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Enhancing Critical Thinking through Multimodal EFL Tasks in Secondary Education

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ABSTRACT

This study investigates the effectiveness of multimodal English as a Foreign Language (EFL) tasks in enhancing secondary students' critical thinking skills. Using a quasi-experimental pre-test and post-test design, the study involved 32 secondary school students who participated in structured multimodal learning activities integrating visual, textual, and contextual analysis. Data were collected through a binary assessment measuring students' ability to identify implicit persuasive techniques and a critical thinking rubric scored on a four-point scale. Descriptive and inferential statistical analyses revealed substantial improvement following the intervention. Students' ability to identify implicit persuasive techniques increased from 28.12% at baseline to 81.25% after the intervention. The McNemar test confirmed that this change was statistically significant ($p < .001$; odds ratio = 9.50). In addition, the mean critical thinking score improved from 2.04 (SD = 0.36) to 3.29 (SD = 0.37), representing a mean gain of 1.25 points. A paired-samples t-test indicated that the improvement was statistically significant, $t(31) = 15.36$, $p < .001$, with a very large effect size (Cohen's $d = 2.72$). These findings suggest that multimodal EFL tasks effectively enhance students' inferential reasoning, analytical interpretation, and evaluative judgment. However, minor variability in student performance highlights the importance of structured scaffolding to support learners in developing higher-order thinking skills.

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1. Introduction

Critical thinking is a core twenty-first-century competency (Widodo & Fang, 2025). In EFL classrooms, instruction often prioritizes grammar over analytical reasoning (Arahman, S., Ramayani, R. F., & Khafizah, N. (2025)). Multimodal pedagogy, grounded in multiliteracies theory (Stibbe, 2023), integrates textual, visual, and digital modes to enhance cognitive engagement. Research highlights digital discourse transformation (Alviniyanti, et al.,2024)) and collaborative reasoning benefits (Masrul & Sri, 2023). However, classroom-based empirical evidence from Indonesian secondary education remains limited. This study investigates how multimodal tasks influence observable critical thinking behaviors. The research problems are: 1. How do multimodal tasks enhance students' critical thinking skills? And 2. What challenges emerge during implementation?

Critical thinking has been widely recognized as a core twenty-first-century competency essential for academic success and global participation (Widodo & Fang, 2025). In an era characterized by rapid information exchange, digital communication, and complex social discourse, learners are expected not only to comprehend information but also to evaluate, interpret, and synthesize it critically. Within contemporary educational frameworks,

critical thinking is positioned as a higher-order cognitive skill that enables learners to analyze arguments, detect bias, assess evidence, and make reasoned judgments. Therefore, cultivating critical thinking has become a central objective in secondary education, particularly in language learning contexts where meaning-making and interpretation are integral to communicative competence.

Despite this growing emphasis, instructional practices in many English as a Foreign Language (EFL) classrooms continue to prioritize grammatical accuracy and vocabulary acquisition over analytical reasoning and reflective inquiry (Arahman, S., Ramayani, R. F., & Khafizah, N. (2025)). While linguistic competence remains important, an overemphasis on structural correctness may limit opportunities for students to engage in deeper cognitive processing. Students frequently complete controlled exercises and comprehension tasks that focus on literal meaning rather than interpretive analysis. As Tur, G., Urbina, S., & Forteza, M. D. (2019) argue, such grammar-centered instruction may restrict the development of higher-order thinking skills, particularly in contexts where assessment systems emphasize measurable linguistic output rather than critical engagement.

Multimodal pedagogy offers a promising response to this pedagogical gap. Grounded in multiliteracies theory, multimodal instruction recognizes that meaning is constructed through the integration of multiple semiotic modes, including textual, visual, auditory, spatial, and digital elements (Stibbe, 2023). Rather than viewing language as a purely verbal system, multiliteracies theory emphasizes that communication in contemporary society occurs through complex combinations of media and symbolic resources. In classroom practice, multimodal tasks may involve analyzing videos, digital advertisements, infographics, social media posts, or interactive texts. Such activities encourage learners to synthesize information across modes, interpret implicit meanings, and evaluate persuasive strategies, thereby fostering deeper cognitive engagement.

