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The Effect of Spaced Repetition Strategy on Students' Vocabulary Mastery

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ABSTRAK

Penelitian ini bertujuan untuk mengetahui pengaruh strategi pengulangan berkala terhadap penguasaan kosakata siswa kelas VII SMP Negeri 11 Padangsidimpuan. Penelitian ini menerapkan pendekatan kuantitatif dengan rancangan pre-experimental menggunakan one-group pre-test and post-test design. Subjek penelitian berjumlah 55 siswa yang ditentukan melalui teknik total sampling. Data dikumpulkan menggunakan instrumen berupa lembar observasi dan tes penguasaan kosakata. Temuan penelitian memperlihatkan bahwa skor rata-rata siswa pada pre-test sebesar 54,91, kemudian meningkat menjadi 74,94 pada post-test setelah penerapan Spaced Repetition Strategy. Selain itu, hasil observasi terhadap pelaksanaan strategi tersebut memperoleh persentase sebesar 90% yang termasuk dalam kategori "Very Good". Berdasarkan uji hipotesis, nilai t-count lebih besar dibandingkan nilai t-table pada tingkat signifikansi 5% (13,73 > 2,01). Hasil tersebut mengindikasikan bahwa hipotesis alternatif diterima dan hipotesis nol ditolak. Dengan demikian, dapat disimpulkan bahwa strategi pengulangan berkala berpengaruh signifikan terhadap penguasaan kosakata siswa serta memfasilitasi siswa dalam mengingat kosakata secara lebih efektif melalui proses pengulangan yang dilaksanakan secara berkala.

ABSTRACT

This research was conducted to investigate the effect of the Spaced Repetition Strategy on the vocabulary achievement of seventh-grade students at SMP Negeri 11 Padangsidimpuan. A quantitative method with a pre-experimental one-group pre-test and post-test design was applied in this study. The sample comprised 55 students who were selected using the total sampling technique. Data were obtained through observation checklists and a vocabulary assessment. The results showed that the students' average pre-test score was 54.91, which improved to 74.94 in the post-test following the application of the Spaced Repetition Strategy. Furthermore, the observation of the strategy's implementation yielded a score of 90%, classified as "Very Good." The hypothesis test demonstrated that the calculated t-value exceeded the critical t-value at the 5% level of significance (13.73 > 2.01). This finding confirmed that the alternative hypothesis was accepted, whereas the null hypothesis was rejected. Consequently, it can be inferred that the Spaced Repetition Strategy significantly enhanced students' vocabulary mastery and supported more effective vocabulary retention through scheduled and repeated review practices.

1. INTRODUCTION

Vocabulary competence is highly important in English learning because it functions as the fundamental element that supports students' communication and language comprehension. Students who have sufficient vocabulary are able to express ideas, understand texts, and participate actively in classroom interaction. In contrast, students with limited vocabulary often face difficulties in understanding instructions, reading texts, and communicating in English. Therefore, vocabulary mastery is one of the essential aspects that should be developed in English learning, especially for junior secondary school students.

Vocabulary remains a common obstacle for many students learning English as a foreign language. Students frequently forget words that have been learned previously and often find difficulties in using vocabulary correctly in sentences. This condition is usually caused by limited practice, lack of repetition, and ineffective learning strategies. As a result, students become less motivated and show low confidence in using English during the learning process.

Based on preliminary observation conducted at SMP Negeri 11 Padangsidimpuan, It was observed that many seventh-grade students still struggled with vocabulary mastery. Most students had difficulties in translating words, understanding simple English texts, and remembering vocabulary taught by the teacher. The students' overall average score fell short of the Minimum Mastery Criterion (KKM), indicating that vocabulary learning outcomes had not yet achieved the expected target.

To solve this problem, teachers need to apply learning strategies that are effective and engaging for students. One strategy that can be applied in vocabulary learning is the Spaced Repetition Strategy. Spaced repetition is a learning technique that emphasizes repeated review of learning materials at increasing intervals over time. The strategy is based on Ebbinghaus' Forgetting Curve theory, which explains that information tends to be forgotten rapidly when it is not reviewed regularly. Through systematic review activities, students are encouraged to retrieve previously learned vocabulary, thereby strengthening memory retention and reducing the rate of forgetting.

