THE EFFECT OF WORD SEARCH PUZZLE IN STUDENTS'VOCABULARY MASTERY AT SEVENTH GRADE IN UPTD SMP NEGERI 4 PEMATANGSIANTAR

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ABSTRACT

The mastery of vocabulary is essential for effective communication and language acquisition. However, many students face challenges in enhancing their vocabulary through traditional teaching methods. The gap that this research aims to fill is the lack of studies focusing on the effectiveness of word search puzzle in learning strategies to improve vocabulary at the junior high school level. While there is a growing body of research on vocabulary learning in general, there is limited evidence on the specific challenges of the students in written words. This study aims to find out the effect of words search puzzle in students' vocabulary mastery at the seventh grade in UPTD SMP Negeri 4 Kota Pematangsiantar. This study used quantitative method in collecting the data with quasi-experimental design. The results indicated a significant increase in the post-test scores of the experimental group, with a t-test value of 3.55, exceeding the critical value of 1.673 at a 0.05 significance level. This finding suggests that Word Search Puzzles significantly enhance vocabulary learning among students. The study concludes that incorporating interactive and engaging methods like Word Search Puzzles can effectively improve vocabulary acquisition.

Keywords: Word search; Effect; Vocabulary

ABSTRAK

Penguasaan kosakata sangat penting untuk komunikasi dan pemerolehan bahasa yang efektif. Akan tetapi, banyak siswa menghadapi tantangan dalam meningkatkan kosakata mereka melalui metode pengajaran tradisional. Kesenjangan yang ingin diisi oleh penelitian ini adalah kurangnya penelitian yang berfokus pada efektivitas permainan tebak kata dalam strategi pembelajaran untuk meningkatkan kosakata di tingkat sekolah menengah pertama. Meskipun ada banyak penelitian tentang pembelajaran kosakata secara umum, bukti yang ada mengenai tantangan khusus siswa dalam kata-kata tertulis masih terbatas. Penelitian ini bertujuan untuk mengetahui pengaruh permainan tebak kata dalam penguasaan kosakata siswa kelas tujuh di UPTD SMP Negeri 4 Kota Pematangsiantar. Penelitian ini menggunakan metode kuantitatif dalam

pengumpulan data dengan desain kuasi-eksperimental. Hasil penelitian menunjukkan peningkatan yang signifikan pada skor pasca-tes kelompok eksperimen, dengan nilai uji-t sebesar 3,55, melebihi nilai kritis sebesar 1,673 pada tingkat signifikansi 0,05. Temuan ini menunjukkan bahwa permainan tebak kata secara signifikan meningkatkan pembelajaran kosakata di kalangan siswa. Penelitian ini menyimpulkan bahwa menggabungkan metode interaktif dan menarik seperti permainan tebak kata dapat secara efektif meningkatkan pemerolehan kosakata.

Kata Kunci: Pencarian kata; Efek; Kosakata

A. Introduction

Vocabulary is a fundamental part of language proficiency and provides a lot of the basis of how well students listen, read, speak, and write in learning English (Richards and Renandya, 2002). A rich vocabulary is essential because it enables students to understand and produce language across listening, speaking, reading, and writing activities. Students who lack sufficient vocabulary in English often struggle in serving as the foundation for communication effectively, reading comprehension, and academic progress. In addition, vocabulary is a list of words that instrumental at English in forming sentences, which express thoughts and feelings, whether in spoken and written language (Richards & Schmidt, 2010). Vocabulary mastery is very necessary to facilitate students in capturing the meaning of the conversation with teacher during English learning, and also in solving on English questions. Thus, vocabulary is the most important thing in learning English, without vocabulary students will not become proficient.

