

A Comparative Study on the Use of Paper-based and Digital Flashcards as Media to Learn Vocabulary at the First-grade Students of Senior High School in the Academic Year 2024/2025

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Abstract: This study aimed to compare the effectiveness of paper-based flashcards and digital flashcards as media for learning general vocabulary and to determine whether there was a significant difference between their use. This study was conducted at SMAN 1 Selong in the academic year 2024/2025 and aimed to compare the use of paper-based and digital flashcards as media in vocabulary learning to find out if there is a significant difference from the use of both. This study used quantitative research method with quasi-experimental research design. The research data was collected by giving pre-test and post-test to two sample classes consisting of 72 students with 36 students per class, namely class 10-1 (digital flashcards) and 10-9 (paper flashcards). After analyzing the data and testing the hypothesis using the Mann-Whitney test, the results obtained were Asymp. Sig. (2-Tailed) was 0,103 which was greater than $>$ the probability value of 0,05 which means H_0 is accepted and H_a is rejected. Indicating that there are no significant differences between the uses of paper flashcards and digital flashcards as media in vocabulary learning for first-grade students of SMAN 1 Selong in the academic year 2024/2025. Future research is encouraged to explore broader vocabulary coverage, including specialized vocabulary and other linguistic aspects such as word forms and usage. Additionally, educators are advised to enhance their teaching methods by integrating creative instructional strategies and effective learning media.

Keywords: vocabulary, learning media, flashcard

INTRODUCTION

Vocabulary is a basic element in learning a language, with a good size of vocabulary, it will be easier to express and understand the meaning when communicating, as well as when in language learning. According to Schmitt (2020), native English speakers have a vocabulary size of approximately 10,000-to-13,000-word families. However, second language learners of English such as high school students do not need to have the same vocabulary as native speakers, they just have to know the general vocabulary that are commonly used in a wide range of context. Schmitt (2020), further described that 2,000-to-3,000-word families are a reasonable estimate of the lexical requirements for understanding daily discourse for second language learners of English.

In reality, in the process of learning English, a common problem that often occurs is that students have difficulty in understanding the meaning of some English words due to their lack of vocabulary mastery. This is supported by the survey study that had been conducted by Afriando et al., (2015) at some high school in Lampung, the study was seek to determine the students' vocabulary of English vocabulary size. Based on the research findings, that most students' vocabulary size was still low. As a result of students' lack of vocabulary, learners will find it difficult to follow the lesson, lack of understanding of the material learned, and will consider that the lesson is difficult. This also can be due to the way teachers teach, Amin et al. (2020: 229), said that "The teacher plays a central role in the student learning process". Due to the importance of the teacher's role in the learning process, teachers must be creative and be able to attract students' interest and increase their motivation in learning. One of them is the use of learning media.

There are several media that can be used in learning to improve students' vocabulary mastery, one of which is flashcards. Flashcards are card media containing images, writings that can be made as card games so that it is possible for students to be interested in understanding the material presented (Fidiyanti, 2020). Flashcards is one of many media that can be used to help the teachers to teach English easily.

Over time, with the technological development, the development of learning media, one of which is the use of flashcards media, is also influenced. Nowadays, in addition to paper flashcards, it has now developed into digital flashcards in the form of applications or the web. The Memrise for English language study that will be used in this study is one example of this. Memrise is an online and mobile-based educational tool for learning various subjects (Luczak, 2017). Each has its own advantages, some studies said that the digital flashcard was better than the paper-based flashcards (Xodabande et al., 2022) but in the other hand, paper-based flashcards have its own advantages over digital flashcards (Honarзад & Soyooof, 2023). Another result was given by Rachmadi (2023), in his research he said that the use of paper-based and digital flashcards is equally effective to improve learners' vocabulary and there is no significant difference in the use of both.

The results of a limited number of studies are conflicted. It is still unclear whether using digital flashcards as a learning media is more effective, less, or equal to using paper-based flashcards for students' vocabulary learning.

Based on the preliminary observation and interview with the English teachers at State Senior High School (SMAN) 1 Selong, the researcher found that the common problem faced by students in learning English is that they do not understand the meaning of some English words due to their lack of

vocabulary. Another problem is the students' lack of motivation in learning, it can be influenced by both internal from the students themselves and external factors such as the way teachers teach. Flashcards are one of the interactive media that can be used in learning English. This is also confirmed by the teacher's statement, which states that the employment of flashcards as a learning medium in teaching English even before technological advancements is very effective.

Therefore, this study aimed to compare the use of paper-based and digital flashcards in vocabulary learning at the first-grade students in SMAN 1 Selong. This study, focuses on the study of The New General Service List (NGSL) words. The digital flashcards used was the New General Service List 1.01 flashcard sets, and can be accessed from the Memrise course (an online digital learning platform) using mobile phones. The use of Memrise NGSL 1.01 flashcard sets resulted in better vocabulary learning strategies, it was effective in improving the learning process (Hidayatullah et al., 2024).