According to Ebbinghaus, spaced repetition improves long-term memory by reviewing previously learned information at increasing intervals. Similarly, Nation and Nation state that spaced repetition helps learners retain information by distributing learning activities over time rather than concentrating them in a single session. As a result, vocabulary becomes easier to recall and remains accessible for a longer period.

A number of previous studies have highlighted the beneficial effects of spaced repetition on vocabulary acquisition. (Halizah & Anggraini, 2024) found that spaced repetition significantly improved students' vocabulary mastery through repeated exposure and review activities. (Lafleur & Kanazawa, 2024) also reported that learners who experienced systematic vocabulary review demonstrated better vocabulary retention than those who did not. Furthermore, (Saksitanupab, 2024) concluded that structured vocabulary review contributed positively to vocabulary acquisition and retention among EFL learners.

However, most previous studies were conducted in different educational contexts and frequently compared experimental and control groups. Limited studies have specifically examined the implementation of the Spaced Repetition Strategy among seventh-grade students at SMP Negeri 11 Padangsidimpuan using a one-group pre-test and post-test design. Accordingly, this study aims to determine the impact of the Spaced Repetition Strategy on the vocabulary mastery of seventh-grade students at SMP Negeri 11 Padangsidimpuanusing.

2. METHODS

This study employed a quantitative approach with a pre-experimental design. Specifically, a one-group pre-test and post-test design was utilized in the research. The research design used in this study was O_1 – X – O_2, where O_1 referred to the pre-test, X referred to the treatment using the spaced repetition strategy, and O_2 referred to the post-test. The research was conducted at SMP Negeri 11 Padangidimpuan during the 2025/2026 academic year. This research sought to explore the influence of the Spaced Repetition Strategy on students' vocabulary mastery.

The researcher used the spaced repetition strategy as the treatment in teaching vocabulary. This strategy emphasizes repeated review activities at certain intervals to help students retain vocabulary in long-term memory. Throughout the learning sessions, students were exposed to new vocabulary and encouraged to revisit the words regularly through a variety of vocabulary tasks and retrieval activities. During the learning process, students were introduced to new vocabulary and asked to review the words repeatedly through various vocabulary exercise and recall activities.

The implementation of the Spaced Repetition Strategy was adapted from (Saksitanupab, 2024). The treatment consisted of several stages, namely introducing new vocabulary items, conducting repeated review activities, strengthening students' memory through vocabulary recall practices, adjusting review intervals, and evaluating students' understanding through exercises and tests. The vocabulary materials focused on four aspects, namely nouns, adjectives, verbs, and adverbs.

During the treatment, students were exposed to vocabulary repeatedly through teacher explanations, reading activities, vocabulary exercises, flashcards, fill-in-the-blank activities, and self-assessment tasks. The repeated exposure was intended to strengthen students' retention and facilitate the transfer of vocabulary knowledge into long-term memory.

To establish the validity and reliability of the, the vocabulary test was developed based on the indicators of vocabulary mastery used in this research. The test measured students' understanding of nouns, adjectives, verbs, and adverbs through multiple-choice questions administered in both the test.

This study was conducted through several stages. Initially, a pre-test was given to measure the students' prior vocabulary mastery. Second, the researcher conducted the treatment by applying the spaced repetition strategy through activities such as initial learning of new vocabulary, repeated review sessions, vocabulary recall practices, and reinforcement exercises. Following the implementation of the strategy, the students completed a post-test to determine their level of vocabulary mastery.

Population

The population of this research consisted of 55 students of the seventh grade at SMP Negeri 11 Padangsidimpuan in 2025/2026 academic year. The total population was 55 students.

Sample

The study was conducted with 55 seventh-grade students from SMP Negeri 11 Padangsidimpuan. Given that the population consisted of fewer than 100 students, total sampling was considered appropriate. Thus, the whole population was involved as the sample for this study.

