CHAPTER III

RESEARCH METHOD

In this chapter discusses about the research method, it consist of research design, population and sample, research instrument, validity and reliability testing, normality and homogeneity testing, data collecting method and data analysis.

A. Research Design

This research, the researcher found that experimental research is classified into: pre-experimental design, true experimental design, and quasi experimental design. Pre experimental designs do not have random assignment of subjects to groups or other strategies to control extraneous variables. True experimental designs (also called randomized design) use randomization and provide maximum control of extraneous variables. Quasi experimental design lacks randomization but employs other strategies to provide some control over extraneous variables.

This research used pre-experimental research design by using pre-test and post-test with quantitative approach, because the researcher want to established possible cause and effect between dependent and independent variable. The researcher is intended to describe the effectiveness of crossword puzzle game toward students' vocabulary achievement for the first grade students of SMPN 2 Sumbergempol by comparing between the students' score before being taught by

using crossword puzzle game and after being taught by using crossword puzzle game. This research was classified as pre experimental design because it had not a control variable. In this research, the researcher just put one group and used pre-test and post-test to see the results of the test.

According to Mark Balnaves (2001) a research design is the guidance of how the research was constructed and carried out. Based on Creswell (2012: 293) research design can be used to collect, analyze, and interpret data. Based on the theory above, the researcher gets valid data and finally the researcher come to find the answer of the research problems.

Gay (1992:298) defines that the experimental method is the only method of the research that can truly test hypotheses concerning cause and effect relationships. Creswell (2012:326) explains that experimental researchers test and idea (or practice or procedure) to determine its effect on an outcome. There are three designs included in pre-experimental. They are one-shot case study, one-group pretest-posttest design and static group. The researcher used one-group pretest-posttest design. The one-group pretest-posttest design usually involved three steps as follow:

1. Administering a pretest measuring the dependent variable
2. Giving the experimental treatment to the subjects
3. Administering a posttest measuring the dependent variable

Differences attributed to application of the experimental treatment are evaluated by comparing the pretest and posttest scores.

Table 3.1 The Test Illustration of One Group Pre-test and Post-test Design

Pre-test	Independent Variable (Treatment)	Post-test
Y_1	X	Y_2

The procedures of pre-experimental design used one group pre-test and post-test design applied in this research are, they are:

1. Administering a pre-test before applying game with a purpose measuring the students' vocabulary achievement in the first grade students at SMPN 2 Sumbergempol.
2. Applying treatment in teaching vocabulary by using Crossword Puzzle Game to the subject in the first grade students at SMPN 2 Sumbergempol.
3. Administering a post-test after applying game with a purpose measuring the students' vocabulary achievement in the first grade students at SMPN 2 Sumbergempol.
4. Comparing the scores of pre-test and post-test.

It means that the researcher used only one class in this research. The researcher had two test, those are before being taught crossword puzzle game and after being taught crossword puzzle game. Then both of students' score are compared to know the significant difference. The reason why the researcher chose one group pre-test and post-test is because the researcher wanted to focus conducted research on one class.

This research intended to investigate the effectiveness of crossword puzzle game toward students' vocabulary at first grade of students in SMPN 2

Sumbergempol in academic years 2015/2016. By applying the treatment was to know whether the scores are increasing or not. Pre-test and post-test were given to measure if there were significant difference scores before and after the students being taught by using crossword puzzle game. So, the researcher know about the effectiveness when the students' get scores.

B. Population and Sample

1. Population

Population is subjects that have some qualities and characteristics chosen to be learned and to be concluded by the researcher. According to Gay (1992:140) population is the group to which a researcher would like the result of a study to be generalizable. Moreover, Arikunto (Encyclopedia of Educational Evaluation, 2010:173) states that a population is a set (or collection) of all elements processing one or more attributes of interest.

Based on that statement above, the population of this research is all the students at first grade of SMPN 2 Sumbergempol that consist of 209 students. The first grade of SMPN 2 Sumbergempol consist of seven classes. The quantity of students in each class of the population is as follow:

Table 3.2 Population of the Research

Class	X (Total of Students)
VII A	26
VII B	26
VII C	26
VII D	26
VII E	27
VII F	26
VII G	26
VII H	26
	∑X = 209

2. Sample

Gay (1992:123) states that sample is the individual selected comprise. It means that selecting of a sample is very important step in conducting a research study. It can be concluded that a sample is a part of the population which have a certain characteristic from the population. The researcher has chosen first grade class as one experimental.

