CHAPTER III
RESEARCH METHODOLOGY

A. Research Methodology

1. Research Design

The quantitative method used in this research with pre-experimental. The experimental method is a research procedure that is carried out to reveal a causal relationship between two or more variables by controlling the influence of other variables, as Nawawi (2015:88) explains. According to Sugiyono (2016:73), who noted that "pre-experimental design is not yet a true experiment, since there are still external factors that also impact the construction of the dependent variable (bound)" a real experiment. So, the findings of the experiment, which are what are known as the dependent variable, are not completely controlled by the dependent variable.

The reason researcher choose *pre-experimental design* is because this form of research finds it impossible to control or manipulate all relevant variables. Then to find out whether there is an influence and if there is how effect it is, it can be done by comparing the situation before treatment and after treatment.

The research employed a one-group pretest-posttest design. In this design, a pretest was administered before the implementation of the treatment. The pretest served to provide a baseline measurement, allowing for a more accurate comparison with the post-treatment situation. This design can be illustrated in the table 3.1 :

Table 3.1

One-Group Pre-Test and Post Test Design

$$O_1 \ X \ O_2$$
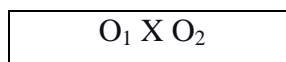
O_1 = Students' score before treatment

X = Treatment

O_2 = Students' score after treatment

2. Subject of The Research

In this pre-experimental research the subject in this research are all eighth-graders at SMPN 5 Sungai Kunyit, where there was only one class. There are 32 students enrolled in the eighth grade at SMPN 5 Sungai Kunyit, with 18 male students and 14 female students making up the class's total enrollment.

B. Techniques and Tool of Data Collection

1. Techniques of Data Collection

In this research, the researcher used measurement techniques as data collection. "Measurement is a method that is measuring, since it employs standard equipment and provides data from measurement findings in the form of ordinal numbers (numbers)," as stated by Sukmadinata (2010:230). The objective of the measuring strategy is to determine how much students' vocabularies have expanded or contracted before and after receiving treatment. The first step in the process is administering a pre-test to students in order to determine their starting vocabulary levels before beginning the treatment process. The second exam is called the post-test, and its purpose is to evaluate how far the students have come in terms of their vocabulary. Both the pre-test and the post-test employ the same degree of difficulty for the assessment.

2   Tools of Data Collection

In this research, the researcher applied a vocabulary test for pre-test and post-test to collect data. Margono (2014:158) argues that "a test is a set of stimuli given to someone with the intention of getting an answer that can be use as the basis for determining a numerical score". Arikunto (2013:192) states that "a test is a series of questions or exercises and other tools use to measure skills, knowledge, intelligence, abilities or talents possessed by individuals or groups."

Based on the experts thoughts above, it can be deduced that tests serve as instruments for gauging students' knowledge, both on an individual basis

and within group settings, to systematically evaluate their proficiency. In the context of this research, the designated data collection tool is the Vocabulary Test. The utilization of tests aims to ascertain the effectiveness of teaching and enhancing English vocabulary through the application of anagram techniques.

Researcher apply pre-test and post-test. Pre-test is taken before conducting experimental studies or before teaching English vocabulary using anagram techniques. This type of test uses essays, and oral test that used to measure students' word meaning, word use, spelling, pronunciation and vocabulary use by individuals used with the pre-test and post-test. After conducting the pre-test and getting the results, the researcher conducts treatment, teaching English vocabulary with anagram techniques. After the treatment researcher conducted a post-test, so the post-test was taken after conducting experimental studies or after teaching English vocabulary using anagram techniques. After treatment, researcher gave post-tests to all students. From the results of the post-test, researcher wanted to know students' understanding of the vocabulary mastery given after the treatment was carried out. And to find out if there are effect differences in scores in students during the pre-test and post-test.

C. Validity

Validity is the most important idea to consider when preparing of selecting an instrument for used. Validity information indicated the degree to which the test was capable of achieving certain aims, states by Ary, *et.al* (2010:225) "Validity is the most important consideration in developing and evaluating measuring instruments." The aim of validity in this research was measure knowledge and ability.