Technique of Data Collection

a. Observation

Observation sheets were used to observe the implementation of the Spaced Repetition Strategy during the teaching and learning process. The observation focused on students' participation, attention, and responses during the treatment.

b. Vocabulary Test

The researcher used vocabulary tests to measure the students' vocabulary mastery before and after the treatment. The tests consisted of pre-test and post-test in the form of multiple-choice questions. Students' vocabulary mastery was first assessed through a pre-test administered before the treatment. After the Spaced Repetition Strategy had been implemented, a post-test was used to determine changes in their vocabulary mastery. The test covered four aspects of vocabulary, namely nouns, adjectives, verbs, and adverbs.

The Technique of Data Analysis

Data analysis in this study involved both descriptive and inferential statistics. The descriptive statistical analysis was used to summarize the students' mean scores, frequency distributions, percentages, and score categories obtained from the pre-test and post-test. Before testing the hypothesis, the researcher analyzed the normality of the data by using Chi-Square formula to determine whether the data were normally distributed or not. Having established that the data met the normality assumption, the researcher applied a t-test to evaluate the effect of the Spaced Repetition Strategy on students' vocabulary mastery.

Hypothesis testing was conducted using the t-test at a significance level of 0.05. The alternative hypothesis was supported when the calculated t-value exceeded the critical value, demonstrating the significant effect of the Spaced Repetition Strategy on students' vocabulary mastery.

3. RESULT AND DISCUSSION

Results

Data description of Students' Vocabulary Mastery before and after the applying of Spaced Repetition Strategy

a. Before

The pretest given to students at the seventh grade which consists of 55 students in vocabulary mastery before using spaced repetition strategy to find out the initial condition of students, the data indicated that the maximum score achieved was 75, whereas the minimum score was 35, mean score was 54,91, it was categorized bad, median was 54, and mode was 48,48.

Table 1. Score of Mean, Median, Mode on Students' Vocabulary Mastery Before Using Spaced Repetition Strategy

No	Criteria	Score	Category
1	Mean	54,91	Bad
2	Median	54	Bad
3	Mode	48,48	Bad

Furthermore, the frequency distribution before using spaced repetition strategy the data are summarized in the following table

Table 2. Frequency Distribution of The Students Pretest of The Students' Vocabulary Mastery Before Spaced Repetition Strategy

No	Score	Frequency	Percentage (%)
1	35	1	1,82%
2	40	4	7,27%

3	45	9	16,36%
4	50	12	21,82%
5	55	6	10,91%
6	60	10	18,18%
7	65	6	10,91%
8	70	5	9,09%
9	75	2	3,64%
	Total	**55**	**100**

The frequency distribution table above indicates that 1 student (1.82%) attained a score of 35, while 4 students (7.27%) attained a score of 40, who got the score 45 were 9 students or 16,36%, who got the score 50 were 12 students or 21,82%, who got the score 55 were 6 students or 10,91%, who got the score 60 were 10 students or 18,18%, who got the score 65 were 6 students or 10,91%, who got score 70 were 5 students or 9,09%, and students who got score 75 were 2 students or 3,64%. The researcher shows the histogram as follows:

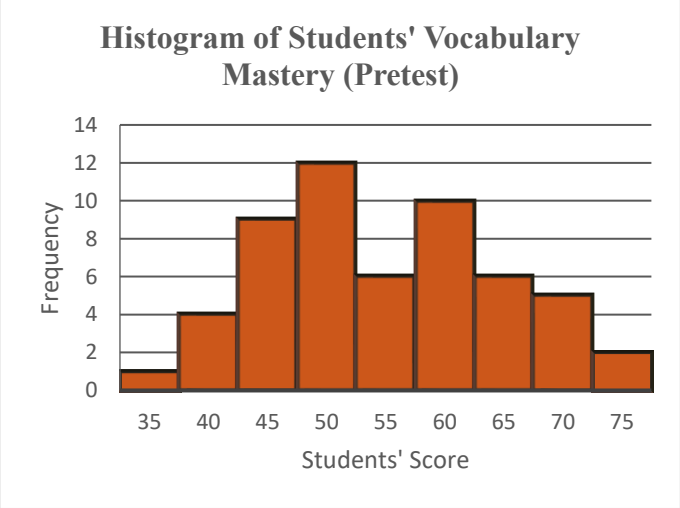

Figure 1. Histogram of Students' Pretest Vocabulary Mastery Before Spaced Repetition Strategy