However, in reality, when the researcher did a teaching practice (PPL) at UPTD SMP Negeri 4 Pematang Siantar, it was found that many students still had limitations in mastering English vocabulary, which had a negative impact on their learning process at school. Quiz results showed that most students had low vocabulary mastery, as seen from the average score which was still below the minimum competency standard. In this quiz, students were asked to recognize, understand and translate basic vocabulary. However, many of them

struggled and answered randomly. This limitation also not only hinders students' understanding of the material, but also makes it difficult for them to understand instructions and explanations, resulting in less effective communication between teachers and students. Consequently, students rarely give feedback because they do not understand the intentions conveyed. This lack of vocabulary mastery also affects students' learning motivation. When they feel that they don't understand basic vocabulary, they often perceive the lesson as difficult, which ultimately decreases their interest and desire to learn.

Several factors contribute to students' difficulties in mastering vocabulary, categorized into internal and external factors. Internal factors are factors that come from students, including students' learning attitudes, students' physical health, intelligence and students' learning motivation (Sucandra et al., 2022). Students' learning attitudes greatly determine learning outcomes, if students like English subjects then they are happy to do every problem given by their teachers, so they will get maximum learning results. Conversely, if students already dislike the subject, it is potential that learning outcomes will never be maximized. Then, the health of the student's body is also quite influential because it causes students to be less focused when the teacher conveys learning material, so that the learning results obtained are also less than optimal. Furthermore, intelligence is an important factor in learning activities whose role is to store information for a long period of time so that it is not easy to forget. After that, motivation is an important factor so that students make maximum efforts in participating in English learning to achieve maximum learning results.

External factors are those derived from outside the students, such as teaching variations, the use of media, and learning methods. Teachers must carefully design these factors to select the most appropriate methods to minimize student difficulties. Unfortunately, some teachers still apply traditional methods in delivering material such as the lecture method, question and answer method, memorization method, and assignment method. These methods often make students feel bored and lead them to quickly forget English

vocabulary due to a lack of active engagement in learning. It also causes students to be less able to acquire and understand new vocabulary in daily contexts because teachers only focus on textbooks in teaching. Thus, if the teaching methods are inadequate, then students will have difficulty remembering new vocabulary and understanding its use in wider situations (Schmitt, 2008).

In this study, the use of varied learning media can be a solution to attract students' interest and strengthen vocabulary comprehension. Learning media is any tool, material, or means used to support the teaching-learning process to make it more effective and interesting for students (Arsyad, 2011). This media serves as an intermediary between teachers and students in delivering the subject matter, thus facilitating students' understanding and recall of the material taught. Various learning media, such as flashcards, audio and video, mind mapping, educational games, interactive learning applications, and posters, can help enrich students' learning experience. They allow students to be more actively involved in the learning process, making it easier for them to understand concepts and remember new vocabulary. One effective learning media to introduce and reinforce vocabulary is word search puzzle. Media such as word search offers a fun and contextual approach, thus encouraging students to recognize and remember new words better. The use of word search puzzles allows students to be active in the vocabulary learning process, improves memory, and helps them understand the context in which words are used in real life.

Word Search Puzzles are beneficial as a learning method because they help students recognize and familiarise themselves with new vocabulary, thereby enhancing their communication skills (Rahmah, 2016). A word search puzzle is a type of word game that consists of a grid of letters in which words are hidden in various directions, including horizontally, vertically, and diagonally. The objective of the puzzle is for players to locate and circle or highlight the words from a provided list within the grid. Word search puzzles are commonly used as educational tools to enhance

vocabulary, spelling, and cognitive skills, making learning more engaging and interactive for students (Jhonson & Smith, 2020). This method assists students in remembering new vocabulary, particularly English words they have recently encountered. According to Sutherland (2009), there are five benefits of word search puzzles, such as: (1) word search puzzles keep the brain active, (2) word search puzzles are useful for learning new languages, (3) improve spelling by reinforcing letter patterns, (4) help increase vocabulary by building word knowledge, and (5) word search puzzles train the brain to recognize patterns, improving cognitive skills like focus, memory, and problem solving. Thus, using word puzzles in learning not only makes learning fun, but also helps students think more critically and remember vocabulary better.

