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The Effectiveness of the Multisensory Approach on Students' Vocabulary Mastery at SMAN 2 Sukawati

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ABSTRACT

This study aimed to examine the effectiveness of multisensory approach on eleventh-grade students' vocabulary mastery at SMA N 2 Sukawati and to investigate students' perception of its implementation. This study employed quantitative research method with a quasi-experimental research design involving 68 eleventh-grade students. Test and questionnaires were used to collect the data, which were analyzed using descriptive and inferential statistical analyses. The finding revealed a significant difference in the post-test results between experimental and control groups after controlling the pre-test results as the covariate, F (1,65) = 4.666, p = 0.034, ηp2 = 0.067. In addition, the questionnaire results showed the mean scores ranging from 3.00 to 4.71, indicating that the multisensory approach positively affected students' vocabulary mastery and generated positive perceptions toward vocabulary learning. However, this study was limited by the small number of participants and short duration of the research. Future researchers are encouraged to conduct the similar studies with larger samples of participants and longer research duration to obtain more comprehensive findings.

Keywords: *Vocabulary mastery, multisensory approach, quasi-experimental design, students' perception*

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INTRODUCTION

Vocabulary serves as foundation that students must master in order to learn English effectively. One component of learning English is mastering a broad range of English vocabulary which helps in understanding spoken and written language (Agazzi, 2022). A strong vocabulary foundation enables student to express themselves more effectively in communication. However, student continue to face challenges when learning vocabulary in English. Many students quickly forget new words they have learned because they struggle to memorize their meaning, spelling, and pronunciation. This align with Adieli et al., (2025), states that students have difficulty learning vocabulary, ranging from difficulty memorizing vocabulary, not being able to use vocabulary in certain contexts, and difficulty remembering vocabulary in the long term. Students which are exposed to monotonous and boring teaching methods frequently become disinterested and lose interest in learning new words. Learning vocabulary through memorization is not effective and often lead to various learning difficulties. Memorization will only make students remember words during the lesson and immediately forget it when the lesson has passed. Limited vocabulary in learning will make students struggle to understand the lesson and follow the instruction during the class. Vocabulary learning is still commonly implemented through conventional learning, using the lecture method. Because of this, students have to memorize word lists, which makes learning new words boring and not effective. Conventional learning involves teachers initiating classroom discussions and focusing only on the textbook and note content (Ekeanyanwu, 2021). The students passively accept the knowledge and repeat the information memorized in exams. The assessments still take the form of paper tests, requiring only one correct answer. The steps in this model generally begin with an explanation of the material provided by the teacher, followed by completing the assigned exercises, and ending with homework assignments. This conventional learning doesn't let students use terminology in meaningful ways and doesn't work for all types of students. To address this issue, it's important to know about different learning approaches to teaching and learning vocabulary. One approach that can assist students to memorize vocabulary is the multisensory approach. A multisensory approach is one that integrates the use of multiple senses in learning. This align with research conducted by Majeed & Ghaleb (2023), stated that multisensory learning is a powerful way for helping students learn new vocabulary in a meaningful and lasting way. By using sight, sound, touch or movement, students create stronger memory connections and feel more involved in the learning process. Despite its many benefits, the application of multisensory approach in senior high schools is still underexplored. Many schools still rely on textbook-based instruction and memorization, which may not effectively accommodate students with different learning styles. Previous studies (Algrni, 2020), suggest that multisensory can be used in vocabulary mastery, but these study did not specify which aspect of vocabulary were assessed and focused on student with dyslexia or student's disabilities . However, there is still limited research that examines the use of a multisensory approach for vocabulary mastery, focusing on assessing all aspects of vocabulary. This study aims to investigate the effectiveness of multisensory approach on eleventh-grade students' vocabulary mastery at SMA N 2 Sukawati and to explore students' perceptions after using a multisensory approach. This study addressed the following questions:

1. Is there any significant effect on the vocabulary mastery of eleventh-grade students at SMA N 2 Sukawati?
2. How are the perceptions of eleventh-grade students at SMA N 2 Sukawati toward the use of the multisensory approach for vocabulary mastery?

METHODS OF RESEARCH

Research Design

This research used a quasi-experimental research design, focuses on a non-equivalent control group design because the participants were not randomly assigned to the experimental group and control group, and both groups take a pre-test and a post-test (Gall et al., 2003). Therefore, the groups were considered non-equivalent, which means that a quasi-experimental design was used in this research. Quasi-experimental design is a research design used to find a cause-and-effect relationship between the independent and dependent variable (Hayat et al., 2024). The quasi-experimental design is used because the researcher wants to investigate the effect of independent variable on dependent variable between experimental group and control group.

