**Prima Magistra:** Jurnal Ilmiah Kependidikan
Volume 7 – Number 3, July 2026, pp 604-615
https://doi.org/10.37478/jpm.v7i3.8494
*Open Access:* https://e-journal.uniflor.ac.id/index.php/JPM/article/view/8494

**ISSN 2721-8112 (print)**
**ISSN 2722-4899 (online)**

# IMPLEMENTATION OF INTERACTIVE LEARNING BASED ON MULTIMODAL TEXTS TO IMPROVE STUDENTS' CRITICAL THINKING SKILLS

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**Article History**
Received : 26/05/2026
Revised : 19/06/2026
Accepted : 18/07/2026

**Keywords:**
Expository text, Multimodal literacy, Cognitive engagement, Instructional scaffolding, Classroom action research.

**Abstract.** Students' critical thinking skills in expository-text learning require further development because classroom instruction tends to remain teacher-centered and relies on single-mode verbal texts. This study aimed to analyze the improvement of students' critical thinking skills through the implementation of interactive learning based on multimodal texts. The study employed a Classroom Action Research design based on the Kemmis and McTaggart model and was conducted in two cycles involving 20 students. Each cycle comprised planning, action, observation, and reflection. Data were collected through tests, observations, and documentation and were analyzed using descriptive quantitative and interactive qualitative techniques. The results showed gradual improvements in both mean scores and classical learning mastery. The mean score and mastery percentage increased from 56.15 and 25% in the pre-cycle stage to 70.40 and 50% in Cycle 1 and to 80.85 and 90% in Cycle 2. These improvements were associated with the use of written texts, images, infographics, audio, and video as interconnected sources of information analyzed through discussions, stimulating questions, feedback, and instructional scaffolding. Therefore, interactive learning based on multimodal texts can improve expository-text instruction and descriptively enhance students' critical thinking skills, although the findings remain contextual to a single classroom.

**How to Cite:** Mulyati, M., Arwan, A., & Fadli, B. M. (2026). IMPLEMENTATION OF INTERACTIVE LEARNING BASED ON MULTIMODAL TEXTS TO IMPROVE STUDENTS' CRITICAL THINKING SKILLS. *Prima Magistra: Jurnal Ilmiah Kependidikan*, 7(3), 604-615. https://doi.org/10.37478/jpm.v7i3.8494

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**Publisher:**
Program Studi PGSD Universitas Flores. Jln. Samratulangi, Kelurahan Paupire, Ende, Flores.
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## INTRODUCTION

Critical thinking is one of the essential competencies that must be developed to meet the demands of twenty-first-century education. The rapid development of digital technology and the increasing flow of information require students not only to acquire information but also to analyze, evaluate, compare, and use it responsibly. These competencies include identifying problems, assessing the strength of arguments, drawing inferences, and making rational decisions based on relevant evidence. Therefore, learning processes should provide students with opportunities to engage actively in higher-order thinking activities rather than merely receiving knowledge passively (Oya et al., 2025; Humam & Hanif, 2025; Yang et al., 2025). However, several studies have indicated that Indonesian students' critical thinking skills remain relatively low because classroom instruction continues to be dominated by conventional teacher-centered approaches that do not adequately facilitate analytical, evaluative, and problem-solving activities (Adam et al., 2026; Safitri et al., 2025).

One indicator illustrating this condition is the scientific literacy performance of Indonesian students, who ranked 64$^{th}$ among 81 participating countries, with an average score of approximately 383 points. This achievement, which remains below the OECD average, demonstrates the challenges encountered in developing students' abilities to comprehend information, use evidence, and draw logical conclusions (Solin et al., 2025). A similar problem is evident in Indonesian language learning, particularly when students experience difficulty identifying main ideas and arguments, evaluating the accuracy of information, distinguishing facts from opinions, and independently drawing conclusions from the texts they read. Classroom instruction also continues to rely predominantly on lectures and assignments based on single-mode verbal texts, while visual, audio, video, and interactive digital elements have not been systematically integrated into activities involving the reading and analysis of expository texts.

Consequently, students' cognitive engagement in understanding and evaluating information remains limited (Pratiwi et al., 2025).

