

## A contextual digital comic-based approach (DCBA) for enhancing multimodal literacy in a rural EFL context

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### Highlights

Students reported that the digital comic was easier to understand than the textbook they usually used in class. The visual elements, such as images and character expressions, helped them follow the story and grasp meaning even when they did not fully understand the written text. These visual cues supported comprehension and made reading English feel more accessible.

**ABSTRACT:** Research on digital media in English literacy has largely emphasized technological effectiveness while overlooking the role of learners' sociocultural context, particularly in non-urban settings. This study develops and evaluates a contextual Digital Comic-Based Approach (DCBA) designed for junior high school students in a rural coastal area of Southeast Sulawesi. Using a mixed-methods explanatory sequential design, the study involved 13 eighth-grade students and combined pre- and post-tests with semi-structured interviews. Quantitative analysis indicated an increase in students' mean literacy scores from 33.08 to 41.54, with a mean difference of 8.46 points. A paired-samples t-test showed that the improvement approached statistical significance,  $t(12) = -2.13$ ,  $p = .055$ , with a moderate effect size ( $d = 0.59$ ). Qualitative findings revealed that students relied primarily on visual elements such as images, layout, and character expressions as central semiotic resources for constructing meaning, enabling them to compensate for limited linguistic proficiency. Engagement emerged from the coordinated orchestration of visual and textual modes grounded in students' coastal lived experiences, which reduced cognitive barriers and supported vocabulary and pronunciation development through contextualized input. These findings suggest that the pedagogical value of digital comics in under-resourced EFL contexts lies less in immediate statistical gains and more in their capacity to mediate meaning-making through contextual multimodal design. The study contributes to multimodal literacy research by demonstrating how socially situated visual orchestration can expand textual accessibility for beginner learners and offers a context-responsive model for digital material development in rural EFL education.

**Keywords:** contextual learning; digital comic-based approach; English literacy; junior high school; rural coastal education

## Introduction

Reading literacy is a central component of English as a Foreign Language (EFL) education, underpinning learners' academic achievement, language development, and long-term learning capacity. Despite its importance, many EFL learners continue to face difficulties in reading comprehension due to limited exposure to meaningful texts, insufficient instructional strategies, and persistent linguistic barriers (Ali et al., 2019; Ali et al., 2022; Habok & Magyar, 2019). Contemporary perspectives further conceptualize reading literacy as a multidimensional construct that extends beyond cognitive and linguistic processes to include sociocultural and digital dimensions (Iswati, 2022; Li et al., 2023; Stankić & Jakovljević, 2022). Although effective instruction is expected to integrate strategic teaching, critical literacy, and digital competence (Al-Hawamdeh, 2025; Robiasih & Hastuti, 2023), a consistent gap remains between these theoretical expectations and actual classroom practices, often due to limitations in teacher preparation and the rapidly evolving demands of digital learning environments (Fuchs, 2019; Vaisman & Kahn-Hortwitz, 2020).

Within this context, research on literacy in EFL has increasingly focused on the role of technological interventions in supporting learners' reading literacy development. A significant body of work has examined the implementation of digital tools and pedagogical models (Bizami et al., 2023; Fan, 2023), showing that approaches such as digital storytelling can promote learner agency and ownership of meaning-making (Churchill, 2020; Roy & Bhavani, 2025), while gamified environments enhance motivation and digital skill development (Alt & Raichel, 2020). At a more advanced level, virtual exchange programs extend literacy practices by fostering intercultural awareness and critical engagement with texts (Bilki et al., 2023). In parallel, multimodal materials, particularly digital comics, have been shown to support reading comprehension and vocabulary acquisition by integrating visual and textual elements that make meaning more accessible for learners with limited proficiency (Cimermanová, 2015; Golding & Verrier, 2021; Rizcallah & Parlak, 2025; Tsene, 2022). These findings collectively indicate a shift toward understanding literacy as a multimodal and interactive process rather than a purely text-based activity.

