



# A Comparative of Physical and Digital Flash Card in Vocabulary Mastery at SMP Negeri 1 Baranti

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## Abstract

Penelitian ini membandingkan efektivitas flashcard fisik dan digital dalam penguasaan kosakata bahasa Inggris di SMP Negeri 1 Baranti. Penelitian ini menggunakan metode kuasi-eksperimental dengan desain pre-test dan post-test untuk mengukur peningkatan pemahaman kosakata siswa setelah menggunakan kedua jenis flashcard tersebut. Sampel terdiri dari siswa kelas delapan yang dibagi menjadi dua kelompok, masing-masing menggunakan flashcard fisik atau digital sebagai media pembelajaran. Hasil penelitian menunjukkan bahwa flashcard digital lebih efektif dalam meningkatkan skor post-test dibandingkan dengan flashcard fisik. Namun, berdasarkan kuesioner yang diberikan kepada siswa, sebagian besar lebih memilih flashcard fisik karena tampilannya yang menarik secara visual dan lebih fokus saat digunakan. Di sisi lain, flashcard digital memberikan keuntungan dalam hal aksesibilitas dan fitur audio yang membantu pembelajaran pengucapan.

Penelitian ini menyimpulkan bahwa flashcard digital secara signifikan meningkatkan penguasaan kosakata siswa, meskipun preferensi siswa masih condong ke flashcard fisik. Temuan ini memberikan wawasan bagi pendidik dalam memilih media pembelajaran yang sesuai dengan kebutuhan dan preferensi siswa untuk mengoptimalkan efektivitas pengajaran bahasa Inggris.

**Kata kunci:** Flashcard Fisik, Flashcard Digital, Penguasaan Kosakata, Media Pembelajaran, Bahasa Inggris

## Abstract

This study compares the effectiveness of physical and digital flashcards in English vocabulary mastery at SMP Negeri 1 Baranti. The research employs a quasi-experimental method with a pre-test and post-test design to measure students' vocabulary comprehension improvement after using both types of flashcards. The sample consists of eighth-grade students divided into two groups, each using either physical or digital flashcards as learning media. The results indicate that digital flashcards are more effective in improving post-test scores compared to physical flashcards. However, based on a questionnaire given to students, most preferred physical flashcards due to their visually engaging appearance and better focus during use. On the other hand, digital flashcards provide advantages in accessibility and audio features that aid pronunciation learning.

The study concludes that digital flashcards significantly enhance students' vocabulary mastery, yet student preferences still lean toward physical flashcards. The findings provide insights for educators in selecting appropriate learning media that align with students' needs and preferences to optimize English language teaching effectiveness.

**Keywords:** Physical Flashcards, Digital Flashcards, Vocabulary Mastery, Learning Media, English Language

## Introduction

Vocabulary plays a crucial role in enhancing English language skills. As individuals expand their vocabulary, they become more proficient at expressing their needs, thoughts, ideas, and emotions effectively in

English. While understanding grammar is essential for language study, vocabulary is even more critical for achieving language fluency. Grammar provides structure, but vocabulary forms the foundation of language learning (Ha, 2022). Therefore, mastering vocabulary is fundamental to achieving proficiency in any language.

Teachers and students must prioritize acquiring a broad range of vocabulary to foster language fluency and communication skills. One effective way to master vocabulary is by utilizing educational tools like flashcards. Flashcards, as described by Indriana (2011), are educational tools usually in the form of picture cards, often around 20 x 30 cm in size. These cards feature images or text related to specific concepts. Flashcards are widely used in language learning due to their simplicity and effectiveness. Chatib (2011) noted that flashcards can enhance student engagement in language activities, improve communication skills, and boost learning achievements. By using flashcards, students can better express their ideas and improve their language comprehension, making the learning process more interactive and engaging.

There are two primary types of flashcards used in education: physical flashcards and digital flashcards. Physical flashcards are typically small cards featuring images, text, or symbols that help students remember concepts. Each word or concept is displayed on one side of the card, with the corresponding definition or illustration on the other side (Chen & Chan, 2019). The simplicity of physical flashcards allows for easy pairing of words with their relevant images, helping students to make associations and improve their vocabulary. Numerous studies have shown that physical flashcards are effective in supporting language learning and vocabulary acquisition, offering a straightforward method for reinforcing new words. However, physical flashcards have limitations, particularly in their static nature. These cards present information from a fixed perspective, making it challenging for students to explore or expand their understanding of the concepts presented (Sage et al., 2019). Despite their effectiveness, physical flashcards may not provide as much engagement as their digital counterparts, which offer more dynamic learning experiences. Digital flashcards

address some of these limitations by incorporating interactive features, such as audio pronunciations, images, and video clips. Platforms like Anki, Quizlet, and Brainscape allow users to create personalized digital flashcards, providing more flexibility in learning and ensuring that students are more engaged in the process.