The development of digital technology in education has encouraged various innovations in instructional design, one of which is interactive learning based on multimodal texts (Fauziyah & Yuniarti, 2024). A multimodal text communicates and constructs meaning through the integration of two or more semiotic modes, including verbal language, images, colors, layout, audio, video, gestures, and interactive elements. Therefore, multimodal texts do not merely refer to the separate use of various media but to the integration of multiple modes that complement one another in constructing meaning. In expository-text learning, the combination of written texts, images, infographics, audio, and video provides students with opportunities to compare different representations of information, identify relationships among ideas, assess supporting evidence, and evaluate the consistency of arguments. These activities have the potential to develop students' critical thinking skills through processes of interpretation, analysis, and evaluation (Argyriou & Tapsis, 2025).

Several studies have reported the contribution of multimodal learning to the development of students' critical thinking skills. Rahmanu & Molnár (2024) demonstrated that multimodal learning in language education can improve students' conceptual understanding and analytical abilities through the integration of various digital media. Handayani et al. (2025) found that the development of multimodal-based electronic modules increased students' learning activities while encouraging their engagement in critical thinking processes. Similarly, Novarita et al. (2025) reported that integrating multiple modes of communication into learning supported students' ability to interpret information and develop reasoning when comprehending texts. These findings indicate that multimodal texts not only make instructional materials more engaging but also provide diverse representations of information that students can use to examine, compare, and evaluate information more comprehensively.

Conceptually, multimodal text-based learning is consistent with the theory of multiliteracies, which emphasizes the importance of understanding, interpreting, and constructing meaning through diverse forms of representation in digital communication environments. In this type of learning, students do not merely read verbal elements but also connect meanings conveyed through images, colors, sounds, videos, spatial arrangements, and interactive features. The integration of these modes can strengthen students' cognitive engagement, particularly when they are required to identify relationships among representations, compare information, and evaluate its appropriateness for particular communicative purposes. Learning that combines multiple modalities also assists students in constructing deeper understanding through diverse interpretative processes (Guo et al., 2024; Shen & Han, 2026). Furthermore, multimodal texts integrated with project-based activities have the potential to improve higher-order thinking skills, including critical thinking and problem-solving abilities (Riwayatiningsih et al., 2025).

Despite its considerable potential, the implementation of interactive learning based on multimodal texts involves several challenges, particularly during the initial stages. Teacher-centered instruction may cause students to become accustomed to receiving information directly and limit their opportunities to explore and evaluate meanings communicated through different textual modes (Arwan et al., 2026). The transition from conventional instruction to interactive multimodal text-based learning requires adaptation from both teachers and students. Teachers must be able to select and integrate written texts, images, audio, video, and interactive components appropriately, while students must become accustomed to participating actively in discussions, presenting reasons, and constructing understanding independently. During the initial stage, these demands may prevent the learning process from functioning optimally. Nevertheless, through continuous reflection and instructional improvement, the quality of implementation can be enhanced in subsequent cycles (Córdova-Esparza et al., 2024; Kusumaningrum et al., 2024).

The success of multimodal text-based learning is determined not only by the diversity of modes employed but also by the quality of interaction established throughout the learning process. Multimodal texts provide more meaningful contributions when students are given opportunities to observe, interpret, question, compare, and evaluate information through collaborative

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activities. Interactivity manifested through group discussions, stimulating questions, active exploration, presentations, peer responses, and feedback can strengthen knowledge construction and encourage students to formulate evidence-based arguments (Ajani & Matiyenga, 2025; Yan et al., 2024). Therefore, the integration of multimodal texts and interactive learning constitutes an important element in creating a participatory and reflective learning environment oriented toward the development of critical thinking skills.

Nevertheless, most previous studies have focused on developing products such as multimodal media, electronic modules, or instructional materials. Other studies have predominantly been conducted in higher education, foreign-language learning, and technology-enhanced learning contexts. These tendencies indicate that research examining the implementation of interactive multimodal text-based learning at the junior secondary school level remains relatively limited. Moreover, multimodality in several previous studies has generally been positioned as a variation in the media used to deliver instructional content rather than as a source of information that students must read, interpret, compare, analyze, and evaluate in Indonesian language learning.

