

Linked to the principle of student-centered learning, AERO positioned students as the main actors in their own learning process. Rather than being passive recipients of information, students became active participants in constructing understanding, collaborating with peers, reflecting on ideas, and producing tangible learning outcomes. This resonates with Sharkey & Weimer (2003), who emphasizes that student-centered pedagogy requires active, reflective involvement from learners to achieve meaningful learning outcomes.

In sum, student engagement improved from a moderate baseline to observable increases in cognitive, affective, and behavioral dimensions. The AERO model proved to be an effective strategy that not only aligns with the conceptual framework of Fredricks et al. (2004, 2019) but also supports contemporary findings on reflective and collaborative learning. Most importantly, AERO affirms the value of student-centered learning by placing students in an active role within staged, meaningful, and participatory learning experiences.

2. The Impact of AERO on Critical Thinking Skills

The critical thinking skills test (adapted from WGCTA) was administered to 22 students before and after the implementation of the staging activities (AERO). The results of the descriptive analysis are presented in Table 2.

Table 2. Descriptive Statistics of Students' Critical Thinking Test Scores (N = 22)

	Mean	Std. Dev	Min	Max
Posttest	4,27	1,75	1	8
Pretest	3,73	1,52	1	7

Based on the table, it can be seen that the posttest score (M = 4.27) was higher than the pretest score (M = 3.73). This indicates an improvement in students' critical thinking ability after participating in the AERO intervention, although the results of the paired sample t-test showed a value of t = -1.10 with p = 0.283 (> 0.05). Statistically, the difference was not significant; however, descriptively there was a tendency toward improvement. The comparison of pretest and

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posttest mean scores is visualized in Figure 2.

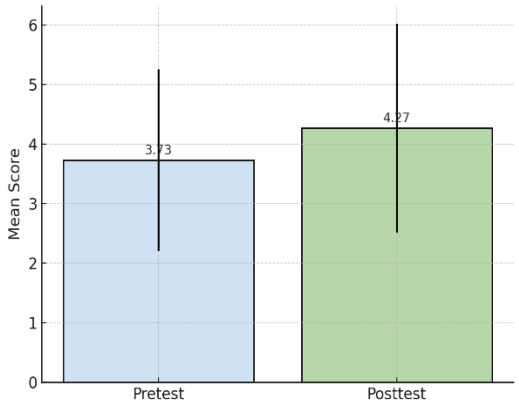

Figure 2. Comparison of Mean Critical Thinking Test Scores between Pretest and Posttest (with Standard Deviation)

Although the increase in test scores was not yet significant, the qualitative data showed clearer development. Classroom observations indicated that in the Reflection and Outcome stages, students were more active in posing analytical questions, critiquing arguments, and organizing ideas with a more logical structure. Students were also observed to use evidence or examples more frequently in presenting arguments, a behavior that was rarely displayed prior to the intervention. Referring to the construct structure of the WGCTA, triangulated findings from classroom observations and the FGD indicated the following developments:

1) Analysis. Students more frequently unpacked claims and evidence during discussions and while editing essay drafts. In the final meeting, they marked ambiguous parts of arguments and requested clarification—an indication of increased analytic reading and argument deconstruction.
2) Inference. In group work, students became increasingly practiced at drawing conclusions from concise data (e.g., article/journal summaries) and stating the degree of certainty (modality) of the conclusions reached.
3) Evaluation of arguments. In debate/peer-review sessions, students more systematically assessed the strength of evidence, the relevance of examples, and potential bias, which had previously been rare.
4) Reflection. At the end of the cycle, students demonstrated metacognitive checking of argument coherence (flow, evidence, and counter-arguments) and a willingness to revise based on feedback.

The last two stages of AERO functioned as a "lever" for improving the quality of critical thinking. Reflection provided a cognitive pause for sense-making: students assessed the validity of their own claims, checked logic, and identified gaps in argumentation before publishing (presentations/drafts). Outcome shifted the focus from process to quality of product through debates, peer feedback, and targeted revision, thereby encouraging deeper argument evaluation and metacognitive reflection (e.g., strengthening evidence, reorganizing structure, adding rebutted counter-arguments). The FGD results reinforced these findings. Several students stated that AERO helped them improve the quality of their critical thinking in both presentations and essay writing.

Activation Stage builds confidence before engaging with the material:

> *"During the initial brainstorming, I felt more confident because I already knew the direction of the discussion." (FGD Respondent 3)*

Exploration Stage broadens knowledge through collaboration:

> *"Group work in the exploration stage made me realize that my peers have different perspectives. It made the discussion more lively and broadened my insights." (FGD Respondent 5)*

Reflection Stage fosters analytical awareness:

> *"In the reflection stage, I was forced to look back at my own arguments—whether they were already logical or still weak." (FGD Respondent 4)*

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Outcome Stage encourages caution in using data:

> *"Previously, I just wrote things as they were, but after the outcome stage, I became more careful in using data and examples." (FGD Respondent 6)*

Outcome Stage also strengthens revision and critical thinking skills:

> *"The debate and peer feedback at the end made me aware of the weaknesses in my writing. After revising, I felt my essay was better and more critical." (FGD Respondent 7)*

