Reading Comprehension through Multimodal Literacy Approach for English Education

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Abstract. In the digital era, reading comprehension of multimodal texts that integrate written language with images, videos, and interactive elements has become crucial yet challenging for many students. This mixed-methods study investigated the effectiveness of a multimodal instructional approach in enhancing reading comprehension among 120 Indonesian high school students. The quantitative component employed a quasi-experimental design with pre/post reading comprehension tests, while the qualitative component utilized observations and interviews. The results revealed that the experimental group receiving multimodal instruction achieved significantly higher reading comprehension scores compared to the control group receiving traditional text-based instruction $(F(1, 117) = 12.68, p < .001, \eta p2 = .098)$. The multimodal approach was particularly beneficial for students with lower initial reading proficiency levels. Qualitative data indicated increased engagement, motivation, comprehension facilitation, accommodation of diverse learning styles, and the need for technology integration support and instructional scaffolding. The findings align with multimedia learning theory and differentiated instruction principles, providing empirical evidence supporting the integration of multimodal elements to create engaging, accessible, and effective reading experiences. Implications for teacher professional development, curriculum design, and future research directions are discussed. Overall, this study contributes to the growing literature on multimodal literacy pedagogy and offers practical insights for enhancing reading instruction in the 21st century multimedia landscape.
Keywords: Multimodal literacy, Reading comprehension, Multimedia learning, Differentiated instruction, Technology integration

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Introduction

Reading is a crucial skill in foreign language learning, recognized for identifying and comprehending written materials (Yu, 2015; Heriyawati, Saukah,

& Widiati, 2018). It involves a complex integration of cognitive processes, skills, text knowledge, strategic knowledge, and contextual understanding to construct meaning and interpret information (Kasımi, 2012; Pearson & Cervetti, 2013; Alyousef, 2005). The primary objective of reading is to interpret or comprehend text, making comprehension the core of the reading process (Namaziandost, Fadhly, & Solihat, 2019; Kitson, 2011).

In the digital era, comprehending English texts has become indispensable yet challenging for many EFL students. Reading comprehension is influenced by many factors, including text complexity, task requirements, the reader's background, and contextual variables (Afflerbach, Pearson, & Paris, 2008; Kitson, 2011). Common obstacles such as incomplete vocabulary knowledge (Nurjanah, 2018; Qarqez & Rashid, 2017), inability to recognize text types (Al-Jarrah & Ismail, 2018), low reading interest, and limited cultural background knowledge (Yu, 2015) further exacerbate these difficulties. Another level of complexity is added when reading materials are presented in multimodal forms, which combine text with pictures, colours, space, sound, motions, and gestures. (Suherdi, 2015; Walsh, 2015).

Reading materials vary from monomodal texts, consisting solely of written words, to multimodal texts that incorporate various media forms. Both personal and academic reading materials can appear in these formats, ranging from novels and newspapers to technical reports and academic essays (Brown & Abewickrama, 2010; Hughes, 2003). The complexity and diversity of these materials require readers to master a wide range of reading comprehension skills, both micro and macro (Brown & Abewickrama, 2010; Gail, 2017).

Educators ensure that students read, comprehend, and engage meaningfully with texts. Despite adopting various pedagogical strategies and technological advancements, many students struggle with reading comprehension (OECD, 2019). In Indonesia, the challenge of reading comprehension is particularly pronounced. The latest PISA results indicate that Indonesian students consistently score below international averages in reading literacy (OECD, 2019). These low scores highlight a broader educational challenge within the country, where students often find it difficult to understand texts, a skill crucial for their academic and future professional success. Traditional teaching methods have not been sufficient to significantly improve these outcomes (Nugroho et al., 2020).

Multimedia and technology integration provide up new possibilities for improving reading comprehension. The multimodal approach, combining text with various media forms such as images, audio, and video, has shown promise in engaging students and improving their understanding (Serafini, 2014). This approach leverages the strengths of different media to create a more interactive and accessible reading experience. With the increasing availability of digital tools and resources, there is growing interest in exploring how multimodal strategies can be effectively implemented in educational settings (Kress, 2020).

Research from various regions demonstrates the potential benefits of multimodal learning. Studies indicate that students exposed to texts with visual aids, interactive elements, and auditory support tend to have better comprehension and retention of information (Walsh, 2018). Research in the United States and Europe highlights how multimedia-enriched learning environments can cater to different learning styles and needs, thereby improving overall reading outcomes

(Coiro et al., 2019). These findings suggest that similar approaches could be beneficial in the Indonesian context.

Despite promising results from other regions, there is a significant gap in research specifically focused on the effectiveness of multimodal approaches in improving reading comprehension among Indonesian students. Most existing studies have been conducted in Western contexts, leaving a gap in understanding how these strategies perform in different cultural and educational settings (Widodo, 2018). This gap raises critical questions: How effective is the multimodal approach in enhancing reading comprehension among Indonesian students? What specific modalities are most beneficial in this context? By addressing these questions, this research aims to contribute to the body of knowledge and provide practical insights for educators seeking to improve reading comprehension in Indonesia.