Before researcher determines sample of this research, researcher used purposive sampling because she already know the characteristics of the class which would be used as sample based on observation. Purposive sampling can be very useful for situations where you need to reach a targeted sample quickly. In this research, the researcher had taken the first

grade as a sample. The sample in this research is the students' of VII-F in SMPN 2 Sumbergempol. In this class, there were consists of 9 female and 17 male students'.

C. Research Instrument

Instrument has important function in this research. To collect data, the researcher used instruments. According to Creswell (2012:157) an instrument is to measure the variables in the study may not be available in the literature or commercially. Creswell explains that developing an instrument consist of several steps such as identifying the purpose of the instrument, reviewing the literature, writing the questions and testing the questions with individuals similar to those plan to study.

According to Sugiyono (2009) research instrument is a tool or instrument used to measure nature and social phenomena observed. In this research, the researcher collected the data through administering test. Test is an instrument or procedure designed to measure the student's ability.

In this research, the instrument used by the researcher was test. According to Isnawati (2014) test is to obtain information. The information that we hope to obtain will of course vary from situation to situation. In this research, the instrument is used to know the students score of vocabulary achievement. The tests were constructed by the researcher by using some score. Before her real test was administered, the researcher conducted a try out test to the same students with

the same test. In this test, there are pre-test and post-test. Both pre-test and post-test have a same topic. The materials of the test are taken from English book which are related to their subject and based on Junior High School Curriculum. Pre-test is given to measure their ability before giving the treatment; meanwhile post-test is given after giving the treatment. The numbers of the test given were 30 questions. This test is to know the aims of the students to improve the vocabulary achievement.

D. Validity and Reliability Testing

1. Validity

The first criterion of good test is validity. According to Gay (1992:154) validity is totally indispensable; there is no quality or virtue of a test that can compensate for inadequate validity. Other definition, Gay (1992) explains validity is the degree to which a test measures, what it is supposed to measure. It means that, the used of valid instrument is very essential to determine the validity of data. According to Isnawati there are four types of validity: 1) Content validity, 2) Criterion- Related Validity and 3) construct validity 4) Face Validity. To measure whether the test has a good validity, the researcher analyzed the test from content validity.

In this research, content validity is the degree to which a test measures an intended content area and the test must appropriate with the grade. The researcher made a test based on the objectives of syllabus so that

it was not out of contents. Moreover, the try out test of this research had content validity because the items were taken from sources for first grade students in SMPN 2 Sumbergempol.

2. Reliability

In this research, reliability is a necessary characteristic of any good test for it to be valid at all and a test must be reliable as measuring instruments. According to Gay (1992:161) Reliability is the degree to which a test consistently measures whatever it measures. Moreover, reliability is expressed numerically, usually as a coefficient; a high coefficient indicates high reliability. In this research, there is significant difference between the score of pre-test and the score post-test.

To measure the reliability of the test, the researcher administered tryout to see if the result of the test was reliable or not. Tryout was done to make sure that the instrument was clear and the test was not either too easy or too difficult. The formula used was Pearson-Product Moment formula.

Table 3.3 The Result of Try Out Test Reliability

Correlations

		VAR00001	VAR00002
VAR00001	Pearson Correlation	1	.663**
	Sig. (2-tailed)		.000
	N	26	26
VAR00002	Pearson Correlation	.663**	1
	Sig. (2-tailed)	.000	
	N	26	26

**. Correlation is significant at the 0.01 level (2-tailed).

The result of the calculation showed the reliability coefficient was 0.663. The computation of the Person Product Moment in tryout test the score is 0.663, it is bigger than r table that is 0.388. So the researcher concluded that the test is reliable.

E. Normality and Homogeneity Testing

1. Normality

Normality is the vital requirement in parametric analysis. The purpose of normality testing is to know whether the data is normal distribution or not. Normality of the data is important because if the data were in normal distribution, the data are considered to be the representative of the population. In this research, the researcher used one of the methods of normality testing was done towards both try out of pre-test and post-test score. The data were presented on the table below:

Table 3.4 Normality Try out Pre-test of the students'

One-Sample Kolmogorov-Smirnov Test

		VAR00001
N		26
Normal Parameters[a]	Mean	72.8462
	Std. Deviation	5.40882
Most Extreme Differences	Absolute	.239
	Positive	.239
	Negative	-.107
Kolmogorov-Smirnov Z		1.219
Asymp. Sig. (2-tailed)		.102

a. Test distribution is Normal.

