CHAPTER III
RESEARCH METHOD

A. Research Design

According to (Jilcha Sileyew, 2020) the research design is intended to provide an appropriate framework for a study. The research method can be defined as a way to achieve a research objective. A very significant decision in research design process is the choice to be made regarding research approach since it determines how relevan information for a study will be obtained; however, the research design process involves many inter related decisions. The research design used by researchers at this time is Quasi Experimental Design. The basic objective of the experimental design is to test and determine the impact of the results of the treatment carried out on the final results and organize other influencing factors.

In this study, one group will be designated as the experimental class, while the other will be designated as the controlled class. The researcher would use the fly swatter game as a teaching technique in the experimental class, while the conventional teaching technique would be used in the controlled class. According to (Sugiyono, 2019) the research design is described in the table below:

Table 3.1 Table of Research Design

Group	Pre-test	Treatment	Post-test
Experimental Group	O_1	X_1	O_2
Control Group	O_3	X_2	O_4

Source *(Sugiyono, 2019)*

Note:

$O_{1,3}$ = Pre-test

$O_{2,4}$ = Post-test

X_1 = Treatment using Fly Swatter Game

X_2 = Conventional

In the description above, it can be explained that the researcher gave a pre-test for the experimental class and the control class. The purpose of

giving a pre-test is to find out students' abilities in vocabulary mastery. Researchers give tests before treatment in the experimental or control class. The researcher gave treatment to the experimental class X1 (Giving vocabulary teaching through fly swatter game media) and the control class X2 (Conventional). After being given the treatment, the researcher gave a post-test to measure students' scores in writing analytical exposition texts in the experimental class and the control class.

B. Research Variables

(Sugiyono, 2019) research variable is an attribute, characteristic, or value of a person, object, or activity that has certain variations determined by the researcher to be studied and then drawn conclusions from. Variable comes from the fact that specific elements can vary among objects in a population. The variables in a researcher's study are the dependent variable and the independent variable. As for an explanation of each of the variables are as follows:

1. Independent Variable according to (Sugiyono, 2019) this variable is often referred to as a stimulus, predictor, or antecedent variable. In Indonesian, it is often referred to as the independent variable. The independent variable is the variable that influences or causes the change or emergence of the dependent variable.

2. Dependent variables as (Sugiyono, 2019) states are often referred to as output, criteria, or consequent variables. In Indonesian, it is often referred to as the dependent variable. The dependent variable is the variable that is affected by or is the result of the independent variables. The descriptions of both variables are as follow:

    - Dependent Variable/(y) will be vocabulary mastery.
    - Independent Variable/(x) will be using the fly swatter game.

C. Research Population, Sample and Sampling Technique
1. Population

Population refers to the set or group of all the units on which the findings of the research are to be applied. Referring to the definition of population, we can say that it consists of all the units on which the findings of research can be applied. In other words, population is a set of all the units which possess variable characteristic under study and for which findings of

research can be generalized (Shukla, 2020). Therefore, the population of this study were students of class XI SMA Negeri 2 Metro. There are nine classes with 35 students in each class. The total population is 347 students.

2. Sample

Within this target population, the researcher selected a sample for study. (Sugiyono, 2019) in quantitative research, the sample is part of the number and characteristics possessed by the population. When the population is large and it is impossible for the researcher to study everything in the population, for example, due to limited funds, manpower, and time, the researcher can use samples taken from that population. What is learned from the sample can be forced on the population. For this reason, samples taken from the population must be truly representative. In this study, researchers chose two classes as samples. Researchers used a random sampling technique to select a class. In the science class, there are six classes, and in the social studies class, there are two classes. To choose the experimental class and the control class, the researcher used a random sampling technique, and the classes selected were class XI IPS 2 as the experimental class and class XI IPS 3 as the control class at SMA Negeri 2 Metro, totaling 70 students. It can be seen from the following table:

Table 3.2

Table sample research

Experiment group (IPS 2)	35
Control group (IPS 3)	35
Total	70

Source: Data of students of class XI IPS at SMA Negeri 2 Metro

3. Sampling Technique

Based on (Bhardwaj, 2019) sampling is defined as a procedure to select a sample from an individual or from a large group of people for a certain kind of research purpose. In this research, researchers will use cluster random sampling. Cluster random sampling is a sampling technique from a randomly selected population without looking at its position in that population. Below the steps done by the researcher to choose the experimental group and the control group:

a. First, write down all of Class XI on a piece of paper.

b. Second, the papers are rolled up and then put in a glass.

c. Third, shake the glass until the paper rolls.

d. Then two classes (XI IPS 2 and XI IPS 3) were selected and had the opportunity to become experimental and control classes.

e. Then the two papers were rolled up and put back into the bottle and then shaken again to determine which class was the experimental class and which class was the control class.

f. Then the experimental class will focus on the first roll of paper (XI IPS 2).

g. The control class will be assigned to the second roll of paper (XI IPS 3).