The Cognitive Theory of Multimedia Learning

This study was guided by the **Cognitive Theory of Multimedia Learning (CTML) by Richard E. Mayer:** Mayer (2005). CTML is a theoretical framework for learning through the utilization of multimedia. Mayer's (2014) CTML suggest that multimedia learning equipments and methods can improve and influence the learning process. In conclusion, the use of multimedia which contain verbal and visual information was a good option in learning process. In this case, the use of flashcards as learning media is chosen by the researcher. Flashcards can improve and increase students' vocabulary mastery, it can also help students memorize the words easily, increase students' attention and motivation in learning English, and help students understand vocabulary easily (Sitompul, 2013; Nugroho et al., 2012). Based on the theories, the researcher believes that the use of flashcard is good for learning new words and understanding their meaning. It means that flashcards can be very useful in enhancing students' vocabulary and are successful in helping students recall the words that have been learnt.

RESEARCH METHOD

This study was conducted at SMAN 1 Selong, East Lombok, West Nusa Tenggara for 5 weeks, from August 7, 2024 to 5 September, 2024 based on the meta-analysis conducted by Lin and Lin (2019) on time intervention, the researchers discovered that the majority of studies (68%) lasted between 01 to 06 weeks, just 24% lasted for more than 02 months or longer, and only two studies lasted for a whole semester for vocabulary research.

This study used a quantitative method using a **quasi-experimental** research design. According to Sugiyono (In Siyoto & Sodik, 2015), quantitative research method used to research on certain populations or samples. In this study, sampling techniques were carried out randomly, data collection used research instruments, data analysis was quantitative/statistical with the aim of testing predetermined hypotheses. The population of this study were all the first-grade students at SMAN 1 Selong in the academic year 2024/2025 with the total of 12 classes consist of 436 students and using the *Purposive Simple Random Sampling*, the samples of this study were two classes 10-1 (digital flashcard) and 10-9 (paper flashcard) consist of 72 students, 36 students

for each class. The researcher used the pre-test and post-test vocabulary test as the research instruments to collect the data and find the effectiveness of the treatment that is the use of flashcards as a learning media on students' vocabulary mastery, it applied for both paper-based and digital flashcards group so that the outcome for both groups can be compared to see whether it has a difference or not on the use of both paper-based and digital flashcards.

The Memrise with the New General Service List (NGSL) 1.01 flashcard sets was used in this study and the paper flashcard used the vocabulary material in the Memrise with the New General Service List (NGSL) 1.01 flashcard sets. The NGSL was selected with consideration that it consists the general vocabulary of approximately 2800 high-frequency words that are commonly used in a wide range of context. The NGSL focused on general vocabulary or the high-frequency words, allowing the students to prioritize the most words that are commonly used in English to learn.

The pre-test and post-test were taken from the New General Service List Test (NGSLT) with consideration of it already represents 2000 to 3000 words families that learners need. The post-test was rearranged to avoid students from doing the very same test. The treatments were done 3 times in 3 meetings for 3 weeks, 1 meeting per week for each class.

The next step is to analyze the data collected, data collected in this study was analyzed using Mann-Whitney non parametric test in the SPSS software, the reason researcher used this test method was because the data collected was not normal after being tested for data normality using the Shapiro-Wilk's normality test.

RESULT AND DISCUSSION

This study focused on the use of flashcard as media to learn vocabulary at the first-grade student of SMAN 1 Selong, and comparing them to find out whether they have significant difference or not on their use. The vocabulary tests were applied in the pre-test and post-test for both groups to see their prior knowledge of vocabulary and get the data needed to be compared and find out whether it have any significant differences or not. Observation and documentation were also conducted during the research, resulting in data that can be used for data processing. The collected data is as follows:

Table 1. 10-9 Score

10-9 (Paper FC)	Score	
	Pre-test	Post-test
	46 53	39 25
	39 28	55 33
	89 75	91 81
	51 68	30 74
	57 40	69 89
	33 51	36 64
	73 66	91 88
	24 40	23 92
	95 75	91 81
	46 29	66 25
	36 44	24 26
	40 27	25 20
	72 46	73 84
	89 67	85 83
	52 67	82 88
	41 35	45 27

Table 2. 10-1 Score

10-1 (Digital FC)	Score	
	Pre-test	Post-test
	51 57	85 56
	65 84	64 90
	74 48	90 42
	77 53	93 59
	52 89	64 88
	79 69	86 83
	35 65	38 71
	88 68	88 84
	94 71	93 78
	38 33	37 53
	67 61	78 66
	38 75	51 84
	55 69	54 93
	99 85	98 63
	61 86	64 88
	51 – 80	58 – 88

Table 1. 10-9 Score

10-9 (Paper FC)	Score	
	Pre-test	Post-test
	67.54	89.79
	42.52	91.59
Total	1909	2214
Avg	53.027 78	61.5

Table 2. 10-1 Score

10-1 (Digital FC)	Score	
	Pre-test	Post-test
	62.75	70.79
	52.59	51.94
Total	2365	2621
Avg	65.694 44	72.805 56

The pre-test and post-test results provide useful information about students' prior knowledge of general vocabulary and the result after being treated at the treatment stages using paper-based and digital flashcard.

