CHAPTER III
RESEARCH METHOD

1.1 Research Design

The research was a quantitative research. Hatch and Farhady (1982) stated that quantitative is kind of research in which the data used tend to use statistics as measurement in deciding the conclusion. In this research, the researcher used pretest posttest control group design which belongs to the true experimental designs. There are three basic characteristics of true experimental designs into three:

     a. A control group is present.

     b. The students are randomly select and assigned to the groups.

     c. A pretest is administered to capture the initial differences between the two groups.

(Hatch and Farhady (1982:22)

These three characteristics allow us to avoid almost all the problems associated with external and internal validity.

They said that this design deals with two groups; both of the two groups receive the treatments, experimental class receive treatment through logico and control class as comparison receive treatment through crossword puzzle.

The research design can be represented as follow:

$$G_1 \text{ (Random)} \quad T_1 \ X_1 \ T_2$$

$$G_2 \text{ (Random)} \quad T_1 \ X_2 \ T_2$$

Notes:

G1   = Experimental class
G2   = Control class
T1   = Pretest
T2   = Posttest
X1   = Treatment by using logico
X2   = Treatment by using crossword puzzle
(Hatch and Farhady, 1982: 25)

This design used pre-test to find out students' achievement on vocabulary treatments. Afterward, the researcher gave three treatments by using logico and Crossword Puzzle. Finally, the researcher administered a post-test to find out the students' vocabulary achievement after being taught by using Logico and Crossword Puzzle. The mean of the result of pre-test in experimental class and control class were identified.

Then, the mean of the result of post-test in experimental class and control class were identified as well. The gain score from post-test results in experimental class were compared to the gain score from post-test result in control class , in order to see whether there is a significant difference between the student who are taught through Logico and Crossword Puzzle or not.

Before the test was held to collect the data of students' vocabulary achievement, the researcher firstly tried it out to the students. The aim of the try out test was to

find out the quality of the items of the tests used in the research, and the try out

was held before all the tests and the treatments were given to students.

1.2 Research Procedure

The procedures of the research are:

1. Determining the population and sample.

2. Constructing the try-out items.

3. Administering try-out test.

4. Analyzing the result of the try-out test.

5. Giving pretest.

6. Conducting the experiment.

7. Administering Post test to the two groups.

8. Analyzing the data.

9. Reporting the result.

3.3 Population and Sample

The population of the study was the seventh grade students of SMPN 21 Bandar

Lampung in the 2011/2012 academic year. There were ten classes of VII grade.

Two classes were taken as the sample of the experimental class and control class.

Each class consists of 30-33 students. The total numbers were 315 students. The

characteristics of the population were:

- The divisions of the classes were not based on ranking, but it was divided

    randomly.

- The mastery of vocabulary was almost the same between two classes.

In this research, before the researcher decided the sample, she made complete list of the population so that all of the population had the same opportunities to be chosen as the sample. The researcher selected the sample by using simple probability sampling. In simple Probability Sampling the class was selected randomly by using lottery. It was used based on the consideration that every class had the same opportunity to be selected and in order to avoid the subjectivity in the research (Setiyadi, 2006:39).

In this case, the researcher asked the leader of each class to take a small piece of paper in order to know the class would be experimental class or be control class.

In the research, after conducting the pretest for both classes, experimental class and control class, the result was compared. It was purposed to measure the two classes` had the same ability. In the other word, they had equal ability. The result of the homogeneity of the scores between the two classes was carried out by using T-test, in which the hypothesis for the homogeneity of the variance test is:

H_0 : There is no significant difference

H_1 : There is significant difference

3.4 Variables

John W Best (1997:9) says that, variables are the conditions or characteristics that the researcher manipulates controls or observer.

This research consists of the following variables:

1. The students' vocabulary mastery (achievement) as dependent variable (Y).

2. Logico and crossword puzzle (X1 and X2) as independent variables.

3.5 Data Collecting Technique

The data of this research is the students' vocabulary achievement relates to kind of jobs before and after treatment. The researcher used test as the instruments. There are two kinds of tests.

1. Pretest

A Pretest of vocabulary is administered to the students before the treatment was given to measure how far the students' preliminary ability and competence in vocabulary before being treated, and to know whether both experimental class and control class were equals or not in basic of vocabulary achievement before the treatment was given. Pretest which was given in both classes was the same. The number of item in this pretest was 30 in multiple choices. One was the correct answer and the rests were the distracters. The pretest conducted in 90 minutes.