However, despite these developments, existing research often evaluates digital tools in isolation from learners' sociocultural contexts, implicitly treating classrooms as neutral environments (Pratiwi & Waluyo, 2023; Singh, 2021). This limitation is significant because learners' engagement with digital texts is shaped by their social experiences, cultural norms, and local conditions. For instance, students' participation in digital learning is influenced by family roles, gender expectations, and broader societal structures, which affect both engagement and emotional responses to learning (Aladsani, 2024). Furthermore, learners' understanding of literacy itself is mediated through personal and cultural frameworks that shape how texts are interpreted and valued (Tham et al., 2021). These insights suggest that digital literacy should be understood not merely as the use of technological tools, but as a socially situated process of meaning-making.

From a theoretical perspective, this argument aligns with the concept of multimodality, which views meaning as constructed through the coordinated use of multiple semiotic

resources such as language, images, and layout (Kress, 2003). Grounded in Halliday's (1978) view of language as a social semiotic system and extended by Hodge and Kress (1988), multimodality emphasizes that meaning emerges through socially shaped practices rather than fixed representations. Jewitt and Kress (2010) further explain that meaning is produced through multimodal orchestration, in which different modes contribute distinct affordances that must be understood in relation to the interests and contexts of meaning-makers. Empirical research supports this perspective, showing that multimodal approaches enhance vocabulary acquisition, reading comprehension, and learner engagement across educational settings (Li et al., 2022; Pan & Zhang, 2020; Rahmanu & Molnár, 2024), while also supporting affective dimensions such as motivation, participation, and confidence (Hafner & Ho, 2020; Kohnke et al., 2021; Unsworth & Mills, 2020). At the same time, the effectiveness of multimodal materials depends on learners' digital literacy, including their ability to navigate, interpret, and engage with multimodal texts (Chiu et al., 2022; Reddy et al., 2023; Tinmaz et al., 2022). In under-resourced contexts, challenges such as limited access, uneven digital experience, and insufficient instructional design continue to constrain the use of digital tools, raising concerns about equity in digital literacy education (Alakrash & Abdul Razak, 2021; Mudra, 2020; Savva, 2022).

These issues are particularly evident in the Indonesian context, where reading literacy development remains a persistent challenge. Since the early 2000s, literacy has gained increasing attention (Isnarti, 2010; Lowenberg, 2000), yet national and international assessments continue to show limited progress. Data from PISA 2022 indicate that Indonesia's reading performance remains low, with only a small proportion of students reaching minimum proficiency levels (Amelia et al., 2024; OECD, 2023). These challenges are more pronounced in rural and coastal areas, where limited access to resources, inconsistent curriculum implementation, and minimal exposure to English constrain literacy development (Salim & Hanif, 2021; Laila et al., 2023; Khulel, 2021; Zein et al., 2020). Although Indonesian learners are often familiar with digital technologies, this familiarity does not necessarily translate into strong literacy skills, as difficulties in vocabulary and reading comprehension persist (Hartono & Prima, 2022). Moreover, while digital competence has contributed to academic development in higher education contexts (Rinesko et al., 2021), its application in school-level literacy instruction remains uneven and often disconnected from learners' local realities.

Despite the recognized potential of digital tools, including comics and storytelling platforms, their implementation in Indonesian EFL classrooms often lacks contextual grounding (Kaptan & Cakir, 2025; Kumar & Dhar, 2024; Yang et al., 2022). Few studies have explored how digital learning materials can be designed based on learners' sociocultural and environmental contexts, particularly in rural settings (Kumpulainen et al., 2020; Maulina et al., 2022). As a result, the potential of multimodal digital resources to support literacy development remains underutilized, especially for learners who require contextualized support to access meaning effectively.

In response to this gap, the present study examines a contextualized Digital Comic-Based Approach (DCBA) designed for junior high school students in a rural coastal EFL setting. Rather than treating digital comics as neutral instructional tools, this study investigates

how multimodal resources, when grounded in learners' sociocultural experiences, can mediate meaning-making and support literacy development. By integrating visual and textual elements with locally relevant content, the study aims to reduce cognitive barriers and make English texts more accessible for beginner learners. In doing so, it offers a context-responsive and theoretically grounded contribution to the field of multimodal literacy, emphasizing that the effectiveness of multimodal instruction depends not only on technological design but also on its alignment with learners lived realities.