Research on "The Effect of Word Search Puzzle in Students'Vocabulary Mastery" was conducted by Adriani, A., & Ismayanti, M. (2024). The study focused on the eleventh Agama 3 at MAN 1 Polman. The main focus of their study was to determine the effectiveness of the Word Search Game in improving the vocabulary of students. The results of this study showed using word search games were effective in improving the mastery of vocabulary owned by students. Then, according to Fitria (2023), the result of the study shown that Word Search Puzzle is effective in improving students' vocabulary mastery. While in this research, the researcher focuses on improving students' vocabulary in classes seventh at UPTD SMP Negeri 4 Pematang Siantar using word search puzzle. The researcher will give pre-test, treatment, and post-test. The pre- test and post- test will gave in matching type. This study aimed to determine whether the use of word search games could increase students' vocabulary mastery of seventh grade UPTD SMP Negeri 4 Pematang Siantar or not.

Based on phenomena above, the researcher concluded that many seventh-grade students at UPTD SMP Negeri 4 Pematang Siantar struggled with limited vocabulary, which hindered their interest in learning English and caused frequent mistakes in solving exercises and understanding basic instructions. This lack of vocabulary led to ineffective

communication and minimal feedback during lessons, impacting students' engagement and overall progress in English. Given that vocabulary is essential for language learning, the researcher recognized the need for a more engaging approach to improve students' vocabulary skills. To address this, the researcher decided to conduct a study entitled "The Effect of Word Search Puzzle in Students' Vocabulary Mastery at Seventh Grade Students in UPTD SMP Negeri 4 Pematang Siantar." This study aimed to assess whether incorporating word search puzzles, an interactive and enjoyable learning tool, could enhance students' vocabulary mastery and increase their motivation and interest in learning English.

B. RESEARCH METHOD

This research used quantitative method.Quantitative research is a type of research methodology that involves the use of numerical data to gather and analyze information about a particular phenomenon or problem (Creswell, 2013). This method typically involves collecting data through structured surveys, experiments, or observations and analyzing the data using statistical methods. In this study, the researcher aims to investigate 'The Effect of Word Search Puzzle on Students' Vocabulary Mastery at Grade Seventh in UPTD SMP Negeri 4 Pematangsiantar.' The primary objective of this research is to determine whether the implementation of word search puzzles as a teaching tool has a significant impact on the vocabulary acquisition of seventh-grade students. Given the importance of vocabulary development in language learning, this study seeks to explore how interactive and engaging activities, such as word search puzzles, can enhance students' learning experiences and outcomes.

Research Design

The research used quasi-experimental research design. Quasi-experimental research design is a type of research design that lacks random assignment of participants to treatment or control groups (Creswell, 2013). Quasi-experimental designs can include pre-test, post-test designs, interrupted time-series designs, and non-equivalent control group designs. This design typically for two groups design, namely

experimental group and control group. Experimental group receives the intervention or treatment being studied. While, control group does not receive the intervention or treatment, it may receive a standard or traditional treatment or no treatment at all. Both groups are measured before and after the treatment or intervention, and the results are compared to determine the effect of the treatment.

Figure 1. Research Design



Note: O_1: Pre- test; X: Treatment; O_2: Post- test

Research Participants or Population and Sample

This research will be conducted at UPTD SMP Negeri 4 Pematang Siantar in the 2024/2025 school year. The population of this research was 290 students of ten classes (VII-1, VII-2, VII-3, VII-4, VII-5, VII-6, VII-7, VII-8, VII-9, and VII-10), two classes were taken to be the experimental group and control group. The researcher would use two classes, one class was for experimental group and another one was for control group. Each class consists of 29 students. The reason why the researcher choose class VII-4 as the experimental group was because the initial quiz results showed a low level of English vocabulary mastery, where many students had difficulty understanding basic vocabulary which hindered the understanding of learning materials and instructions. While, the reason why the researcher choose class VII-1 as the control group is because this class has a relatively better vocabulary mastery level compared to class VII-4 based on the initial quiz results. This allows the researcher to compare the effectiveness of using "Word Search Game" as a learning method in the experimental group with the control group who did not receive special treatment, so that the results of the study can be more valid and show significant differences in vocabulary mastery.