Previous similar studies have shown a focus and limitations that strengthen the position of this study. Through a systematic review of 34 articles, Rahmanu & Molnár (2024) found that multimodality could support reading, writing, speaking, and vocabulary development; however, their review focused on English language learning in higher education. Through bibliometric and content analyses of 689 publications, Guo et al. (2024) identified multimodal texts, multimodal composition, media literacy, and technology-enhanced learning environments as prominent themes, but their findings also revealed a research tendency toward adult learners. Liang & Lim (2021) developed a pedagogical framework for digital multimodal composition that integrates critical, creative, and technical dimensions, although their study was primarily oriented toward students' production of multimodal texts in English language classrooms. Hafner & Ho (2020) proposed a process-based assessment model for digital multimodal composition in second-language writing at the university level. Meanwhile, Yan et al. (2024) demonstrated that multimodal learning analytics could support feedback and reflection in collaborative learning; however, their study emphasized the use of multimodal data in health education and did not examine multimodal texts as objects of critical reading. Based on these limitations, the novelty of the present study lies in implementing interactive multimodal text-based learning in Indonesian language instruction at the junior secondary school level, particularly in the teaching of expository texts. This study does not merely employ various modes as instructional delivery media but positions multimodal texts as sources of information that students interpret, compare, analyze, and evaluate through interactive discussions, stimulating questions, and instructional *scaffolding*.

Another limitation of previous research is its tendency to assess cognitive learning outcomes only at the end of instruction without thoroughly examining how critical thinking skills emerge and develop during classroom interactions. Therefore, research is needed that not only measures changes in students' scores but also observes their engagement in interpreting texts, analyzing arguments, evaluating evidence, drawing inferences, and articulating reasons throughout the learning process. The classroom action research design enables these processes to be examined progressively through planning, action, observation, and reflection. Through instructional improvements implemented in each cycle, interactive multimodal text-based learning can be adapted to students' needs and actual classroom conditions.

Based on the preceding discussion, this study aims to analyze the improvement of students' critical thinking skills through the implementation of interactive multimodal text-based learning in expository-text instruction in Grade IX-1 at SMPN 3 Bolo. More specifically, the study examines changes in students' critical thinking skills throughout the implementation of the intervention and the instructional improvements undertaken in each cycle. Accordingly, this study is expected to provide empirical contributions to the development of Indonesian language instruction that integrates multimodal texts, interactivity, and reflective processes to enhance students' critical thinking skills.

## RESEARCH METHODS

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This study employed a Classroom Action Research (CAR) approach conducted collaboratively by the researcher and the classroom teacher. The research design referred to the spiral model proposed by Kemmis & McTaggart (1988), which comprises four stages in each cycle: (1) planning, (2) action, (3) observation, and (4) reflection. Classroom action research was selected because the study was oriented toward systematically, reflectively, and continuously improving classroom learning through the implementation of interactive learning based on multimodal texts. A collaborative action research approach enables researchers and practitioners to identify instructional problems, implement improvement measures, and evaluate changes according to actual classroom conditions (Somekh & Zeichner, 2009).