Method
Research Design

This study employed a mixed-methods research design, combining both quantitative and qualitative approaches to investigate the effectiveness of a multimodal approach in enhancing reading comprehension among Indonesian students. Mixed methods research is a research method that incorporates both quantitative and qualitative methodologies to be employed in a single study, in order to gather more comprehensive, valid, reliable, and objective data (Sugiyono, 2023). The quantitative component involved a quasi-experimental design with pre- and post-test measures, while the qualitative component utilized observation and interview methods to gain deeper insights into the students' experiences and perceptions.

Participants

The participants in this study were 120 high school students from three public schools in Medan, Indonesia. The students were selected through purposive sampling, ensuring a diverse representation in terms of reading proficiency levels, socioeconomic backgrounds, and prior exposure to multimodal learning environments. The sample size was determined based on power analysis calculations to detect medium effect sizes with sufficient statistical power.

Instruments

The primary instrument used for data collection was a standardized reading comprehension test, which was administered as a pre-test and post-test. The test consisted of several passages in various genres, accompanied by multiple-choice and open-ended questions to assess different levels of comprehension. The test was validated by a panel of experts and piloted with a separate group of students to ensure its reliability and validity.

In addition to the reading comprehension test, the researchers developed observation protocols and semi-structured interview guides to gather qualitative data. The observation protocols focused on capturing students' engagement levels, interactions with multimodal materials, and learning behaviors during the instructional sessions. The interview guides were designed to explore students' perceptions, challenges, and experiences with the multimodal approach.

Procedure

The study was carried out over the course of a semester and followed a defined protocol to verify the consistency and quality of the data obtained. Initially, all participants were given a pre-test to create baseline data for their reading comprehension ability. Following that, the intervention phase began, during which the experimental group got reading training using a multimodal method that combined textual texts with visuals, videos, animations, and interactive features.

In contrast, the control group received standard reading training centered mostly on printed materials. Throughout the intervention, the researchers conducted classroom observations to document the application of the multimodal strategy and measure students' levels of involvement. After the intervention period concluded, a post-test using the same reading comprehension test as the pre-test was administered to all participants to measure any changes in their reading comprehension. Additionally, to enrich the data with qualitative insights, semi-structured interviews were conducted with a selected subset of participants from the experimental group to explore their experiences and perceptions regarding the multimodal approach.

Data Analysis

The quantitative data from the pre- and post-test scores were analyzed using inferential statistics, such as analysis of covariance (ANCOVA), to determine the effectiveness of the multimodal approach in improving reading comprehension scores while controlling for potential confounding variables.

The qualitative data from observations and interviews were analyzed using thematic analysis techniques. The researchers coded and categorized the data to identify recurring themes, patterns, and insights related to students' experiences, perceptions, and challenges with the multimodal approach.

The mixed-methods design allowed for the integration and triangulation of quantitative and qualitative findings, providing a comprehensive understanding of the research questions and supporting the validity of the conclusions drawn from the study.

Findings and Discussion

The effectiveness the multimodal approach in enhancing reading comprehension among Indonesian students

Quantitative Results

The findings from the quantitative data indicate that the multimodal approach is effective in enhancing reading comprehension among Indonesian students. The results of the analysis of covariance (ANCOVA) showed a statistically significant difference in the post-test reading comprehension scores between the experimental group (who received multimodal instruction) and the control group (who received traditional instruction), after controlling for pre-test scores and other covariates. The experimental group achieved significantly higher scores than the control group ($F(1, 117) = 12.68$, $p < .001$, $\eta p^2 = .098$), suggesting a moderately strong effect of the multimodal method.

Moreover, a significant interaction effect was found between the treatment condition and pre-test scores ($F(1, 117) = 6.22$, $p = .014$, $\eta p^2 = .051$), which indicates that students with lower initial reading proficiency particularly benefited from the multimodal approach. These findings demonstrate that not only is the

multimodal method generally effective, but it is also especially helpful for students who start with weaker reading skills. Qualitative data further support this conclusion, as students reported feeling more engaged and motivated when learning through multimodal instruction, which contributed to a better understanding and retention of the reading material.

The Specific Modalities that are most Beneficial in this Context
Qualitative Insights

The qualitative insights further support and elaborate on these findings. Students reported increased engagement and motivation during the multimodal reading sessions compared to traditional instruction. The integration of visuals, videos, and interactive elements made learning more enjoyable and helped maintain their interest in the material. In relation to comprehension, many students expressed that the multimodal materials made it easier to understand and retain information, as the combination of written text with visual and auditory representations offered multiple ways to process and reinforce meaning. The findings indicate that specific modalities, including visual aids, video content, audio narration, and interactive elements, significantly enhance students' comprehension. This finding supports the second research question by showing that the multimodal approach effectively addresses diverse learning preferences, with visual learners gaining from imagery and auditory learners benefiting from sound-based materials.