Participants

The participants of the study included 164 eleventh-grade students at SMA N 2 Sukawati, and 68 students from XI.1 and XI.2 were selected as sample using cluster random sampling with lottery method in piece of paper. Cluster random sampling is a sampling technique that involves selecting naturally existing groups and then choosing one of those groups to be the sample (Ahrens & Zascerinska, 2014). The cluster random sampling was chosen because of practical and efficient.

Instruments

The instruments used in this study were a test and a questionnaire. The tests were designed based on the syllabus eleventh-grade students SMA N 2 Sukawati, specifically on the topic of narrative text. There were two written tests administered: a pre-test and a post-test. The pre-test consisted of 30 multiple-choice tests with the following answer choices: a, b, c, d and e and 10-word list reading. Each correct answer from multiple choice is scored with 1 point and word list reading was assessed based on the pronunciation rubric. The purpose of this test is to obtain initial data on student vocabulary mastery before and after receiving treatment in both the experimental and control classes. The post-test consisted of 30 multiple-choice tests with the following answer choices: a, b, c, d and e and 10-word list reading. The assessment was the same as the used in the pre-test. The purpose of this test was to measure the improvement in the students' vocabulary mastery after receiving the treatment. A questionnaire was administered to students in the experimental group after receiving the treatment, consists of 15 questions using likert scale with five levels: strongly agree (5), agree (4), neutral (3), disagree (2), strongly disagree (1). The questionnaire was analyzed using quantitative analysis. The scores obtained are calculated to determine the average value and percentage, which are then used to describe students' perceptions of the use of a multisensory approach in vocabulary learning.

Data Collection Procedure

The data was collected in several steps. First, the pre-test was administered to both groups to measure students' initial vocabulary mastery. Pre-test given for experimental and control group before the treatment begins. Pretest is done before the treatment process to find out the students' initial vocabulary skills. The questions were administered using a google form. Second, the experimental group received treatment using the multisensory approach, while the control group received conventional learning. The

multisensory activities involved visual, auditory, and kinesthetic learning activities. After the treatment, the post-test was administered to both groups to measure students' vocabulary improvement. Finally, the questionnaire was distributed to the experimental group to explore the student's perception after using multisensory approach for learning vocabulary. The data were analyzed using descriptive and inferential statistics.

RESULT AND DISCUSSION

Result

Descriptive and statistical analysis was carried out to answer the first research question. In the preliminary phase of this research, a pre-test was conducted to both the experimental group (XI.1) and the control group (XI.2), in order to examine students' vocabulary mastery before being given intervention of multisensory approach and conventional learning. The pre-test minimum score was (00), and the maximum score was (100). The data from table 1 showed that the mean scores from pre-test in experimental group was 64.12 higher than control group was 61.91.

Table 1. Experimental and Control Group Pre-test

Test	N	Means	Median	Mode	Std.Dv	Min	Max
Pre-test experimental group	34	64.12	64.50	65	5.666	55	75
Pre-test control group	34	61.91	64.00	65	6.421	50	74

A Shapiro-Wilk test was conducted to determine whether the pre-test score data were normally distributed or not, this test used to test the data because the data was less than one hundred. Based on the result from table 2, it was found that *p* value of the pre-test in experimental group was 0.096 and control group was 0.081. It can be determined that the pre-test data in both experimental group and control group were normally distributed.

Table 1 Pre-test Normality test

	Groups	Shapiro-Wilk		
		Statistic	df	Sig.
Pre-test	Experimental	0.946	34	0.096
	Control	0.944	34	0.081

The researcher conducted a homogeneity test using Levene's Statistic after learning the result of the normality test to determine whether the data were homogeneous or not. Based on the table 3, the result of homogeneity test between the pre-test of the experimental group and control group was F (1,66) = 1.865, p = 0.177. It means the data of pre-test were homogeneous

Table 2 Pre-test Homogeneity test

Test of Homogeneity of Variance Comparison and Experimental Group				
	Levene Statistic	Df1	df2	Sig.
Based on Mean	1.865	1	66	0.177
Based on Median	.842	1	66	0.362

Based on the Median and with adjusted df	.842	1	64.166	0.362
Based on trimmed mean	1.869	1	66	0.176

It indicated that the first and second assumptions had been successfully fulfilled. It implied that this study should examine hypothesis testing using an Independent Sample T-test, in order to check the significant difference of students' vocabulary mastery. From the table 4, the result of the Independent Sample T-test revealed a non-significant difference between the pre-test mean score from experimental group (M = 64.12, SD = 5.666) and control group (M = 61.91, SD = 6.421); t (66) = 1.502, p = 0.138.