## **Method**

### **Design**

This study employed a mixed-methods research design with an explanatory sequential orientation to examine the implementation of a contextual digital comic in English literacy instruction. The design was chosen to allow quantitative and qualitative data to serve complementary purposes: the quantitative component assessed changes in students' literacy performance following the intervention, while the qualitative component explored students' learning experiences in order to explain and contextualize the quantitative outcomes.

In the first phase, quantitative data were collected to identify patterns of change in students' literacy achievement after exposure to the digital comic-based instruction. This phase provided an initial indication of the pedagogical impact of the intervention. In the second phase, qualitative data were gathered to investigate how students engaged with and made meaning from the digital comic which offer insight into the learning processes underlying the observed performance trends.

### **Instrument**

The literacy test was administered before and after the implementation of the Digital Comic-Based Activity (DCBA) to examine changes in students' English literacy performance. DCBA is rigorously defined as a literacy-focused pedagogical framework that utilizes digital comics embedded with cultural context as multimodal texts to scaffold comprehension, inspire students, and systematically integrate reading and writing assignments into English instruction (Maulina et al., 2025). The test focused on basic reading comprehension and vocabulary understanding appropriate to the students' proficiency level and instructional content. The pre-test and post-test were designed to capture learning progress associated with the intervention rather than to produce large-scale generalizable results.

The qualitative data were collected through semi-structured interviews. The interviews aimed to explore students' perceptions of learning with the digital comic, particularly in relation to comprehension, engagement, vocabulary, and pronunciation. Open-ended questions allowed students to describe how the visual and textual elements of the comic supported their learning experiences.

### **Participants**

The participants in this study were 13 eighth-grade students from a state junior high school, hereafter referred to by a pseudonym, located in a rural coastal area of Southeast

Sulawesi. The study was carried out at the start of the second semester of the 2024/2025 school year. The specific class was selected randomly from the available eighth-grade classes at the school. The participant group consisted of four male and nine female students. Based on a preliminary assessment and teacher evaluation, all students were identified as beginners in terms of their English language proficiency. Prior to the study, formal research permission was obtained from the local government, which was then presented to the school principal to secure official approval for conducting the research on school premises. Informed consent was also secured from the parents or guardians, and assent was given by the students themselves to voluntarily participate in the research.

### **Data collection**

Quantitative data were collected using a pre-test and post-test designed to measure students' English literacy performance. The tests focused on basic reading comprehension and vocabulary appropriate to the participants' proficiency level. Content validity of the tool was established using Aiken's (1980), ensuring alignment between test items and instructional objectives.

The pre-test was conducted prior to the introduction of the digital comic, while the post-test was given afterwards to the intervention period to evaluate improvements in students' literacy performance.

Qualitative data were gathered via semi-structured interviews with six purposefully selected students to represent varying levels of engagement and performance. The interview questions explored students' experiences using the digital comic, focusing on comprehension, engagement, and perceived language development. All interviews were conducted after the completion of the intervention.

### **Data analysis**

Quantitative data from the pre-test and post-test were evaluated with a paired-samples t-test to discover if a statistically significant difference existed between students' mean scores prior to and subsequent to the intervention. Effect size was calculated to examine the magnitude of change in literacy performance.

Qualitative interview data were analyzed thematically using Braun and Clarke's (2006) six-phase framework: familiarization with the data, initial coding, theme identification, theme review, theme definition, and reporting. The analysis was guided by a multimodal literacy framework (Jewitt & Kress, 2010), focusing on six key concepts: metafunctions, mode, semiotic resources, modal affordances, interest, and multimodal orchestration. These concepts were used as sensitizing lenses to interpret how students constructed meaning and experienced learning through the digital comic.

## **Findings and Discussion**

### **Findings**

#### **DCBA effectiveness in improving students' literacy**

Pre-test and post-test were carried out on this research and then the researchers counted the average scores to know whether to determine whether the literacy level of the students improved as a result of the DCBA's implementation. Tabel 1 shows the results of the pre-test and post-test using the DCBA.