Digital flashcards offer several advantages over their physical counterparts. One key benefit is their accessibility; digital flashcards can be used on electronic devices, allowing students to learn anytime and anywhere. Additionally, digital flashcards often include multimedia features such as spoken language, images, and even sign language videos, which enhance the learning experience (Ashcroft et al., 2018). Studies have shown that digital flashcards can be more effective in helping students grasp vocabulary concepts, especially when combined with spaced repetition algorithms that optimize learning and retention. Maronta et al. (2023) found that digital flashcards helped students improve their understanding of numerical concepts and their symbols. This highlights the flexibility and versatility of digital flashcards in supporting various aspects of learning. However, despite the advantages of digital flashcards, some research suggests that they may be more effective for lower-level students, while advanced learners perform similarly with both digital and physical flashcards (Ashcroft et al., 2018). Moreover, a study by Xodabande et al. (2023) indicated that the use of digital flashcards on mobile devices resulted in significant improvements in students' vocabulary scores. Nevertheless, the use of digital flashcards remains less common in certain educational settings, and many students are still unfamiliar with this tool. In schools such as SMP Negeri 1 Baranti, the use of physical flashcards is prevalent, but digital flashcards are not yet widely adopted.

This research aims to fill the gap in the existing literature by directly comparing the

effectiveness of physical and digital flashcards in enhancing vocabulary mastery at the junior high school level. Preliminary observations at SMP Negeri 1 Baranti revealed that physical flashcards are frequently used, but their application is limited and not as engaging as digital flashcards could be. This research will explore whether digital flashcards provide a more effective learning experience for students and how students perceive the use of both types of flashcards in the classroom. The study aims to answer the following research questions: Which type of flashcard is more effective in improving students' vocabulary mastery, physical or digital? And what are the students' perceptions of using physical and digital flashcards in the learning process?.The significance of this research lies in its potential to inform educators and curriculum designers about the most effective tools for teaching vocabulary. By examining the effectiveness of physical and digital flashcards, the study aims to provide valuable insights that could improve the teaching and learning of English at the junior high school level. The findings will also contribute to a broader understanding of how modern technology can be integrated into traditional language learning methods to enhance student engagement and achievement in language learning.

### Method

In this chapter, the methodology used in this study is outlined, including the research design, population and sample, research instruments, data collection procedures, and data analysis techniques. This section serves as the foundation for understanding how the study was conducted and the approach used to gather and analyze data. This study employs a mixed-method approach, combining both qualitative and quantitative research methods. According to William Trochim, quantitative research is a systematic process that uses numerical data to obtain information about the world (Patton, 2002). The study uses a quasi-experimental research design with a pre-test and post-test

structure. Both the experimental and comparison groups undergo an initial pre-test to assess their baseline conditions before any treatment is applied. Afterward, the experimental group receives treatment while the comparison group does not. A post-test is then administered to both groups to compare results. In addition, a qualitative approach is used in the form of questionnaires to explore deeper insights regarding the use of physical and digital flashcards. Open-ended questions in the questionnaire allow for detailed responses from the participants.

The study includes both independent and dependent variables. According to Sugiyono (2010), an independent variable is the one that is manipulated to observe its effect on the dependent variable. In this research, the independent variable is the method of vocabulary mastery, which involves the use of physical and digital flashcards. The dependent variable is students' vocabulary mastery, which is measured through pre-tests and post-tests.

The population in this research consists of eighth-grade students at SMP Negeri 1 Baranti, located in Baranti District, Sidenreng Rappang Regency. The sample is selected using total sampling, which includes all eighth-grade students. A total of 15 students participate in the study, with 8 students using physical flashcards and 7 students using digital flashcards. This sampling technique ensures that the study accurately represents the population of interest.

The research instruments include pre-tests, post-tests, and questionnaires. The pre-test and post-test are multiple-choice tests designed to assess students' vocabulary mastery. The pre-test is administered before the treatment to establish a baseline, while the post-test is given afterward to measure any improvements. The questionnaire uses a Likert scale to measure students' perceptions of physical and digital flashcards. The responses from the questionnaires provide additional qualitative data to complement the quantitative test results.

Data collection for this study involves a series of steps to ensure accuracy and reliability. First, the sample is selected, and the research instruments are designed. A validity and reliability test is conducted on the instruments to ensure their effectiveness. After obtaining the necessary permissions, the pre-test is administered, followed by the post-test and questionnaire. Once all the data is collected, the

results are analyzed using SPSS, with statistical tests such as the Paired-Samples T-Test and univariate analysis being used to evaluate the effectiveness of the flashcard methods.