Table 3 Pre-test Independent Sample T-test Result

Group Statistics					
Score pre-test	Grouping	N	Mean	Std.Dv	Std. Error Mean
	Experimental	34	64.12	5.666	0.972
	Control	34	61.91	6.421	1.101

Levene's Test Equality of Variances										
						t-test for Equality of means			95% Confidence Interval of the Difference	
		F	Sig.	t	df	Sig.(2-tailed)	Mean Difference	Std. Error Difference	Lower	Uper
Score pre-test	Equal variances assumed	1.865	0.177	1.502	66	0.138	2.206	1.469	-0.726	5.138
	Equal variances not assumed			1.502	64.993	0.138	2.206	1.469	-0.727	5.139

The post-test was conducted to both the experimental group and control group, in order to examine students' vocabulary mastery after being given intervention of multisensory approach and conventional learning. The table 5 showed the mean scores from the post-test of the experimental and control groups were different, with 83.03 for experimental group and 79.88 for control group.

Table 5 Experimental and Control Group

Test	**N**	**Means**	**Median**	**Mode**	**Std. Dv**	**Min**	**Max**
Post-test experimental group	34	83.03	84.00	85.00	4.871	74	91
Post-test control group	34	79.88	80.00	80	4.898	70	88

Based on the result from Shapiro-Wilk normality test, it was found that *p* value of the post-test in experimental group was 0.074 and control group was 0.060. It can be determined that the post-test data in both experimental group and control group were normally distributed.

Table 6 Post-test Normality Test

Post-test	Groups	Shapiro-Wilk		
		Statistic	df	Sig.
	Experimental	0.943	34	0.074
	Control	0.940	34	0.060

Based on the table 7, the results of homogeneity test between experimental and control group was F (1,66) = 1.865, p = 0.635. It means the data of post-test were homogeneous

Table 7 Post-test Homogeneity Test

Test of Homogeneity of Variance Comparison and Experimental Group				
	Levene Statistic	Df1	df2	Sig.
Based on Mean	.227	1	66	.635
Based on Median	.045	1	66	.833
Based on the Median and with adjusted df	.045	1	65.939	.833
Based on trimmed mean	.218	1	66	.642

In the hypothesis testing, as a post-test results were normally distributed and the assumption of homogeneity of variances was homogeneous and the pretest result were considered as a covariate to control the initial differences between groups, ANCOVA, the parametric version of the analysis of covariance test was conducted in this study to analyze the post-test results. The data showed that there is a significant different in the post-test results between experimental and control groups even after controlling the pre-test results as the covariate, F (1,65) = 4.666, p = 0.034, ηp^2= 0.067. The mean post-tests score of the experimental group (M= 83.03) was higher than control group (M= 79.88).

Table 8 The Result of ANCOVA Test

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	502.692	2	251.346	13.174	.000	.288
Intercept	2034.655	1	2034.655	106.640	.000	.621
Pre-test	334.324	1	334.324	17.523	.000	.212
Treatment	89.027	1	89.027	4.666	0.034	0.067
Error	1240.176	65				
Total	452927.000	68				
Corrected Total	1742.868	67				

Descriptive statistics were used to analyze the questionnaire data. The results showed most items had high to very high mean scores. Statements 2 and 15 had the highest mean scores (M = 4.71), showing a high level of agreement. These results indicate that students are interested in multisensory learning activities. This means that students enjoy engaging in vocabulary learning through a multisensory approach.

Meanwhile, statement 3 had the lowest mean score (M = 3.00), indicating moderate agreement. Overall, the questionnaire's mean scores varied from 3.00 to 4.71, showing that students had positive perceptions toward the multisensory approach in vocabulary learning. This means that multisensory helped students in vocabulary learning.