D. Research Instrument

According to (Sugiyono, 2019) in principle, his research aims to measure social and natural phenomena. Researching with existing data is more appropriate when it is called making a report rather than conducting research. Therefore, the researcher has to make research instruments before conducting the research. In this study, the instrument used is a test form.

The researcher will conduct a pretest and a posttest. Pretests and posttests are types of formative evaluation that are used to assess the progress or development of student learning. A pre-test is a test given at the beginning of the learning process, whereas a post-test is given at the end of learning.

In conclusion, a research instrument is a tool used in research to gather testable data. When administering the instrument to the students, the researcher employs multiple choice to determine the percentage of students' vocabulary mastery.

E. Validity And Reliability
  1. Validity
  a. The Concept of Validity
  According to (Surucu & Maslakci, 2020) validity is determined by the meaningful and appropriate interpretation of the data obtained from the measuring instrument as a result of the analyses. In this case, validity tests, which determine whether the expressions in the scalemake suitable measurements according to the purpose of the research, come to thefore.

In order for the research to yield beneficial results, the measuring instrument must measure what it claims. The use of a validated measuring instrument ensures that the findings obtained as a result of the analyses are valid.

To measure a test that has good validity, the researcher will analyze the form of the advance validity test. Face validity is described as whether a test appears to be a good measure or not. So, test items must represent the material being discussed. At first glance, the validity of the material provided is in accordance with the material assessment experts. Expert assessment is conducted to test (Pérez, 2017) the validity of an instrument using theoretical concepts and contextual instruments. There are two experts who gave the evaluation. The experts reviewed the process of developing the test as well as the test itself and made a decision on how well the items represented the intended content.

b. Expert Assessment

According to (Taherdoost, 2018) a test has face validity if its content simply looks relevant to the person taking the test. Construct validity focuses on what will be measured, namely the effect of using the fly swatter game on students' vocabulary understanding. This research develops the use of games in learning English in the classroom based on vocabulary assessment criteria. The equipment used to measure validation criteria consists of very poor, fair to poor, good to average, excellent to very good. The instrument was consulted with Mam Fitri Palupi Kusumawati, M.Pd. BI as a vocabulary subject lecturer and Mr Mukhsin Al - Aslam, S.Pd as an English subject teacher at SMA Negeri 2 Metro to ensure that the instrument was valid.

2. Reliability

Reliability refers to the consistency of a measure. A participant completing an instrument meant to measure motivation should have about the same responses each time the test is completed. Although it is not possible to give an exact calculation of reliability, an estimate of reliability can be achieved through different measures (Heale & Twycross, 2015). In this study, researcher use Spearman Brown (split half) formula. The formula Spearman Brown (Spilt Half) as follows:

$$r_{xy}$$
$$= \frac{N \sum xy - (\sum x)(\sum y)}{\sqrt{(N \sum x2 - (\sum x)2 \{N \sum y2 - (\sum y)2\})}}$$

Where:

r_{xy} : item of test reliability

N : the number of the sample

$\sum x$: the sum of x score (odd items)

$\sum y$: the sum of y score (even items)

$\sum xy$: sum of the result of X and Y for each student

$\sum x^2$: sum of score X2

$\sum y^2$: sum of score Y2

Table 3.3

Score Criteria

Interval Coefficient	Correlation
0,00-0,199	Very Low
0,20-0,399	Low
0,40-0,599	Medium
0,60-0,799	High
0,80-1,000	Very High

(Sugiyono, 2019)

From the table above, it can be seen that the reliability calculation is 1,000, which means that the reliability is very high so that the test can be used for data collection.