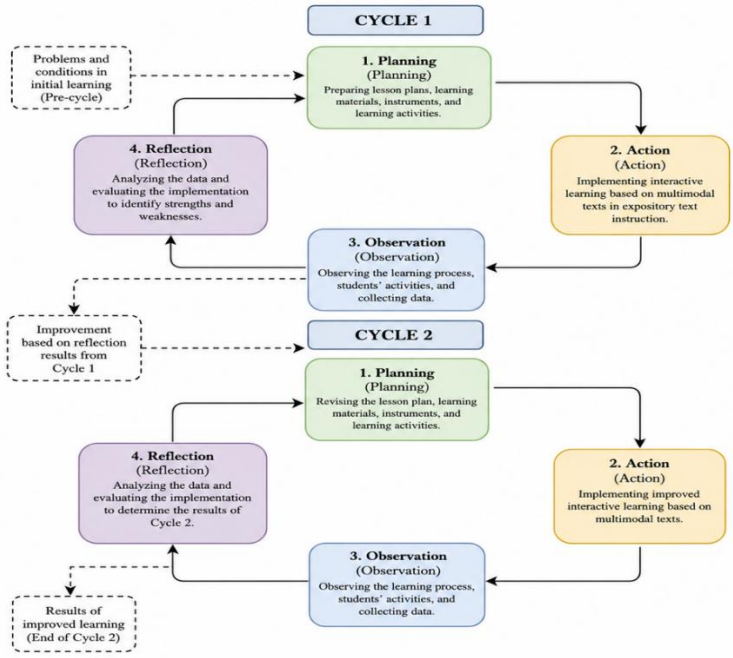



**Figure 1.** The Spiral Model of Classroom Action Research (Kemmis & McTaggart, 1988)

The implementation of this classroom action research followed the Kemmis and McTaggart spiral model, which consists of four stages in each cycle: planning, action, observation, and reflection (Figure 1). Cycle 1 was conducted through these four stages, while Cycle 2 followed the same stages after the instructional intervention had been improved based on the reflection results from Cycle 1. The use of recurring cycles allows instructional practices to be progressively improved based on observation and reflection data obtained from the preceding cycle (Moktar et al., 2025).

The data were collected using three main techniques: tests, observation, and documentation. First, a critical thinking skills test was administered to measure the development of students' critical thinking skills during the pre-cycle stage and after the intervention in each cycle. The test items were developed based on Facione's critical thinking framework, which comprises six dimensions: interpretation, analysis, evaluation, inference, explanation, and self-regulation. Second, observation was conducted using a structured observation sheet to examine the implementation of interactive learning based on multimodal texts and students' critical thinking activities during the learning process. Third, documentation was used to complement the research data in the form of activity photographs, video recordings of classroom instruction, and students' work. These six dimensions have been widely employed as a framework for operationalizing and assessing critical thinking skills in educational contexts (Ma, 2023).

The research data were analyzed by integrating quantitative and qualitative analysis techniques. Quantitative data in the form of students' critical thinking test scores were analyzed using descriptive statistics, including the mean score and the percentage of classical learning mastery. Qualitative data obtained from observation and documentation were analyzed using the interactive analysis model, which consists of data condensation, data display, and conclusion

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drawing and verification. The analytical processes were conducted iteratively and interactively so that the qualitative findings could provide a more comprehensive explanation of the quantitative changes identified in each cycle (Miles et al., 2020).

The study was considered successful when at least 75% of the students achieved the Minimum Mastery Criterion score of 75 on the critical thinking skills test. The classical success threshold of 75% was operationally determined based on the characteristics of the class and the mastery standards applied by the school. Establishing success criteria before the intervention is consistent with the principle of mastery learning, in which learning achievement is evaluated according to predetermined mastery standards rather than solely through comparisons among students (Kulik et al., 1990). The percentage of classical learning mastery was calculated using the following formula:

$$\text{Classical Learning Mastery} = \frac{\text{Number of Students Achieving Mastery}}{\text{Total Number of Students}} \times 100\%$$

## RESULTS AND DISCUSSION

This study was conducted with 20 students from Grade IX-1 at SMPN 3 Bolo during expository-text instruction. The intervention involved the implementation of interactive learning based on multimodal texts across two action-research cycles. The multimodal texts integrated written language, images, infographics, audio, and video as interconnected sources of information. During the learning process, students were guided to identify main ideas, connect information across modes, compare arguments, evaluate evidence, draw inferences, and formulate logical conclusions. Meanwhile, group discussions, stimulating questions, presentations, feedback, and instructional scaffolding functioned as interactive learning activities that supported students in reading and analyzing multimodal texts.

### a. Pre-Cycle Description

The pre-cycle stage was conducted to identify students' initial critical thinking skills before interactive learning based on multimodal texts was implemented. Data were obtained through an initial critical thinking skills test and classroom observations during expository-text instruction. The observations indicated that instruction remained dominated by teacher explanations and the use of single-mode written texts. Students had not been given adequate opportunities to read information presented through integrated verbal, visual, and audiovisual modes.

Most students were also unable to identify the main arguments, distinguish facts from opinions, evaluate the relevance of evidence, or formulate conclusions based on the available information. Their participation in the learning process tended to be passive, while their ability to express opinions and provide systematic reasoning remained limited. The pre-cycle critical thinking test results are presented in Table 1.