Table 9 Result of Questionnaire

Descriptive Statistics				
Statement		N	Mean	Std. Deviation
1.	Learning vocabulary through multisensory activities makes the lesson more interesting.	34	4.53	.563
2.	I enjoy learning vocabulary when the teacher uses videos, pictures, and sounds.	34	4.71	.462
3.	Learning vocabulary through multisensory activities feels new to me	34	3.00	.853
4.	Using colors, images, and movement helps me understand vocabulary meaning.	34	4.62	.493
5.	I feel more motivated to learn vocabulary through multisensory learning.	34	4.50	.508
6.	I feel more engaged when learning vocabulary through a multisensory approach.	34	4.44	.504
7.	Learning vocabulary with visuals and actions helps me focus during the lesson.	34	4.47	.507
8.	Multisensory learning helps me recognize different word classes (noun, verb, adjective).	34	4.56	.504
9.	I feel confident using new vocabulary after multisensory learning activities.	34	4.50	.508
10.	Group activities in multisensory learning help me learn vocabulary better.	34	4.50	.508
11.	Collaborative activities in multisensory learning help me understand vocabulary better	34	4.56	.504
12.	Learning vocabulary through videos and storytelling helps me understand word use in context.	34	4.50	.508
13.	I am more active in class when multisensory learning is applied.	34	4.47	.507
14.	Multisensory approach makes vocabulary learning easier for me.	34	4.53	.507
15.	I prefer vocabulary lessons that involve pictures, sounds, and movements.	34	4.71	.462
	Valid N (listwise)	34		

Discussion

The purpose of this study was to answer two main research question, one of which is "Does the multisensory approach have a significant difference on the vocabulary mastery of eleventh-grade students at SMA N 2 Sukawati?". In this study the researcher used the multisensory approach for vocabulary learning. Based on the data results, this study showed a significant difference between the experimental group and control group. This is because the treatment of multisensory approach that applied in experimental group, even though the initial vocabulary knowledge in experimental group better than control group in the pre-test score, however the statistical result showed that there was no significant difference between the group. The average post-test score in the experimental group was higher (M= 83.03, SD= 4.871) compared to control group (M= 79.88, SD= 4.898). The ANCOVA results indicated that there was a significant difference on students' post-test score after controlling the pre-test score F (1,65) = 4.666, p = 0.034, this means that the alternative hypothesis was accepted and the null hypothesis was rejected. The findings suggest that students taught using multisensory approach achieved better score than those who were taught using conventional learning. This aligns with Algrni (2020), found that the multisensory approach was effective for vocabulary mastery. It can be seen from the result of the mean score of the experimental group (M = 28.91, SD = 7.79) was higher than the control group (M = 8.40, SD = 5.73). This finding was in line with the result of the current study, which also revealed that multisensory can helped student in learning vocabulary.

Multisensory learning involved the use of multiple senses that make the learning more interesting. This aligns with the theory of Orton Gillingham which is emphasize visual, auditory, and kinesthetic (Valde, 2024). Another theory that has a relation with the multisensory approach is VAK theory from Walter Burke Barbe. This theory emphasize the visual, auditory, and kinesthetic in learning process (Resmi, 2022). Knowledge or information were transformed through multisensory activities, making it easier for students to remember vocabulary. Multisensory activities also reduced students' cognitive load and created more diverse learning experiences beyond textbooks and memorization. This condition increased students' engagement in the learning process. Essentially, multisensory learning can help students learn vocabulary. The differences between the experimental and control groups because of the sensory activities provided. In the control group, most sensory activities involved visual and auditory learning; kinesthetic learning was limited, and the lack of interaction made students more passive and only receiving information without a lot of activity. Meanwhile, in the experimental group, learning not only involved visual and auditory but also integrated kinesthetic activity, that make students active in participating through movement. This allowed students to learn through direct practice, which helped students understand and retain vocabulary. As a result, kinesthetic activities benefited students in improving all aspects of vocabulary mastery, including word meaning, word spelling, word pronunciation, word classes, and word use. However, the strongest effects were found in word meaning and word use, although the other aspects also showed improvement. This finding is supported by Confucius who stated that "I hear and I forget, I see and I remember, I do and I understand" (Vaillancourt, 2009). It means learning through direct experience or learning by doing was effective. This quote shows that students' understanding levels increase because students are actively engaged in learning. Hearing alone is not enough; seeing can help with memory, and doing it directly allows students to understand deeply. This is also supported by Rahmi (2024), stated about experiential learning where the students understanding and engagement can be created through practical activities. Experiential learning encourages students to learn through direct experience. Learning occurs

through a four-step process: first, concrete experience, in which students engage in an activity firsthand; second, reflective observation, in which students reflect on what they have done; third, abstract conceptualization, in which students begin to understand and connect their experiences to theory; and finally, active experimentation, in which students can apply the knowledge in practice. Through direct experience, students can connect theory with practice. Experiential learning also encourages students to collaborate and actively participate in class. A learning approach that involved direct activities is consistent with constructivism theory by Jean Piaget and Vygotsky stated that knowledge is not directly transferred by teachers and students but is instead constructed directly by students through their experiences and interactions in the learning environment (Mir et al., 2025). It can be concluded that the kinesthetic component of multisensory learning can support or complement other sensory modalities, such as visual and auditory. Vocabulary learning among students in the experimental group was supported by sensory engagement in each learning activity.