Table 3.5 Normality Try out Post-test of the students'

One-Sample Kolmogorov-Smirnov Test

		VAR00002
N		26
Normal Parameters[a]	Mean	77.5769
	Std. Deviation	5.87315
Most Extreme Differences	Absolute	.167
	Positive	.167
	Negative	-.128
Kolmogorov-Smirnov Z		.850
Asymp. Sig. (2-tailed)		.465

a. Test distribution is Normal.

This output of the result normality testing by using One Sample Kolmogrov Smirnov Test. If the significant value was less than 0.05, it means that the data was not in normal distribution, meanwhile if the significant value was more than 0.05. It means that the data was in normal

distribution. Test above showed that the subject is 26 students. The significance value from tryout of pre-test is 0.102. The significant value from the pre-test it is bigger than 0.05 (0.102 > 0.05). It means H_0 is accepted and H_1 is rejected and the data is in normal distribution.

Meanwhile, the significant value tryout of post-test was 0.465. The significant value from the tryout of post-test it is bigger than 0.05 (0.465 > 0.05). It also means that H_0 was accepted and H_1 was rejected and the data was in normal distribution. So, it could be interpreted that both of the data tryout (pre-test and post-test) are in normal distribution.

2. Homogeneity

Homogeneity test is intended to know whether the variant of data is homogeneous or not. Procedure used to test variant of homogeneity was by determining F-max value. In homogeneity test F empiric should be lower than F theoretic (table).

Table 3.6 Students' score of Homogeneity

ANOVA

VAR00001

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	376.235	7	53.748	2.724	.041
Within Groups	355.150	18	19.731		
Total	731.385	25			

Based on the table above, the test is homogeneity because the significant is 0.041. It means that the significant is more than 0.05 (0.041>0.05).

F. Variable

A variable is everything that would become that object of research or the influencing factors that would be studied. According to Mark Balnaves (2001) a variable is a general class of objects, events, situations, characteristics and attributes that are of interest to the researcher. Creswell (2012:112) stated that a variable is a characteristic or attribute of an individual or an organization that (a) researchers can measure or observe and (b) varies among individuals or organization studied. The variables of this research are two variable, they are independent variable and dependent variable.

1. Independent variable (X)

   According to Mark Balnaves (2001) Independent variable has an impact on the dependent variable. In other definition, Creswell (2012: 116) stated that an independent variable in an attribute or characteristic that influences or affects an outcome or dependent variable. In these research independent variables is crossword puzzle game in teaching vocabulary.

2. Dependent variable (Y)

   According to Creswell (2012:115) a dependent variable is an attribute or characteristic that is dependent on or influenced by the

independent variable. Dependent variable is the consequence or dependent variable upon antecedent variables. The dependent variable in this research is the student's in vocabulary achievement.

G. Tryout Test

The researcher conducted try out this test to another subject of sample would be used in this research. The purpose of conducting tryout of the instrument is to achieve the validity and reliability of the instrument. Tryout would be implemented to one class of students of the first grade students at SMPN 2 Sumbergempol. Researcher chose this subject based on characteristics of students ability that near same with the sample was used in this research. Tryout was being conducted in home of students because this day is day off and doing in 45 minutes. All of student's doing by his or her tryout of test. Tryout sample was the students in different class namely VII-A class. The researcher was chosen because they have almost same level as the experimental group. The researcher conducted a try out test to the other students with the same test on Wednesday, 24 February 2016.

H. Data Collecting Method

Data collecting method is the method to obtain data. Data of this research are collected by administering test. Test is tool or procedure used to know or measured something in a condition, ways and the rules are determined (Arikunto,

2010: 266). The researcher as teacher in this research teaches the students. In order to get high quality of data, the instruments used must meet requirements as good instruments. Instrument is used to collect data in research and it is one of the significant steps in conducting the research. The instrument is to get the students score of vocabulary achievement. Therefore, the researcher must choose some instruments in data collecting process. There were three steps of tests used in this research they were:

1. Pre-test

   Before teaching the new material by using crossword puzzle game, the researcher gave a test to the students. This test was given to know the basic competence for the student and to measuring knowledge skills of individual students. Pre-test was given to the students before being taught by using crossword puzzle game. The test respondent was asked to do set of vocabulary. The score obtained were analyzed in determine between pre-test and post-test. The tests of pre-test consist of 30 questions. Time allocation of test was 45 minutes. The researcher had taken the pre-test from the first grade students in SMPN 2 Sumbergempol on Monday, 29 of February 2016.