**Table 1.** Students' Critical Thinking Skills Test Results in the Pre-Cycle Stage

| Student Code | Pre-Cycle Score | MMC | Category | Student Code | Pre-Cycle Score | MMC | Category |
|---|---|---|---|---|---|---|---|
| ADF | 76 | 75 | Achieved | NS | 50 | 75 | Not achieved |
| AS | 55 | 75 | Not achieved | RR | 42 | 75 | Not achieved |
| AAA | 60 | 75 | Not achieved | SR | 60 | 75 | Not achieved |
| E | 45 | 75 | Not achieved | SA | 38 | 75 | Not achieved |
| F | 77 | 75 | Achieved | UAH | 55 | 75 | Not achieved |
| MK | 50 | 75 | Not achieved | AA | 78 | 75 | Achieved |
| M | 40 | 75 | Not achieved | PA | 48 | 75 | Not achieved |
| MA | 55 | 75 | Not achieved | N | 42 | 75 | Not achieved |
| MI | 48 | 75 | Not achieved | F | 50 | 75 | Not achieved |
| NI | 75 | 75 | Achieved | S | 79 | 75 | Achieved |
| | | | | **Total** | **1,123** | | |
| | | | | **Mean** | **56.15** | | |

As presented in Table 1, only 5 of the 20 students achieved the Minimum Mastery Criterion, while the remaining 15 students did not achieve mastery. Therefore, classical learning mastery in the pre-cycle stage was 25%, with a class mean of 56.15. These results indicate that students'

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initial abilities to interpret information, analyze relationships among ideas, evaluate arguments, and draw conclusions were relatively low.

This condition was associated with instruction that continued to rely on single-mode written texts and did not explicitly teach students how to connect meanings conveyed through different modes. Lim et al. (2022) explained that multimodal literacy requires students not only to recognize written language and images but also to understand how different semiotic resources work together to construct meaning. Rahmanu & Molnár (2024) similarly found that instruction integrating multiple modes can support reading skills, information comprehension, and communicative competence. Therefore, the pre-cycle findings provided an empirical basis for using multimodal texts as analytical resources in expository-text learning.

**b. Cycle 1 Description**

Cycle 1 was implemented through the stages of planning, action, observation, and reflection. During the planning stage, the researcher and classroom teacher prepared the teaching module, student worksheets, observation instruments, and critical thinking skills test. The expository-text materials were presented as multimodal texts integrating written language, images, infographics, audio, and video. These different modes were designed to communicate complementary information rather than function as separate instructional media.

The action stage was conducted in two meetings, each lasting 2 × 45 minutes. The learning activities included multimodal-text exploration, interactive discussion, presentation, and reflection. Students were asked to identify the thesis and arguments in written texts, interpret data presented in infographics, connect visual information with verbal statements, and assess whether the evidence presented in videos was consistent with the arguments in the expository texts.

The observation results showed that students began to demonstrate greater interest and engagement during the learning process. They actively examined written texts, images, and videos and began participating in group discussions. Nevertheless, several students continued to read each mode separately. They were able to locate information in written or visual texts but were not yet fully able to explain the relationships between the modes to construct a comprehensive interpretation. At the end of Cycle 1, students completed a critical thinking skills test. The results are presented in Table 2.

**Table 2.** Students' Critical Thinking Skills Test Results in Cycle 1

| Student Code | Cycle 1 Score | MMC | Category | Student Code | Cycle 1 Score | MMC | Category |
|---|---|---|---|---|---|---|---|
| MA | 80 | 75 | Achieved | N | 68 | 75 | Not achieved |
| MI | 65 | 75 | Not achieved | F | 60 | 75 | Not achieved |
| NI | 75 | 75 | Achieved | S | 77 | 75 | Achieved |
| NS | 60 | 75 | Not achieved | MA | 55 | 75 | Not achieved |
| RR | 78 | 75 | Achieved | MI | 78 | 75 | Achieved |
| SR | 62 | 75 | Not achieved | NI | 80 | 75 | Achieved |
| SA | 58 | 75 | Not achieved | NS | 65 | 75 | Not achieved |
| UAH | 76 | 75 | Achieved | RR | 75 | 75 | Achieved |
| AA | 65 | 75 | Not achieved | SR | 68 | 75 | Not achieved |
| PA | 82 | 75 | Achieved | SA | 81 | 75 | Achieved |
| | | | | **Total** | **1,408** | | |
| | | | | **Mean** | **70.40** | | |

