

## **CHAPTER III**

### **RESEARCH METHODOLOGY**

This chapter describes research methodology, which includes; statements of problem, research design, hypothesis, clarification of terms, data collection, research procedures and data analysis.

#### **3.1 Statements of Problem**

In the chapter I, it has been briefly discussed that this study is aimed to find out whether or not the use of crossword puzzle is effective to improve students' vocabulary mastery and to investigate students' responses towards the use of crossword puzzle in teaching vocabulary. Therefore, the study is purposed to observe the following problems:

1. Can crossword puzzle improve students' vocabulary mastery?
2. What are students' responses towards the use of crossword puzzle in teaching vocabulary?

#### **3.2 Research Design**

The research methodology which the writer was used in this study was Quasi experimental design. Since the population of the study has been already assigned to several classes, the researcher chose non-equivalent group design. The study involved two groups namely the experimental group and the control group. The experimental group received crossword puzzle treatment while the control group did not.

Schematically, the experimental design in the study can be described as follows:

G1	T1	X	T2
G2	T1		T2

G1 = Experimental group

G2 = Control group

T1 = Pre-test

X = Treatment

T2 = Post-test

(Hatch and Farhady, 1982: 22)

There were two variables involved in this study namely the independent variable and dependent variable. The Independent variable is a variable which influences the dependent variable. Meanwhile, dependent variable is a variable which is influenced by the independent variable (Arikunto 2010: 162). In this study, the independent variable was crossword puzzle. Furthermore, the dependent variable was students' vocabulary mastery.

### 3.3 Hypothesis

According to Coolidge (2000:98), there are two types of hypothesis as follows:

Ho:  $\mu_1 = \mu_2$  = there are no significant differences between the two population's means.

Ha:  $\mu_1 \neq \mu_2$  = there are any significant differences between the two population's means.

In addition, this study used an alternative hypothesis (Ha) as a tentative statement, which means that there are any significant differences in mean adjustment level between students who were taught by using crossword puzzle with students who did not.

### **3.4 Clarification of Terms**

In order to avoid unnecessary misinterpretation, some terms are classified as below:

1. Crossword puzzle refers to a word game which has arrangement of words to be fill into numbered squares that goes vertically and horizontally (Dhand, 2008:55; Bellis: 1997; Cambridge Dictionary of American-English, 2008).
2. Vocabulary refers to list of words in a language with their meanings (Milton, 2009:6-8; McKeown and Curtis, 1987:7-11; Oxford advanced learner's dictionary, 1995).
3. Vocabulary mastery refers to the ability to understand and use words to acquire and convey meaning (Brown et.al, 2009: 85).
4. Reading refers to the complex thinking process in which is used by the reader to get meaning of the text (Phenix, 2002:4).

5. Recount text refers to a text that is used to retell for the purpose of informing or entertaining (Barwick, 1999:4; Gerot and Wignell, 1994: 194; Widiawati et.al, 2008:29; Wardiman et.al, 2008:61).

### **3.5. Data Collection**

#### **3.5.1. Population and Sample**

The population of this study was the eighth grade students of a Junior High School in Bandung Barat. The population was selected based on the curriculum of simple recount text which is given to the eighth grade of Junior High School students.

Furthermore, the selected population was narrowed into a sample. By considering to the design of this study, that was non-equivalent group design. Therefore, the sample of this study was not chosen randomly. There were two groups as the sample of this study, VIII B as an experimental group and VIII C as a control group.

#### **3.5.2 Research Instruments**

To obtain the data, some instruments were used in this study, namely pre-test, post-test, and questionnaire. Firstly, Pre-test was conducted to find out the initial differences of vocabulary mastery in both groups; experimental group and control group before giving the treatment. Second, Post-test was conducted to measure the effectiveness of using crossword puzzle in improving students' vocabulary mastery. It was also given to the both groups in the end of the

program. The last, questionnaire was administered to investigate students' responses towards the use of crossword puzzle in teaching vocabulary. It was given after obtaining the data from pre-test and post-test.

### **3.6 Research Procedures**

#### **3.6.1 Administering Tryout Test**

A tryout test was administered to measure the validity and reliability of the instrument. Furthermore, the difficulty index of each item and discrimination index of each item were also calculated in order to achieve the good instrument. The test was made in the form of multiple choice tests which consists of thirty five questions. The reason in using the multiple choices for the test is multiple choices can provide high objectivity and reliability of scores (Oller, 1979:233).

#### **3.6.2 Treatment**

The crossword puzzle treatment of this study was only given to the experimental group for six meetings. Meanwhile, the control group was taught by using conventional teaching strategy. The reason in applying crossword puzzle at the beginning of the lesson is crossword puzzle can be used to introduce and practice new vocabulary which can be used by students to develop their communicative skills (Little, 1986:80; Brown, 2010).

Since the teaching vocabulary in the level of Junior High School is implicitly stated in standard competency (SK 5) and basic competency (KD 5.1),

therefore some vocabulary teaching techniques which were used in the treatment involved synonym, grammar of vocabulary, pronunciation, describing words and connecting words to students' live. (See also the framework of vocabulary teaching techniques in the table 2.1).

