CHAPTER III

RESEARCH METHODOLOGY

A. Research Design

Research design refers to the overall plan or framework that guides the process of conducting research. This research is quantitative research. Quantitative research is research that measures using data in the form of numbers or statistics to test hypothese (Jaya 2020) . In this research, research used an experimental design. The aim of experimental design is to examine the effect of a treatment on the symptoms of a certain group compared to other groups who use different treatments (Dr. Muhammad Ramdhan n.d.). Experimental research can be carried out in the laboratory, in the classroom and in the field. In this study, experimental research was conducted in the classroom by taking students as the population. A researcher selects a design to determine the validity of conclusions that can be drawn from the study. The researcher want to know the effect of realia as teaching method towords vocabulary mastery with experimental research usimg pre-test, treatment and post-test instrument.

B. Research Variable

Variables are variations of the research object. Variable is object of research or something of concern research. There are two types of variables: dependent variable and independent variable. The dependent variable is the variable focus or central variable on which other variables ifany relationship. The independent variable is selected with researchers to determine the relationship with dependents variables. So, the variables in this study are:

1. The independent variable (X) is the input variable, which is cause, partially or completely, a particular outcome, it is the stimulus that influences the response, and the antecedent or modifiable factor to influence an outcome. This is a variable that influences or causes a change or emergence of the dependent variable. The independent variable in this research is the use of Realia.
2. The dependent variable (Y) is the result variable that caused totally or in part by the input, antecedent variables. This is the effect, consequence or response to the independent variable. Is a variable that is influenced by the

independent variable. The dependent variable in this study is the students' vocabulary mastery.

C. Research Population, Sample and Sampling Technique

This research conduct of SMP N 7 Metro, and the research will be implemented in the seven grade in academic year of 2024/2025

1. Population

According to (sugiyono 2016), population is a general field consisting of subjects/objects with certain qualities and characteristics determined by the reviewer to be studied and then conclusions drawn. The population is all research subjects. The population in this study students of class VII for the academic year 2024/2025. The total population is 204 students divided into 7 classes. The population in this study was students of VII grade of SMP N 7 Metro.

2. Sample

Based on sampling techniques. The sample for this research was 60 students. Class 7 B as an experimental class has 30 students. while class 7 F is the control class.

3. Sampling Technique

In this study, researchers used sampling techniques to select participants.The sample is a part of the total and the characteristics possessed by the population selected as the data source. It is called a sample study when researcher want to generalize a sample of research results. Sampling technique is a sampling technique to determine samples that used in research (Sharma 2017) . In this research the author used a cluster random sampling technique. where the stages in determining the research sample are as follows :

1. The researcher made a lottery for all seventh grade students at SMPN 7 Metro. Next, the researcher cut the paper into small pieces and assigned a class identity to each paper.
2. The paper is rolled up and then drawn by drawing 2 times so that 2 classes are selected.
3. Next, the two classes were drawn to determine 1 experimental class and 1 control class.

D. Research Instrument

The instrument is very important for a researcher in conducting research before collecting data. According(Xu and Storr 2012)"selection of appropriate and

useful measuring tools is very important for the success of research." This means that appropriate instruments are needed to conduct research. Moreover,the instrument itself will whether it is working properly or not. In this research, the researcher uses tests as the instrument

According to (bidin A 2017) "a test is an assessment tool in written form to record or observe student achievement in line with the target of a series of assessments." This means that the test is an instrument given by the teacher which aims to identify student values. In this study, the test was intended to determine the effect of realia as teaching method towards vocabulary mastery. There are two types of tests used in this research, namely pre-test and post-test. The purpose of giving the pre-test is to determine students' vocabulary mastery and their scores before implementing the treatment. Meanwhile, the post-test was used to determine the increase in vocabulary mastery and vocabulary mastery scores after implementing the treatment. Apart from that, the pre-test and post-test are in written form, the questions are in the form of multiple choices and there will be questions about synonyms, antonyms, etc. The test questions that will be used are as follows:

1. Pre-Test

The pre-test was carried out to determine the extent of vocabulary mastery of students in class VII B and VII F before being given treatment. This test is given to determine students' achievement of vocabulary understanding. This test is in the form of multiple choice with a total of 25 questions, where students can choose one answer between A, B, C, D.

