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Vocabulary Learning and Retention Using Semantic Mapping Technique At 7th Grade of SMPN 2 Sakra Timur

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Abstract: Vocabulary plays a crucial role in English language acquisition, serving as the foundation for developing listening, speaking, reading, and writing skills. This study investigates the effectiveness of the semantic mapping technique in improving vocabulary learning and retention among seventh-grade students at SMPN 2 Sakra Timur. This study employs quantitative methods with a pre-experimental one group pre-test and post-test design. The population in this study were all Class 7th-grade students, with 30 samples. The study involved a single experimental group of 30 students who underwent pre-test, post-test, and delayed post-test assessments. The data collection technique used the pre-test, post-test, and delayed post-test. Data were analyzed using Repeated Measures ANCOVA to find out significant differences across testing phases. The results indicate that the semantic mapping technique significantly improved students' vocabulary learning, as evidenced by a substantial increase in post-test scores compared to pre-test scores (p = 0.007, n = 0.235). However, the technique did not significantly improve students' retention, as evidenced by the non-significant interaction between time and pre-test scores (p = 0,137, n = 0.077). These findings suggest that while semantic mapping is effective in facilitating initial vocabulary learning, its impact on long-term retention remains limited. This implies additional strategies to combine the semantic mapping technique with other techniques to maximize its effectiveness in long-term vocabulary retention.

Keywords: Vocabulary Learning, Retention, Semantic Mapping Technique.

Introduction

Vocabulary is a fundamental component of learning English. Before students can effectively develop their language skills, they must acquire a basic vocabulary (Sekhar, 2021). An extensive vocabulary significantly improves language proficiency and facilitates effective communication (Palma, 2023). Learning vocabulary is integral to developing other language skills, such as listening, speaking, reading, and writing. It is crucial because the more words students know, the better their comprehension and communication abilities, both orally and in writing (Indriarti, 2014). Many countries worldwide include English in their education curriculum and make English a second language so that children can learn it early (Ilyosovna, 2020). To communicate effectively in English, learners must acquire a sufficient vocabulary and know how to use it correctly (Anditasari, 2022). Being able to speak a language requires proficiency in its vocabulary as well. However, Learners struggle to master vocabulary, and they face difficulty in finding the right words to express themselves when speaking English (Udaya, 2021). Learners find mastering vocabulary one of the significant challenges for non native speakers (Mbaki, 2023). The students in junior high school learning English must become proficient in vocabulary. According to Bakti (2018), one of the most crucial components of understanding a subject is vocabulary. In a context such as junior high school

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education, vocabulary is an essential link that connects and facilitates the development of the four language skills (Machfudi & Afidah, 2022). One of the most significant obstacles that language learners face is expanding their vocabulary, which is necessary for effective communication. Ghazali (2007) states in Tran (2020) that one of the main difficulties language learners encounter is acquiring vocabulary. Without an adequate vocabulary, learners cannot express themselves or comprehend others. In addition, learners sometimes struggle with long-term word retention when expanding their vocabulary, and the words are typically not retained in their long-term memory (Wisran, 2021). This is further exacerbated because English vocabulary differs greatly from Indonesian; therefore, most English language learners find learning English challenging.

A preliminary study conducted at SMPN 2 Sakra Timur revealed that a student's ability to master English vocabulary is minimal and generally at a low level. The teacher stated that students have difficulty memorizing English words and do not recognize or understand the use of these words in the context of the sentence. Additionally, according to the students' perspective, English is the second most challenging subject after mathematics. They have difficulty memorizing English vocabulary, which is a major barrier to their ability to learn and use English. The major factor is due to the teacher's monotonous teaching methods. Teachers do not emphasize memorizing and spelling new vocabulary, so students tend to forget the words they have learned. Consequently, students only focus on memorizing words without understanding the meaning or how to use it in a communication.

To address this issue, it can be concluded that there is an urgent need to improve vocabulary learning and retention teaching methods. One promising technique that can be applied is the semantic mapping. According to Graves in Udaya (2021), semantic mapping allows students to consider the relationship between words, which makes it one of the most effective methods for teaching vocabulary. Semantic mapping techniques could be beneficial for students who study English directly. Students would be constantly exposed to the many ways significant ideas are communicated and analyzed from the perspective of understanding. This technique also connects both sides of the brain to receive and process new knowledge. This is because the connecting function of the left brain consists of words, numbers, and lists, while the right brain consists of colors, imagination, and dimensions (Otoluwa, 2024). By combining the two functionalities, semantic mapping can significantly enhance students' vocabulary learning and retention.

Considering these benefits, this research intends to investigate whether or not there is a significant effect on the use of semantic mapping techniques in students' vocabulary learning and student retention among 7th-grade students at SMPN 2 Sakra Timur.