Although the increase in the total test score was not statistically significant during the short intervention period, the consistency of qualitative findings showed a shift in students' cognitive processes toward analytical–evaluative. This is consistent with evidence that the development of critical thinking in the EFL context tends to be gradual and is highly influenced by reflective–interactive practice, rather than only short-term standardized tests (Tomaszewski et al., 2024; Yan, 2021). Patterns of essay revision, use of references, and assessment of evidence strength during Reflection–Outcome align with Song et al. (2025) and Zhang (2018) findings that critical writing requires repeated reflection practice and meaningful feedback. In addition, the role of collaboration and content–language integration—as manifested in Exploration and Outcome—is consistent with Samad et al. (2025) (CLIL) and Ismail (2025) (peer editing & digital feedback), both of which show improvement in the quality of arguments and metacognitive awareness. The staged AERO framework is also coherent with the principle of scaffolding (Sinclair et al. (2013); Van de Pol et al. (2010), which gradually transfers the responsibility of thinking from lecturer to students, while at the same time affirming student-centered learning—students produce meaning, evaluate, and revise their own arguments (Sharkey & Weimer, 2003).

Thus, it can be concluded that AERO contributes to the enhancement of students' critical thinking skills, both through test score improvements and through reflective learning experiences that encourage students to be more analytical, logical, and critical. Although quantitatively the improvement was not yet significant, qualitative findings provide strong evidence that AERO is effective as a learning strategy that supports the development of critical thinking skills in the EFL context.

The findings of this study position AERO (Activation → Exploration → Reflection → Outcome) as a staged pedagogy framework that enriches EFL literature by explicitly linking three dimensions of engagement (cognitive–affective–behavioral) with four critical thinking subskills (analysis, inference, argument evaluation, reflection). Theoretically, AERO offers a clear process mechanism—especially through the Reflection–Outcome loop—to explain how active participation metamorphoses into evidence-based argument evaluation and meaningful revision. This framework also bridges the concept of scaffolding with process assessment: the sequential and graded stages not only provide progressive cognitive support but also suggest the mapping of process indicators (e.g., claim–evidence–reasoning, quality of questions, and revision consistency) that can be operationalized in engagement and critical thinking research in the EFL context. Furthermore, the functional mapping of each stage—Activation for schema activation/cognitive readiness, Exploration for collaborative analysis and inference, Reflection for argument evaluation and metacognition, and Outcome for product consolidation through evidence-based revision—provides a conceptual foundation for developing rubrics and instruments that are more sensitive to processual changes. Thus, AERO not only reinforces the relevance of student-centered approaches but also provides a coherent theoretical framework to assess learning transformation from engagement toward measurable critical literacy.

This study not only offers the operational steps of AERO in the classroom but also formulates new knowledge

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contributions in the form of a set of design principles, assessment frameworks, facilitation heuristics, cross-course orchestration, and capacity-building protocols that can be replicated—without altering the substantive content that has been previously designed.

The main contribution is the operationalization of AERO stages as design principles that can be tested and adopted across EFL contexts. Conceptually, each stage is positioned as a causal mechanism for certain types of engagement/thinking:

1) Activation → cognitive readiness through advance organizers, guiding questions, and authentic warm-ups;
2) Exploration → collaborative analysis & inference through jigsaw/case-based reading tasks with clear roles (facilitator, summarizer, challenger, evidence-finder);
3) Reflection → argument evaluation & metacognition through argument mapping, minute papers, and structured peer questioning;
4) Outcome → consolidation of academic products (debates, academic posters/slides, revised essays) with rubric-based peer feedback.

Conclusion

This study demonstrates that the AERO (Activation → Exploration → Reflection → Outcome) framework serves as an effective staged pedagogy for enhancing student engagement and fostering critical thinking in EFL classrooms. Quantitative results revealed moderate-to-positive improvements in all three dimensions of engagement—cognitive, affective, and behavioral—while qualitative evidence confirmed progressive growth in students' participation, collaboration, and motivation throughout the AERO stages. Similarly, although statistical analysis showed that the increase in critical thinking test scores was not significant over a short intervention period, descriptive and qualitative findings consistently indicated cognitive shifts toward analytical and evaluative reasoning.

The integration of engagement and critical thinking within AERO underscores its dual pedagogical strength. First, AERO provides structured scaffolding that gradually transfers learning responsibility from instructor to student, thereby promoting cognitive autonomy and self-regulated learning. Second, the reflective and collaborative nature of the stages cultivates metacognitive awareness, encouraging learners to question assumptions, evaluate evidence, and refine arguments through peer interaction and feedback. These findings align with prior research emphasizing that critical thinking development in EFL contexts is a gradual process, best supported by interactive and reflective learning environments rather than short-term testing mechanisms.

From a theoretical standpoint, AERO contributes to the body of knowledge by linking the three dimensions of engagement (cognitive, affective, and behavioral) with four critical thinking subskills (analysis, inference, argument evaluation, and reflection) within a single, coherent pedagogical model. The Reflection–Outcome loop, in particular, provides a clear process mechanism for how active engagement transforms into evidence-based reasoning and meaningful revision. Practically, AERO offers replicable design principles and assessment heuristics that can inform curriculum innovation, teacher professional development, and EFL instruction design in similar higher education contexts.

In conclusion, while the short duration of intervention limited the statistical impact on quantitative measures, the qualitative findings strongly affirm AERO's potential to promote sustained engagement and critical literacy in English language learning. Future research should extend the duration

Author contributions

The author confirms being the sole contributor of this work and has approved it for publication.

Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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