2. Post- Test

This post-test will be given to class VII B and VII F after treatment. The purpose of this test is to determine the difference in results between the pre-test and post-test.

E. Validity and Reability Instrument

1. Validity

In quantitative research, validity must be used. Validity is defined as the extent to which a concept is accurately measured in a quantitative study (Heale and Twycross 2015). This is defined as measuring your research concept accurately.

Validity is often defined as the extent to which an instrument measures what it purports to measure (Kimberlin and Winterstein 2008). It means the test measures what it claims to measure. To measure whether the test has good validity, researcher analysis the test with empirical validity.

The validity formula is as follows:

correlation of product moment.

$$Rxy = \frac{\sum xy}{\sqrt{(\sum x2)\,(\sum y2)}}$$

Where :

r_{xy} : Coefficient between variable X and Y

∑xyO2 : sum of the result of X and Y for each students

$\sum x^2$: sum of each item

$\sum y^2$: sum of total score/total items

2. Reability

The second measure of quality in quntitative research is the reliability or accuracy of an instrument.(Heale and Twycross 2015)stated that the research instrument consistently had the same situation on the repeated opportunities. In other words, the extent to which a research instrument consistently has the same results if it is used in the same situation on repeated occasions.

Reliability refers to the stability of the measuring instrument used and its consistency over time(SÜRÜCÜ and MASLAKÇI 2020). In other words, Reliability is the ability to measure instruments to give similar results when applied at different times.

$$r_{11} = \frac{2\,(rxy)}{(\,1+rxy)}$$

Where:

r_{11} = Coefficient reliability is appropriate

r_{xy}= Coefficient between variable X and Y

The criteria of reliability based on as follows

Tabel 3 .The criteria of interval coefficient.

Interval coeffient	Criteria
0,00-0,19	Very low
0,20-0,39	Low
0,40-0,59	Medium
0,60-0,79	High
0,80-1,00	Very high

(Schober and Schwarte 2018)

F. Data Collecting Technique

Data is very important in conducting research. Need to know a lot information about the research topic. In conducting research, researchers can use a lot of data collection such as tests, interviews, observations or questionnaires. In this study, researchers will several steps, namely:

1. Preparing research instruments

Before conducting the research, the researcher prepare several research instruments. The researcher made several tests for pre-test and post-test. Each test consists of 25 multiple choice questions.

2. Giving pre-test to students

Researchers conduct research by giving tests to students before being given treatment. Students must complete 60 minutes and work individually

3. Providing treatment to students

Researchers provide materials and use realia as teaching method towards vocabulary mastery to teach students.

4. Giving post-test to students

Researchers conducted research by giving tests to students after being given treatment. The questions in the post-test are different from the pre-test and treatment.

5. Analyzing the results of both tests

The researcher analyzed the per-test and post-test data from the students. After the researcher calculates the results of this study, the researcher can conclude whether the realia as teaching method towards vocabulary mastery is effective or not.

6. Rating

In assessing objective tests, each correct answer is counted as one pointuse the formula below:

$S = R \times 4$

Where:

S = Score

R = Total number of correct answers

G. Data Analyzing Technique

In this study, the data obtained from the experimental group and the control group. To know the difference between the groups.