Method

This study employs a quantitative approach through a pre-experimental design with one group Pre-test, post-test, and delayed post-test. According to Stratton (2019), this research design has the benefit of having a study direction, which allows for assessing dependent variables (e.g., vocabulary learning and retention). This study involves a single experimental group, which receives vocabulary instruction using the semantic mapping technique. The data from the pre-test, post-test, and delayed post-test will be analyzed using Repeated Measures ANCOVA to find out the significance of improvement in vocabulary learning and retention.

This study consists of two variables: the Semantic Mapping Techniques as an independent variable (X) and Vocabulary Learning and Retention as a dependent variable (Y). According to Flannelly (2014), the independent variable is the element in the experiment that the researcher manipulates or modifies. Meanwhile, the dependent variable is the outcome or reaction assessed during the experiment.

According to Castel (2021), the population defines the boundaries of a study's scope and gives the reader context and environmental cues. The population in this study is the first semester of seventh-grade students at SMPN 2 Sakra Timur in the 2024/2025 academic year, with 30 students as the sample. The sample of this research uses purposive sampling. Wang (2024) states that purposive sampling is known as the technique of choosing "typical" or "representative" units from the population.

This study followed a lesson plan and used a multiple-choice test as the main instrument consisting of three assessments: pre-test, post-test, and delayed post-test. First, the pre-test was conducted during the first meeting. The purpose of this test was to measure students' initial abilities. Second, the post-test was conducted immediately after the treatment. The purpose of this test was to measure students' vocabulary improvement after the application of the semantic mapping technique. Finally, the delayed post-test was conducted a month after the post-test. The purpose of this test was to evaluate students' retention after some time.

The scoring process is done separately for the pre-test, post-test, and delayed post-test to ensure a fair comparison of results. The researcher also categorized the students' abilities using the classification score from Brown and Abeywickrama (2010). The data were analyzed using SPSS 27. The classification score is shown in Table 1.

Table 1: Students' scoring classification

No.	Category	Score
1.	Excellent	81-100
2.	Very Good	71-80
3.	Good	56-70
4.	Satisfactory	41-55
5	Poor	0-40

Result and Discussion

In this section, because the pre-test was used as a covariate, the researcher used repeated measures ANCOVA to analyze significant differences in the three tests to control for the effect of the pre-test. The main objective was to focus on the significant effect of semantic mapping on improving vocabulary learning and retention in grade 7 students at SMPN 2 Sakra Timur.

Three tests were conducted to measure students' vocabulary learning and retention: pre-test, post-test, and delayed post-test. Descriptive statistics of students' scores can be seen in the following Table 2.

Table 2: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Pre-test	30	27	47	35.67	5.561
Post-test	30	43	83	64.37	9.279
Delayed Post-test	30	37	80	61.30	9.820
Valid N (listwise)	30				

The results of the descriptive statistics table above show a significant increase in students' vocabulary scores. The mean score in the pre-test increased from 35.67 to 64.37 in the post-test. Meanwhile, there was a slight decrease in the score from the post-test 64.37 to 61.30 in the delayed post-test.

To determine whether the data is normally distributed, the researcher conducted a normality test using the Shapiro-Wilk test. The results of the test can be seen in Table 3.

Table 3: Test of Normality

	Shapiro-Wilk		
	Statistic	**df**	**Sig.**
Pre-test	**.944**	**30**	**.118**
Post-test	**.947**	**30**	**.137**
Delayed Post-test	**.939**	**30**	**.087**

Based on the normality test results above, the results of Shapiro-Wilk show p-values <0.05, indicating that the data was normally distributed. The results of repeated measures ANCOVA can be seen in Table 4.

Table 4: The Results of Multivariate Test

Effect		Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
time	Pillai's Trace	.235	8.587[b]	1.000	28.000	.007	.235
time * pre-test	Pillai's Trace	.077	2.344[b]	1.000	28.000	.137	.077

Based on the multivariate test results in Figure 3 above, the time effect showed Pillai's Trace = 0.235, F (1,28) = 8.587, p = 0.007, Partial Eta Squared = 0.235. The results showed that the pre-test, post-test, and delayed post-test time indicates that the differed significantly, with 23.5% of the variability attributed to the time factor. However, the interaction between time and the pre-test was found to be insignificant (p = 0.137), meaning it did not significantly affect students' performance on the post-test and delayed post-test.

In addition, the results of Mauchly's Test of Sphericity can be seen in Table 5.

Table 5: Sphericity Assumption

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon		
					Greenhouse-Geisser	Huynh-Feldt	Lower-bound
time	1.000	.000	0	.	1.000	1.000	1.000

Based on the table above, it can be seen from the value of Mauchly's W (1.000), indicates that the assumption of sphericity is not violated.

