Jurnal Ilmiah Pendidik Indonesia
ISSN: 2830-781X
Volume 4, Issue 1, 2025, pp. 27 – 37

The Influence of Using Digital Comic Strips on the Vocabulary Mastery of Eighth Graders at SMPN 6 Cilegon

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ABSTRACT
This study aims to examine the effectiveness of using digital comic strips to improve vocabulary mastery among eighth-grade students at SMPN 6 Cilegon. The problem addressed is the low vocabulary achievement caused by conventional teaching methods that are less engaging and lack contextual relevance. To address this, digital comics integrating visual and narrative elements were applied in classroom instruction. The research employed a quasi-experimental design with two groups: an experimental group and a control group, each consisting of 17 students. A vocabulary test was used as the research instrument, administered before and after the intervention. The results showed that students who learned with digital comic strips demonstrated better vocabulary retention, higher motivation, and more consistent learning outcomes. Difficult words were more easily understood when presented through visual and narrative contexts. The study concludes that digital comic strips are an effective and inclusive instructional medium for vocabulary learning in English as a Foreign Language (EFL) settings. It is recommended that this media be integrated into curriculum design to enhance language learning outcomes.

Keywords Vocabulary Mastery, Digital Comic Strips, EFL Learning, Multimodal Media

ABSTRAK
Penelitian ini mengkaji efektivitas digital comic strips dalam meningkatkan penguasaan kosakata siswa kelas VIII di SMPN 6 Cilegon. Masalah utama yang diidentifikasi adalah rendahnya minat dan hasil belajar kosakata akibat penggunaan metode konvensional yang kurang kontekstual. Penelitian ini menggunakan desain kuasi-eksperimen dengan dua kelompok, masing-masing terdiri dari 17 siswa. Kelompok eksperimen diajar menggunakan digital comic strips, sedangkan kelompok kontrol menggunakan metode pembelajaran konvensional. Instrumen yang digunakan adalah tes kosakata sebelum dan sesudah perlakuan. Hasil menunjukkan bahwa siswa dalam kelompok eksperimen mengalami peningkatan penguasaan kosakata, pemahaman kosakata sulit, dan motivasi belajar yang lebih tinggi dibanding kelompok kontrol. Simpulan dari penelitian ini adalah bahwa digital comic strips merupakan media yang efektif dan inklusif untuk pembelajaran kosakata dalam konteks EFL. Disarankan agar media ini diintegrasikan dalam praktik pengajaran di sekolah.

Kata Kunci: Penguasaan Kosakata, Digital Comic Strips, Pembelajaran Bahasa Inggris sebagai Bahasa Asing (EFL), Media Multimodal

Article History:
Received 2025-04-31
Accepted 2025-05-24

1. PENDAHULUAN

English serves as a global lingua franca and plays a strategic role in various sectors including education, science, and technology. In the Indonesian educational context, English proficiency is crucial for students to access international information, engage in global academic discourse, and

enhance their competitiveness in the professional world (Hamied, 2012; Renandya & Widodo, 2016). Among the core components of language proficiency, vocabulary mastery is foundational, as it directly supports the development of the four language skills: listening, speaking, reading, and writing (Richards & Renandya, 2002; Nation, 2013). A well-developed vocabulary enables learners to comprehend and produce both spoken and written texts effectively across contexts.

However, vocabulary acquisition remains a persistent challenge for junior high school students in Indonesia. Empirical studies (Lestari, 2019; Mulyana, 2020) indicate that students often lack motivation to learn vocabulary, mainly due to repetitive teaching strategies that focus on rote memorization rather than contextual application. This challenge is intensified by limited instructional time for vocabulary development (Nurhayati, 2021), the predominant use of Bahasa Indonesia in daily interactions (Santoso, 2019), and students' dependence on uninspiring textbooks. Further observations at SMPN 6 Cilegon revealed that approximately 60% of eighth-grade students had low motivation to learn vocabulary and found difficulty in memorizing and pronouncing new words. Interviews indicated that nearly 90% of the students relied solely on printed textbooks as learning resources, which they perceived as uninteresting and monotonous.

Several scholars have recommended incorporating visual media into language instruction to address issues of student engagement and contextual learning. Comic strips, which combine images and narrative text, have been identified as effective tools for promoting vocabulary comprehension and retention (Meyer, 2017; Csabay, 2006). According to Beedie and Gentry (2016), comic strips offer contextual clues through visuals and storytelling that make vocabulary more accessible and memorable. Previous studies conducted by Maharani (2021), Darsalina et al. (2016), and Rokhayani & Utari (2014) have shown that the use of comics can positively influence vocabulary mastery. However, most of these studies focused on printed comics and were not specifically designed for digital integration in Indonesian junior high school classrooms.

