

CHAPTER III

RESEARCH METHODOLOGY

This chapter presents the methodology on conducting this study. This chapter provides six main parts of the investigation: 1) research design, 2) research variable, 3) research hypothesis, 4) location and time, 5) population and sample, 6) the schedule of the research, 7) data collection technique, 8) data analysis.

3.1. Research Design

This study was a quasi-experimental method. It involved two groups. They were an experimental group and a control group. They were treated differently. Hatch and Farhady (1982: 20) say, "The experimental group receive a treatment while the control group does not." The experimental group was treated by using crossword puzzle while the control group was treated without using crossword puzzle. After getting some treatment, both experimental and control group received a post-test.

The design of this research can be seen in the following Table:

GI	T1	X	T2
G2	T1		T2

(Hatch and Farhady, 1982:22)

Where:

G1 = experimental group

TI = Pre-test

T2 = posttest

G2 = control group

X= Treatment by using crossword puzzle

3.2 Research Variables

Hatch and Farhady (1982) state that independent variable is the main variable which is investigated. It is the variable which is selected, manipulated and measured. In this study there were two variables. They were independent variable and dependent variable. The use of crossword puzzle was the independent variable. Otherwise, dependent variable is the variable which is observed and measured to discover the effect of the independent variable (Hatch and Farhady, 1982). In this study, the dependent variable was the students' vocabulary mastery.

3.3. Research Hypothesis

According to Sugiyono (2010) quantitative method uses hypothesis to make a tentative statement about the outcomes of the study. The hypotheses were stated as follows:

H_o = There is no difference achievement between the students' ability in vocabulary before and after taught by using crossword puzzle.

H_a = There is significant difference achievement between the students' ability in vocabulary before and after taught by using crossword puzzle.

3.4. Location and Time

This study was carried out in SMP N 3 Siak, Riau and conducted from May, 2011 to June, 2011.

3.5. Population and Sample

Arikunto (2010) says that population is an entire subject of the research. It is supported by Fraenkel and Wallen (1990) state that population is the group interest to the writer, the group to whom the writer would like to generalize the result of the study. The population of this research was the Eighth grade students of SMP N 3 Siak, Riau in academic year 2010/2011. The selection of the population site was based on the writer's willing to apply the crossword puzzle technique in countryside, and want to know whether crossword puzzle can be applied in the school in a countryside or not. Besides, the school was very welcome in giving opportunity for the writer to conduct the study. Eighth Grade Students were divided into four classes. Considering they have same age, taught by the same teacher with the same allocation and material to be studied, the writer chose randomly two classes as sample. The two classes are VIII-1 as the experimental class consisted of 25 students and class VIII-2

24
24

as the control class consisted of 25 students. As the result, the samples of the study were 50 students.

3.6. Schedule of the Study

Before conducting the study, the materials and themes were also set to suit the material schedule.

Table 3.1
Schedule of the Study

No	Date	Time Allocation	Activity	Material /Theme
1	May 4 th , 2011	2x40'	Introduction, try out to 26 students at second grade in SMPN 3 Siak, Riau	Vocabulary test
2	May 13 th , 2011	2x40'	Pretest (Both of VIII-1 and VIII-2 class)	Vocabulary test
3	May 14 th , 2011	2x40'	At 08.10-09.30 10 teaching manually by giving spelling puzzle in control class At 10.00-11.10 1st meeting (Treatment by using crossword puzzle) in experimental class	Describing people
4	May 20 th , 2011	2x40'	At 08.10-09.30 treatment by using crossword puzzle At 10.00-11. teaching manually by giving spelling puzzle in control class	Describing people
5	May 21 st , 2011	2x40'	At 08.10-09.30 teaching manually by giving	Describing animal