2. Posttest

After giving the treatment, the posttest administered after they got treatment in order to investigate the effect of the treatments towards the student's vocabulary achievement after test. Similar to the pretest, the researcher used an objective test in form of multiple choices. The number of items in the test was 30 with four alternative answers for each. One was the correct answer and the rest were

distracters. The posttest was conducted in 90 minutes. This test had the same difficulty level as pretest.

3.6 Procedures of Collecting Data

In collecting the data, this research used the following procedures:

1. Determining Research Problem

In this research, the researcher determined 2 research problems. Those were:

- To find out whether there is significant difference of vocabulary achievement between students who are taught through Logico and those who are taught through crossword puzzle.

- To investigate which media is more effective to teach vocabulary.

2. Determining the Population and Sample of the Research.

The population of the research was taken at the seventh grade students of SMP Negeri 21 Bandar Lampung. The researcher took two classes as a sample they were VII I and VII J one as experimental class and one as control class. In addition, VII H was taken as try-out class. In this research, the researcher decided to take the sample, the researcher used simple probability sampling. Then the researcher made complete list of the population of the students at the seventh grade, so that all of the population had the same opportunities to be chosen as the sample, and then it was taken through lottery.

3. Selecting Instrument Material

In this research, the researcher chose concrete noun and verb that refer to kinds of jobs. The researcher chose kinds of jobs vocabulary, because it consisted of words that were familiar for the students and easy to understand for them who were the seventh grade of junior high school. It also related with topic of their book.

4. Administering Try-out Test to Another Class

The try out was conducted to measure the level of difficulty, discrimination power, validity and reliability of pretest and posttest. The purpose of try out was to know the quality of the test which was used as the instrument of the research and to determine which item should be revised for pretest and posttest. This research used the result of the try out test to measure the level of difficulty and discrimination power, to find out the validity and reliability. This was multiple choices test. The numbers of the test items were 50 with four alternative answers for each (A, B, C, and D), one was as the correct answer and the rest were the distracters. The try out was conducted in 90 minutes. The aim of try out test was to make sure the quality of validity, reliability, level of difficulty.

5. Administering The Pre-Test

The researcher administered the pre-test in both class experimental class and control class. The pretest was conducted to measure the students' mastery of vocabulary before they would be given by teaching vocabulary through logico and

crossword puzzle. The test was in form of 30 items multiple choices test with 4 optional answers for each (A, B, C, and D) One was the correct answer and the rests were the distracters. The pretest was conducted in 90 minutes.

6. Conducting the Treatment

In conducting the treatments, the researcher applied logico in teaching vocabulary for the experimental class and the control class used crossword puzzle .The treatment was administered 3 times for each group. The treatment was conducted 90 minutes. The researcher also prepared the materials and the lesson plans.

7. Administering The Post-Test

Posttest is conducted to measure the students' mastery of vocabulary after being giving treatment by teaching through logico and crossword puzzle. The test was in form of 30 items multiple choices test with 4 optional answers for each (A, B, C, and D) One was the correct answer and the rests are the distracters. The posttest was conducted in 90 minutes.

8. Analyzing the Test Result (Pretest and Posttest)

After conducting pretest and posttest, the researcher analyzed the data. The data was analyzed by using independent group T- Test. It was used to find out whether there is any significant different of vocabulary test score of the students who are taught through logico and those taught through crossword puzzle. Independent group T-Test formula was to compare the means of the pretest ad posttest of both

two groups. The data was computed through the statistical package for social sciences (SPSS) version 17.0.

9. Testing Hypothesis

After analyzing the data, the researcher tested the hypothesis.

3.7 Instrument of the Research

The instrument for collecting the data was objective vocabulary test. The instrument was held for pretest and posttest. Pretest was applied before the treatment in order to identify how far the students' achievement in vocabulary related to content words (concrete noun and verb) with title kinds of jobs, and posttest was applied after presenting the treatment in order to identify the improvement of students' vocabulary achievement related to content words (Kinds of jobs). The test was in the form of multiple choice tests. The items of pretest and posttest were the same. It was based on the result of try out test. The Test evaluated the meaning of vocabulary. The vocabulary that was included in the test was related to content words. The validity of the test concerned with the content and constructs validity.

3.8 Try Out Test

Try out was held in different class from the sample classes. The purpose of administering try out was to prove whether the test has good validity, reliability, discrimination power and level of difficulty. So, the try out of the test here was to determine whether the items can be used as pretest and posttest. The numbers of

items in this try out were 50 items which were in multiple choice forms. The test was given to the try out class before the pretests in experimental class and control class were administered.