According to the histogram above, the distribution pattern of the students' pre-test scores is clearly illustrated relatively normal because the frequency was concentrated in the middle and gradually decreased on both sides. Most students obtained a score around 50, which indicates that the data distribution tended to be normal.

b. After

After administered the pretest, the posttest was conducted with the seventh grade students, consisting of 55 participants, to measure their vocabulary mastery. Based on the data collected, the scores ranged from 60 to 95, with a mean of 74.94, which is categorized as "Good". In addition, the median score was 74,5, and the mode was 64,66 (see appendix 7, page 70). The detailed results of the mean, median, and mode from the posttest are presented as outlined in the table below:

Table 3. Score of Mean, Median, Mode on Students' Vocabulary Mastery After Using Spaced Repetition Strategy

No	Criteria	Score	Category
1	Mean	74,94	Good
2	Median	74,5	Good
3	Mode	64,66	Enough

Furthermore, the frequency distribution after using spaced repetition strategy the results are shown in the table below:

Table 4. Frequency Distribution of The Students Posttest of the Students' Vocabulary Mastery After Using Space Repetition Strategy

No	Score	Frequency	Percentage (%)
1	60	3	5,45%

2	65	9	16,36%
3	70	10	18,18%
4	75	11	20%
5	80	10	18,18%
6	85	8	14,54%
7	90	3	5,45%
8	95	1	1,81%
	Total	**55**	**100**

As shown in the frequency distribution above, the largest proportion of students, 11 (20%), obtained a score of 75. Scores of 70 and 80 were each achieved by 10 students (18.18%), while 9 students (16.36%) scored 65. In addition, 8 students (14.54%) attained a score of 85. Scores of 60 and 90 were each obtained by 3 students (5.45%), whereas only 1 student (1.81%) achieved a score of 95. The score distribution is presented in the histogram below:

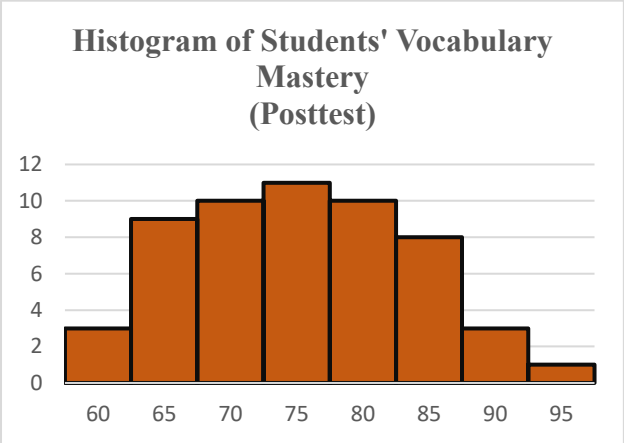

Figure 2. Histogram of Students' Posttest Vocabulary Mastery After Using Spaced Repetition Strategy

The histogram above illustrates the distribution of the students' post-test scores was relatively normal because the frequency was concentrated in the middle and gradually decreased on both sides. Most students obtained a score around 75, which indicates that the data distribution tended to be normal.

Data Description of Spaced Repetition Strategy on Students' Vocabulary Mastery

Before carrying out the hypothesis test, the researcher first assessed the normality of the pre-test and post-test data. This procedure was necessary since a normal distribution of the data is required for conducting t-test analysis.

a. Normality Test

In this research, the researcher used Chi-square (x^2) formula to test the normality of the data. The calculation was conducted manually based on the frequency distribution table of the students' scores. The researcher first determined the class interval, calculated the observed frequency (fo), theoritical frequency (ft), and then calculated the value of Chi-square. The formula of Chi-square is presented as follows:

$$x^2 = \sum \frac{(fo - ft)^2}{ft}$$

Where:

x^2 = Chi-square
fo = Observed Frequency
ft = Theoritical Frequency

The data are categorized as normally distributed if the value of x^2count is lower than x^2table at the significance level of 5%.