According to Ary, *et.al* (2010: 235), "The main concern in assessing the validity of criterion-referenced tests is content validity." To ensure the relevant content of the items by researcher, it is suggested to use experts judgment in

order to valuate the contents of the test items that will be used by rescarcher to measure students' ability.

In this context, the researcher will discuss the problem with the expert that master in teaching english and then the researcher distributes the test to the expert. and then, the expert will tell the appropriate test that will be purposed of the research. The consideration for the validity of items can be a suggestion, evaluation, and also modification to re-make the instrument. In other word the researcher asked the validator to check the content of the test whether the instrument valid or not.

Based on the validator comment, the researcher should revised the pronunciation assessment aspect section is placed at the end of the questions and the layout of the questions is arranged from easy to medium to more difficult levels. Therefore, after the researcher has done revised, so the vocabulary test was used in this research.

D. Technique of Data Analysis

Data analysis holds crucial role in the research process as it enables the utilization of data to address research problems and achieve research goals. In this particular research, the focus is on assessing students' vocabulary achievement through the implementation of Anagram technique in teaching vocabulary mastery. The researcher conducted pre-test and post-test to evaluate students' progress. Various data analysis techniques employed, and the formulas specific to each technique utilized by the researcher to analyze the data effectively.

1. Student`s individual scores of pre-test and post-test

In order to analyse the students` individual scores, the researcher used the formula below:

$$X1= \frac{A1}{N} \times 100 \qquad\qquad X2= \frac{A2}{N} \times 100$$

Where:

X1 = Students` score pre-test

X2 = Students` score post-test

A1 = Number of correct items pre-test

A2 = Number of correct items post-test

N = Total number of scoring item pre-test and post-test

Taken from Cohen *et al*. (2007:423)

To determine individual scores, the researcher multiplies the number of correct answers by 100 and then divides it by the total number of test items. Following the computation of individual scores, the researcher proceeds to analyze the mean score.

2. Students` mean score of pre-test and post-test

After the computation of individual scores, the next step is to calculate the mean score of the individual scores. According to Brase & Brase (2012: 85), the mean is the average commonly used to calculate a test's normal. Similarly, the formula for determining the mean score is as follows:

a. Pre-test

$$X_1 = \frac{\sum X_1}{N1}$$ Taken from Singh (2007: 138)

Where:

X_1 = Mean Score

$\sum X_1$ = The sum of the Scores

N_1 = Total samples

b. Post-test

$$X_1 = \frac{\sum X_1}{N1}$$ Taken from Singh (2007: 138)

Where:

X_1 = Mean Score

$\sum X_1$ = The sum of the Scores

N_1 = Total samples

Table 3.2 Mean Score Classifications

Test Score	Classification
80.0-100.0	Excellent
70.0-79.0	Good
60.0-69.0	Average
50.0-59.0	Poor
0.0-40.0	Very Poor

Taken from Cohen *et.al* (2012:338)

3. Standard Deviation

The researcher employs standard deviation to assess the extent of the Mean previously collected. Essentially, this involves utilizing the appropriate formula to examine the distribution or spread around the Mean score, which is calculated through the Standard Deviation formula. Additionally, as per Brase & Brase (2012: 95), standard deviation is employed to illustrate the dispersion around the Mean Score.

The formula of standard deviation is as follow:

$$\mathbf{SD} = \sqrt{\frac{\Sigma d2}{N-1}}$$ Taken from Cohen *et al*. (2007:512)

Where:

d^2 = The deviation of the score from the mean(average), squared

Σ = The total value of

N = The number of subjects

According to Cohen et al. (2007:512), they state that "A low standard deviation suggests that the scores are closely grouped, whereas a high standard deviation indicates that the scores are more widely spread. Essentially, determining the rate of dispersion in the mean scores is a valuable complement to the outcomes of this research."