In this section, the researcher presented the average difference between the post-test and delayed post-test after controlling the covariate. The results can be seen in Table 6 below:

Table 6: Estimated Marginal Means

time	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Post-test	64.367[a]	.914	62.494	66.239
Delayed Post-test	61.300[a]	.952	59.351	63.249

The confidence interval (Ci) is 95%, showing that the mean scores of students in the post-test were 62.494 and 66.239. Meanwhile, in the delayed post-test, the mean score of students was in the range of 59.351 and 63.249

In this section, the researcher presented the detailed differences between the post-test and delayed post-test times and their significance. The results can be seen in Table 7 below:

Table 7: Pairwise Comparison

(I) time	(J) time	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference	
					Lower Bound	Upper Bound
1	Post-test	3.067*	.328	.000	2.395	3.738
2	DelayedPost-test	-3.067*	.328	.000	-3.738	-2.395

The mean difference between the post-test and delayed post-test was 3.067. Referring to the 95% confidence interval, the difference between the post-test and delayed post-test scores was between 2.395 and 3.738

The results of this study demonstrate the significant effect of the semantic mapping technique on students' vocabulary learning. The results of the pre-test show that students' vocabulary skills are generally low, as evidenced by most students being in the "poor" category. However, after treatment using semantic mapping, the results of the post-test show significant improvement, with most students scoring higher. The mean score of the post-test was in the "good" category. This improvement shows that semantic mapping affects interpreting students' vocabulary learning. Despite the positive effect on vocabulary learning, students' mean results in the delayed post-test showed a slight decrease compared to the post-test. Although the mean score remained higher than the pre-test, this indicates that long-term retention is not maintained over time.

Based on the results of the delayed post-test, which showed a decrease in retention, this indicates that additional strategies for retention are needed. Strategies that can be used can include memory practice or repetition at a certain time interval to reduce the decline in student retention. Some of the factors that influence this decline in retention include inconsistent student attendance and the level of student involvement that is lacking in the treatment session. Some students only attended 2 of the 4 treatments carried out in class, which resulted in less impact on the benefits of the semantic mapping technique implemented. In addition, differences in motivation and learning habits of students also affect students' ability to remember vocabulary over time

Although the interaction between time and pre-test score did not show significant, indicating that the semantic mapping technique did not significantly in improving students' retention, this finding suggests that the semantic mapping technique had the same impact on vocabulary acquisition over time regardless of students' initial ability. Semantic mapping acts as a universal scaffold that benefits students equally, but it is worth considering exploring other techniques that can be combined with semantic mapping as a reinforcement technique.

This study was in line with (Fitriani et al., 2022), where the researchers showed that the semantic mapping technique significantly improved vocabulary learning. This was evidenced by the students' pre-test average score, which was lower than the results of the post-test average score, which was higher. Based on the findings, the results showed a p-value lower than significant alpha (a). Ha was accepted, and semantic mapping improved students' vocabulary learning. Although there are differences in terms of sample size, duration of instruction, and assessment methods, it is possible for differences in the results obtained. Fitriani et al.. implies a longer period of treatment with a larger sample, while this study implies a shorter period of treatment with a smaller sample.

Likewise, research from Hung (2023) found that the mind-mapping technique increased vocabulary retention in students, although there were differences in the larger sample size used and also the longer treatment time, which made possible the differences in results found in this study.

In a similar study, Heidari (2015) indicated that when teaching English through the use of mind maps, it was found that there is a significant effect on vocabulary learning and retention. The first thing the researcher did was conduct a pre-test. After that, the researcher conducted the post-test after the treatment. Finally, after a month's time lag, the researcher conducted a delayed post-test. The main finding of this research was that when teaching English vocabulary through the use of mind-maps, there was an improvement in scores on students' post-test and delayed post-test.

Sinaga (2023) also emphasized that the semantic mapping technique improved students' vocabulary mastery. This study focuses on the importance of vocabulary mastery in language learning. The result of the study showed a signficannt increase in students pre-test and post-test score. It was shown that the percentage of students who met the mastery minimum criteria increased from 25% in the pre-test to 80% in the post-test. These results indicated a similarity in this study.

Conclusion

The findings of this study indicate that the semantic mapping technique significantly improves students' vocabulary learning. The repeated measures ANCOVA results show a notable increase in students' scores from the pre-test to the post-test. This confirms that semantic mapping is an effective technique for improving vocabulary learning. However, the findings also indicate that semantic mapping does not significantly improve students' retention. The repeated measures ANCOVA results show a notable slight decrease from the post-test to the delayed post-test. This confirms that the semantic mapping technique remains inconclusive.

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