No	Date	Time allocation	Activity	Material /theme
			spelling puzzle in control class At 10.00-11.10 treatment by using crossword puzzle	
6	May 27 th , 2011	2x40'	At 08.10-09.30 treatment by using crossword puzzle At 10.00-11.10 teaching manually by giving spelling puzzle in control class	Describing family
7	May 28 th , 2011	2x40'	At 08.10-09.30 teaching manually by giving spelling puzzle in control class 10.00-11.10 treatment by using crossword puzzle	Describing job
8	June 1 st , 2011	2x40'	At 14.00-15.10 teaching manually by giving spelling puzzle in control class At 15.10-16.20 treatment by using crossword puzzle	Describing house
9	June 3 rd , 2011	2x40'	At 08.10-09.30 treatment by using crossword puzzle At 10.00-11.10 teaching manually by giving spelling puzzle in control class	Describing school
10	June 4 th , 2011	2x40'	At 08.10-19.30 teaching manually by giving spelling puzzle in control class At 10.10-11.10 treatment by using crossword puzzle	Describing house
11	June 8 th , 2011	2x40'	At 14.00-15.10 teaching manually by giving	Describing

			spelling puzzle in control class At 15.10-16.20 treatment by using crossword puzzle	interesting place
No	Date	Time allocation	Activity	Material/theme
12	June 9 th , 2011	2x40'	14.00-15.10 teaching manually by giving spelling puzzle 15.10-16.20 treatment by using crossword puzzle	Describing job
13	June 10 th , 2011	2x40'	Post test (Both of VIII-1 and VIII-2 class) and distributed questionnaire to VIII-1 as experimental class	Vocabulary test

From the table above, at the first meeting students were given the try-out to make sure whether the vocabulary test could be as instrument. Both an experimental and a control classes received pre-test. After receiving the pre-test both of them received the differently treatment. An experimental group got treatment by using crossword puzzle while a control group without using crossword puzzle. Post-test was administered to experimental group and control group. The results of post test were compared to discover the effectiveness of using crossword puzzle in improving students' vocabulary mastery. Finally, the questionnaires were distributed to the

experimental group to investigate the students' response toward the use of crossword puzzle in learning English vocabulary.

3.7. The data collection techniques

3.7.1. Instruments of the research

This study used a quasi-experimental design in order to discover how effective of using crossword puzzles in improving students' vocabulary mastery, and then to investigate the students' responses on the use of crossword puzzles in learning English vocabulary. The instruments of the research were vocabulary test and questionnaire. Multiple choices as kind of vocabulary test were used in try out, pre-test and post-test.

After administering pre-test and post-test, the questionnaires were distributed to investigate students' responses toward the use of crossword puzzle in learning English vocabulary.

3.7.2. Research procedures

These are the procedures in collecting the data:

➤ **Try-out**

Try out was a test done at the beginning of this study to the second grade students who were not the sample. Try out was given on May 4th, 2011. Try out aimed to examine the validity, reliability, difficulty, and discrimination of the instrument. Try out consists of 50 items of multiple choices based on the themes given. The themes in this study were describing people, describing house, describing family, describing school, describing interesting place, describing animal. The more detail of try out items can be seen in appendix B

➤ **Pre-test**

Pre-test was administered to determine the ability of students before receiving some treatment. The pre-test was administered on May 13th, 2011. It was given to both VIII-1 as an experimental and VIII-2 as a control groups. The formation of the test was vocabulary test. To get more detail of pre-test items can be seen in appendix B.

➤ **Treatment**

The treatment was crossword puzzle technique in learning English vocabulary. The crossword puzzles were given to experimental group and teaching spelling puzzle to control group. The students were given the treatment for 10 meetings by using crossword puzzles from May 14th, 2011 to June 9th, 2011.

➤ **Post-test**

29
29

Post-test was administered to students after receiving some treatment. The questions on the post-test were the same as the pre-test items. The result of the post-test for both an experimental group and a control group show the effect of the treatment for the student's vocabulary mastery and it was the final data for this study. The more detail of post-test items can be seen in appendix B.

➤ **Questionnaire**

To investigate the students' responses toward the use of crossword puzzles in learning English vocabulary, questionnaires were given to experimental class. According to Erma (2003) questionnaire is a list of questions or statements that must be answered by respondents. The questionnaires consist of ten simple statements. The statements were divided into two. First, positive statements, for number 1, 2, 3, 4,5,6,7, and 8. Second, number 9, and 10 as negative statements. The questionnaire was analyzed using Likert scale. The more detail of questionnaire items can be seen in appendix E.