Table 1

*DCBA pre-test and post-test result*

	Pre-test	Post-test
<b>Game started on</b>	Monday, 21 July 2025	Tuesday, 5 August 2025
<b>Number of students</b>	13	13
<b>Class accuracy</b>	29%	39%
<b>Mean</b>	33,0769	41,5385

A paired-samples t-test compared students' literacy scores before and after using the digital comic. Post-test scores ( $M = 41.54$ ) were higher than pre-test scores ( $M = 33.08$ ). The difference was not statistically significant,  $t(12) = -2.13$ ,  $p = .055$ . The effect size was medium ( $d = 0.59$ ), indicating that the improvement was practical but not statistically confirmed. The small sample size likely reduced the power of the test. Table 2 summarizes the statistical results.

Table 2

*Result of the paired samples T-test*

	Mean Difference	Std. Error Difference	t	df	Sig. (2-tailed)	Lower	Upper
Pre-test post-test	-8.46154	3.978	-2.127	12	0.055	-17.13	0.20865

The confidence interval crossed zero, showing that the improvement cannot be considered statistically reliable due to the limited sample size. These findings suggest potential benefits that should be examined with a larger sample in future research.

### **Students' Voices on the use of DCBA**

The interviews produced three themes that explain how students experienced the digital comic's usage in their English class: (1) visual support for comprehension, (2) increased engagement through design, and (3) perceived development in vocabulary and pronunciation.

#### *Visual Support for Comprehension*

Students consistently identified the visual features of the digital comic, such as the images, character expressions, and page layout, as the key elements that supported their understanding. This pattern appeared in every interview and showed how strongly they relied on visual support when engaging with English content. They often compared the comic with their regular textbook, which they described as dense and difficult to interpret because their exposure to English texts is limited. P4 explained:

*“It makes me easier to understand the material because there are pictures that can show the situation. So, even though I don't*

*understand the whole sentence, I can still get the point of the comic.” (P4)*

P1 echoed this view, emphasizing that the comic’s visual cues reduced the cognitive load required to process the English text:

*“The topic in the comic is interesting, and there are pictures also, so the material is easy to understand.” (P1)*

P3 added that the comic helped them follow the storyline in a way that felt more concrete than their usual reading materials:

*“It looks more real when I learn English using digital comic, so it’s easier to follow the story.” (P3)*

The students’ accounts indicate a clear reliance on non-linguistic cues to make sense of the text, which aligns with their limited exposure to authentic English reading materials in a rural school setting. The visuals in the comic were not an added aid; they formed the main route through which students accessed meaning. Students used the images to predict events, infer unfamiliar vocabulary, and rebuild the storyline when they were unable to decode whole sentences. Their responses show that the visual mode filled gaps in their linguistic knowledge and allowed them to work with English material that would normally be beyond their reach. In a context where limited resources often hinder literacy development, the visual support within the comic acted as an essential link between unfamiliar English input and the comprehension strategies they already possessed.

Although students consistently described the comic as engaging and enjoyable, their comments suggest that engagement was primarily associated with visual appeal and ease of participation rather than deeper linguistic processing. Increased motivation may have encouraged students to interact more willingly with English materials; however, engagement alone does not guarantee immediate literacy development. As a result, the positive emotional response generated by the comic may have contributed to improvement while still requiring longer-term exposure before larger measurable gains could emerge.

#### *Increased Engagement through Design*

Students consistently reported that the digital comic was more engaging than the materials they usually encountered in class. Their explanations focused on the visual design, particularly the colour, clarity, and presentation of the characters. They noted that these features made the content more appealing and helped them sustain attention more effectively than their regular classroom materials. P1 stated:

*“I would rather learn English with a comic than a traditional book.” (P1)*

P6 highlighted the role of visual clarity in sustaining attention:

*“The colours are attractive and the writing is clear.” (P6)*

P2 echoed this sentiment, noting that the design itself supported comprehension and motivation:

*“It’s (the comic) good because the characters are interesting and it is easier to understand the material.” (P2)*

Across interviews, students repeatedly framed engagement not as a matter of willpower but as a direct response to how the material was designed. The comic’s visual coherence and familiar aesthetic reduced the sense of cognitive burden often associated with textbook reading, making students feel more willing to stay focused and participate. The appeal of the comic’s design did not function merely as entertainment; it shaped how students approached the lesson, influenced their emotional response to reading tasks, and ultimately created a learning environment that felt lighter, less stressful, and more inviting.

