

## **BAB III**

### **RESEARCH METHOD**

#### **A. Research Design**

According to Arikunto (2013) research design can be interpreted as a planstructured work in terms of relation between variables in a manner comprehensive in such a way that the result of his research can provide answers for research questions. The plan consists of the factor to be the studies changed into carried out, beginning from making hypotheses and their implications operational till the very last analysis. A studies technique is described because the manner wherein the cause on this studies is achieved ( Arikunto, 2013).

This research used quantitative research due to the fact the facts with inside the shape of numerical and statistical analysis. It consists of at the experimental studies. According to Winarni (2011), stated that experimental research is a study of manipulating stimuli, experimental conditions, then observe effect of treatment (Winarni, 2011). So, this research is a research to find out differences in learning outcomes due to treatment which is assigned to the two classes, namely experimental class and control class. The sorts of experimental design utilized by the studies is quasi-experimental design. According to Sugiyono (2014), Quasi Experimental Design has control group, but cannot function completely to control the variables outsiders that affect implementation experiment. Two classes are given different treatments, so that the differences in learning outcomes in the cognitive domain can be seen student (Sugiyono, 2014). The researcher uses a quasi-experimental class because in this study it involves two classes that will be used as an experimental class and a control class.

The researche use cluster random sampling as a technique to get an experimental class and control class. The researcher give some steps, they are pre-test, treatment, and post-test. Giving the pre-test to students to determine their ability to master the material before using the board game, then a post-test is given to students to determine their ability after using the board game. The table of the research design as quoted by Sugiyono (2016) as follow :

**Table 3.1**  
**Research Design**

Class	Pre-test	Treatment	Post-test
C	O1	-	O2
E	O1	X	O2

Note :

E : Experiment Class

C : Control Class

O1 : Pre-test

X : Board Game

- : Conventional Technique

O2 : Post-test

( *Sugiono,2010*)

From the statement above, the researcher will give a pre-test to the experimental class and control class to determine their original ability in mastering vocabulary. The researcher gave a pre-test to the students before being given treatment X (Board Game). the researcher uses treatment X (Board Game) in the experimental class, after the researcher uses the treatment in the experimental class the researcher will give a post-test to find out how many scores they get.

## **B. Research Variable**

Variable comes from English variable with the meaning: "change", "unfixed factor", or "modifiable symptoms". The term variable can be interpreted in various ways. According to Sugiyono (2017), research variables are basically anything that is determined by the researcher to be studied so that information is obtained about it, then draw conclusions (Sugiyono, 2017).

According to Sugiyono (2016) research variable is an attribute investigation, variable is everything that planned by the researcher to learn. Variable is a constructor character to studied there are two kind of variables in common, they are Independent variable and dependent variable. Independent variable is a variable that is affected or to influence another variable. Dependent variable is a variable

that is affected or has become effect by independent variable (Sugiyono, 2016). In this research, there are two variables that is used by researcher, they are Independent variable (X) and Dependent variable (Y).

In this study the Board Game as an independent variable to indicate students' vocabulary mastery and in a dependent variable the researcher chose students' vocabulary mastery. The description as follows :

**Table 3.2**

**Research Variable**

Group	Independent Variable	Dependent Variable
Experiental Group	Board Game	Students' Vocabulary Mastery
Control Group	-	Students' Vocabulary Mastery

Based on the statement above, the researcher concluded that there were 2 variables in this study, namely, X as "Board Game" and Y as "Students' Vocabulary Mastery".

**C. Research Population, Technique Sampling, and Sampling**

**1. Research Population**

Sugiyono (2018) defines population as a generalization area consisting of objects/subjects that have certain qualities and characteristics determined by the researcher to be studied and then drawn conclusions (Sugiyono, 2018). Based on the understanding of the population above, the population in the study is SMK Muhammadiyah 1 Metro with 44 students.

In conclusion, population as a generalization area consisting of: objects/subjects that have certain qualities and characteristics determined by the researcher to be studied. The subject of this study is all students of class XI at SMK Muhammadiyah 1 Metro.

**Table 3.3 Research Population**

No.	Class	Number
1.	XI AKL	15
2.	XI MPLB	17
3.	XI BDP	21
4.	XI TKJ	15
5.	XI DKV	11
	<b>Total of students'</b>	<b>79</b>

*(Source by : English teacher of SMK Muhammadiyah 1 Metro)*

Based on the data above, it can be concluded that the population in this study was carried out in the SMK Muhammadiyah 1 Metro. There are five classes. Therefore, the total of the population in this study is 79 students'.