The second research question in this study "How are the perceptions of eleventh-grade students at SMA N 2 Sukawati regarding the use of the multisensory approach for vocabulary mastery?". The questionnaire results were analyzed based on several indicators, including students' engagement and interest, understanding vocabulary, confidence in used vocabulary, collaboration, and students' motivation. Most off the statement showed positive responses from students toward the use of multisensory approach for vocabulary learning.

In term of students' engagement and interest, most students showed positive responses. The majority of student responses with agree and strongly agree about multisensory learning activities made vocabulary more engaging and interesting. This indicates that the use of multiple sense visual, auditory and kinesthetic, successfully attracted students' attention in the learning process. In term of students' understanding vocabulary and word classes, the results showed that most students gave positive responses with agree and strongly agree that the multisensory approach helped students recognize word classes and understanding vocabulary in context. This suggest that multisensory activities supported students in understanding vocabulary better. In term of confidence, the results showed that most students gave responses with agree and strongly agree after learning vocabulary through multisensory approach students felt more confident in using new word. This suggest that multisensory approach encourages students to apply vocabulary in real context. In term of collaboration, the results showed that most students gave responses with agree and strongly agree that working in groups helped students understanding vocabulary better. This align with Simamora et al., (2025), stated that students can receive information or knowledge through interactions that take place during the learning process, such as group discussions and exchanging ideas with each other. This suggest that interaction and collaboration in group can help students in vocabulary by discussing with each other. In term of motivation, the results showed that most students gave responses with agree and strongly agree that learning vocabulary through multisensory approach increased students' motivation. This suggest that students felt more motivated when learning involved various sensory activities.

In conclusion, students showed a positive response after learning through a multisensory approach, which indicated that learning vocabulary through multisensory approach was effective to help students' engagement and interest, confident in using vocabulary and also felt motivated in learning vocabulary.

This study focused on the effectiveness of multisensory approach on eleventh-grade students' vocabulary mastery and the perception of students toward the use of multisensory approach for vocabulary mastery. This study still had limitations, the study only included eleventh-grade students from SMA N 2

Sukawati, therefore the results cannot be generalized to other schools that has different characteristic. These findings cannot be considered representative of the wider educational situation. The study's duration is limited time duration, the study does not assess long-term vocabulary retention, and the consistency of students' vocabulary knowledge over several months is uncertain. So, future research can do the same research in other senior high schools, with a larger number of participants and longer time to see the effect on students' vocabulary mastery.

CONCLUSION

This study was to examine the effectiveness of multisensory approach on eleventh-grade students' vocabulary mastery at SMA N 2 Sukawati", focusing on several aspects word meaning, word spelling, word pronunciation, word classes, and word used and to measure students' perception about the implementation of multisensory approach for vocabulary mastery. It can be concluded that multisensory approach had significant effect on students' vocabulary mastery. This was indicated by the improvement in the mean scores from the pre-test to the post test supported by statistical analysis. Furthermore, the used of multisensory approach contributed to better learning outcomes in all aspect vocabulary especially to supported vocabulary understanding and usage. The integration of multiple senses in the learning process helped students understanding, increased students' engagement and interest in learning. Therefore, the multisensory approach can be considered an effective approach for students' vocabulary mastery

The strength of this research is previous research has not explained specifically which aspect that receive strong effect and did not assess five aspects of vocabulary, while this research explained which aspects receive strong effect and asses five aspect of vocabulary. Therefore, it can be the strength of this research, where this research not only mention multisensory approach was, but also give a detailed explanation about which aspect receive the strong effect and why those aspects receive stronger effect.

The weakness of this research is that the research was conducted in a limited duration, which may affect the consistency of the students' vocabulary improvement. Due to limited time, this study only focused on the effectiveness of multisensory approach on eleventh-grade students' vocabulary mastery at SMA N 2 Sukawati, so the result cannot be generalized to other senior high school that have different characteristics. So, future research can do the same research in other senior high school, with larger number of participants and longer time to see the consistency effect on students' vocabulary mastery. Furthermore, future research can also use take supporting data by using interview to get students or teachers' opinion about the use of multisensory approach in learning process.

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