Instruments

The instruments used in this study were tests, consisting of pre-test and post-test, to measure the improvement of students' vocabulary mastery. The tool of data collecting is an item that could be used to get and collect information from the test form. In this research, the tool of data collecting is a written test form, specifically using matching type questions. In this research, the

researcher chose two aspects that are appropriate for scoring students'vocabulary, namely translation words into Indonesian and spelling or written.

Table 1. Table Scoring of Student's Individual Score

No	The table to be evaluated for each part of test	Score	
		Correct Number	Incorrect Number
1.	Translation Word into Indonesia	1	0
2.	Spelling – written	1	0

Note:
Min. Score: the lower score (0)
Max. Score: the highest score (100)

The procedure for collecting data was as follows:

1. *Pre- Test*

The pre-test was conducted as an initial step to assess the initial ability of students' vocabulary before treatment was given by the researcher. This pre-test was carried out at the first meeting and was attended by two groups, namely the experimental group and the control group. In this pre-test, the researcher gave students a test in the form of matching type about vocabulary of action verbs with number of questions are 10. The score for each question was 10 points so the total score for questions was 100 points if all questions could be answered correctly.

2. *Treatment*

The researcher taught English vocabulary to the participants by using Word Search Puzzle in this treatment. The learning steps taken by the researcher were as follows. The first meeting contained an introduction, which explained the purpose of the research and the importance of vocabulary mastery, as well as providing an overview of the material to be learned, followed by the implementation of a pre-test to measure students' initial abilities. The second meeting contained an explanation of the vocabulary to be learned and continued with learning activities using Word Search Puzzle, where students searched for words in random letters to improve vocabulary recognition and understanding. Finally, in the third meeting, a final evaluation in the form of a post-test was conducted to assess whether there was an improvement in students' vocabulary mastery after following the given treatment. Treatment was conducted only on the class

that had been selected as the experimental group.

3. Post-test

After the treatment was completed, the researcher gave a post-tests, like in the pre-test, which aim to measure students' vocabulary skills after receiving the treatment. The results of this post-test were then compared between the two groups to determine the significant improvement in the experimental group compared to the control group, so that the effectiveness of the treatment could be analyzed.

Data Analysis

In analyzing the data collected through pre-test and post-test, the researcher used a t- test (paired t-test) to test the hypothesis, specifically to determine whether or not vocabulary improves by using Word Search Puzzle. By computing the results of the students in the pre-test and post-test, the researcher compared and measured the mean, standard derivation, standard error, t-test, and t-table of each group, so providing a comprehensive understanding of the impact of the intervention on students' vocabulary development (Hatch & Farhady,1982). Firstly, the researcher calculated each individual's pre-test and post-test scores.

Secondly, the researcher collected the data and entered the data into the table below.

Table1. Data of Pre- tests and Post-tests

No.	ID	Pre-test Score (Experiment Group)	Post-test Score (Experiment Group)	No.	ID	Pre-test Score (Control Group)	Post-test Score (Control Group)
1	C1	X1	Y1	1	D1	A1	B1
2	C2	X2	Y2	2	D2	A2	B2
3	C3	X3	Y3	3	D3	A3	B3
4	C4	X4	Y4	4	D4	A4	B4
5	C5	X5	Y5	5	D5	A5	B5
n	Cn	Xn	Yn	n	Dn	An	Bn

After that, the researcher calculated the mean for each group on the pre-test and post- test, such as: (1) To find out the average of students' score before the treatment (pre-test), the researcher used the formula:

$\bar{X}$ = $\sum Xa$…..(2)