After that, the result of try out test showed which items that could be taken as pretest and posttest, because those items were included into the criteria of good test.

The items which did not fulfill the criteria of the good test, those would not be used for pretest and posttest. The try out was conducted in 90 minutes.

3.9 Criteria of Good Test

In this research, to prove whether the test had good ability, it would be tried out first. The test could be said have a good quality if it has a good validity, reliability, level of difficulty, and discrimination power. The try out test was given to the students to know how the quality of the test which was used as the instrument of the research. The try out test was given to another class that was not included in the sample. The data gained were analyzed to judge the level of difficulty, discrimination power, validity, and reliability of the test.

1. The Validity of the Tests

According to Heaton (1991:159) states that the validity of the test is the extent to which is measured whether the test has a good ability. There are 5 validity, those are: face validity, content validity, predictive validity, construct validity. In order

to measure whether the test have good validity, the researcher analyzed the test from content validity and construct validity.

a. Content Validity

According to Heaton (1991:160) the test should be constructed as to contain a representative sample of the course. It means that the tests should represent the materials that have been taught to the students. This research applied one material for the treatments. The test should represented those materials. To know whether the test has a good content validity the items of the test. In the content validity, the materials were given which suitable with the curriculum. To fulfill this validity, the researcher saw all the indicators of the instrument and analyzed them whether the instrument had represented the material that would be measured or not.

The researcher used the table of specification to check content validity of the test items. Gronlund (1981:101) stated that table of specification was to illustrate how such table was used to check on content validity.

If the table represented the material that the tester wanted to test, it meant that it was a valid test from the point of view (Shohamy, 1985:74).

The content of try out was presented in the table of specification below:

Table I. Table of Specification of the Try out Test

No	Word Classes	Vocabulary	Number of items	Percentage
1	Concrete Nouns	Postman, cheerleader, attendant, painter, typist, hairdresser, radio mechanic, nurse, bank clerk, mechanic, butcher, dentist, custom officer, stewardess, farmer, factory worker, teacher, carpenter, fisherman, actress, waiter, judge, firefighter, referee, doctor, architect, shop assistant, tailor, florist, astronaut, journalist, lawyer, headmaster, soldier, bookseller.	1., 2., 3., 4., 5., 7., 8., 10., 11., 13., 14., 17., 18., 19., 20., 22., 25., 27., 28., 30., 32., 33., 34., 35., 36., 37., 38., 39., 40., 41., 42., 43., 44., 46., 47., 50	72%
2	Verbs	Study, work, dance, drive, sing, watch, teach, clean, cook, play, sail, sell, drink, water	6., 9., 12., 15., 16., 21., 23., 24., 26., 29., 31., 45., 48., 49	28%
		Total		100%

b. Construct Validity

Construct validity was focused on the kind of test that was used to measure the ability. According to Setiyadi (2006:26) if the instrument just measure one aspect, for example vocabulary, the construct validity can be measured by evaluate all items in the test. If all items have measured vocabulary mastery, the instrument has fulfilled construct validity.

c. Reliability

"Reliability refers to extent to which the test is consistent in the score and gives us an indication of how accurate the test score are" (hatch & Farhady, 1982:244). To estimate the reliability of the test, the researcher used half technique to analyze the odd (x) and even number (Y) of the test items.

To measure the coefficient of the reliability between odd and even group, the researcher used Pearson Product Moment formula as follows:

$$r_{xy} = \frac{\sum xy}{\sqrt{\left(\sum x^2\right)\left(\sum y^2\right)}}$$

Notes

r_{xy} : coefficient of reliability between odd numbers and even numbers items

$\sum x^2$: the right answer of odd part

$\sum y^2$: the right answer of even part

$\sum xy$: number of students who take part in the test

Then this research used "Spearmen Brown's prophecy formula" (Hatch and Farhady, 1982:286) to know the coefficient correlation of whole items.

The formula is as follows:

$$rk = \frac{2rl}{1 + rl}$$

rk : the reliability of the test

rl : the reliability of half test

The criteria of reliability are:

0.90 – 1.0 : High
0.50 – 0.89 : Moderate
0.00 – 0.49 : Low

If the result of the reliability us less than 0.50 the items would be revised.

(Hatch & Farhady, 1982:247)

d. Level of Difficulty

Level of difficulty (LD) relates to how easy or difficult the item from the students' points of view who take the test. Then level of difficulty can be determined by

dividing the number of students who get it right by the total number of students.

