CHAPTER III

RESEARCH METHODOLOGY

A. Research Design

Experimental research is any research conducted with a scientific approach, where a set of variables are kept constant while the other set of variables are being measured as the subject of experiment. Experimental research is one of the founding quantitative research methods (Bhat, 2019, p.2). The simplest example of an experimental research is conducting a laboratory test. As long as research is being conducted under scientifically acceptable conditions – it qualifies as an experimental research. A true experimental research is considered to be successful only when the researcher confirms that a change in the dependent variable is solely due to the manipulation of the independent variable.

The research design of this research is experimental research. It is an empirical study in which are studies exploit and controls one or more independent variables and observes the dependent variable (Munir, 2016, p.27). So, the experimental research need a group that can be a control group and other group is experimental group.

B. Research Population and Sample

1. Research Population

According to Sugiyono (2011, p.90) population is composed of the generalization object or subject that has quality and certain characteristics' set by the researcher to learn and then take a conclusion. Then, the population of this research is the students' in the Diploma computer of Muhammadiyah university of Metro in academic year 2019/2020. There are 2 classes, those are "A" class consists of 20 students and "B" class consists of 20 students. Then, total of the students' A and B class are 40 students.

2. Research Sample

The researcher chooses Class A and B in the Diploma computer of Muhammadiyah university of Metro with 40 students as the sample to observe by using random sampling.

Sampling is a way the researcher select number of individuals as a sample which presents the population. In this research the researcher takes one classes as the experimental class and the control class that were “A” class consists of 20 students and “B” class consist of 20 students from the population of students in the Diploma computer of Muhammadiyah university of Metro as the sample. The research sample is selected by the cluster random technique. It is the sample selection in which all members of the population are naturally grouped in units (Wiersma and Jurs 2009, p. 355). The writer used random selection to determine which class will be the experimental group and the control group. Below the steps done by the researcher:

a. Write number in piece of paper.
b. The papers is rolled and then put into the glass.
c. The glass is shaken until getting rolling of paper out.
d. The first roll of paper will the subject of the experimental class.
e. The second roll of paper will be the subject of the research as control class.

Finally, the researcher will get 20 students as experimental group in “B” class, and there are 20 students as control group in “A” class.

C. Data Collecting Technique

The most important thing in this research is collecting the data that can determine the result of the research. Brown (2009, p.384) argues that ‘’a test is a method of measuring a person’s ability or knowledge in a given domain’’. So, an improvement of students’ achievement can be tested by using a test as a method.The most important thing in this research is collecting the data that can determine the result of the research. Some technique will be used in collecting data in this research are:

1. Pre-Test

Pre-test is given before the researcher given the treatment to the experimental class and control class. The aim of pre-test is to know students' vocabulary mastery before the researcher give treatment.

2. Treatment

The treatment in this research is audiovisual media especially the game that related to English vocabulary, the researchers will teach vocabulary by using online games as a media of teaching. The game helps the students easier to memorize vocabulary. It makes the students will be enthusiasm, enjoyable and interested in learning English. When teaching and learning process are hoped conducted by using online games as media especially vocabulary is done, the students will be happy and they get new spirit to learn English.

3. Post- test

After doing treatment, it is given post test to all students. Post test is used to know the students vocabulary mastery after teaching by using word online games, especially vocabulary; how far the students understand and remember about some vocabulary that given after giving treatment process is done. Apparently, the result of the test will show that the students' vocabulary mastery improved significantly, whether their scores after giving treatment is higher or no than before. Finally, after the class has been exposed to the treatment for some period of time, the administering test of the dependent variable (or otherwise measures it). After reducing, classifying, analyzing the data, and then determining whether there is/are any significant different between before play online games and after playing online games as media, it is determined whether the treatment made the different or not.

D. Instruments of the Research

1. Validity and Reliability

The validity and reliability of instrument will be explained by the researcher, validity is supposed to measure the instrument of the test that must be valid. Besides, test reliability refers to the degree to which a test is consistent and stable in measuring what is intended measure.

a. Validity

Arikunto (2010, p.211) claims that validity is a standard which shows the degree of validity or valid instruments. So, validity is a tool that can be used to see the validity of an instrument that will be used by the researcher. In this study the researcher analyzed the test from content validity. Content validity examines whether the test is a good representation of the material that needs to be tested. It means that the item of the test will be represented by the material that is discussing. The validity instrument was corrected by the validator. The instrument get validation from two the expert vocabulary lecturers at the Muhammadiyah University of Metro.

- Content Validity

  Content validity examines whether the test is a good representation of the material that needs to be tested. It means that the item of the test will be represented by the material that is discussing. In the content validity, the material is given was suitable with the material from the teacher.