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#### *Perceived Gains in Vocabulary and Pronunciation*

Students frequently reported that the digital comic supported their vocabulary development, particularly because new words appeared within a clear visual storyline. They explained that the combination of images, context, and dialogue made unfamiliar words easier to recognize and remember. P2 noted:

*“There is an increase my vocabulary because I can understand the word from the picture and the story of the comic.” (P2)*

Similarly, P5 highlighted how the integration of visuals helped them grasp meaning that would otherwise feel abstract in a textbook:

*“I can learn new vocabulary because the picture can show what the word means.” (P5)*

Several participants also linked the comic to improvements in pronunciation. Their comments show that they relied on visual cues and contextual dialogue to form a clearer sense of how expressions should sound. P4 remarked:

*“I also know how to pronounce it because it is shown clearly in the comic.” (P4)*

P6 expressed parallel progress, explaining:

*“There is improvement in the way of reading and pronouncing the words.” (P6)*

Across the interviews, students explained that the comic made vocabulary easier to understand and pronunciation easier to attempt. They felt that the visuals helped them infer meaning without relying only on written text, and the contextual cues in the storyline supported their attempts to say new words. Their responses indicate that the digital comic did more than present language forms. It offered concrete entry points for decoding, interpreting, and producing English in ways that aligned with their current level of proficiency.

Students perceived gains in vocabulary and pronunciation, yet their explanations indicate that these gains were strongly supported by visual context and storyline cues. Participants frequently described understanding words through pictures rather than through direct recognition of textual forms. Similarly, improvements in pronunciation were based on learners' perceptions rather than demonstrated phonological accuracy. These findings suggest that the intervention supported initial language development and confidence in attempting unfamiliar words, but that deeper mastery of vocabulary and pronunciation may require more sustained practice. This may help explain why the quantitative improvement, although educationally meaningful, remained moderate and did not reach statistical significance.

## **Discussion**

The quantitative analysis indicated an improvement in pupils' mean literacy scores following the implementation of the DCBA, accompanied by an intermediate effect size, even though the difference did not attain statistical significance. This pattern suggests that the digital comic supported meaningful learning progress, but that the impact could not be statistically verified, most likely due to the limited sample size. In small-scale classroom-based research, particularly in rural contexts, such findings are common because a small number of participants reduces statistical power despite observable instructional benefits. Therefore, the non-significant finding should not be construed as evidence of ineffectiveness. Instead, the medium effect size points to the practical value of the approach and aligns with previous research indicating that multimodal materials tend to facilitate gradual literacy development rather than immediate large gains (Li et al., 2022; Pan & Zhang, 2020). Within this study, the quantitative results demonstrate the potential impact of DCBA, while the qualitative findings clarify the mechanisms through which this impact is realized in classroom practice.

The first qualitative theme demonstrates that visual elements served as the primary pathway to comprehension for students with limited English proficiency. When linguistic decoding became challenging, students relied on images, character expressions, and layout to infer meaning, indicating that comprehension was achieved through visual interpretation rather than textual mastery. This pattern reflects the concept of modal affordance in multimodality

theory (Jewitt & Kress, 2010), which emphasizes that different modes provide distinct meaning-making potentials. In the digital comic, images effectively represented actions, settings, and emotions, enabling students to construct meaning even without full understanding of the written text. This process aligns with the ideational metafunction, where meaning is built through representations of experience across multiple modes. For learners in a rural coastal context with limited exposure to English texts, the visual mode did not merely support comprehension but functioned as a central semiotic resource that compensated for linguistic gaps. These findings are aligned with prior research indicating that multimodal texts reduce cognitive barriers for beginner learners by distributing meaning across modes rather than relying solely on written language (Golding & Verrier, 2021; Haq et al., 2025; Huang et al., 2022). In this study, such visual support explains why students were able to engage with otherwise inaccessible texts and helps account for the upward trend observed in the post-test literacy scores.