Range	Qualification
90-100	Good to Very Good
70-89	Average to Good
50-69	Poor to Average
0-49	Very Poor

$a\ Na$

(2) To find out the average of students' score after the treatment (post-test), the researcher

used the formula:

Ya

= ∑ Fa…..(3)

Na

While, (3) to find out the average of students' score for control group (pre-test), the researcher used the formula:

$\overline{X}$ = ∑ Xb…..(4)

b Nb

And, (4) to find out the average of students' score for control group (post-test), the researcher used the formula:

Yb

= ∑ Fb …..(5)

Nb

Where:

Xa: the data of the students' score before the treatment Ya: the data of the students' score after the treatment Xb: the data of the students' score for control group (pre-test)

$Y_{b:}$ the data of the students' score for control group (post-test) N: the number of students

The result of the students' mean score is categorized into its qualification. To know the improvement is as follow:

Table 2. The Criteria Of Students' Score

Fourth, after found the mean for each group, the researcher calculated the students' different mean score of pre-test and post-test with used the formula:

a) Experimental Class

b) Control Class

Where:

$Xd = \overline{Ya} - \overline{\overline{Xa}}$ … . . (6)

$Yd = \overline{Yb} - \overline{\overline{Xb}}$ … . . (7)

Xd : the data of students'different mean score

$\overline{\overline{Xa}}$: the data of the students' score before the treatment

$\overline{Ya}$: the data of the students' score after the treatment

Next, the researcher calculated the standard derivation with these following formulas

used:

1) Experimental Class (Sa)

Where:

$\sum da2$

$Sa = \sqrt{N - 1}$

… . . (8)

Sa : Standard Derivation of Experimental Class

$\sum da2$: Sum of Mean Derivation of Experimental Class

Na : Number of Students of Experimental Class 1 : Constant Number

2) Control Class (Sb)

$\sum db2$

$Sb = \sqrt{N - 1}$

…..(9)

Where:

Sb : Standard Derivation of Control Class

$\sum db2$: Sum of Mean Derivation of Control Class

Nb : Number of Students of Control Class 1: Constant Number

Next, to find out the standard error mean, the researcher used formula:

$$SE(X_a - X_b) = \sqrt{(\frac{S_a}{\sqrt{N_a}})^2 + (\frac{S_b}{\sqrt{N_b}})^2} \ldots..(10)$$

Where:

$SE(X_a - X_b)$: Standard Error

After that, to finding T-test, the researcher used formula:

$$T_{test} = \frac{X_a - X_b}{SE(X_a - X_b)} \ldots..(11)$$

C. RESEARCH FINDINGS AND DISCUSSION

Research Findings

In this research, the purpose of the researcher is to investigate the effect of word search puzzles on students' vocabulary mastery at grade seventh in UPTD SMP Negeri 4 Pematangsiantar. The researcher involves a class that consists of 29 students.