## 2. Technique Sampling

According to Setiadi (2013) that the sampling techniques is one of technique to take a sample. Sampling approach is the manner for the researcher to take the pattern of the population (Setiadi, 2013). In undertaking the studies to get the pattern from the population, the researcher used cluster random sampling because the approach. The researcher used cluster random sampling to decide which the elegance may be the experimental organization and the control organization. From those classes, and the researcher took classes a good way to be the pattern of this research. Below the stairs accomplished with the aid of using the researcher:

- a. The researcher wrote the class numbers, namely XI AKL, XI BDP, XI DKV, XI MPLB, and XI TJK on a piece of paper.
- b. The paper have been rolled after which positioned into the glass.
- c. The glass has shaken till getting the rolling of paper out.
- d. The first published paper was XI TKJ.
- e. Then put the paper back into the jar and shake again until a roll of paper comes out. A second paper is coming out, namely XI AKL. In this case, the two roles are equally likely to be an experimental class and a control class.
- f. Shuffle the two rolls of paper again to determine the experimental and control classes. First comes Class XI TKJ, which is an experimental class.
- g. The second roll of paper that comes up is XI AKL, which is the control class.

After finishing, the researcher finally got x as the experimental group class with 15 students and y as the control class group with 15 students.

## 3. Research Sampling

Sugiyono (2018) suggests that the sample is part of the total and characteristics possessed by the population (Sugiyono, 2018). In this study, the author uses nonprobability sampling technique with incidental sampling method to determine the sample study. According to Sugiyono (2018) non-probability sampling is a sampling technique samples that do not provide equal opportunities/opportunities for each element or members of the population to be

selected as samples ( Sugiyono, 2018). While incidental sampling according to Sugiyono (2018) is a sampling technique based on chance, that is, anyone coincidentally/incidentally met with the researcher can be used as a sample, if deemed by the person who happened to meet it matched the data source (Sugiyono, 2018).

from the explanation above it can be concluded that the sample is part of the total and characteristics possessed by the population. In this study, two classes were selected, namely class XI TKJ and class XI AKL at SMK Muhammadiyah 1 Metro. class XI AKL as control class and class XI TKJ as experimental class.

#### **D. Research Instrument**

According to Arikunto as cited in Nasution (2016) that "Research instruments are something that is most important and strategically positioned in the overall activity study. The existence of research instruments is an important part of very integral and included in the component of the research methodology because the instrument research is a tool used to collect, examine, investigate a problem under investigation (Nasution, 2016). It can be concluded that the instrument is a tool to collect data in research. Some instrument used in collecting data in this research were :

##### **1. Test**

Some studies use test instruments to obtain data. According to Arikunto as cited in Nasution (2016) Test is a set of questions or exercises or other tools used to measuring skills, knowledge, intelligence, abilities or talents possessed individual or group. In this study, the researcher conducted two tests, namely, pre-test and post-test (Nasution, 2016).

##### **a. Pre-test**

Pre-test is given when students have not been given treatment. This test is given to find out how much they master new vocabulary without treatment.

##### **b. Post-test**

The post-test was given after the students were given treatment. This test aims to let researchers know how much change the student's grades have increased or decreased after using the new treatment given.

In this study, researchers used tests, namely pre-test and post-test. the pre-test was given before using the treatment and the post-test was given after the treatment was given. The test is used because it can collect data results or values that have been given to students so that they can be seen in the final results.

## **E. Validity and Reliability**

### **1. Validity**

Validity refers to extent to which the test measures what it is intended to measure Sugiyono (2016) it means measuring what it claims to measure. To measure the validity of the test, researchers analyzed the content validity test form. Content validity checks to see if the test properly represents the material under test. Therefore, the subject of the test should represent the material discussed. Regarding the validity of the content, the specified material is compatible with the material from the evaluation.

Expert assessment is conducted to the test validity of an instrument by theoretical concepts and contextual instruments that will use. There are two experts which gives evaluation, namely Mrs. Fitri Palupi K, M.PBI and Mrs. Isnaini Lutfia, S.Pd. the experts were reviewer the process that is used in developing the test as well the test itself and make judgement concerning how well items represent the intended the content. The set of equipment which is used to measure the criteria of validation are (1) failed, (2) poor, (3) fair, (4) good, (5) excellent.

