CHAPTER III
RESEARCH METHODOLOGY

A. Research Design

In this study, researchers used quantitative methods and quasi-experimental research designs. Since the purpose of this study was to draw informal conclusions about the relationship between the independent and dependent variables, namely whether the self-construction of lexical strategies affects students' lexical competence, the researcher conducted an experiment using a project.

However, Creswell (2012) defines quantitative research as research that collects data in a digital format and uses tools to generalize it to a group of people. In addition, quantitative research can also be interpreted as testing that requires variable control and requires valid and reliable measurements. The purpose of this type of research is to collect measurable data, such as: size, cost, quantity. Second, it states that quantitative research data must be able to be counted or measured. This study includes two procedures. The two groups were divided into two groups, the experimental group and the control group. The treatment uses a mind mapping strategy as a class treatment in the experimental class. In the control group, no mind mapping strategy was used for treatment. The outline of the quasi-experimental research can be described as follows.

Table 3.1

Quasi-Experimental Design: Pre-test and Post-test Design

Group	Pre-Test	Treatment	Post-Test
Experimental	O1	X1	O2
Control	O3	X2	O4

Explanation of the table:

O1, O3   : Check vocabulary before quiz

O2, O4   : Check vocabulary after quiz

X1   : Use mind map processing strategy

X2   : Do not use mind map processing strategy

B. Research Variable

Variables are properties or characteristics of a person or organization that (a) can be measured or observed by researchers and (b) vary among people or organizations studied. Measurement means the researcher gathers information about a person by asking them to answer questions. If the variable is variable, it means that the results take different values depending on the type of variable being measured (Creswell, 2012:). There are two variables in this research.

1. Independent Variable

Independent variables are features that affect the results or the dependent variable (Creswell, 2012). Independent variables cause other variables. Based on the definition above, the independent variable in this study is the conceptual planning strategy.

2. Dependent Variable

The dependent variable is a feature that depends or is influenced by the independent variable (Creswell, 2012). This is the effect of the independent variable. Researchers do not manipulate this variable, but are influenced by independent variables. The dependent variable in this research is the students' vocabulary mastery.

C. Population, Sampling, Sample
1. Population

The largest group used for generalization is called the population. Population is a broad entity with certain traits and characteristics. Aria et al., (2010) argues that the population is defined as all members of a well-defined class of people, events, or organisms. According to Arikunto (2013), the research subject is the population itself. The subjects of this study were all students of class VIII SMP Negeri 4 Metro, totaling 245 students.

2. Sampling

In this study, scientists use special probes to take samples. Sampling is based on the process of selecting a large number of people for research and the voluntary participation of one or more people. Sampling aims to obtain general information from a large number of people. Sampling is a sampling method. In this study, directional sampling was used as the sampling method. According to

Arikunto, mentioned in (Azkiya, 2016), targeting is a sampling process by selecting subjects based on specific objectives rather than levels or domains.

3.   Sample

Arikunto (2010) states that a sample is a limited number of elements from a population to be able to represent that population. There are six classes at SMP Negeri 4 Metro. The sample was selected based on the teacher's recommendation to take VIII F as the experimental class and VIII G as the control class. Because of that, they have learned to speak English at SMP 4 Negeri Metro `since junior high school until now. Therefore, the sample of this study was students of class VIII F 30 which consisted of students and class VII G which consisted of 32 students.

D.   Research Instrument

According to (Sudjana, 2014), a test is an assessment in which students are given questions that can be answered orally (d'stock test), written (d'stock test) or practically (d'stock test). . Compared to (Zinal, 2016), the test is used in the context of a measurement task that requires solving or answering several questions or a series of tasks to determine different aspects of the student's behavior being measured. used. . Based on the opinion of experts about the importance of the test, it can be said that the test is a procedure carried out to measure students' ability to achieve the expected learning objectives. Researchers will use this test as a tool in this study. Students took an entrance test to measure their speaking ability before treatment and a post-treatment test to measure their speaking ability after treatment. If all tests were reliable, the researchers performed initial tests before treatment and additional tests after treatment.

E.   Validity and Reliability Instrument
1.   Validity

(Arikunto, 2013) effectiveness is a measure of the effectiveness or degree of effectiveness of an instrument. So being honest means knowing that the research results are good. In other words, validity is also a tool by which researchers can test the validity of the tools they use and check content relevance, i.e. whether the test is a good representation of what is being tested. .