## Result and Discussion

This section presents the findings from the data analysis conducted on the effectiveness of physical and digital flashcards in enhancing students' understanding of study material. The analysis was performed based on pre-test and post-test scores, as well as students' perceptions toward both types of flashcards.

### 1. Respondent Characteristics

The study involved 15 students from SMP Negeri 1 Baranti, with the following gender distribution:

#### Gender Frequency Percentage

Male	6	40%
Female	9	60%
Total	15	100%

As shown in the table, the majority of the respondents were female (60%), while male students represented 40%.

### 2. Research Findings

#### Effectiveness of Physical and Digital Flashcards

The effectiveness of the flashcards was measured using pre-test and post-test scores. Below are the results:

#### Pre-Test Results:

The pre-test scores revealed that students had a low understanding of the study material, with all students scoring in the "Very Poor" category (below 60%).

Respondent	Correct	Incorrect	Score	Description
Muh. Rezky Kurniawan	11	9	55	Very Poor
Muh. Reski Wijaya	3	17	15	Very Poor
...	...	...	...	...
Apri Tri Astri	4	16	20	Very Poor
Mean Score	-	-	55.67	

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The highest score in the pre-test was 55%, and the lowest was 15%, with the overall mean score of 55.67, indicating that students had limited understanding prior to the intervention.

#### Post-Test Results:

Following the treatment, the post-test scores showed a significant improvement in students' understanding of the material. Most students achieved scores in the "Excellent" and "Good" categories, with the highest score being 95% and the lowest 65%.

Respondent	Correct	Incorrect	Score	Description
Muh. Rezky Kurniawan	19	1	95	Excellent
Muh. Reski Wijaya	18	2	80	Good
...	...	...	...	...
Apri Tri Astri	17	3	85	Good
Mean Score	-	-	80.33	

The mean score after the intervention was 80.33, representing a significant improvement from the pre-test mean score of 55.67.

#### Descriptive Statistics:

Statistic	Pre-Test	Post-Test
Mean	55.67	80.33
Std. Deviation	7.04	8.55
Minimum	40	65
Maximum	65	95

The descriptive statistics show a noticeable improvement in the average scores, with the post-test mean score increasing by 24.66 points. The standard deviation increased from 7.04 (pre-test) to 8.55 (post-test), indicating a higher variability in the post-test results, possibly due to the difference in student preferences between physical and digital flashcards.

### Normality Test:

Both pre-test and post-test data were found to be normally distributed, as indicated by the results of the Kolmogorov-Smirnov and Shapiro-Wilk tests:

Group	Kolmogorov-Smirnov	Shapiro-Wilk
Pre-Test	p = 0.119	p = 0.165
Post-Test	p = 0.005	p = 0.061

The normality assumption was met, allowing the use of parametric tests for further analysis.

### Paired T-Test:

A paired sample t-test was conducted to determine if there was a statistically significant difference between pre-test and post-test scores:

Pair	Mean Difference	t-Value	Df	P-Value
Pre-Test vs. Post-Test	66.5	25.498	29	0.000

The paired t-test revealed a significant difference between the pre-test and post-test scores ( $p = 0.000$ ), supporting the hypothesis that the use of physical and digital flashcards significantly improved students' learning outcomes.

### Correlation Analysis:

The paired sample correlation test showed a very strong positive correlation between pre-test and post-test scores ( $r = 0.852$ ), suggesting that students' initial abilities were strongly linked to their improvements after the treatment.

### 3. Students' Perceptions of Flashcards

Students' perceptions of physical and digital flashcards were assessed using a series of questions about the effectiveness, engagement, and preference for each type of flashcard.

#### Physical Flashcard Results:

Statement	Frequency	Percentage
Fulfilled Requirements	11	73.3%
Did Not Fulfill	4	26.7%

The majority of students (73.3%) felt that the physical flashcards fulfilled the requirements for effective learning.

#### Digital Flashcard Results:

Statement	Frequency	Percentage
Did Not Fulfill	15	100%

All respondents felt that the digital flashcards did not fully meet the learning requirements.

#### Preference for Flashcards to Increase Interest in Vocabulary Mastery:

Flashcard Type	Frequency	Percentage
Physical Flashcard	6	40%
Digital Flashcard	9	60%

The results show that digital flashcards were preferred by 60% of students for increasing interest in vocabulary mastery, although physical flashcards also contributed to 40%.

#### Preference for Flashcards to Make Learning Fun:

Flashcard Type	Frequency	Percentage
Physical Flashcard	9	60%
Digital Flashcard	6	40%

Physical flashcards were preferred by 60% of students for making learning more fun, while 40% preferred digital flashcards for this purpose.