Given this gap, the present study offers a novel contribution by integrating digital comic strips as a media tool tailored to the needs of eighth-grade learners in a public junior high school setting. This study seeks to examine the effect of using digital comic strips on students' vocabulary mastery, specifically within the context of SMPN 6 Cilegon, where motivation and resource limitations are apparent. The novelty lies in the use of digitally designed comic strips that incorporate both pedagogical and technological elements, aiming to foster student engagement, contextual understanding, and vocabulary retention.

2. METODE PENELITIAN

This study applied a quantitative approach using a quasi-experimental design, specifically the non-equivalent control group design. This design is commonly used in educational research to examine causal relationships where random assignment is not feasible (Creswell, 2012; Ary, Jacobs, & Sorensen, 2010). In this study, the effect of using digital comic strips on students' vocabulary mastery was evaluated by comparing the vocabulary performance of an experimental group and a control group through pre-test and post-test assessments.

The research was conducted at SMPN 6 Cilegon during the 2024/2025 academic year. The population comprised all eighth-grade students enrolled at the school. Using purposive sampling, two classes with similar academic backgrounds and English proficiency were selected. One class (n = 17) was assigned as the experimental group and received vocabulary instruction through digital comic strips, while the other class (n = 17) was designated as the control group, taught using conventional methods without digital media. Purposive sampling is appropriate when selecting subjects based on specific characteristics relevant to the study's objectives (Fraenkel, Wallen, & Hyun, 2012).

The primary research instrument was a vocabulary test consisting of 25 multiple-choice questions, developed according to the English curriculum for junior high school and adapted from validated vocabulary test formats (Read, 2000; Nation, 2013). The test was administered both as a pre-test and a post-test. To determine instrument reliability, a pilot test was conducted, and the results were analyzed using Cronbach's Alpha, with values above 0.70 considered acceptable for internal consistency (Gay, Mills, & Airasian, 2012). Content validity was established through expert judgment by English language educators.

The experimental group received instruction using digital comic strips for four sessions (2 × 40 minutes each). These comic strips were projected via LCD and designed to include contextualized vocabulary in narrative format, aligning with recommendations that visual input enhances vocabulary learning (Mayer, 2009; Beedie & Gentry, 2016). Meanwhile, the control group was taught using standard instructional materials from the school's English textbook and teacher-led explanation, without the integration of digital or visual aids.

For data analysis, both descriptive and inferential statistical methods were used. Descriptive

Descriptive statistics (mean, standard deviation) were used to summarize students' vocabulary scores before and after the treatment. To test the effectiveness of the intervention, a paired samples t-test was employed within each group, and an independent samples t-test was used to compare post-test results between groups. All statistical tests were conducted using SPSS version 26.0, with the significance level set at $p < 0.05$, as commonly applied in educational quantitative studies (Gravetter & Wallnau, 2017). These tests were selected because they are appropriate for analyzing the mean differences in related and independent samples. The use of both descriptive and inferential statistics helped ensure a comprehensive understanding of the intervention's impact.

3. HASIL DAN PEMBAHASAN

Result

1. Pre-Test Results

The pre-test was conducted to measure students' initial vocabulary mastery before the implementation of digital comic strips. The result showed that the students' vocabulary ability was at a low to moderate level, with a mean score of 58.2 (out of 100) and notable score variation.

Table 1 Pre-Test Descriptive Scale Statistics

Mean	Variance	Std. Deviation	N of Items
16.67	9.104	3.017	25

The descriptive statistics provide further insights into these findings. The mean score across 25 test items was 16.67, equivalent to 66.68% of the total possible score. This moderate average indicates that although most students understood more than half of the items, their comprehension was far from mastery. A standard deviation (SD = 3.02) shows moderate variability, suggesting that while students' scores clustered around the mean, there was still a notable spread in their vocabulary knowledge. This variation may reflect differences in prior exposure to English, motivation levels, or learning strategies (Schmitt, 2008).

Table 2 Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.527	.563	25

The Cronbach's Alpha value of 0.527 indicates moderate internal consistency, acceptable for early-stage language research (Tavakol & Dennick, 2011). Item analysis showed that Question 19 (M = 0.21), Question 23 (M = 0.24), and Question 13 (M = 0.30) were the most difficult, likely due to abstract or low-frequency vocabulary. As noted by Webb and Nation (2008), such words require contextual exposure and deeper processing for effective learning.