The formulation is as follows:

$$LD = \frac{R}{N}$$

Notes

LD : level of difficulty
R   : the number of students who answer correctly
N   : the total number of students who take part in the test.

Criteria of level difficulty as follows:

LD< 0.30   : difficult
LD= 0.30 – 0.70   : satisfactory
LD>0.70   : easy
(Shohamy, 1985:79)

e. Discrimination Power

Discrimination power is used to indicate the discrimination of the failure and the success of the students. It refers to the extent to which the item differentiates between high and low level students on that test.

To find out the discrimination power this research used the following formula:

$$D = \frac{correct\ U - correct\ L}{^{1}/_{2}\ N}$$

D   = Discrimination Power
Correct U   = The number of upper group students who answer correctly
Correct L   = The number of lower group students who answer correctly
N   = The total number of students who take the test

The criteria are:

1. If the value is positive discrimination, there are a larger number of more knowledgeable students than poor students who get the item correct. If the value is zero, it means that there is no discrimination.

2. If the value is negative, it means that there are more low-students than high level students who get corrects item.

3. In general, the higher discrimination index the better. In classroom situations most items should be higher than 0.20 or negative the test will be revised.

3.10 Scoring System

In scoring the result of students' test, the researcher will use Percentage Correct (Lyman, 1971:95). The percentage correct score is used in reporting the result of classroom achievement tests. The researcher calculated the average of the pre-test and post test by using this formula:

$$X_{\%c} = 100\frac{R}{T}$$

(Lyman, 1971: 95)

Where:

$X_{\%c}$ = percentage of correct score
R = number of right answers
T = total number of items on test.

3.11 Data Analysis

The researcher analyzed the data in order to investigate whether there is significant difference of the students' vocabulary mastery or not.

The steps of the data analysis of this research were:

1. Scoring the pre-test and post-test

2. Tabulating the result of the thesis and calculating the mean of the pretest and posttest. To compute the average score or mean of the pretest and posttest, the researcher will use a very simple statistic formula as follows:

$$\bar{X} = \frac{\Sigma x}{N}$$

Notes:
$\bar{X}$: mean (average score)
Σx: total number of the student's score
N : total number of the students

(Hatch and Farhady, 1982:5)

3. Drawing calculation from the tabulated results of the pretest and posttest administered. The data was examined using Independent Group T-Test since in this research there were two means of two different groups (Experimental class and control class) that were compared each of them. The data of the research used statistically analyzed by using statistical package for Social Sciences (SPSS) version 17.0.

4. Administering random test was used to ensure whether the data is random or not. As stated by Setiyadi (2006; 168-169), one of the assumption should be fulfilled in using

   T-Test is the data should be taken from random sample in population. In this case, the researcher used mean as the cut point run test.

   The hypotheses for random test formulated as follow:

   H_0 : (the data is not random)

   H_1 : (the data is random)

   In this research, H_0 is accepted if Sign>α. In this case, the researcher used the level of significance of 0.05

5. Administering the normality of the test was used to measure whether the data in experimental class and control class were normally distributed or not.

   The hypotheses for the normality test were as follows:

   H_0 : the data is not normal distribution

   H_1: the data is normal distribution

   In this research, the criterions for the hypothesis were:

   H_1 is accepted if sign>α. In this case, the researcher used the level of significance α = 0.05.

6. Administering homogeneity test was used to determine whether the data fulfill the criteria of the quality of variance. This test used T-test to analyze the data.

The hypotheses for the homogeneity of variance were as follows:

H_0 : there is significant difference in the level of ability (not equal)

H_1 : there is no significant difference in level of ability (equal)

3.12 Hypothesis Testing

The hypothesis analyzed at the significant level of 0.05 in which the hypothesis would approve if sign<@. It meant that the probability of error in the hypothesis was only about 5%.

The hypotheses were:

Ho : There is no significant difference of students' vocabulary achievement between those who are taught through logico and those are taught through crossword puzzle.

H1 : There is significant difference of students' vocabulary achievement between those who are taught through logico and those taught through crossword puzzle.

(Hatch & Farhady, 1982: 111)

The criteria were:

1. If the t- value is lower than T-table: Ho is accepted. There is no significant difference of students' vocabulary achievement between those who are taught through logico and those taught through crossword puzzle.

2. If the t- value is higher than T-table: H1 is accepted there is significant difference of students' vocabulary achievement between those who are taught through logico and those taught through crossword puzzle.