Moreover, crossword puzzle in this study has also several criteria that were used to select words which are provided in the text into the crossword puzzle. Those are:

➤ Employ new words

As it is stated by Little (1986:80) and Brown (2010), crossword puzzle can be used as a media to introduce and to practice new vocabulary so that the students will be able to develop their communicative skills.

For example:

Students may use word "shop" frequently to describe a building where they can buy something even in bazaar. As a result, the word "stall" which may new for students is presented in the crossword puzzle in order to enrich students' vocabulary mastery. This gives the students an alternative word which helps them to communicate effectively.

➤ Encompass the accurate word spelling

According to Whisenand (2010) and Jones et.al (2007), students need to have an exact word spelling to solve a crossword puzzle.

For example:

Students may know the word “traditional” as “*tradisional*”. For that reason, the use of word “traditional” is considered to trigger students to find the precise word spelling by looking at the dictionary or reading the textbook.

➤ Involve lexical terms

Students are required to identify and understand the terms are being used to solve a crossword puzzle (Jones et.al, 2007). In this study, the students are not only trained to enrich new words, but also they are trained to master the words in different forms.

For example:

✓ Synonym

In their daily activities, some students may only use the word “acne” to describe a skin disease common in young people, in which small red spots appear on the face and neck. Thus, the synonym of the word “acne” is available in the crossword puzzle in order to train students to master the word which has similar meaning to the word “acne” (“pimple”).

✓ Grammar of vocabulary

Some words which are provided in the recount text are commonly formed in the past tense. For that reason, the word such as “arrived” is provided in the crossword puzzle in order to train students to identify the word “arrive” in the different form (past form) which can help them able to read and comprehend the text more easily.

### 3.6.3 Administering Pre-test and Post-test

The pre-test was given to the experimental and control groups before treatment in order to find out students' basic vocabulary knowledge. Meanwhile, the post-test was given to the two groups in the last program in order to investigate the effectiveness of using crossword puzzle in improving students' vocabulary mastery. In addition, the framework design of the instrument on pre-test and post-test is as follows:

Standard Competency (SK 5)	Basic Competency (KD 5.1)	Indicator of SKKD	Items
students should be able to understand a very simple recount text in school context	Students should be able to read aloud and understand a very simple recount text with correct pronunciation, stress, and intonation.	Identify word related to the text (Synonym)	6, 11, 12, 14, 16, 20, 21, 25
		Identify the meaning of several words in the text (Describing words, grammar of vocabulary and connecting words to students' live)	1,2,3,4,5,7,8,9, 10,13,15,17,18 ,19,22,23,24

Table 3.1 the framework of pre-test and post-test

### 3.6.4 Administering Questionnaire

To investigate students' responses towards the use of crossword puzzle in teaching vocabulary, questionnaire in the form of open and close-ended were distributed to the students in the experimental group. In the close-ended



questionnaire, there are eight questions which may cover students' responses towards treatment. The framework of questionnaires can be seen as below:

No	Aspects	Item Number
1	Response to students' motivation in learning vocabulary	1,2,3
2	Response to students' participation in learning vocabulary	4,5
3	Response to students' challenge and critical thinking	6,7,8

Table 3.2 the framework of closed-ended questionnaire

Furthermore, the closed-ended questionnaire consists of 3 aspects which was used in this study were made in the form of *Likert Scale*, in which students only choose the available answer related to the scale. The framework of *Likert scale* on closed-ended questionnaire is illustrated in the following table:

Scale of Response	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
Score	5	4	3	2	1

Table 3.3 the framework of *Likert scale* on closed-ended questionnaire

In addition, this study used also an open questionnaire which consists of 1 question in order to investigate students' problem in learning vocabulary through crossword puzzle. The open questionnaire which was used in this study is drawn in the following table:

No.	Question
1.	<i>Kendala apa yang kamu hadapi ketika belajar kosakata bahasa Inggris dengan menggunakan media crossword puzzle?</i>

Table 3.4 the framework of open questionnaire

(See appendix 2 for the detail of a whole questionnaire form)

### 3.7 Data Analysis

#### 3.7.1 Scoring Technique

According to Arikunto (2009:167), there are two types of formula which can be used to evaluate the test. Those are: 'with punishment' and 'without punishment'. This study only used the formula without punishment. The formula is stated as follows:

$$S = R$$

S = Score

R = Right answer

(Arikunto, 2009: 168)

#### 3.7.2 Data Analysis on Tryout Test

To achieve a good test, this study used manual statistical calculation in analyzing the result on the tryout test. There were several steps involved in the tryout data analyzing. Those are:

##### **The Validity of Each Item**

To investigate whether or not each item of the test is really valid, the result of vocabulary test on tryout was calculated by using point biserial correlation. The formula is stated as follows:

$$\gamma_{pbis} = \frac{M_p - M_t}{S_t} \cdot \sqrt{\frac{P}{q}}$$

(Arikunto, 2009:79)

Note:

$\gamma_{pbis}$  = Coefficient of point biserial correlation

$M_p$  = Mean score on the total of students who answer the item correctly

$M_t$  = Mean of the total score

$P$  = Proportion of students who answer the item correctly

$$P = \frac{\text{Number of students who answer the item correctly}}{\text{Number of students}}$$

$q$  = Proportion of students who answer the item incorrectly ( $q = 1 - P$ )

$S_t$  = Standard deviation of the total score

Furthermore, comparing the data from  $r_{obs}$  with  $r$  product moment ( $r_{table}$ ) on the level significant 95% and degree of freedom ( $df$ ) = 40. The data becomes valid if  $r_{obs}$  more than  $r_{table}$  and the data is not valid if  $r_{obs}$  less than  $r_{table}$ .