According to Table 1. and Table 2., the total pre-test score for 10-9 and 10-1 were 1909 and 2365, the mean of pre-test scores was 53,03 and 65,70. It has a significant difference on both groups' prior knowledge. Furthermore, the post-test score provides the information of students' development of vocabulary after being treated, the post-test also provides the information about the paper-based and digital flashcard whether it have any significant differences or not.

This information is obtained by comparing the post-test score of both groups through several stages of data analysis.

The Normality Test

Following data collection, before deciding on a data analysis method, researchers conducted a normality test on the data by using the Shapiro-Wilk test at a significance level of 0,05, the following result was shown in Table 3.

Table 3. Normality Test

Shapiro-Wilk				
Class		Statistic	df	Sig.
Score	Class 10-1	.926	36	.019
	Class 10-9	.844	36	<.001

Based on the Table 3. above, the output indicated that the Sig. value for class 10-1 was 0,019 and class 10-9 was < 0,05, indicating that the data was not normally distributed, as stated by Santoso (2014: 191), data is said to be normally distributed in the Shapiro wilk test if the Sig. value > 0,05. Furthermore, due to the abnormal data, researcher used the Mann Whitney non-parametric test to do data analysis and hypothesis testing

Mann-Whitney Test

After analyzing the data, the result of the data analysis and hypothesis testing can be seen in the test statistics in Table 4.

Table 4. Ranks

Class		N	Mean Rank	Sum of Ranks
Score	Class 10-1	36	40.51	1458.50
	Class 10-9	36	32.49	1169.50
	Total	72		

Table 5. Test Statistics

Mann-Whitney test	
Mann-Whitney U	503.500
Asymp.Sig (2-tailed)	.103

Based on the output in Table 5. Test Statistics in the Mann-Whitney test above, the Asymp. Sig. (2-tailed) was 0,103, which was greater than > the probability value of 0,05. As a result, as the basis for decision making in the Mann-Whitney test, it is possible to conclude that H_a is rejected and H_0 is accepted, which means that there are no significant differences between the use of paper-based flashcards and digital flashcards.

In addition, although the two do not have any significant differences, it can be seen from the result of the pre-test and post-test that both are improving, showing that both paper-based and digital flashcards have positive effects on students and their vocabulary mastery. Komachali & Khodareza (2012), stated that flashcards are useful for drilling new letters, syllables, words, and other information. Sitompul (2013), stated that flashcards can improve students' vocabulary mastery, it can also help them memorize the words easily, motivate them to learn English, and help them understand vocabulary easily. Besides, digital flashcards provide opportunity for learning to occur outside the classroom walls in anytime and anyplace (Başoğlu and Akdemir, 2010).

CONCLUSION

The primary purpose of the study was to compare the use of paper-based flashcard and digital flashcard as media to learn general vocabulary and find out whether they have a significant difference or not on their use. Based on the results of hypothesis testing using Mann-Whitney Test that has been done before, the result obtained was Asymp. Sig. (2-tailed) was 0,103, which is greater than > the probability of 0,05 showed that the null hypothesis (H_0) was accepted and the alternate hypothesis (H_a) was rejected.

In conclusion, based on the result obtained, there is no significant difference on the use of paper-based flashcard as opposed to digital flashcard as media to learn vocabulary at the first-grade student of senior high school. Moreover, the study yielded positive results apart from the purpose of the study, it was found that the paper-based and digital flashcard have positive impacts on the learning process, the students and their improvement of vocabulary mastery.

The result from the observations of research results that were reviewed with Cognitive Theory of Multimedia Learning (CTML), in accordance with the assumptions of CTML, the use of flashcards fulfills all three assumptions. First, the brain process information (verbal and visual information) using two channels. In the use of flashcards, students can process the information in the flashcards (visual) and the information from the teacher's explanation (verbal) well. Second, every channel has a capacity limit. This explained why the treatment is done in stages, 1000 words per meeting and not 3000 words at once. Third, individuals are active processors who seek to make sense of multimedia presentations. When the flashcards media was used in the learning process, students become more active, they were curious and ask more than usual.

This study focused on the target vocabulary so it focused and limited on the words listed in the NGSL. Furthermore, the test and the learning material in this study was descriptive vocabulary to focus more on the aspect of meaning of the words. The researcher suggests to further researcher to reach the larger aspects such as the greater vocabulary coverage other than just the general vocabulary, as

well as the other aspects besides of meaning of the words such as the form of vocabulary, or etc.

In addition, the researcher suggests to all parties specially the teachers to be more creative on developing learning for students to make the students to be more active, motivated, and interested in following the learning process. This concerns the use of learning media, teaching methods, learning strategies, etc. These would help both teachers and students so that the learning objectives can be achieved well.

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