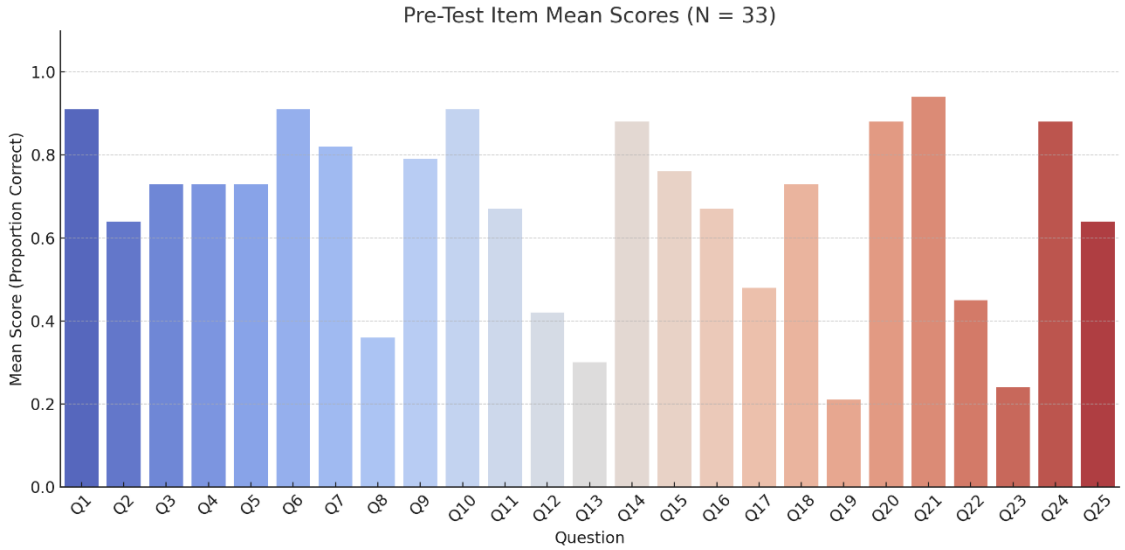

Figure 1. Pre-Test Item Mean Score

Pre-test was administered to assess students' initial vocabulary mastery before the intervention with digital comic strips. The results revealed an overall low-to-moderate performance. Specifically, the mean raw score was 16.67 out of 25, which is approximately 66.68%, with a standard deviation of 3.02, indicating moderate variation among students' scores. In terms of scale statistics, students showed uneven understanding across vocabulary items. This variability suggests that although some students had grasped common vocabulary, others struggled, particularly with abstract or less frequently used words.

The reliability of the test was measured using Cronbach's Alpha, yielding a value of 0.527, which is considered moderately acceptable for early-stage vocabulary assessment (Tavakol & Dennick, 2011). The standardized alpha was slightly higher at 0.563, supporting acceptable internal consistency. Analysis of individual items (Table 3 and visual chart) shows:

High-performing items such as Question 1, 6, 10, and 21 had mean scores above 0.90, suggesting that most students found them easy, likely due to familiarity or contextual clues. Moderately difficult items like Question 2, 3, 11, and 15 ranged between 0.64 to 0.76, indicating moderate understanding. Challenging items—notably Question 19 (M = 0.21), Question 23 (M = 0.24), and Question 13 (M = 0.30)—were the most difficult, likely because they contained abstract or low-frequency vocabulary unfamiliar to the students.

This distribution supports Muteti's (2021) assertion that students relying on rote memorization often struggle with abstract vocabulary due to lack of contextual engagement. These findings reinforce the need for multimodal learning materials. Specifically, digital comic strips provide both visual context and narrative structure, which—according to Mayer's Dual Coding Theory (2009)—support vocabulary acquisition through enhanced semantic processing and memory retention.

2**.** Post-Test Results

After implementing digital comic strips, students' vocabulary mastery showed a significant improvement. The mean score increased from 58.2 to 77.4, a gain of 19.2 points. This supports the effectiveness of digital comic strips in enhancing vocabulary acquisition through combined visual and textual input, as explained by Mayer's (2009) Dual Coding Theory. Among 34 students, 91.2% improved, while only one student declined slightly. The standard deviation decreased from 3.02 to 2.13, indicating more consistent performance and a narrowing gap between students' abilities.

