CHAPTER III

RESEARCH METHOD

A. Research Design

According to Sileyew (2019) the design of the research is supposed to provide a suitable framework for the study . A research methods becomes the process by which researchers conducts their research (Sileyew, 2019). It indicates the way through which researchers formulate their problems and objectives and present their results from the data obtained during the research process. The most significant decision in the research design process is the choice to be made regarding the research approach because it determines how relevant information for a study is to be obtained. However, the research design process involves many decisions that are related. The study design used by the current researcher is a Quasi-experimental design. This research design of Quasi-experimental tests whether there is a relationship of cause and effect between independent and dependent variables (Rogers & Révész, 2019).

In this study, the experimental class is divided into one group, and the control class is divided into one group as well. The researcher uses Promova application as the teaching technique in the experimental class, while the conventional teaching technique is used in the control class. According to Sugiyono (2019), the design of this study 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 Promova Application

X_2 = Conventional

Based on the description above, it can be explained that the researcher conducted a pre-test for the experimental and control classes. Its purpose is to determine the students' ability in vocabulary mastery. The researcher provide a test before treatment in both experimental and control classes. Then, the researcher give the treatment to the experimental class X1 (Providing vocabulary teaching through Promova application) and the control class X2 (Conventional). After receiving the treatment, the researcher provides a post-test to measure the vocabulary mastery of students in the experimental and control classes.

B. Research Variables

Hatch and Farhady (1981) variables can theoretically be defined as attributes of a person, or object, that have "variations" between one person and another or one object and another object (Erlisa Saraswati, 2020). The research variable is an attribute, trait, or value of people, objects, or activities that have certain variations set by researchers to study and then draw conclusions. Then, not everyone or all things are of the same value no matter what is being measured. For this reason, when something is measured, it is usually referred to as a variable (Sheskin, 2020). variables in a researcher's study are dependent variables and independent variables. The Independent variables are variables that affect or have an effect to other variables (dependent variables), and the dependent variable is the variable that is affected or affected by other variables (independent variables) (Yusri, 2020).

The descriptions of both variables are as follow:
1) Dependent Variable/(y) was vocabulary mastery.
2) Independent Variable/(x) was using the Promova App.

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

According to Fraenkel and Warren, population refers to the complete set of individuals (subjects or events) having common characteristics in which the researcher is interested (Sileyew, 2019). Referring to the definition of population, It can be said that the population consists of all units to which the research findings 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 are tenth grade students in majoring post harvesting technology at SMK N 2 Metro. There are three classes with 32 students in class X Post Harvesting Technology 1 and 2, then 31 students in class X Post Harvesting Technology 3 with the total population is 95 students.

2. Sampel Technique

Sampling technique 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 (Bhardwaj, 2019). To determine the sample to be used in research, there are various sampling techniques used. In this study, the researcher is using cluster random sampling. Cluster random sampling is a sampling technique from a randomly selected population regardless of its position in that population. The following are the steps taken by the researcher to select the experimental group and control group:

a. First, write down all of class tenth grade in majoring post harvesting technology on a piece of paper

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

c. Third, two papers are rolled up and shuffled to determine which class becomes the experimental class and which class becomes the control class.

d. Then the experimental class focused on the first roll of paper (Post Harvesting Technology 2)

e. The control class is designed for the second roll of paper (Post Harvesting Technology 1)

3. Sample

Sampling can be defined as the process of selecting a part of individuals or units from a larger population in which to participate in a research study (Shorten & Moorley, 2014). Then in this study, selecting a sample is an important step in conducting a study. In an investigation, many sampling techniques are used, but certain techniques are more appropriate in certain situations. The researcher obtained the class of Post Harvesting 2 as an experimental class group and the class of Post Harvesting 1 as a control class group using the Cluster Random Sampling method. Class of Post Harvesting 1 consist of 32 students acting as the

control class and class of Post Harvesting 2 as the experimental class also consist 32 students.

Table 3.2

Table of Sample Research

Experimental Group	32
Control Group	32
Total	64

Source: Data of students of class tenth grade Post Harvesting Technology at SMK N 2 Metro

D. Research Instrument

Instruments are tools used by researchers when conducting research. This can assist researchers in collecting information related to research variables. Instruments are tools used to collect data in social science research (Taherdoost, 2017). Then, because of that it can be said that research instruments are very substantial because they are tools in research, the researcher must to make research instruments before conducting the research.

In this study using a test as a research instrument. Jacobs and Chase (1992), test is an assessment tool in the written form to record or observe student achievement in line with the assessment target (Margareth, 2017). The researcher takes a pre test and a post test. Pre test and post test are two types of formative evaluations used to assess student learning progression or development. The pre test is a test given at the beginning of the learning process, while the post test is given at the end of learning.

In conclusion, research instruments referred to tools used in a study to collect the testable data. when giving instruments to students, researchers used a multiple choice to determine the percentage of students' vocabulary mastery.