Recent research further highlights the evolving nature of digital discourse and its implications for language education. Yosawati, Rezky Alviniyanti, et al. (2024) argue that digital communication transforms how learners interpret persuasive messages, requiring advanced inferential reasoning to decode visual symbolism and implicit rhetoric. Similarly, Masrul & Yuliani, Sri. (2023) demonstrate that collaborative reasoning within multimodal tasks promotes reflective dialogue, argument construction, and evaluative thinking. Their findings suggest that multimodal environments can serve as catalysts for critical inquiry, particularly when learners engage in peer discussion and problem-solving activities. However, much of this research has been conducted in technologically advanced contexts or higher education settings, leaving secondary-level classroom evidence relatively limited.

In the Indonesian secondary education context, empirical investigations examining the observable impact of multimodal EFL tasks on students' critical thinking behaviors remain scarce. Although digital tools are increasingly integrated into classroom instruction, systematic evidence demonstrating how multimodal tasks enhance analytical reasoning is still developing. Therefore, this study seeks to investigate how multimodal EFL tasks influence students' critical thinking skills and to identify the challenges that emerge during implementation. By providing classroom-based empirical findings, the study aims to contribute to the growing body of literature on multimodal pedagogy and to inform instructional strategies that balance linguistic development with higher-order cognitive engagement.

2. Literature Review

Multimodality involves meaning-making through multiple semiotic resources, including language, images, gestures, sound, and spatial design (Sunderland, 2024). Rooted in social semiotics and multiliteracies theory, multimodality acknowledges that communication

in contemporary society extends beyond printed text to digital and visual forms. In language education, multimodal approaches encourage learners to interpret layered meanings across different modes, fostering deeper engagement with content. Studies indicate that multimodal materials increase learner motivation, participation, and comprehension (Suryanto, 2014; Jauhara, Dadan, et al., 2021). By integrating visual and digital resources with textual analysis, EFL classrooms can move beyond traditional grammar-focused instruction toward more cognitively stimulating learning environments.

The theoretical foundation of multimodality is strongly influenced by the work of Kress and van Leeuwen (2006), who argue that meaning is socially constructed through multimodal ensembles rather than isolated linguistic systems. Their framework of visual grammar highlights how images communicate through composition, framing, and salience, offering analytical tools for classroom application. Similarly, the Cazden, Courtney, B. (1996) introduced the concept of multiliteracies, emphasizing the need for pedagogical practices that reflect linguistic and cultural diversity in globalized societies. Together, these perspectives provide a conceptual basis for integrating multimodal tasks in EFL classrooms to cultivate interpretive and analytical skills.

Critical thinking, meanwhile, encompasses a set of higher-order cognitive processes, including interpretation, analysis, evaluation, inference, and explanation (Yosawati, Rezky Alviniyanti, et al., 2024). Ennis (2018) defines critical thinking as reasonable and reflective thinking focused on deciding what to believe or do. In educational contexts, critical thinking enables learners to question assumptions, evaluate evidence, identify bias, and construct logical arguments. Within language learning, these skills are particularly important for interpreting implicit meanings, persuasive strategies, and cultural nuances embedded in texts. Therefore, promoting critical thinking in EFL instruction requires pedagogical strategies that extend beyond literal comprehension toward analytical reasoning.

Empirical research suggests that multimodal and project-based digital learning environments can significantly enhance analytical reasoning. Sudewi, Ni Ketut, P.,N. et al. (2025) found that Indonesian secondary students engaged in digital storytelling projects demonstrated improved inferential reasoning and argument construction. Similarly, Syabarrudin, Agus, et al. (2023) reported that project-based multimodal tasks in EFL classrooms promoted collaborative problem-solving and evaluative judgment. These findings align with research by Masrul & Yuliani, Sri (2023) showing that collaborative reasoning within multimodal tasks fosters reflective dialogue and deeper comprehension. Such evidence supports the view that multimodal pedagogy not only increases engagement but also strengthens higher-order cognitive development.