The second theme indicates that students' engagement was strongly shaped by the coordinated use of visual design elements, particularly color, layout, and character presentation. From a multimodal perspective, this pattern reflects multimodal orchestration, in which engagement and meaning arise from the interaction of multiple modes rather than from isolated visual features. Students' clear preference for the comic over the textbook also illustrates the concept of interest as proposed by Jewitt and Kress (2010), which emphasizes that learners' engagement is socially and culturally shaped. In this study, the comic's familiar visual style and contextualized content aligned with students' everyday experiences, reducing emotional resistance toward English learning and reframing reading as a more approachable activity. Importantly, students did not describe their engagement as mere entertainment; instead, they emphasized improved focus and willingness to participate because the material felt lighter and clearer. This finding supports prior research demonstrating that multimodal materials enhance affective engagement, which helps sustain attention and facilitates learning over time (Kohnke et al., 2021; Rahmanu & Molnár, 2024), and likely contributed indirectly to the literacy gains observed in this study.

The third theme indicates that students perceived improvements in vocabulary and pronunciation through their interaction with the digital comic. From a multimodal literacy perspective, this finding can be explained through the concept of sign-making, where learners actively interpret and reconstruct meaning by drawing on multiple semiotic resources simultaneously. Students did not learn vocabulary as isolated items; instead, they connected new words to images, actions, and narrative context embedded in the comic. This process aligns with previous research showing that multimodal input supports deeper lexical processing and retention by anchoring language in meaningful and contextualized representations (Li et al., 2022). Although pronunciation gains were self-reported, students' accounts suggest that visual context and dialogue structure supported their confidence in attempting spoken language (Lar & Maulina, 2021). These qualitative insights help explain why literacy scores increased despite modest statistical results, as vocabulary and pronunciation development often precede measurable gains in reading comprehension, particularly among beginner learners. In this way,

the digital comic functioned as a bridge between receptive understanding and emerging productive skills.

A key contribution of this study lies in its contextualized multimodal approach. By grounding the digital comic in students' coastal environment, the DCBA aligned multimodal resources with learners' sociocultural realities, allowing meaning-making to emerge from familiar experiences rather than abstract or urban-centered content. This finding supports the argument that multimodal literacy is not simply about combining multiple modes, but about selecting and orchestrating modes in ways that resonate with learners lived experiences and social contexts (Jewitt & Kress, 2010; Kress, 2003). In under-resourced rural settings, where textbooks often reflect distant urban norms, contextual multimodal materials provide a practical pathway toward more inclusive and accessible literacy instruction. The results indicate that when multimodal design is paired with contextual relevance, students are more likely to engage with texts, sustain attention, and construct meaning effectively, even when structural limitations restrict large-scale measurable gains.

## **Conclusion**

This study examined the implementation and evaluation of a contextual Digital Comic-Based Approach (DCBA) to support English literacy among junior high school students in a rural coastal EFL context. Quantitative findings indicated that students' mean literacy scores increased from 33.08 to 41.54, yielding a mean gain of 8.46 points. Although the paired-samples t-test did not reach conventional statistical significance,  $t(12) = -2.13$ ,  $p = .055$ , the moderate effect size ( $d = 0.59$ ) indicates meaningful practical improvement within a small-sample classroom setting and suggests instructional potential that merits further investigation. Qualitative findings clarified the learning processes underlying this improvement, showing that students relied on images, layout, and character expressions as central semiotic resources to construct meaning and compensate for limited linguistic proficiency. Engagement emerged from the coordinated orchestration of visual and textual modes grounded in students' coastal lived experiences, which reduced cognitive barriers and supported vocabulary development and pronunciation attempts through contextualized input. These results indicate that the value of DCBA lies less in immediate statistical gains and more in its capacity to mediate meaning-making through contextual multimodal design. The study provides empirical support for multimodal literacy principles articulated by Jewitt and Kress (2010) by demonstrating how visual modes function as primary meaning-making resources for beginner learners in under-resourced settings. While the limited sample size, short intervention duration, and reliance on self-reported pronunciation constrain generalizability, the findings offer a context-responsive model for integrating multimodal digital materials into rural EFL instruction and establish a foundation for larger-scale investigation.

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