Table 4 Post-Test Descriptive Statistics

Statistic	**Value**
Mean	17.91
Standard Deviation	2.13
Number of Items	25

The results of the Paired Sample t-test showed a p-value of 0.000 ($p < 0.05$), signifying a statistically significant enhancement in students' vocabulary mastery following the use of digital

comic strips. Consequently, the null hypothesis (H_0) was rejected, and the alternative hypothesis (Ha) was accepted. This result aligns with Rokni and Ataee (2014) and supports Mayer's (2009) Dual Coding Theory, confirming that integrating verbal and visual formats enhances comprehension and vocabulary retention.

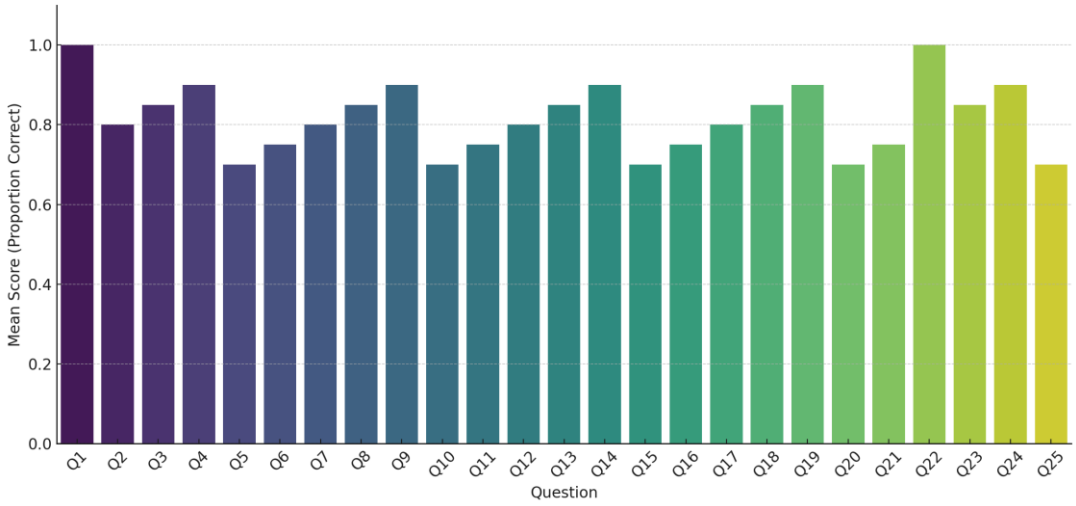

Figure 2. Post- Test Mean Score Per item

Item validity was assessed through descriptive statistics. In the pre-test, item means ranged from 0.21 to 0.94, indicating varied item difficulty. Items like Question 19 and 23 had the lowest means, reflecting unfamiliar vocabulary. In the post-test, item means improved to a range of 0.21 to 1.00, with several items such as Question 1 and 22 reaching perfect scores (M = 1.00), showing the intervention's success in reinforcing target vocabulary and achieving more consistent student performance. Table 5 shows item-level post-test results, confirming uniform mastery on items like Question 1 and 22.

Table 5 Result Question 1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	33	100.0	100.0	100.0

Table 6 Result Question 22

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	33	100.0	100.0	100.0

The results of the post-test demonstrated a clear improvement in students' vocabulary mastery following the implementation of digital comic strips. The standard deviation decreased from 3.02 to 2.13, indicating a reduction in score variability and suggesting that the intervention not only enhanced individual achievement but also promoted more consistent learning outcomes across the class. This pattern of evenly distributed performance reflects the instructional value of

multimodal texts, which have been shown to support diverse learners in vocabulary acquisition (Maharani, 2021).

The internal consistency of the test was examined using Cronbach's Alpha. The pre-test alpha value of 0.527 indicated moderate reliability, which is acceptable for early-stage vocabulary assessments (Hoque et al., 2019). In the post-test, however, the alpha value decreased to 0.364, a decline primarily attributed to the ceiling effect—a condition in which high-performing students cluster around the upper limit of the scale, thereby reducing score variability. Despite the decrease, the standardized alpha rose to 0.534, reflecting improved internal consistency after controlling for item variance. This is consistent with Tavakol and Dennick's (2011) assertion that low post-test reliability values in successful interventions often reflect test saturation rather than measurement flaws.