3.8. Data Analysis

3.8.1. Scoring technique

According to Arikunto (2010) there are two types of formula in processing the score for multiple choice tests: with punishment and without punishment. To avoid the negative score, this study used the formula without punishment. The formula proposed as follows:

30
30

$$S = R$$

S : Obtained score (Raw Score)

R : Right answer

3.8.2. Data analysis on try out

Before gathering the data for this study, the try out was held in order to measure the difficulty level, the discrimination index of each items, reliability, and validity of the test.

3.8.2.1. The Validity test

Hatch & Farhady, (1982:250) say that validity refers to “the extent to which the result of the procedure serves the uses for which they were intended”. Pearson product moment can be used to analyze the validity items. The data were calculated by SPSS 17 for windows. After *r* coefficient correlation value was calculated, and *t* value was gained, then it was compared to $t_{critical}$. If $t_{obtained} \geq t_{critical}$, it means that the item is valid. And if the $t_{obtained} < t_{critical}$, it means that the item is not valid.

3.8.2.2. The Difficulty level

Arikunto (2010) states that difficulty index is an assumption that a good item should not be too difficult or too easy. To measure the degree of difficulty is generally express as the percentage of the students who answered the items correctly, the writer used the following formula:

$$P = \frac{B}{JS}$$

Where:

P : Difficulty index

B : Number of subjects who answer the item correctly

JS : Number of all students

Table 3.2
Criteria of the difficulty index

Difficulty index	Interpretation
0.00 – 0.30	Difficult
0.30 – 0.70	Moderate
0.70 – 1.00	Easy

(Arikunto, 2010)

3.8.2.3. The Discrimination index

Arikunto (2010) suggests that good items must be able to differentiate higher achiever from the lower achiever subject as well. It deals with the determining discrimination index with the following formula:

$$D = \frac{BA - BB}{1/2 JS}$$

D = Discrimination Index

BA = Number of Right Answer From Upper Group

BB = Number of Right Answer From Lower Group

JS = Number of All Subjects

Table 3.3
Criteria of Discrimination Index

Discrimination Index	Interpretation
0.00 – 0.20	Poor
0.20 – 0.40	Satisfactory
0.40 – 0.70	Good
0.70 – 1.00	Excellent

(Arikunto, 2010)

3.8.2.4. The Reliability

“Reliability is the degree to which a test produces consistent result under similar condition.”(Hatch and Farhady, 1982:224).

Cronbach's alpha formula was used in this study for testing the reliability. The computation was done by using SPSS 16 for Windows Program. After the coefficient of reliability was obtained, then it was interpreted based on the following categorization:

Table 3.4
Category of Coefficient Correlation of Reliability

Coefficient Correlation	Interpretation
0.0 – 0.20	Low
0.20 – 0.40	Moderate
0.40 – 0.70	High
0.70 – 1.00	Very High

(Arikunto, 2010)

3.8.3. Data analysis on pre-test and post-test

Pre-test was administered at the beginning of experiment to experimental class and control class. The next step analyzed the data of pre-test to decide that both groups were equivalent by using independent t-test. According to Coolidge (2000) there are some criterion that should fulfill before performing the independent t-test. First, the scores in each group normally distributed. Second, equal in terms of homogeneity of variance.

3.8.3.1. Normal Distribution Test

To investigate the normal distribution, Kolmogorov-Smirnov's formula was used in this study. The Kolmogorov-Smirnov was done by using SPSS 16 for windows. There were three steps to analyze the normal distribution. First, stating the hypotheses and setting the alpha level. The alpha level set was at 0.05 (two-tailed test). The null hypothesis (H_0) is that "the scores of both of group are normally distributed", while the alternative hypothesis (H_A) is that "the scores of both of group are not normally distributed". Second, analyzing the group by using Kolmogorov-Smirnov formula on SPSS 16 for Windows Program. Thirdly, interpreting the data, if the level of significance > 0.05 , the null hypothesis is accepted which means the distribution of data is normal. In contrast, if significance level < 0.05 , the null hypothesis is rejected which means the distribution of the data is not normal.