Table 3. Data of Pre-tests and Post-Tests Score

No.	ID	Pre-test Score	Post-test Score	Mean of Post Test - Post Test Score	No.	ID	Pre-test Score	Post-test Score	Mean of Post Test - Post Test Score
1	C1	60	80	0,68	1	D1	70	80	-6.21
2	C2	40	70	10.68	2	D2	60	70	3.79
3	C3	70	90	-9.32	3	D3	60	80	-6.21
4	C4	30	80	0.68	4	D4	70	80	-6.21
5	C5	60	90	-9.32	5	D5	60	70	3.79
6	C6	60	80	0.68	6	D6	80	70	3.79
7	C7	30	70	10.68	7	D7	60	70	3.79
8	C8	30	70	10.68	8	D8	70	80	-6.21
9	C9	60	80	0.68	9	D9	80	80	-6.21
10	C10	40	70	10.68	10	D10	70	70	3.79
11	C11	50	80	0.68	11	D11	60	70	3.79
12	C12	40	80	0.68	12	D12	90	80	-6.21
13	C13	50	90	-9.32	13	D13	70	90	-16.21
14	C14	70	80	0.68	14	D14	70	70	3.79
15	C15	40	70	10.68	15	D15	80	80	-6.21
16	C16	50	80	0.68	16	D16	70	80	-6.21
17	C17	70	90	-9.32	17	D17	80	80	-6.21
18	C18	50	70	10.68	18	D18	70	80	-6.21
19	C19	50	80	0.68	19	D19	80	70	3.79
20	C20	50	80	0.68	20	D20	80	80	-6.21
21	C21	60	90	-9.32	21	D21	80	70	3.79
22	C22	60	90	-9.32	22	D22	70	70	3.79
23	C23	40	80	0.68	23	D23	70	70	3.79
24	C24	30	70	10.68	24	D24	70	70	3.79
25	C25	60	90	-9.32	25	D25	80	70	3.79
26	C26	70	90	-9.32	26	D26	50	60	13.79
27	C27	80	90	-9.32	27	D27	60	60	13.79
28	C28	30	80	0.68	28	D28	50	60	13.79
29	C29	30	80	0.68	298	D29	70	80	-6.21

After the researcher did analysis of students' score of pretest and post-test. The researcher collected the students' scores of pre-test and post-test, the researcher compared the result between the pre-test and post-test scores. The aim of calculating the pretest and post-test scores is to find out the result of t-test since it is required to be calculated in the formula of finding t-test.

a) The students' mean score of pre-test and post-test

1) Pre-test (Experimental Class)

$\bar{\bar{X}} = \sum Xa$

$a \qquad Na$

$\bar{\bar{X}} = 1460$

a 29

2) Post-test (Experimental Class)

$\overline{\overline{Xa}}$ = 50.34

$\overline{Ya}\ \overline{Ya} \sum Ya = Na$

2340 =29

3) Pre-test (Control Class)

$\overline{Ya}$ = 80.68

$\overline{\overline{X}} = \sum Xb$

b Nb

$\overline{\overline{X}}$ = 2030

b 29

$\overline{\overline{Xb}}$ = 70

4). Post-test (Control Class)

$\overline{Yb}$

$\overline{Yb}$

$\sum Yb = Nb$

2140=29

$\overline{Yb}$ = 73.79

Figure2. Mean Score of Pre-test and Post-test

The value of the students' difference (experimental group) is taken from the mean value of the post-test minus the mean value of the pre-test. In this study, the results showed that the difference in students' pre-test and post-test scores was Y_d = 33.11. The value of the student difference score of the pre-test and post-test:

$$X_d = \overline{Y_a} - \overline{X_a}$$

$$X_d = 80.68 - 50.34$$

$$X_d = 30.34$$

Table4. The Qualifications of Students' Mean Score Of Pre-Test and Post-Test

Test	Mean Score	Qualification
Pre-test	50.34	Poor to Average
Post-test	80.68	Average to Good
Average	30.34	

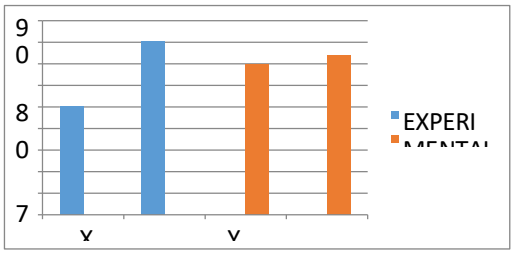
Meanwhile, the difference in the students' scores (control group) is calculated by subtracting the mean value of the pre-test from the mean value of the post-test. In this study, the result showed that the difference in students' pre-test and post-test scores was Y_d = 3.79. The value of the student difference score of the pre-test and post-test:

$$Y_d = \overline{Y_b} - \overline{\overline{X_b}}$$

$$Y_d = 73.79 - 70$$

$$Y_d = 3.79$$

Table5. The Qualifications of Students' Mean Score of Pre-Test and Post-Test



Test	Mean Score	Qualification
Pre-test	70	Average to Good
Post-test	73.79	Average to Good
Average	3.79	