Despite these promising findings, research examining qualitative classroom artifacts—such as student discussions, interpretive responses, and analytical outputs—remains limited in Indonesian secondary EFL contexts. Much of the existing literature relies on quantitative performance measures or self-reported perceptions rather than detailed analysis of observable critical thinking behaviors. Furthermore, contextual factors such as curriculum constraints, technological accessibility, and teacher preparedness may influence implementation outcomes (Arahman, S., Ramayani, R. F., & Khafizah, N. (2025)). Therefore, there is a need for classroom-based empirical investigations that analyze how multimodal tasks concretely shape students' interpretive processes and reasoning patterns within authentic Indonesian EFL settings.

3. Method

3.1 Research Design

This study employed a quasi-experimental pre-test and post-test design to investigate the effectiveness of multimodal EFL tasks in enhancing students' critical thinking skills in

secondary education. The research was conducted over a six-week classroom intervention in which students engaged in structured multimodal learning activities integrating textual, visual, and digital materials such as short videos, infographics, digital advertisements, and persuasive multimodal texts. The instructional tasks required students to interpret implicit meanings, analyze persuasive techniques, evaluate arguments, and engage in collaborative problem-solving discussions. A baseline assessment was administered prior to the intervention to measure students' initial critical thinking abilities, followed by a post-intervention assessment to determine observable changes after exposure to multimodal instruction.

3.2 Research Participants

The participants consisted of 32 secondary school students enrolled in an Indonesian EFL classroom. Purposive sampling was used because the selected class allowed the systematic implementation of multimodal tasks within the existing curriculum structure. The participants represented mixed English proficiency levels, enabling the study to examine varied cognitive responses to multimodal pedagogy. Ethical procedures were strictly followed, including obtaining informed consent, ensuring confidentiality, and assigning coded identifiers (S01–S32) to protect student identity. The intervention was integrated into regular instructional hours to maintain ecological validity and reflect authentic classroom conditions.

3.3 Data Collection and Data analysis

Data were collected using two primary instruments. First, a binary assessment measured students' ability to identify implicit persuasive techniques (0 = incorrect, 1 = correct). Second, a critical thinking rubric, adapted from established higher-order thinking frameworks, assessed five dimensions: interpretation, analysis, evaluation, inference, and explanation. Each dimension was scored on a 4-point scale ranging from emerging (1) to advanced (4). The same instruments were administered during the pre- and post-intervention phases to ensure comparability and internal consistency.

Data analysis combined descriptive and inferential statistical procedures. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were calculated to describe performance trends. To determine whether the improvement in critical thinking scores was statistically significant, a paired-samples t-test was employed, as the data involved repeated measurements of the same participants on a continuous scale. For the binary variable measuring implicit persuasion identification, the McNemar test was applied to assess significant changes in paired categorical responses between pre- and post-intervention conditions. These statistical tests were selected because they are appropriate for within-subject pre-test and post-test designs. Effect sizes were calculated to determine the magnitude of improvement, providing a more comprehensive interpretation beyond statistical significance.

3.4 Data Validity and Reliability

To ensure validity, content validity was established through expert review. Two experienced EFL educators examined the assessment tasks and rubric criteria to confirm alignment with critical thinking constructs and multimodal literacy objectives. Construct validity was ensured by grounding the rubric dimensions in established theoretical frameworks of critical thinking and multiliteracies pedagogy. Furthermore, the tasks were piloted with a small group of students outside the research sample to ensure clarity,

appropriateness of difficulty level, and alignment with instructional objectives. Reliability procedures were implemented to enhance measurement consistency. Inter-rater reliability was established for the critical thinking rubric by involving two independent raters who scored a randomly selected subset (25%) of student responses. Agreement rates were calculated using percentage agreement and Cohen's kappa coefficient to ensure scoring consistency. Any discrepancies were discussed and resolved through consensus to refine rubric clarity. Internal consistency of rubric scoring was also examined using Cronbach's alpha to confirm reliability across dimensions. The binary identification instrument ensured objective scoring, minimizing subjective bias.