### **2. Reliability**

Arikunto (2013) says that the reliability of the test is an instrumental can be believed to be used as instrument for collecting data because it has been good (Arikunto, 2013). It means that reliability is needed to know whether the test has a good quality or not.

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

$$r_{xy} = \frac{N \sum xy - (\sum X)(\sum y)}{\sqrt{\{(N \cdot \sum x^2 - (\sum X)^2)(N \sum y^2 - (\sum y)^2)\}}}$$

Where :

$r_{xy}$  : item of test reliability

- N : Number of sample  
 $\sum x$  : the sum of x score  
 $\sum y$  : the sum of y score  
 $\sum xy$  : sum of the result of X and Y for each students  
 $\sum x^2$  : sum of score X<sup>2</sup>  
 $\sum y^2$  : sum of score Y<sup>2</sup>

The result of the compilation then applied into Spearman-Brown formula to estimate the reliability of the entire test. The formula is :

$$r_{11} = \frac{2 \cdot r_{xy}}{1 + r_{xy}}$$

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

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

The criteria of reliability which based on Sugiyono's criteria 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

According to Supriati as cited in Aini et al. (2018) The method of data collection is an important thing in research, because this method is a management strategy or method used by researchers to collect data needed in their research. Some of the techniques that will be used in this research are as follows:

### 1. Test

#### a. Pre-test

The pre-test was given at the first meeting during the research in order to find out the problems and students' scores on vocabulary mastery. pre-test was carried out

before treatment. the researcher will give a written test to the students. The test is in the form of paper and contains questions about vocabulary such as verbs, adverbs, conjunctions, nouns, pronouns, adjectives, and prepositions. The pre-test was carried out in the experimental class and the control class.

#### b. Treatment

After giving the pre-test, the researcher conducted treatment in class on the students. The treatment contains vocabulary mastery. The treatment that will be used in this research is the Board Game. Before the game starts the researcher explains the flow of the game to the students, after the students understand about the game the researcher explains the learning theme to be studied. After that they play Board Game games independently by using dice which will determine what topic the student will do related to the material. Treatment is carried out in experimental class.

#### c. Post-test

The post-test was carried out after the treatment was completed. post-test was given so that researchers know the value obtained by students after using the Board Game media about vocabulary mastery. post-test was conducted in the experimental class and the control class.

### **G. Data Analysis Technique**

After the researcher collects the results from the pre-test and post-test data, the formulas that will be given in this study are the normality test, homogeneity test, and hypothesis test. the procedures to treat the data as follow :

#### 1. Normality Test

Normality test is a test carried out with the aim of assessing the distribution of data in a group of data or variables, whether the distribution of the data is normally distributed or not. Therefore analyzing the normality of distribution the students' score is crucial. The detail explanation can be seen as follow:

Normality test using the formula Chi-quadrates Arikunto (2013) follow:

##### a. The Hypothesis formula:

Ho : sample comes from the population that has not a normal distribution.



$H_1$  : sample did not come from the population that has not a normal distribution.

b. Statistic formula:

$$X^2_{count} = \sum_{i=1}^k \frac{(O_i - E_i)^2}{E_i}$$

Notes :

$X^2$  = Chi-quadrates

$O_i$  = frequency observes

$E_i$  = frequency expectation

$K$  = interval class

The criterion, if  $X^2_{count} \leq X^2_{table}$  with  $dk = k - 3$ , so, the data is normal.

*Arikunto (2006)*

2. Homogeneity Test

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

a. The hypothesis formula:

$H_0$  :  $\sigma_1^2 = \sigma_2^2$  Both sample have the quality of variants.

$H_1$  :  $\sigma_1^2 \neq \sigma_2^2$  Both sample have different of variants.

b. The used statistic formula of the test is:

$$f = \frac{(\text{The highes variance})}{(\text{The smalles variance})}$$

c. The test criterion:

Accept  $H_0$  if  $F_{ratio} \geq F_{\frac{1}{2} \alpha} (V_1 - V_2)$ , with  $V_1 = \eta_1 - 1$  and  $V_2 = \eta_2 - 1$

Setiadi (2013)

3. Hypothesis Test

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

repeated measures t-test was conducted and the used formula of the test is t-test which this formula:

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

Notes:

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

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

S = the standard deviation

$N_1$  = 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 concluded that the hypothesis is an assumption about a population parameter. This assumption may be true or not be true when sample data are not consistent with the statistical hypothesis, so the hypothesis is rejected because the test is used to know whether the hypothesis that is proposed can be accepted or rejected. The formula which is used in this test is t-test.