1) Normality Test of Pretest

The normality test of pretest was conducted to determine whether the students' pretest scores were normally distributed before the treatment was given. The calculation was done manually by using Chi-square formula. The researcher calculated the observed frequency and theoritical frequency from each class interval. After that, the researcher calculated the value of (fo-ft)^2/ft from every interval and summed all the results to obtain the value of x^2count.

Table 5. The Result of Chi-Square value of Pretest

Result	df	1%	5%	Explanation
4,861	5	15,086	11.070	The Pretest data were normally distributed or Ho was accepted.

The pre-test data were analyzed using the Chi-Square test for normality. Based on the calculation results, the obtained x^2count (x^2 calculated) was 4,861. With a degree of freedom (df) of 5 at a significance level of 5%, the x^2table (4,861 < 11,070), it can be concluded that the pre-test data are normally distributed.

2) Normality Test of Posttest

The normality test of posttest was conducted after the treatment using spaced repetition strategy. The purpose of this test was to determine whether the students' posttest scores were normally distributed or no similar to the pretest, the researcher used Chi-square formula in calculating the normality of posttest data. The result of the normality test was used to identify whether the data met the requirement for hypothesis testing. The detailed calculation and result of the posttest normality test are presented in the following table:

Table 6. The Result of Chi-Square value of Posttest

Result	df	1%	5%	Explanation
9,251	5	15,086	11,070	The posttest data were normally distributed or Ho was accepted

The post-test data were analyzed using the Chi-Square test for normality. Based on the calculation results, the obtained x^2count (x^2 calculated) was 9,251. With a degree of freedom (df) of 5 at a significance level of 5%, the x^2table (9,251 < 11,070), it can be concluded that the post-test data are normally distributed.

Based on the results of the normality tests of both pretest and posttest, the researcher concluded that all data in this research were normally distributed. Thus, the researcher continued the analysis by conducting hypothesis testing using t-test formula.

Hypothesis Testing

After conducting the normality test, the researcher continued the analysis by testing the hypothesis of the research. The purpose of the hypothesis testing was to determine whether there was a significant effect of using spaced repetition strategy on students' vocabulary mastery of the seventh grade at SMP Negeri 11 Padangsidimpuan. In this research, the researcher used t-test formula to analyze the data. The t-test was used to compare the students' scores before and after the treatment. The calculation was conducted manually by comparing the mean score of pretest and posttest. The hypotheses of this research were formulated as follows:

Ha : There is a significant effect of spaced repetition strategy on students' vocabulary mastery.
Ho : There is no significant effect of spaced repetition strategy on students' vocabulary mastery.

The calculation included finding the mean difference, standard deviation, and standard error mean difference. After all the calculations were completed, the obtained score of t-test was compared to the t-table value.

Table 7. The Result of T-test of Spaced Repetition Strategy

	df	tcount	ttable	Determine
Pre-test and Post-test	54	13,73	5% = 2,01 1% = 2,68	Ha was accepted and Ho was rejected.

Based on the t-table at the significance level of 5% (two-tailed) with degree of freedom 54, the value of ttable was 2,01 and for the 1% was 2,68. After comparing the value of to and ttable, the researcher found that the value of to was higher than the value of ttable. It can be seen 13,73 > 2,01. Therefore, the alternative hypothesis (Ha) was accepted and the null hypothesis (Ho) was rejected.

Based on the result above, it can be concluded that there was a significant effect of using spaced repetiton strategy on students' vocabulary mastery. The students' posttest scores were higher than the pretest scores after the implementation of spaced repetition strategy. Therefore, spaced repetition was effective in improving students' vocabulary mastery.