2. Post-test

   To get a data, a post-test was given to the students. In this test was given to know the scores of the students after being taught by using crossword puzzle game. The test respondent was asked to do set of vocabulary. The tests of post-test consist of 30 questions. Time allocation of

test was 45 minutes. The researcher had taken of pre-test and post-test from the same place. The post-test have been conducted on Saturday, 12 of March 2016.

I. The Description of Treatment

After administering the pre-test, the researcher gave the treatment to the students. The researcher applied the treatment of English by using crossword puzzle game on 29th February 2016 until 7th March 2016. The treatment in this research is crossword puzzle game. The researcher taught vocabulary by crossword puzzle game of teaching. The material animals are used to teach vocabulary, in order to increase their vocabulary achievement. Crossword puzzle games help the students easier to memorize vocabulary. The students can answer with instruction for teacher. It makes the students were enthusiasm, enjoyable and interested in learning English. When teaching and learning process by crossword puzzle is done, the students were very happy and they got new spirit to learn English.

J. Data Analysis

This research used a quantitative data analysis. The quantitative data of this research is numeric data and can be formulated by using statistical method. In the experimental design, the data analyses are experimental one groups, used pre-test and post-test. The data analysis in this research is using t-test.

Gay (1992:436) states that t-test is used to determine whether two means are significantly different at a selected probability level. The method used to find the significant difference on the teaching vocabulary related with the first value of pre-test and the last value of post-test by using crossword puzzle game.

The researcher in this research used the formula of t-test to analyze the data, because to find out which one is more effective between before the students' being taught using crossword puzzle game and after the students being taught using crossword puzzle game in teaching vocabulary achievement to the first grade students of SMPN 2 Sumbergempol in academic year 2015/2016.

In this research, the data obtained from pre-test and post-test were analyzed by using T-test by using SPSS 16.0. It means that the researcher did not used manual computation. All the data collected were accounted by using SPSS 16.0 program in this case was paired sample T-test. Because the researcher hope to find out the effect of crossword puzzles game in teaching vocabulary achievement. Firstly, the researcher conducted of pre-test. Then after of pre-test, the researcher gives a treatment. The researcher was taught by using crossword puzzles game in teaching vocabulary. After the treatment, the students were tested again. Finally, the means of the two tests are compared to find out there is significant difference.

The researcher used of T-test as follows:

1. The researcher finds out the mean of pre-test (x) and mean of post-test (y), the formula is:

$$x = \frac{\sum x}{N}$$

$$y = \frac{\sum y}{N}$$

Where:

$\sum x$: Total score of pre-test

$\sum y$: Total score of post-test

N : total number of students

2. Then, the researcher finds out the mean of differentiate pre-test and post-test, the formula used is follow:

$$Md = \frac{\sum d}{N}$$

Where:

Md : the mean of differential pre-test and post test

$\sum d$: sum of different between post-test and pre-test

N : total number of students

3. Next, the researcher finds out the data percentage, the researcher used formula:

$$P = \frac{f}{n} \; x \; 100\%$$

Where:

P : percentage of data

f : frequency of the counted value

n : number of students

4. After that, the researcher finds out the standard deviation, the formula used is:

$$S = \sqrt{\frac{\sum x^2 - \frac{\sum (x)^2}{N}}{N-1}}$$

$$S = \sqrt{\frac{\sum y^2 - \frac{\sum (y)^2}{N}}{N-1}}$$

Where:

S : standard deviation

$\sum X^2$: sum of pre-test quadrate score

$\sum x$: sum of pre-test score

$\sum Y^2$: sum of post-test quadrate score

$\sum y$: sum of post-test score

N : number of students

5. Then, the researcher finds out the total number of quadrate deviation ($\sum X^2$ d), the formula is:

$$\sum X^2 d = \sum d^2 - \frac{(\sum d)^2}{N}$$

Where:

$\sum X^2$ d : total number of quadrate deviation

$\sum d$: sum of different between post-test and pre-test

N : number of students

6. Next, the researcher finds out the t-test by using formula:

$$t_{count} = \frac{Md}{\sqrt{\frac{\sum x^2 d}{N(N-1)}}}$$

Where:

Md : mean different of pre-test and post-test

$\sum x^2$ d : total of quadrate deviation

N : number of students

7. Finally the researcher looks for t-table distribution with significant 5%

df = N-1

Where:

df : degree of freedom

N : number of students