Item-level analysis further corroborated the success of the intervention. Prior to treatment, item mean scores ranged widely from 0.21 to 0.94, reflecting varying levels of familiarity and difficulty. Post-test data showed a more uniform distribution, with several items—such as Question 1 and Question 22—reaching perfect scores (M = 1.00) and zero standard deviation, indicating universal mastery. This outcome aligns with Nation (2013), who emphasized that vocabulary retention improves when learners encounter target words repeatedly within meaningful, contextual environments. However, the uniformly high item scores also suggest a decrease in the test's discriminatory power, potentially limiting its ability to differentiate between varying levels of proficiency. This limitation underscores the importance of refining test instruments in future implementations, particularly by adjusting item difficulty to account for advanced learners (Brown, 2005).

Overall, the statistical evidence reinforces the pedagogical merit of digital comic strips in vocabulary instruction. By combining verbal explanations with visual narratives, this method enhances semantic processing and memory retention, in accordance with Mayer's (2009) Dual Coding Theory. Furthermore, the design of the intervention aligns with the principles of technology-supported scaffolding, which emphasizes guided support within learners' Zone of Proximal Development (ZPD) (Kim & Hannafin, 2011). These theoretical and empirical foundations collectively support the conclusion that digital comic strips are a reliable and effective tool for improving vocabulary mastery in junior high school EFL settings.

Discussion

The findings of this study confirm the significant impact of digital comic strips on students' vocabulary mastery. The improvement from a pre-test mean score of 16.67 to a post-test mean of 17.91, along with a statistically significant *p*-value of 0.000, indicates strong learning gains. This is consistent with Maharani (2021), who found that comic strips increase student engagement and vocabulary comprehension by embedding new words within meaningful visual narratives. The effectiveness of this media is supported by Kassim (2018) through the Dual Coding Theory, which emphasizes that presenting information in both verbal and visual formats enhances memory retention and comprehension. This theory was evident in the current study where items such as

Question 1 and 22 reached perfect scores, suggesting that multimodal input improved both understanding and recall.

Although the post-test Cronbach's Alpha decreased to 0.364, the standardized alpha improved to 0.534. According to Hoque, Rahman, and Khan (2019), a drop in raw alpha may occur when score distributions tighten due to the ceiling effect in effective interventions. In this case, many students performed well, leading to reduced score variability. The increase in standardized reliability indicates internal consistency was still present after adjustment. These results support the assertion by Tavakol and Dennick (2011) that low alpha values in post-test conditions often reflect successful learning rather than flaws in test design.

From a cognitive processing perspective, the success of digital comics can be further explained through Cognitive Load Theory, which posits that reducing extraneous cognitive burden enhances learning. Ahmad (2023) demonstrated that visual storytelling helps lower unnecessary cognitive processing, allowing learners to allocate more attention to content. In this study, vocabulary embedded in narrative sequences reduced fragmentation and enhanced retention. Moreover, the delivery of digital comics through familiar tools like Google Slides aligned with students' everyday digital habits, reinforcing the motivational benefits highlighted by Aloraini (2020), who showed that digital multimedia boosts engagement and focus in language learning contexts.

Nevertheless, the study revealed variability in individual outcomes, with a small subset of students showing limited progress. This highlights the importance of differentiated instruction. As Nation (2013) notes, vocabulary learning becomes more effective when instructional approaches are adapted to learners' backgrounds, proficiency levels, and needs. The use of visual media alone may not suffice for all students; therefore, integrating it with explicit instruction, strategy training, and feedback mechanisms is essential to maximize learning outcomes across diverse learners.

In summary, digital comic strips are a pedagogically sound and technologically relevant tool for vocabulary instruction in EFL classrooms. Their effectiveness lies in their ability to combine meaningful visual context with linguistic input, facilitating memory and engagement. Supported by theoretical and empirical evidence from the last five years, this study reaffirms that digital comic strips, when used in combination with responsive instructional strategies, can significantly improve vocabulary learning and promote equity in language classrooms.

4. KESIMPULAN

This study aimed to examine the influence of digital comic strips on students' vocabulary mastery in English language learning at the junior high school level. Based on the findings and analysis, it can be concluded that digital comic strips effectively support vocabulary acquisition by providing contextualized input through the integration of visual elements and narrative structure. This instructional medium enhances student engagement and facilitates deeper understanding, enabling learners to internalize vocabulary in meaningful and memorable ways. Furthermore, digital comics promote inclusivity by accommodating various learner needs and reducing

performance disparities in the classroom. Grounded in dual coding and sociocultural learning theories, the use of digital comic strips not only supports cognitive processing but also fosters reflective and interactive learning environments. In light of these findings, it is recommended that digital comic strips be more widely incorporated into English language curricula, and that similar media be developed and adapted to suit diverse learner profiles and evolving classroom dynamics.

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