4. Results and Discussion

4.1 Result

The analysis of the pre- and post-intervention data reveals several significant findings regarding the impact of multimodal EFL tasks on students' critical thinking skills. First, there was a substantial improvement in students' ability to identify implicit persuasive techniques. At baseline, only 9 out of 32 students (28.12%) were able to correctly identify implicit persuasion. After the implementation of multimodal tasks, this number increased to 25 out of 32 students (78.12%). This represents a 50-percentage-point increase, indicating that multimodal instruction effectively strengthened students' inferential and analytical reading skills. Second, students' critical thinking scores improved consistently across the cohort. The mean baseline critical thinking score was 2.02 (SD = 0.36), while the post-intervention mean rose to 3.28 (SD = 0.41), yielding a mean gain of 1.26 points on a 4-point scale. This improvement suggests notable development in students' abilities to analyze arguments, evaluate evidence, interpret multimodal texts, and make reasoned judgments. Third, individual-level analysis shows that the majority of students demonstrated measurable progress. Most students who initially scored below 2.0 improved to scores above 3.0, indicating that the intervention particularly benefited lower-performing students. However, a small number of students showed limited improvement or regression in persuasion identification (e.g., two students shifted from correct to incorrect identification), highlighting variability in how learners respond to multimodal instruction.

To determine whether the observed improvements were statistically significant, inferential statistical tests were conducted. A paired-samples t-test comparing baseline and post-intervention critical thinking scores showed a statistically significant improvement, $t(31) = 15.36$, $p < .001$. The calculated effect size (Cohen's $d = 2.72$) indicates a very large practical impact of the multimodal intervention on students' critical thinking development.

For the binary variable measuring implicit persuasion identification, the McNemar test was applied to examine changes in paired responses. The analysis revealed a significant increase in correct identification following the intervention ($p < .001$). The odds ratio of approximately 9.50 indicates that students were more than nine times more likely to correctly identify implicit persuasion after participating in the multimodal tasks.

Overall, the findings indicate that multimodal EFL tasks significantly enhanced students' higher-order thinking skills, particularly in interpreting implicit meaning and engaging in analytical reasoning. The results suggest that integrating multiple semiotic modes in language learning can effectively promote critical thinking development, although individual differences and instructional scaffolding remain important considerations.

4.2 Discussion

4.2.1 Multimodal tasks enhance students' critical thinking skills.

Table 1

Pre- and Post-Intervention Student Performance on Implicit Persuasion Identification and Critical Thinking Scores (N = 32)

Student ID	Baseline Identified Implicit Persuasion (0=No,1=Yes)	Post Identified Implicit Persuasion (0=No,1=Yes)	Baseline Critical Thinking Score (1–4)	Post Critical Thinking Score (1–4)
S01	0	1	2.4	3.3
S02	0	1	1.6	3.7
S03	0	1	2.2	3.4
S04	0	1	1.3	3.0
S05	1	1	1.6	3.4
S06	0	1	2.2	3.9
S07	0	0	2.4	3.3
S08	0	1	2.2	3.9
S09	0	1	2.1	2.3
S10	1	1	2.0	3.6
S11	1	0	1.5	3.3
S12	0	0	1.8	3.2
S13	1	1	1.9	3.3
S14	0	1	2.5	2.5
S15	0	1	2.2	3.2
S16	0	1	1.4	3.4
S17	1	1	2.2	3.9
S18	1	1	1.9	3.1
S19	0	1	1.8	3.0
S20	1	1	2.3	3.1
S21	0	1	2.5	3.7
S22	0	1	2.5	3.4
S23	0	1	1.8	3.1
S24	0	1	2.0	3.5
S25	0	1	2.2	3.3
S26	0	1	2.5	3.7
S27	1	0	1.9	3.0
S28	0	1	2.0	3.2
S29	0	1	1.7	3.1
S30	0	0	1.6	2.7
S31	0	0	2.4	3.4
S32	1	1	2.6	3.4

Descriptive Statistics: Implicit Persuasion Identification: Baseline = 9 students (28.12%), Post-Intervention = 26 students (81.25%). Critical Thinking Scores: Baseline Mean = 2.04 (SD = 0.36); Post Intervention Mean = 3.29 (SD = 0.37). Mean Gain in Critical Thinking Score = 1.25.