The students' standard derivation of post-test (experimental group):

$\sum da2$

$Sa = \sqrt{}$

$Na - 1$

Sa = √1586.21

28

Sa = √56.65

Sa = 7.52

The students' standard derivation of post-test (control group):

$\sum db2$

Sb = √

$Nb - 1$

1482.759

Sb = √ 28

Sb = √52.59

Sb = 7.27

The standard deviations of the post-test scores for the experimental group (S_a = 7.52) and the control group (S_b = 7.27) indicate that the experimental group exhibited slightly greater variability in their scores. This suggests that the outcomes in the experimental group were more spread out compared to the control group, which may reflect differences in teaching methods, student engagement, or the effectiveness of the experimental treatment. However, to draw more definitive conclusions about the effectiveness of the experimental treatment, further statistical analysis, such as a t-test, is necessary to determine if the differences in means and variances are statistically significant. However, before the researcher computed the t-test value it was necessary to know the value of the standard error mean.

Finding Standard Error Mean:

$$SE(X_a - X_b) = \sqrt{(\frac{S_a}{\sqrt{N_a}})^2 + (\frac{S_b}{\sqrt{N_b}})^2}$$

$$SE(X_a - X_b) = \sqrt{(\frac{7.52}{\sqrt{29}})^2 + (\frac{7.27}{\sqrt{29}})^2}$$

From the above calculations, it is found that the standard error mean is 1.94. This value indicates the extent to which the sample mean is expected to vary from the true population mean. A smaller standard error suggests that the sample mean is a more accurate estimate of the population mean. In this case, a standard error of 1.94 implies that while there is some variability in the sample means, the estimates are relatively precise. This information is crucial for conducting hypothesis tests and constructing confidence intervals, as it helps to assess the reliability of the sample data in representing the broader population. Therefore, further analysis, such as comparing the means of the experimental and control groups using a t-test.

Finding T_{test}

$$T_{test} = \frac{\bar{X}_a - \bar{X}_b}{SE(\bar{X}_a - \bar{X}_b)}$$

$$T_{test} = \frac{80.68 - 73.79}{1.94}$$

$$6.89$$

Based on the T_{test} calculation, a T_{test} value of 3.55 was obtained, indicating that the mean of the experimental group (80.68) was higher than the mean of the control group (73.79). This indicates a significant difference between the two groups in the context of the measured variables. To determine statistical significance, this T_{test} value needs to be compared with the T_{table} value at the appropriate degrees of freedom. If the T_{test} value is greater than T_{table} , then the difference can be considered significant. This result provides evidence that the treatment in the experimental group has a greater effect compared to the control group.

Finding T_{table}

$$df = (N_a + N_b) - 2$$
$$df = (29 + 29) - 2$$
$$df = 58 - 2$$
$$df = 56$$

Hypothesis Testing

Based on the results of the computations above, the researcher used a significance level of α = 0.05. This choice reflects a 95% confidence level, indicating that the results obtained are unlikely to have occurred by chance. Next, the researcher determined the t-table value using the t-distribution, with degrees of freedom calculated as df = (N_a + N_b) − 2d, resulting in df = 58-2 = 56. Therefore, the t-table value is t (0.05, 56) = 1.673. The researcher then compared the t-test to the t-table value. The t-test was found to be 3.55, which is greater than the t-table value of 1.673. This indicates that t-test > t-table value. Therefore, this supports the acceptance of the alternative hypothesis (Ha), which posits a significant difference between the pre-test and post-test scores of vocabulary mastery after instruction using Word Search Puzzles, is accepted, while the null hypothesis (H0) is rejected.