## Discussion

The results of this study provide valuable insights into the effectiveness of physical and digital flashcards as educational tools for enhancing students' understanding and engagement in the learning process. This section will interpret the findings in relation to existing research and highlight their implications for future educational practices.

The significant improvement in students' post-test scores (mean score increased from 55.67 to 80.33) after using both physical and digital flashcards aligns with previous studies that support the effectiveness of flashcards in promoting long-term retention and improving learning outcomes. Flashcards, as active recall tools, engage students in a process of retrieval practice, which has been shown to enhance memory retention and understanding (Roediger & Butler, 2011). The significant improvement in scores (paired t-test p-value = 0.000) indicates that both types of flashcards contributed effectively to the students' learning.

While both flashcard types led to improved results, the difference in scores and student perceptions suggests that the physical and digital formats may engage students in different ways. The higher variability in post-test scores, seen in the standard deviation, reflects the diverse preferences of students for physical versus digital flashcards. This is consistent with research suggesting that students' learning preferences may influence the effectiveness of the tool (Becta, 2007). The increase in variability may indicate that while digital flashcards offered interactivity, such as sound or multimedia, some students may have found them less engaging or effective for specific types of material, such as vocabulary mastery or conceptual learning. A notable finding was the students' preference for physical flashcards for vocabulary mastery and making learning fun, as opposed to digital flashcards, which were more favored for increasing interest in learning. This aligns with research that suggests the tactile and physical interaction with flashcards may provide a more engaging and enjoyable experience for students (Bohn & Albo, 2013). Physical flashcards provide a sensory experience that digital flashcards might not replicate, which could explain why students found them more effective in making learning enjoyable.

On the other hand, digital flashcards were preferred by many students for their interactive features, such as audio pronunciation and instant feedback. These features can cater to different learning styles, especially for auditory or kinesthetic learners (Mayer, 2005). Digital flashcards also offer convenience and flexibility, allowing students to study at their own pace, which might explain why some students preferred them for increasing their interest in the material.

## Implications for Future Educational Practices

The findings from this study suggest that a blended approach, combining both physical and digital flashcards, might be the most effective strategy to enhance learning outcomes. Teachers can leverage the strengths of each flashcard format to cater to different student preferences and learning needs. For example, physical flashcards could be used for activities that require tactile engagement, such as group learning or hands-on vocabulary exercises, while digital flashcards can be incorporated for individual study, providing multimedia elements like audio, video, and instant feedback.

Moreover, educators should consider the importance of student engagement in choosing the appropriate flashcard format. Since the study showed a preference for physical flashcards to make learning fun and digital flashcards to increase interest, a balanced combination of both could maximize student engagement and improve learning outcomes.

## Limitations and Areas for Further Research

While this study provides valuable insights into the effectiveness of physical and digital flashcards, there are several limitations to consider. The small sample size (15 students) and the focus on a specific school (SMP Negeri 1 Baranti) may limit the generalizability of the findings. Future research should involve a larger and more diverse sample of students from different educational backgrounds and age groups to determine whether the results hold true across various contexts. Additionally, the study only measured the immediate impact of flashcards on learning outcomes. Future studies could explore the long-term effects of flashcard use, as well as the potential influence of additional variables, such as the type of content being learned (e.g., vocabulary vs. conceptual knowledge), on the effectiveness of flashcards.

## Conclusion

The findings of this research indicate that digital flashcards are more effective than physical flashcards in enhancing students' vocabulary mastery. The significant improvement observed in students' scores after using digital flashcards suggests that features such as multimedia (audio and images) and interactive tools (quizzes, tests, etc.) make learning more engaging and effective. Digital flashcards, especially with platforms like Quizlet, provide immediate feedback and allow students to practice pronunciation, which contributes to better vocabulary retention. While physical flashcards are still beneficial in certain aspects, the flexibility and interactivity of digital flashcards offer a more comprehensive approach to learning.

Despite the superior effectiveness of digital flashcards, students' preferences leaned toward physical flashcards. The tactile experience of handling physical cards and the absence of digital distractions contributed to this preference. Many students are more familiar with traditional learning methods, which may explain why they find physical flashcards more comfortable. Additionally, students feel that physical flashcards help them focus better without the temptation to switch to other applications on their devices. This suggests that while digital flashcards offer significant advantages, students may still favor the simplicity and direct engagement that physical flashcards provide.

For future teaching strategies, it is recommended that educators incorporate both physical and digital flashcards to cater to diverse learning preferences. Physical flashcards can be used for hands-on practice and memorization, while digital flashcards can be employed for testing and interactive exercises. By combining both methods, teachers can optimize the learning experience and cater to different student needs. Future research could explore the long-term effectiveness of this combined approach and its impact on students' overall academic performance.

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