3.8.3.2. Homogeneity of Variance Test

After finding the normality of distribution, the next step was finding the homogeneity of variance. Levene's formula was used in this study to analyze the homogeneity of variance of the scores. The test was performed using SPSS 16 for windows. The step of analyzing includes three steps. First, stating the hypothesis and setting the alpha level. Second, measure the homogeneity variance using Levene's test through SPSS 16 for windows. Third, compare the result of Levene's test and alpha level. If the Levene's test is significance at > 0.05 , the null hypothesis is accepted which means the variance data of two groups are approximately equal. However, if

the Levene's test is significance at < 0.05 , the null hypothesis is rejected which means the variance data of two group are not equal.

3.8.3.3. The Independent t-test

To know whether there was the difference of mean between the experimental and control class, the independent t-test was used in this study. There were three steps in analyzing the independent t-test. First, stating the hypothesis and setting the alpha level at 0.05. The null hypothesis (H_0) is that there is no significant difference between the pre-test and post-test mean for experimental group and control group. Second, calculate independent t-test by using SPSS 16 for windows. Third, comparing (t) significance 2 tailed with level of significance. If (t) significance 2 tailed > 0.05 , the null hypothesis is accepted which means there is no difference of means between experimental and control group. On the contrary, if (t) significance 2 tailed < 0.05 , the null hypothesis is rejected that means there is difference of means between experimental and control group.

3.8.3.4. The Dependent t-test

The dependent t-test was used to compare the score of pre-test and pos-test of experimental group. The pre-test score of experimental class are compared to the post-test score of experimental class (Coolidge: 2000). To analyze the dependent t-test using SPSS 16 for windows. There were some procedures in analyzing the dependent

36

36

t-test. First, stating the hypothesis and setting the alpha level at 0,05. Null hypothesis (Ho) is that there is no significant difference between the pre-test and post-test scores. Second, analyze the dependent t-test by using SPSS 16 for windows. Third, comparing (t) significance 2 tailed with the level of significance for testing the hypothesis. If (t) significance 2 tailed > 0.05, the null hypothesis is accepted, we can conclude that there is no significant difference between the pre-test and post-test scores of experimental group. Meanwhile, if (t) significance 2 tailed < 0.05, the null hypothesis is rejected which means there is significant difference between the pre-test and post-test scores of experimental group.

3.8.3.5. The Calculation of Effect Size

Effect size is used to discover whether the independent variable gives significant influence to dependent variable (Coolidge, 2000). The formula of effect size:

$$r = \sqrt{\frac{t^2}{t^2 + df}}$$

Where:

r = Effect size

t = Independent t-test value

df = Degree of freedom (df= N₁+N₂-2)

After the value is calculated, its effect size is analyzed by using the following Table:

Table 3.5

The scale of effect size value

Effect Size	r value
Small	0.100
Medium	0.243
Large	0.371

(Coolidge, 2000)

3.8.4. The analysis of the questionnaire

Through distribution of questionnaires, it aimed to investigate the students' responses toward the use of crossword puzzles in learning English vocabulary. Furthermore, it answered the second research question in this study. The questionnaires were analyzed using Likert scale. According to Sugiyono (2010) Likert scale for positive statement uses score 4-1 as described the score of strongly agree (SA) is 4, agree (A) is 3, disagree (D) is 2, and strongly disagree is 1. Nevertheless, negative statement uses score 1-4 as follows: strongly agree is 1, agree

$$R = \frac{P}{F} \times 100\%$$

38
38

is 2, disagree is 3 and strongly disagree is 4. The data of the questionnaire was calculated by using the following formula:

Note:

R : Respondent's percentage

P : The number of respondent that choose each option

F : Number of all respondents

To read the analysis of questionnaire, the following criteria are used as guidance.

Table 3.6

Criteria of the average student's answer

Percentage	Interpretation
0%	None
1% - 25%	Small number of
26% - 49%	Nearly half of
50%	Half of
51%-75%	More than half of
76% - 99%	Almost all of
100%	All of

(Kunjaraningrat in Susilawati, 2011)

3.9. Concluding Remark

This chapter explained the research design, research variable, research hypothesis, location and time, population and sample, schedule of the study, the data collection, and the data analysis. The following chapter will be described the findings and discussion.