As shown in Table 2, 10 students achieved the Minimum Mastery Criterion, while 10 students did not achieve mastery. Classical learning mastery in Cycle 1 reached 50%, with a class mean of 70.40. Compared with the pre-cycle results, the mean score increased by 14.25 points, while classical mastery increased by 25 percentage points. This descriptive increase indicates initial development in students' abilities to read and analyze information represented through different modes.

Presenting expository texts through a combination of verbal language, images, infographics, audio, and video provided students with multiple representations through which they could understand the topic. However, the availability of multiple modes did not automatically

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produce in-depth analysis. Liang & Lim (2021) emphasized that multimodal learning requires a pedagogical framework that explicitly directs students to understand the relationships among the critical, creative, and technical dimensions of texts. Ma (2023) similarly demonstrated that the development of interpretation, analysis, evaluation, inference, explanation, and self-regulation requires systematically designed interactive activities. The Cycle 1 findings therefore indicate that multimodal texts must be accompanied by more structured analytical guidelines and stimulating questions.

Reflection on Cycle 1 identified three primary problems. First, several students continued to perceive written texts, images, infographics, and videos as separate sources of information and were therefore unable to connect information across modes. Second, discussion time was not managed effectively, preventing several groups from completing the analysis and evaluation of information. Third, instructional scaffolding was not distributed evenly, particularly among students who experienced difficulty constructing arguments, evaluating evidence, and drawing inferences.

Based on these reflection results, Cycle 2 was improved by providing more contextual multimodal texts, using cross-modal analysis guidelines, structuring the discussion process more systematically, and providing individual scaffolding. The analytical guidelines included questions about the relationship between written texts and images, the function of data presented in infographics, the consistency between audiovisual information and written arguments, and the relevance of evidence used to support conclusions.

**c. Cycle 2 Description**

Cycle 2 was implemented through planning, action, observation, and reflection, with reference to the evaluation results from Cycle 1. During the planning stage, the teacher revised the teaching module and student worksheets by adding cross-modal analysis guidelines. The expository texts were selected from topics more closely related to students' experiences so that they could more easily connect information conveyed through written language, images, infographics, audio, and video.

During the action stage, students were not merely asked to identify information from each mode but also to compare and evaluate the relationships among modes. The teacher used stimulating questions, such as whether an image supported a statement in the written text, what evidence was presented in an infographic, and whether the information in a video was consistent with the author's argument. Each group subsequently presented its analysis, responded to other groups' arguments, and revised its conclusions based on feedback.

The observation results demonstrated that the learning process in Cycle 2 was more focused and systematic. Students became more active in asking questions, expressing opinions, and providing reasons based on information presented in multimodal texts. Participation among group members was also more evenly distributed. Students began to explain relationships between verbal arguments and visual evidence, evaluate the consistency of information, and defend conclusions based on data.

Instructional scaffolding was provided gradually to students experiencing difficulties. The teacher used guiding questions without directly supplying answers. This support was progressively reduced when students demonstrated the ability to identify arguments, evaluate evidence, and formulate inferences more independently. The critical thinking skills test results for Cycle 2 are presented in Table 3. As shown in Table 3, 18 students achieved the Minimum Mastery Criterion, while 2 students did not achieve mastery. Classical learning mastery in Cycle 2 reached 90%, with a class mean of 80.85. Compared with Cycle 1, the mean score increased by 10.45 points, while classical mastery increased by 40 percentage points. These results exceeded the predetermined success criterion, which required at least 75% of the students to achieve the Minimum Mastery Criterion of 75.

The development observed in Cycle 2 indicates that the benefits of multimodal texts did not merely arise from media diversity but from students' activities in connecting, comparing, and evaluating meanings communicated through different modes. Learning interactions supported by feedback and reflection enabled students to reconsider the foundations of their arguments. Yan et

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al. (2024) demonstrated that multimodal data and representations integrated with reflective feedback can support collaborative learning processes. Shen & Han (2026) similarly showed that multimodal composition activities involving analysis and reflection can contribute to the development of critical thinking skills. The present study extends these findings to critical reading of expository texts at the junior secondary school level.