4. Normality Test

In this research, assessing the normality of data is crucial to determine the distribution of pre-test and post-test data. The researcher employed the one-sample Kolmogorov-Smirnov Test using SPSS version 16. Data is deemed normal if the probability score of the normality test by Kolmogorov-Smirnov is greater than 0.05 (p value > 0.05). Conversely, if the probability score is less than 0.05 (p value < 0.05), it indicates that the data is not normal.

5. Testing Hypothesis

Following the results of the normality test, the subsequent step involved establishing criteria for hypothesis testing. If the value of (p) is less than 0.05 (α), it indicates the effectiveness of the Anagram Technique, leading to

the rejection of Ho. Conversely, if the value of (p) is greater than or equal to 0.05 (α), it suggests that the Anagram Technique is not effective, and Ho is not rejected. To ascertain the hypothesis results, the researcher utilized a t-test to determine whether the hypothesis was accepted or not. According to Urdan (2004:90), "a paired sample T-test is used to compare the means of a single sample or two matched or paired samples." The formula employed for this purpose is as follows:

$$t = \frac{\overline{D}}{\sqrt{\dfrac{\sum D^2 - \dfrac{(\Sigma D^2)}{N}}{N(N-1)}}}$$

Taken from Ary *et al.* (2010:177)

Where:

t	: The student's significant score
D	: The deviation score of pre-test and postest
$\sum D^2$	: Different scores squared, then summed
(ΣD^2)	: Different scores summed then squared
N	: Sample number (Student)

In conducting this research, researcher used IBM SPSS 16 to calculate the T-test. The criteria that would be used to accept or reject the hypothesis is as follows:

If Significant value (Sig.) > α, the $_{Ho}$ accepted

If Significant value (Sig.) < α, the $_{Ha}$ accepted

Note:

H_a : Anagram Technique is effective to use in teaching vocabulary mastery.

H_o : Anagram Technique is not effective to use in teaching vocabulary mastery.

α = 0,05

6. Effect size

After hypothesis testing, the researcher proceeded to address the second question of this research, aiming to determine the effect size resulting from the treatment. As defined by Cohen et al. (2007:293), effect

size serves as a measure of the extent to which a phenomenon is evident or the extent to which a null hypothesis is not upheld. The formula for calculating the effect size is as follows:

$$ES = \frac{X2 - X1}{Sd}$$ Taken from Cohen *et al*. (2007:521)

Where:

ES = Effect size

X_2 = Mean of post-test

X_1 = Mean of pre-test

SD = Standar deviation

This formula can be calculated manually, providing the researcher with the effect size value resulting from the treatment. Additionally, for interpretation purposes, the researcher relies on Cohen *et al.* (2007:521) interpretation guidelines, as outlined in the table 3.3 below:

Table 3.3 Effect Size Level

Value	Level
0-0.20	Weak Effect
0.21-0.50	Modest Effect
0.51-1.00	Moderate Effect
>1.00	Strong Effect

Taken from Cohen *et al*. (2007:521)

If the effect size falls within the range of 0-0.20, it is classified as a weak effect. A value between 0.21-0.50 falls into the category of a modest effect, while a range of 0.51-1.00 indicates a moderate effect. If the value exceeds 1.00, it is categorized as a strong effect.

E. Procedure of Research

Before conducting the research, it is essential to establish a systematic procedure to ensure the research follows a structured and efficient path, aiming for maximum effectiveness over time. Creswell (2003: 22), emphasizes that "Because quantitative studies are the traditional mode of research, carefully worked-out procedures and rules exist for the research." Therefore, implementing a systematic approach in the research process is crucial to

uphold precision and time efficiency. Researcher conducted this research related to the implementation of Anagram to see the effectiveness of that technique toward the students' vocabulary. The procedures of the research are as below:

1. Pre-test

    Researcher gave students pre-test to find out student score before treatment.

2. Treatment

    In this section, researcher administered treatment to the students. The term "treatment" in this context refers to the researcher instructing students using the Anagram technique for teaching vocabulary.

3. Post-test

    After completing the treatment, the researcher administered a post-test to the students. The post-test aimed to determine whether there was any change in students' scores after the treatment. The same test used in the pre-test was employed for the post-test.