Discussion

The analysis of the research findings revealed that the application of the Spaced Repetition Strategy led to a noticeable enhancement in students' vocabulary mastery. Evidence of this improvement can be observed in the increase in the average score, which rose from 54.91 on the pre-test to 74.94 on the post-test. Statistical testing further confirmed the effectiveness of the strategy, as the obtained t-value (13.73) was considerably higher than the critical value in the t-table (2.01). This result indicates that the improvement achieved by the students was statistically significant. In addition, classroom observation data produced a score of 90%, which fell into the "Very Good" category. This outcome suggests that the strategy was implemented successfully and that students were actively involved throughout the learning activities.

The positive change in students' vocabulary achievement may be attributed to the repeated opportunities to review and retrieve previously learned words. Regular exposure to vocabulary items enabled students to strengthen their memory and maintain knowledge for a longer period. This finding is closely related to Ebbinghaus's Forgetting Curve theory, which explains that information gradually fades from memory when it is not revisited. By incorporating systematic review sessions at different intervals, the strategy encouraged learners to reactivate stored vocabulary knowledge, thereby reducing the likelihood of forgetting and improving recall performance.

The present findings also support the view that learning distributed over time produces better outcomes than learning concentrated within a single session. Continuous interaction with vocabulary items allowed students to reinforce their understanding and use words more accurately in various learning tasks. As a result, vocabulary knowledge became more stable and accessible when needed.

Furthermore, the results are in agreement with several previous studies concerning the effectiveness of spaced repetition in language learning. Research conducted by (Halizah & Anggraini, 2024) demonstrated that structured review activities contributed positively to vocabulary development. Likewise, (Lafleur & Kanazawa, 2024) reported that learners who regularly reviewed vocabulary retained lexical items more successfully than those who did not receive repeated exposure. Similar conclusions were reached by (Saksitanupab, 2024), who highlighted the role of spaced review in supporting vocabulary acquisition and long-term memory retention among EFL learners.

Taken together, the findings provide additional evidence that the Spaced Repetition Strategy is a valuable instructional approach for vocabulary teaching. The strategy not only assists students in remembering newly learned words but also promotes stronger retention, greater learner engagement, and more effective vocabulary learning. By integrating repeated review, retrieval practice, and active participation, the strategy creates learning experiences that support sustained vocabulary growth. Therefore, it may serve as a useful alternative for English teachers, particularly at the junior high school level, who seek to improve students' vocabulary mastery through evidence-based instructional practices.

4. CONCLUSION

The findings of this study demonstrate that the Spaced Repetition Strategy positively contributed to the vocabulary mastery of seventh-grade students at SMP Negeri 11 Padangsidimpuan during the 2025/2026 academic year. The effectiveness of the strategy was reflected in the improvement of students' performance, as the average score increased from 54.91 in the pre-test to 74.94 in the post-test following the implementation of the treatment.

The statistical analysis also supported this result. The obtained t-value (13.73) exceeded the critical value of the t-table (2.01) at the 5% level of significance. As a consequence, the alternative hypothesis was accepted, while the null hypothesis was rejected. This result confirms that the use of the Spaced Repetition Strategy produced a statistically significant improvement in students' vocabulary achievement.

The success of the strategy may be attributed to the systematic review process that enabled students to revisit and recall vocabulary items repeatedly over time. Such activities helped strengthen memory retention and facilitated more effective vocabulary learning. Therefore, the Spaced Repetition Strategy can be regarded as a beneficial instructional approach for supporting vocabulary development among junior high school learners studying English as a foreign language.

Despite these positive outcomes, several limitations should be acknowledged. The research employed a one-group pre-test–post-test design without the inclusion of a comparison group, which may limit the strength of the conclusions. Additionally, the study involved a relatively small number of participants drawn from a single school. Consequently, caution should be exercised when applying these findings to broader educational settings. Future research is encouraged to involve larger samples and more rigorous experimental designs to provide stronger evidence regarding the effectiveness of the Spaced Repetition Strategy in vocabulary instruction.

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