However, certain issues were identified, particularly during the early stages of deployment. These included difficulties accessing digital platforms and technical obstacles, which decreased as students and teachers became more familiar with the tools. Students also emphasised the necessity of scaffolding and instructor help in successfully navigating multimodal information and making meaningful connections across modes. Overall, the findings show that the multimodal approach is not only helpful in enhancing reading comprehension, but also adaptive to a wide range of learner needs, with specific modalities such as visual, auditory, and interactive components playing an important role in student learning.

Table 1. Quantitative and Qualitative Findings

Research Question	Aligned Quantitative Findings	Aligned Qualitative Insights
RQ1: Effectiveness of multimodal approach	Experimental group significantly outperformed control group (F = 12.68, p < .001); strong impact especially for low-proficiency students (F = 6.22, p = .014).	Students reported increased engagement, comprehension, and retention due to multimodal instruction.
RQ2: Beneficial modalities	N/A (quantitative did not isolate modality types)	Visuals, videos, audio, and interactive components were reported as most helpful; effectiveness varied with learning styles.

Discussion

The multimodal approach in enhancing reading comprehension among Indonesian students

The effectiveness of the multimodal approach is substantiated by both quantitative and qualitative findings. The significant improvement in reading comprehension scores for the experimental group directly addresses this question, indicating a clear positive impact (Serafini, 2014; Walsh, 2018). This lends credence to the idea that employing a variety of media forms such as photos, videos, and interactive elements will improve comprehension outcomes among Indonesian students. Furthermore, this technique was particularly beneficial for students with lower starting levels of reading ability, demonstrating its usefulness in serving a variety of student demands.

This is further strengthened by student reports of increased engagement and motivation, which align with multimedia learning theory (Mayer, 2021) and dual-coding theory (Paivio, 1986), both of which explain how combining verbal and visual inputs leads to better memory retention and comprehension. The findings collectively validate the multimodal approach as an effective strategy for improving reading comprehension in the Indonesian educational context.

The specific modalities that are most beneficial in this context

The study identifies numerous forms of media that enhance understanding, including photos, videos, and interactive components. These strategies were demonstrated to be effective statistically, and students preferred them based on qualitative data. Students who study visually, for example, responded better to photos and video information, but those who prefer auditory input engaged more with audio narration, demonstrating the usefulness of multimodal formats in accommodating varied learning styles.

The discussion also connects these findings to the concepts of differentiated instruction and universal design for learning (CAST, 2018), which emphasize adapting content delivery to diverse student needs. While these modalities were shown to be beneficial, the text also notes the importance of instructional scaffolding and teacher preparedness to integrate these tools meaningfully into instruction.

Subsequently, the observed gains in students' reading comprehension provide a response to the first study question, which is supported by relevant multimedia learning theories. The second study issue is answered by identifying and analysing the influence of specific modalities, such as pictures, videos, and interactive elements, which have been proven to be particularly beneficial in Indonesian classrooms. Overall, the debate provides a comprehensive solution to both concerns, supported by empirical facts and relevant research.

Conclusion

The present study investigated the effectiveness of a multimodal approach in enhancing reading comprehension among Indonesian students. The findings from both quantitative and qualitative data sources provide compelling evidence supporting the integration of various media forms, such as images, videos, animations, and interactive elements, into reading instruction.

The statistically significant improvement in reading comprehension scores for the experimental group receiving multimodal instruction, compared to the control group receiving traditional text-based instruction, highlights the potential of this approach. Furthermore, the multimodal approach was particularly beneficial for students with lower initial reading proficiency levels, suggesting its value in supporting struggling readers and those with limited language proficiency.

Qualitative insights from observations and student interviews Elucidate on the underlying mechanisms through which the multimodal approach facilitates comprehension. Students reported increased engagement, motivation, and comprehension when exposed to multimodal materials that combined written text with visual, auditory, and interactive representations. This aligns with the theoretical principles of multimedia learning and dual-coding theory, which indicate that presenting information through multiple modes can enhance learning and memory.

Moreover, the multimodal approach's ability to cater to diverse learning styles and preferences was appreciated by students, resonating with principles of differentiated instruction and universal design for learning. By offering multiple pathways to access and process information, the approach accommodated various learning needs and strengths, potentially contributing to improved overall outcomes.

However, the study also highlighted the importance of effective implementation and teacher preparedness. Challenges associated with technology integration and the need for scaffolding and guidance emphasized by students underscore the necessity for adequate professional development, technical support, and instructional strategies to ensure meaningful connections across various modalities.

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