Discussion

From the research findings above, the researcher found a significant positive effect of using Word Search Puzzle in the experimental class VII-4, which

consisted of 29 students (16 boys and 13 girls). The students were given Word Search Puzzle as a treatment to improve their vocabulary after conducting a pre-test. The total pre-test score was 1460 ($\sum X_a$=1460), with the mean score reaching 50.34 ($\overline{\overline{X_a}}$ = 50.34),while the total post-test score was 2340 ($\sum Y_a$=2340), with the mean post-test score reaching 80.86 ($\overline{Y_a}$ = 80.86).The substantial improvement in students' vocabulary acquisition in the experimental class was evident from the mean difference between the post-test and pre-test which reached 30.34 (X_d = 30.34) after the treatment, indicating that the use of Word Search Puzzles had a positive effect on students' vocabulary improvement.

In contrast, the control class was conducted in class VII-1, which also consisted of 29 students (18 boys and 11 girls). The students in the class were not given the Word Search Puzzle, but were only given traditional teaching, such as memorization to improve vocabulary. The control class students were also given the same pre-test as the experimental class. After the pre-test, a post-test was also given to the students at the end. The total pre-test score in the control class was 2030 ($\sum X_b$=2030), while the total post-test score was 2140 ($\sum Y_b$=2140). The mean score of the pre-test was 70 ($\overline{\overline{X_b}}$ = 70), while the mean score of the post-test was 73.79 ($\overline{Y_b}$ = 73.79) which shows the differences between the post-test and pre- test reached 3.79 (Y_d=3.79). The researcher concluded that the traditional teaching method applied in the control class was not effective in improving students' vocabulary. Although there was an increase in scores, the difference was not significant when compared to the experimental class that used Word Search Puzzle, where the average increase reached 30.34. This suggests that more interactive and fun teaching methods, such as the use of crossword puzzles, can have a greater impact on students' vocabulary acquisition.

After that, the researcher found the value of the standard error of the mean of 1.94 ($SE(X_a - X_b)$ = 1.94) which was used to find the t-value in the t-test so as to determine whether the difference between the post-test means of the experimental and control classes was statistically significant. After that, researchers also evaluated the significance of students' pre-test and post-test

scores using the t-test formula. The calculation results showed a t-test value of 3.55 (T_{test} = 3.55), while the t-table value was 1.673 at a significance level of α = 0.05 or α = 5%, with degrees of freedom (df = 56) calculated df = (N_a + N_b) − 2. Thus, the researcher can conclude that the null hypothesis (H0) is rejected which states that there is no significant difference between the post-test averages of the experimental and control classes. Conversely, the alternative hypothesis (H1) is accepted which states that there is a significant difference between the two groups.

The results of this study show that the use of Word Search Puzzle has a very large influence on increasing student vocabulary seen from the t-test > t-table, namely (3.55> 1.673). Word Search Puzzle is a game that involves finding words hidden in a set of letters, which can be arranged in various directions, such as horizontally, vertically, or diagonally. This activity is not only fun, but also encourages students to be more actively involved in the learning process. By searching and finding words, students can strengthen their memory of new vocabulary, as well as improve their ability to recognize and understand words in different contexts. In addition, this method can also increase students' motivation to learn, as they feel more involved and challenged in solving the puzzles. Therefore, the results of this study confirm the importance of using interactive and engaging learning methods involving learning media, such as Word Search Puzzle, in significantly improving students' vocabulary acquisition.

E. CONCLUSION

Based on the results of the research conducted in the seventh grade at UPTD SMPN Negeri 4 Pematangsiantar, it can be concluded that the use of word search puzzles has a positive effect on vocabulary mastery among students. The improvement in students' vocabulary is evident from the mean scores of the pre-test and post-test. The mean score of the pre-test ($\overline{X}$) was 50.34, while the mean score of the post-test ($\overline{Y}$) increased to 80.86 in aaexperimental class. These findings in dicate that word search puzzles can effectively enhance

English vocabulary acquisition. Therefore, it is recommended that word search puzzles be utilized as a valuable tool in vocabulary instruction.

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