The t-test formula as following:

$$T = \frac{Mx - My}{\sqrt{\left(\frac{\sum x^2 + \sum y^2}{Nx + Ny - 2}\right)\left(\frac{2}{Nx} + \frac{2}{Ny}\right)}}$$

Where :

T : Total score

Mx : Mean of Experimental Group

My : Mean of Control Group

Nx : Numbers of students in Experimental Group

Ny : Numbers of students in Control Group

X^2 : Standard of Deviation of Experimental Group

Y^2 : Standard of Deviation of Control Group

1. Normality Test

The object test for normality to determine the distribution of the data follows a normal distribution or not. One of the test assumptions of the statistic compulation is that the data must fulfill the qualification of normal distribution. Therefore analyzing the normality of distribution the students' score is crucial. That calculates by using SPSS (Statistical Package for Social Science) for normality. The tests of normality employed Shapiro Wilk.

The hypothesis for the normality test is formulated as follows:

Ho = The data have normal distributed

Ha = The data do not have normal distributed.

While the criteria of normality test are follows :

Ho is accepted if Sig ≥ α= 0.05

Ha is accepted if Sig <α = 0.05

$$W = \frac{\left(\sum_{i=1}^{n} a_i y_i\right)^2}{\sum_{i=1}^{n}\left(y_i - \bar{y}\right)^2}$$

y^i = i-th data value or data sequence

y = sample average

$a_i = (a_1, \ldots, a_n) = \frac{m^T V^{-1}}{(m^T V^{-1} V^{-1} m)^{1/2}}$

m = $(m_1, \ldots, m_n)^T$ is the expected value of a sequence of independent and identically distributed statistics. Random variable drawn from a standard normal distribution and V is the covariance matrix of the statistics of that order.

2. Homogeneity Test

A homogeneity test applied to analyze whether or not the scores of one group have homogenous variance compared with the score of other groups. In this study, the researcher used F-test. The formula can be seen as follow:

The hypothesis formula:

$H_O = \sigma_1^2 = \sigma_2^2$ both sample have the quality of variants.

$H_1 = \sigma_1^2 \neq \sigma_2^2$ both sample have different of variants.

The used statistic formula of the test is:

$F = \frac{Biggestvariants}{Smallestvariants}$

The test criterion

Accepted H_0 if $F_{ratio} \geq F\frac{1}{2}a\ (V_1 - V_2)$, with $V_1 = n_1 - 1$ and $V_2 = n_2 - 1$

(Intervals 2016)

H. Statistic Hypotesis

A hypothesis is an assumption about a population parameter. This assumption can be true or not. It is a method of making statistical decisions using experimental data, the best way to determine whether a statistical hypothesis is true would examine the entire population. After collecting the data, the researcher analyzed them in order to find out whether the use of reliable could increase the students' achievement in reading related to things in the classroom.

Hypothesis testing is intended to see whether the hypothesis that is proposed in this research is accepted or not, to test the hypothesis,

The T-test formula as follows:

$t -_{test} = \frac{\overline{X}_1 - \overline{X}_2}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}}}$

Notes:

$\overline{X}_1$ = the means of the experiment class

$\overline{X}_2$ = the means of the control class

S = the standard devitiation

N_1 = the number of students' in the experimental class

N_2 = the number of students' in the control class

Before using t-test formula the researcher would determine the average variant (S^2)

The variant (S^2) is calculated by formula:

$$S^2 = \frac{(N_1-1)S_1^2+(N_2-1)S_2^2}{N_2(N_2-1)}$$

Notes:

N_1 = Number of students' in experimental class

N_2 = Number of students' in control class

S_1^2 = Variant of experimental class

S_2^2 = Variant of control class

S^2 = Variant

The criteria are:

H_0 : H_0 is accepted if t-ratio < t-table

H_a :H_a is accepted if t-ratio > t-table

Based on the explanation above, the researcher concludes thatthe statistical hypothesis is an assumption about a population parameter. Thisassumption may or not be true. When sample data are not consistent with thestatistical hypothesis, the hypothesis is rejected, because the test will beused to know whether the hypothesis that is proposed can be accepted orrejected. The formula which is used in this test is t-test.