**Table 3.** Students' Critical Thinking Skills Test Results in Cycle 2

| Student Code | Cycle 2 Score | MMC | Category | Student Code | Cycle 2 Score | MMC | Category |
|---|---|---|---|---|---|---|---|
| MA | 88 | 75 | Achieved | N | 78 | 75 | Achieved |
| MI | 76 | 75 | Achieved | F | 75 | 75 | Achieved |
| NI | 84 | 75 | Achieved | S | 85 | 75 | Achieved |
| NS | 79 | 75 | Achieved | MA | 65 | 75 | Not achieved |
| RR | 88 | 75 | Achieved | MI | 82 | 75 | Achieved |
| SR | 80 | 75 | Achieved | NI | 90 | 75 | Achieved |
| SA | 68 | 75 | Not achieved | NS | 76 | 75 | Achieved |
| UAH | 82 | 75 | Achieved | RR | 84 | 75 | Achieved |
| AA | 76 | 75 | Achieved | SR | 78 | 75 | Achieved |
| PA | 92 | 75 | Achieved | SA | 91 | 75 | Achieved |
| | | | | **Total** | **1,617** | | |
| | | | | **Mean** | **80.85** | | |

During the Cycle 2 reflection stage, most students demonstrated active participation and were able to use cross-modal information as the basis for their arguments. The two students who did not achieve the Minimum Mastery Criterion continued to experience difficulty evaluating the strength of evidence and drawing inferences independently. Nevertheless, because the classical success criterion had been achieved, the study was concluded after Cycle 2. The two students still required follow-up support through individual assistance and gradually structured exercises.

### d. Improvements in Students' Critical Thinking Skills

The development of students' critical thinking skills from the pre-cycle stage to Cycle 2 is summarized in Table 4.

**Table 4.** Students' Critical Thinking Skills

| Stage | Class Mean | Classical Mastery | Students Achieving Mastery | Students Not Achieving Mastery |
|---|---|---|---|---|
| Pre-cycle | 56.15 | 25% | 5 | 15 |
| Cycle 1 | 70.40 | 50% | 10 | 10 |
| Cycle 2 | 80.85 | 90% | 18 | 2 |

As indicated in Table 4, students' critical thinking skills demonstrated a consistent descriptive increase at each stage of the study. The class mean increased from 56.15 in the pre-cycle stage to 70.40 in Cycle 1 and 80.85 in Cycle 2. Classical mastery similarly increased from 25% to 50% and ultimately reached 90%. Overall, the class mean increased by 24.70 points, while classical mastery increased by 65 percentage points from the pre-cycle stage to Cycle 2.

This pattern indicates that multimodal text-based learning should be understood as a process integrating text design, analytical activities, interaction, and assessment. Guo et al. (2024) explained that multimodal learning develops through the integration of multiple representations and collaborative activities aligned with instructional objectives. Hafner & Ho (2020) emphasized that the effectiveness of multimodal learning is associated with connections among teaching processes, meaning-making or design activities, and assessment. The findings of the present study support these perspectives because greater improvement occurred after multimodal texts were combined with analytical guidelines, structured discussions, feedback, and individual scaffolding.

The development of class mean scores and classical mastery across the research stages is further illustrated in Figure 2.