  There are two experts have given the evaluation, they are Fitri Palupi Kusumawati, M.P.d.,B.I as the validator 1 and Drs. H.Bambang Eko Siagiyanto,M.Pd. as the validator 2. The experts were reviewer the process that is used in developing the test as well the test itself and make judgment 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..

b. Reliability

Reliability refers to extention to which the test is consistent in it is score and give an indication how accurate the test score is. According to Arikunto (2010: 221) the reliability of the test is an instrument can be believed to be used as instrument for collecting data because it has been good. Based on explanation above, the measurement whether the test has good reliability or not. In this research used product moment formula which adopted from Arikunto (2006:178) and the result of the test will be counted to look the reliability of each items of the given tests by using product moment formula as follows:

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

Note :

r_{xy} : item of test reliability

N : the number of Sample

∑x : the sum of x score (add items)

∑y : the sum of y score (even items)

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

∑x2 : sum of score X2

∑y2 : sum of score Y2

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

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

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

rxy **:** coefficient of the reliability of half test (rxy)

The criteria of reliability which based on Sugiyono's criteria as follows :

Interval coefficient	**Correlation**
,00 – 0,19	Very low
,20 – 0,39	Low
,40 – 0,59	Medium
,60 – 0,79	High
,80 – 1,00	Very high

(Source: Sugiyono, 2013)

Based on the explanation above, the researcher concludes that reliability refers to the extention to which the test is consistent in it is score and it gives an indication how accurate the test score. It can be seen that the calculation of reliability is (1). It means that the reliability is very high reliable so the test can be used as data collection.

E. Technique of Data Analysis

Quantitative Data Analysis Technique

In experimental design, the technique analysis data that is experimental group and control group pre test post test design. It means that it has two variables investigated in this research are online Games and vocabulary mastery two know there are different before and

after being taught by using online Games. The collected data is analyzed by using quantitative data analysis. Quantitative data analyzing is also called statistical analysis. Usually the data classified into numerical form. In the experimental research by using pre test and post test one group designs, the data are analyzed by using the following formulation of t-test (Arikunto, 2016, p.86):

$$t : \frac{Md}{\sqrt{\frac{\sum x2xd}{N(N-1)}}}$$

Notes:

Md = means of differential pre test and post test

Xd = deviation in every subject (d-Md)

$\sum x^2 d$ = Total of quadrate deviation

N = Subject of sample

d.b = Decided by N_1

The formula above is used to count the effectiveness of treatment.

F. Technique of Data Analysis

The technique of data was conducted to analyze hypothesis testing. This research is focused by the 5th grade students at Muhammadiyah elementary school of Metro. After the researcher collected the data, the researcher analyzed the result of the data from pre-test and post-test related both of them through the formulas of t test. However, before t test formula was applied the two requirements should be fulfilled first namely normality and homogeneity test. The researcher used the formula that is by using a normality test and homogeneity test.

1. Normality Test

The object test for normality to determine the distrubution of the data follows a normal distribution or not. One of the test assumtion 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. Normality test using the formula Chi-quadrate Suharsimi Arikunto (2006, p.273) as follow:

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

Notes:

x^2 = Chi-quadrate

Oi = frequency observes

Ei = frequency expectation

k = Interval class

The criterion, when $X^2_{count} \leq X^2_{table}$ with dk = k – 3 therefore the data was normal.

2. Homogenity Test

Homogenity test was to measure which could be used to determined data variation. After getting result of the varience and average rate of class (Experiment class and Control class). According to Amri and Ahmad (2010, p.2) when the sample come from population which normal distribution, further was done, the researcher used F-test with formula as follow:

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

The test criterion

Accepted H_O when $F_{ratio} \leq F\frac{1}{2}\alpha\ (V_1 - V_2)$, with $V_1 = n_1$-1 and $V_2 = n_2$-1

G. Hypothesis testing

In experimental design, the technique analysis of the data that was experimental group and control group pre and post test design. It means that it has two variables investigated in this research were Online game and vocabulary mastery two know there

were different before and after being taught by using Online game. The collected data was analyzed by using quantitative data analysis. Quantitative data analyzing was also called statistical analysis. Usually the data classified into numerical form. In the experimental research by using pre test and post test one group designs, the data were analyzed by using the following formulation of t-test by Arikunto (2006, p.168)

$$t: \frac{Md}{\sqrt{\frac{\sum x2xd}{N(N-1)}}}$$

Notes:

Md = means of differential pre test and post test

Xd = deviation in every subject (d-Md)

$\sum x^2 d$ = Total of quadrate deviation

N = Subject of sample

d.b = Decided by N_1

The formula above was used to count the effectiveness of treatment.

The test criterion

H_0 accepted when $t_{obtained} < t$ table

H_a accepted when $t_{obtained} > t$ table