F. Data Collecting Technique

According to (Faliyanti et al., 2018) research instrument quality is related to validity and collecting data quality is linked to coincidentally of the ways are in used to collect data. So that, the instrument which has examined its validity and reliability are not fixed yet can produce the valid and reliable data, when that instrument is used exactly in collecting its data. This study will used pre-test, treatment and post-test to collect data from the experimental and control groups, respectively.

1. **Pre-Test**

Before the researcher gives treatment to the experimental and control classes, the researcher will give a pre-test. The purpose of the pre-test itself is to find out the students' initial conditions before the researcher gives them treatment. Then, before teaching new material, play a fly-swatter game with the previous material. The test is a suitable method for assessing students' knowledge, skills, feelings, motivation, and intelligence. Furthermore, there are 40 multiple-choice questions that students will work on. Correct questions get 1 score, and wrong answers get a score of 40. Then the score will be increased to 100 using an index multiplier of 2.5.

2. **Treatment**

Give treatment to students by using a fly swatter game in accordance with the material being studied. This treatment will be carried out in six meetings, in the experimental group, namely class XI IPS 2 students. The researcher explains the material being studied and using the media of the fly swatter game. Meanwhile, in the control class, namely class XI IPS 3, the researcher only explained the material studied to the students, then the researcher tested it by giving a post-test.

3. **Post-Test**

The researcher gave the students a post-test after the pre-test and finished the treatment. The researcher gave a post-test to students after the pre-test and completing the treatment. The researcher gave 40 questions and the same time as the pre-test, but the questions given in the post-test were randomly numbered and the questions were given.

G. **Data Analyzing Technique**

After collecting the data, the researcher analyzes it using three tests, as follows:

1. **Normality Test**

Based on (Supena et al., 2021) in a normality test, the data has to be normally distributed. This test aimsto determine that both groups come from populations that have normal distributions. To know the normality, the researcher used One-Sample Kolmogorov-Smirnov test with SPSS. The Kolmogorov Smirnov normality test is part of the classical assumption test. The normality test aims to find out whether the residual values are normally

distributed or not. A good regression model has residual values that are normally distributed. At this stage there are two criteria, namely:

    a) If the significance value is > 0.05, then the residual value is normally distributed.

    b) If the significance value is <0.05, then the residual value is not normally distributed.

2. Homogenity Test

The homogeneity test aims to determine whether the variance between the control group and the experimental group is homogeneous or heterogeneous. Homogeneous means that the data for both groups have the same variance (Supena et al., 2021). The homogeneity test at this stage using one way anova. At this stage there are two criteria, namely:

    a) If the significance value is >0.05 it means homogeneous.

    b) If the significance value is <0.05 it means not homogeneous.

3. Hypothesis Test

According to (Sugiyono, 2019) the t-test with two samples aims to compare the two data sets and determine whether the variables are the same or different. The t-test shows how far the influence of one independent variable individually explains the variation of the dependent variable. This test compares the experimental class's pre-test and post-test scores to those of the control class. The T-value was calculated using SPSS or the T-test formula by the researcher in this study:

The hypothesis formula are:

Ha: There is a significant effect of using Fly Swatter game on students' vocabulary mastery in class XI students at SMA Negeri 2 Metro.

Ho: There is no a significant effect Fly Swatter game on students' vocabulary mastery in class XI students at SMA Negeri 2 Metro.

To decide which hypothesis is accepted or not accepted, use the t-test formula used to compare two samples. The t-test formula is as follows:

$$T - count = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{(n1 - n2)s_1^2 + (n2 - 1)s_2^2}{n1 + n2 - 2}(\frac{2}{n1} + \frac{2}{n2})}}$$

Notes:

$\bar{x}_1$: the mean value of the first sample group.

$\bar{x}_2$: the mean value of the second sample group.

$n1$: first sample group size.

$n2$: second sample group size.

$S1$: the standard deviation of the first sample group.

$S2$: the standard deviation of the second sample group.

Before using t-test formula the researcher determine the average variant (S^2). The variant (S^2) is calculated by the formula :

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

Notes:

N_1 : number of students' in the experiment class.

N_2 : number of students' in the control class.

$S\frac{1}{2}$: variant of experiment class.

$S\frac{2}{2}$: variant of control class.

S^2 : variant.

Criteria for acceptance of hypothesis testing there are 2 ways they are as follows:

1. Ho is accepted if t-ratio < t-table

2. Ha is accepted if t-ratio > t-table