E. Validity and Reliability

1. Validity

Heaton stated that the validity of a test is the extent to which it measures what it is supposed to measure and nothing else (Furwana,

2019). The validity of a test must be considered in measurement, in this case it must be seen whether the test used actually measures what should be measured. Validity test, which determines whether the expressions on the scale make suitable measurements in accordance with the research objectives (Surucu & Maslakci, 2020). In order for the research to produce useful results, the measuring instrument must measure what it claims. The use of measuring instruments that are validated that the instrument to ensure the findings obtained as a result of the analysis are valid.

To measure a test that is having good validity, the researcher can analyze a form of face validity test. Allen and Yen (1978), face validity is which includes the appearance of the instrument (Setyawati, 2018). Face validity is described as whether or not a test appears to be a good measure. So, the items of the test must represent the material covered. In face validity, the material provided is in accordance with the material from the expert assessment. Expert assessment is carried out to test the validity of an instrument with the theoretical and contextual concepts of the instrument to be used. There are two experts who provide assessment, those are Eva Faliyanti, M.Pd.B.I as a vocabulary subject lecturer and Dra. Magdalena Isherman as an English subject teacher at SMK N 2 Metro. The experts reviewed the test development process as well as the test and made decisions about how well the items represented the intended content. The set of equipment which is used to measure the criteria of validation are: 1. Very Poor, 2. Poor, 3. Enough, 4. Good, 5. Very Good.

2. Reliability

In that a test can be considered valid, the test must be reliable, and the test must be reliable as a measuring instruments. Moser and Kalton (1989), reliability is also concerned with repeatability (Taherdoost, 2017). For example, a scale or test is said to be reliable if repeat measurement made by it under constant conditions will give the same result. Reliability refers to the consistency of a measurement (Hajjar, 2018). A participant filling out an instrument intended to measure perceived motivation should give the same response each time the test is completed. In this study, researcher use Spearman Brown (spilt half) formula. The formula Spearman Brown (Spilt Half) as follow:

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

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 dan 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
0,240-0,399	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

Data collection techniques are the method used in research (Suwardi et al., 2020). The quality of research instruments is related to validity and the quality of data collection is related to the means used to collect data (Faliyanti et al., 2018). This study uses a pre-test and post-test to collect data from the experimental and control groups.

1. Pre-Test

Before the researcher gives treatment to the experimental and control classes, the researcher gives 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, using a Promova App with the previous material. The test is suitable method for assessing students knowledge, skills, feelings, motivation, and intelligence. Furthermore, there are 40 multiple choice questions that are to be done by the students. A correct question gets a score of 1, and a wrong answer gets a score of 0. So, if the student fills in all the questions with the correct answers, then the student takes a score of 40. Then the score can be increased to 100 by using a multiplier index number of 2.5.

2. Treatment

After conducting the pre-test, the researcher gives the treatment to the students. The purpose of this treatment is to develop students' vocabulary mastery. The treatment given to the students using the Promova application in accordance with the material being studied. This treatment takes place in four meetings, in the experimental group, namely class X Post Harvest 2 students, the researcher explains the material being studied with the Promova Application as a media. While in the control class, namely class X Post Harvest 1, the researcher only explains the material being studied to students without use Promova application.

3. Post-Test

The researcher administers the post-test to students after the pre-test and completed the treatment. When conducting a post-test, researcher gave 40 questions with the same questions as the pre-test, but the questions given in this post-test are randomized in number.

G. Data Analyzing Technique

Data analysis is a methodology that generally includes various tasks such as data collection, data cleaning, and data organization. Data analysis mainly includes big data analysis techniques, systematic architecture, data mining and analysis tools (Abdul-Jabbar & K. Farhan, 2022). In this study the data analyzed using techniques as follows:

a. Data identification, researchers have to identify data through students' previous scores.

b. Calculate the score in pre test.

c. Do the treatment using Promova app to teach vocabulary.

d. Calculate the score in post test.

e. Report the result, after completing all the steps the researcher can make conclusion.

The formula is tested using normality and homogeneity tests by the researcher. The procedure for processing data is as follows:

1. **Normality Test**

The normality test is used to assess whether the data collected from the comes from a population that follows a normal distribution (Supena et al., 2021). In this study, researcher used the SPSS to test the normality of the data. 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, there are:

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

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

2. **Homogeneity 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 (Analysis of Variance) ANOVA. At this stage there are two criteria, as below:

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

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

3. **Hypothesis Test**

The t-test is a type of statistical test used to compare the means of two groups (Potochnik et al., 2018). The t-test is a statistical test used see if there are any significant differences between two mean samples drawn at random from the same population. This test compares the experimental

class 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:

$$t = \frac{Ma - Mb}{\left[\frac{da^2 + db^2}{Na + Nb - 2}\right]\left[\frac{1}{Na} + \frac{1}{Nb}\right]}$$

Where:

t : The total score

Ma   : The experimental groups mean.

Mb   : Mean of the control

da   : The experimental groups standard deviation

db   : The control group standard deviation

Na   : The total number of experimental group samples

Nb   : The total number of control groups samples

The Criteria are:

Ha   : is accepted If t-ratio > t-table

Ho   : is accepted If t-ratio