This means that the test plan represents each device. Depending on the actuality of the content, the material presented is subject to the teacher's material. The assessment was carried out by two specialist doctors namely Mr. Mam Wetri Balubi, MD, degree I and Mr. Yang. 2. The evaluator reviews the process used to develop the test as well as the test itself to assess how well the design meets expectations.

The tool used to measure validation is (1) error. (2) good, (3) good, (4) good, (5) very good.

2.   Reliability

Arikunto (2013) states that this test tool is quite reliable and good for use as a data collection tool. In other words, credibility is the key to obtaining good quality evidence.

The reliability test is calculated using the Arikunto formula (2013) as follows:

$$rxy = N\,xy\,\text{-}(X)(y)\{(N.x2\text{-}(X)2(Ny2\text{-}(y)\}$$

Where :

r_{xy} : target reliability test

N   : number of samples

Σx : Sum of x values

Σy : amount and points

Σxy : sum of x and y scores for each student

$x2$ Total score: $\times^2$

$y2$: sum of score Y^2

We then applied the calculated results to the Spearman-Brown equation to assess the reliability of all tests. Formula:

$$r11 = 2..rxy(1+ rxy)$$

r_{11} : coefficient of the reliability of entire test

r_{xy} : coefficient of the reliability of half test

Reliability criteria based on Sugiyono criteria are as follows.

Table 3.4 Score Criteria

Interval Coefficient	Correlation
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

(Source : Sugiyono, 2013)

F.   Data Collecting Technique

Data collection technologies are designed to obtain data in various ways. To get data, scientists use tests. The data collection methods are described below.

1. The first pre-test was carried out at the first data collection stage. Preliminary tests were carried out before treatment was given to the experimental and control groups. My classmate is at the top. The researchers then instructed the students what to do. After explaining the format of the exam, students are asked to answer 40 introductory questions that contain eight parts of the speech.

2. Posttest Students from the experimental and control groups take the posttest. This post-test requires students to do the same thing as the pre-test and answer 40 questions within the time limit given.

G.   Data Analysis Technique

After collecting the data, the researcher analyzed the pre and post test results for the normality test formula, homogenization test and hypothesis testing. The data processing algorithm is as follows.

1.   Normality Test

Test the normality feature to see if your data distribution follows a normal distribution. One of the assumptions of the cluster statistical test is that the data must follow normal distribution criteria. Therefore, it is very important to analyze the normal distribution of student scores. The Kolmogorov-Smirnov test is used to test for normality in large samples (>100), while the Shapiro-Wilk method is used to test small samples (<100).

Normality test using the Kolmogorov-Smirnov formula:

Standard Formats:

Hawass: The sample comes from a normally distributed population.

H1: the sample is not from the retained population.

$$\bar{x} = \frac{x_1 + x_2 + \ldots + x_n}{n} = \frac{\sum_{i=1}^{n} x_i}{n}$$

$$s = \sqrt{\frac{1}{n-1} \sum_{i=1}^{n-1} (x_i - \bar{x})^2}$$

White :

zConverts a number to a normal distribution representation.

x_i: data value i

$\bar{x}$: mean data

s: sample standard deviation

2. Homogeneity Test

The uniformity test is used to check whether the results of one group have the same deviation as that of another group. In this study, researchers used the F test with the following formula:

Standard Formats:

$H_0 : \sigma 1^2 = \sigma 2^2$ both sample have the quality of variants.

$H_1 : \sigma 1^2 \neq \sigma 2^2$ both sample have different of variants.

Statistical formula used:

$$F = \frac{biggest\ variants}{samalles\ variants}$$

Pattern:

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

H. Statistic Hypothesis

Hypothesis is a hypothesis about population parameters. This assumption may or may not be true. It is a method of making statistical decisions based on empirical data. The best way to determine whether a statistical assumption is correct is to look at the entire population. After collecting the data, the researcher analyzed it to see if using reality improved students' speaking skills in class.

The purpose of hypothesis testing is to see whether the hypothesis

proposed in this study is acceptable for hypothesis testing. Perform a repeated measurement t-test. The test pattern used is the t-test, and the pattern is as follows:

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

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 dispersion ($S2$) is

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

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

Base value:

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 that this hypothesis is a community parameter hypothesis. If the sample data does not fit the statistical hypothesis, the hypothesis may or may not be true. Thus, the hypothesis is rejected because testing is used to decide whether to accept or reject the proposed hypothesis. The formula used in this test is the t-test.