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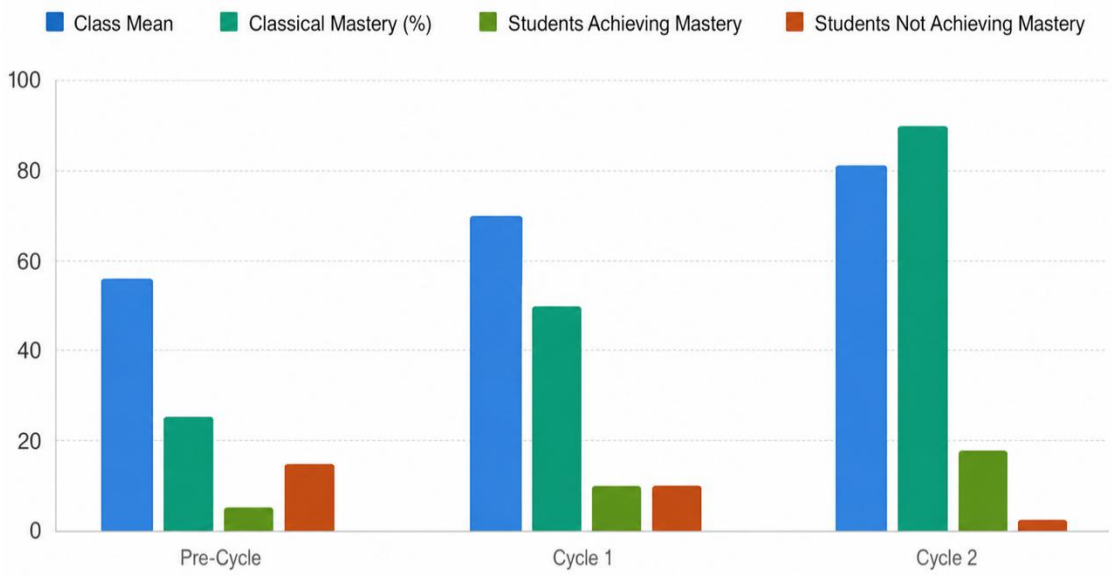



**Figure 2.** Improvement in Students' Critical Thinking Skills Across Research Stages

Figure 2 illustrates an upward pattern in the class mean and classical learning mastery from the pre-cycle stage to Cycle 2. During the pre-cycle stage, instruction continued to rely on single-mode written texts, while students' participation remained limited. In Cycle 1, presenting expository texts through several modes began to improve student engagement, although cross-modal analysis had not yet been conducted optimally. In Cycle 2, more structured analytical guidelines, contextual multimodal texts, interactive discussions, and individual *scaffolding* made the learning process more focused and systematic.

This pattern is consistent with Lim et al. (2022), who found that multimodal learning at the school level requires students' engagement with texts related to their everyday experiences, explicit multimodal literacy instruction, and critical pedagogical activities. Rahmanu & Molnár (2024) similarly demonstrated that multiple modes provide stronger learning benefits when they are used in an integrated manner to support comprehension and communication. Yan et al. (2024) further emphasized that reflection and feedback in collaborative environments play an important role in helping students understand their learning processes.

Overall, the findings indicate that the improvement in critical thinking skills was not caused merely by the number of media used. Improvement occurred when written texts, images, infographics, audio, and video were organized as integrated multimodal texts and used by students as sources for interpreting information, analyzing relationships among ideas, evaluating evidence, and drawing inferences. Discussions, stimulating questions, presentations, feedback, and instructional scaffolding strengthened these meaning-making processes.

## CONCLUSIONS AND SUGGESTIONS

This study demonstrates that interactive learning based on multimodal texts can improve the expository-text learning process while enhancing students' critical thinking skills. The principal significance of the findings lies in the function of multimodal texts not merely as variations in instructional media, but as sources of information that students read, connect, compare, analyze, and evaluate critically. Interactive discussions, stimulating questions, feedback, and instructional scaffolding helped students understand relationships across modes and formulate arguments and conclusions based on relevant evidence. These results correspond with the research objective formulated in the introduction, as indicated by the increase in the mean score from 56.15 in the pre-cycle stage to 70.40 in Cycle 1 and 80.85 in Cycle 2, as well as the increase in classical mastery from 25% to 50% and 90%. Nevertheless, the findings are contextual because they were obtained from a single class consisting of 20 students at one school and therefore cannot yet be broadly generalized. Pedagogically, Indonesian language teachers are advised to design contextual multimodal texts, provide guidelines for analyzing relationships

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across modes, and offer instructional support according to students' learning needs. Future studies should involve more diverse participants and schools, employ comparative or quasi-experimental designs, apply inferential statistical testing, and examine the sustained development of critical thinking skills over a longer period. Further research may also focus on developing instruments that assess each critical thinking indicator in greater detail and utilizing interactive digital platforms to enrich the forms, accessibility, and effectiveness of multimodal texts in learning.

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