The data clearly demonstrate that multimodal EFL tasks significantly enhanced students' critical thinking abilities. First, students' ability to identify implicit persuasive techniques increased substantially. At baseline, only 9 out of 32 students (28.12%)

successfully identified implicit persuasion. After the multimodal intervention, this number rose to 25 out of 32 students (78.12%)**,** indicating a 50 percentage-point increase**.** This improvement suggests that multimodal tasks—such as analyzing visual texts, integrating audio-visual cues, and interpreting layered meaning—strengthened students' inferential reasoning and interpretative skills.

Second, critical thinking rubric scores showed consistent improvement across nearly all participants. The mean baseline critical thinking score was 2.02 (SD = 0.36)**,** while the post-intervention mean increased to 3.28 (SD = 0.41)**.** This represents a mean gain of 1.26 points on a 4-point scale, indicating a substantial development in analytical reasoning, evidence evaluation, and reflective judgment.

Individually, most students demonstrated upward movement in both measures. Even students who initially struggled (e.g., those scoring between 1.3–1.8 at baseline) showed notable growth, with many reaching scores above 3.0 post-intervention. This pattern suggests that multimodal tasks support not only high-performing students but also those at lower proficiency levels.

The improvement can be attributed to several mechanisms inherent in multimodal instruction:

1. Encouraging interpretation of multiple semiotic modes (text, image, sound)
2. Requiring synthesis of information across formats
3. Promoting collaborative discussion and problem-solving
4. Increasing cognitive engagement through authentic materials

Thus, the data indicate that multimodal EFL tasks enhance critical thinking by fostering analytical interpretation, inferential reasoning, and evaluative judgment.

4.2.2 Challenges emerge during implementation.

Despite the overall improvement, the data also reveal several challenges.

1. Uneven Gains in Persuasion Identification

Although most students improved, 7 students did not demonstrate successful post-intervention identification of implicit persuasion. Additionally, two students (S11 and S27) regressed from correctly identifying implicit persuasion at baseline to failing post-intervention. This suggests that:

a. Some students may experience cognitive overload when processing multiple modes simultaneously.
b. Transfer of skill may not be automatic without sufficient scaffolding.
c. Interpretation of implicit meaning requires sustained inferential competence.

2. Variability in Score Improvement

While the mean critical thinking score increased substantially, individual gains varied. For example:

a. S14 showed no improvement in critical thinking score (2.5 to 2.5).
b. Some students improved modestly (e.g., S09: 2.1 to 2.3).
c. Others demonstrated dramatic gains (e.g., S02: 1.6 to 3.7).

This variability indicates that multimodal tasks may benefit students differently depending on prior analytical skills, language proficiency, or learning strategies.

3. Cognitive Demands

The integration of visual, textual, and contextual cues may initially challenge students unfamiliar with multimodal analysis. The slight regressions in persuasion identification (S11 and S27) may reflect difficulties in adapting to new analytical frameworks.

4. Instructional and Time Constraints

Although not directly measurable in the table, the performance variability implies that effective multimodal instruction requires:

a. Structured guidance
b. Clear modeling of analytical processes
c. Sufficient time for discussion and reflection

Without adequate scaffolding, students may struggle to synthesize multimodal information effectively.

5. Conclusion

Multimodal task integration significantly enhanced critical thinking in EFL classrooms. Students improved in interpretation, evaluation, and inference. Structured scaffolding was essential for equitable participation. Future research should employ longitudinal mixed-method designs. It strongly supports that multimodal EFL tasks enhance students' critical thinking skills, as evidenced by substantial improvements in both implicit persuasion identification and critical thinking rubric scores. However, the implementation process reveals challenges related to cognitive load, uneven gains, and the need for pedagogical scaffolding. Therefore, results suggest that multimodal instruction is highly effective when carefully designed and supported, but requires systematic implementation to ensure consistent student development.

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