## The Reliability of Test

Reliability was used to see the consistency of the result in a test when it is administered under similar conditions (Hatch and Farhady, 1982:244). Furthermore, Arikunto (2010:234) states that KR-20 formula provides the higher reliability value of an instrument. For that reason, reliability was searched with the following KR-20 formula:

$$r_{11} = \left( \frac{k}{k-1} \right) \left( \frac{V_t - \sum pq}{V_t} \right)$$

(Arikunto, 2010:231)

Note:

$r_{11}$  = Reliability index of test

P = Proportion of students who answer the item correctly

$$P = \frac{\text{Number of students who answer the item correctly}}{\text{Number of students}}$$

q = Proportion of students who answer the item incorrectly ( $q = 1-P$ )

$\sum pq$  = Sum of the total result of the multiply p and q

K = Number of items

$V_t$  = Variance of the total score

After obtaining the reliability index of test ( $r_{11}$ ), then comparing with  $r$  product moment ( $r_{table}$ ) on the level significant 95% and degree of freedom (df) = 40. The test becomes reliable if  $r_{11}$  more than  $r_{table}$  and the test is not reliable if  $r_{11}$  less than  $r_{table}$ .

### The Difficulty Index of Each Item

The difficulty index was used to categorize the level of items that has been tested, whether the item is categorized as easy, medium or difficult (Arikunto: 2009). The formula used to find out the difficulty index was:

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

Note:

P = Difficulty index

B = Number of students who answer the item correctly

JS = Number of students

(Arikunto, 2009: 208)

After obtaining the result of difficulty index of each item, then categorizing with the criteria of the difficulty index which are described in the following table:

Coefficient Interval	Interpretation
0,00-0,30	Difficult
0,31-0,70	Medium
0,71-1.00	Easy

Table 3.5 the scale of difficulty index

(Arikunto, 2009: 208)

### The Discrimination Index of Each Item

The discrimination index was used to indicate how far a single test item can differentiate the upper group from the lower group (Arikunto, 2009:211). The formula is as follows:

$$D = \frac{B_A}{J_A} - \frac{B_B}{J_B} = P_A - P_B$$

Note :

D = The discrimination index

B<sub>A</sub> = Number of upper group who answer the item correctly

B<sub>B</sub> = Number of lower group who answer the item incorrectly

J<sub>A</sub> = Number of upper group

J<sub>B</sub> = Number of lower group

$P_A$  = Proportion of upper group who answer the item correctly

$$( P_A = \frac{B_A}{J_A} )$$

$P_B$  = Proportion of upper group who answer the item correctly

$$( P_B = \frac{B_B}{J_B} )$$

(Arikunto, 2009 :213-214)

After obtaining the result of discrimination index of each item, then each item was consulted with the criteria of discrimination index which are described in the following table:

<b>Coefficient Interval</b>	<b>Interpretation</b>
0,00-0,20	Poor
0,21-0,40	Satisfactory
0,41-0,70	Good
0,71-1.00	Excellent
Negative	Throw away

Table 3.6 the scale of discrimination index

(Arikunto, 2009 :218)

### 3.7.3 Data Analysis on Pre-test and Post-test

After pre-test and post-test were held to both experimental and control groups, the data obtained from pre-test and post-test were analyzed by using independent t-test from the SPSS 16.0 program for windows in order to find out the effectiveness of using crossword puzzle in improving students' vocabulary mastery. Before conducting the independent t-test, Coolidge (2000:143) states that there are some specific assumptions that have to fulfil in using independent *t-test*; Firstly, the participants have to be different in each group. Second, the scores are normally distributed in each group. Third, the variances of two groups must be homogeneous. Therefore, the normality distribution test and the homogeneity of variances were search with the following steps:

#### **Normality Distribution Test**

The statistical computation of normality distribution test was searched by Kolmogorov-Smornov from the SPSS 16.0 program for windows. Furthermore, the steps in analyzing normality distribution test are as follows:

- 1) Setting the null hypothesis ( $H_0$ ), in which the scores of the experimental and the control groups are normally distributed
- 2) Setting the level of significance at 0.05
- 3) Analyzing the normality distribution with Kolmogorov-Smirnov test from SPSS 16 program for windows
- 4) Comparing the asymp.sig (asymptotic significance)/probability ( $p$ ) with the level of significance. If the asymp.sig is more than the level of



significance (0.05), the null hypothesis is accepted which means the scores of both groups are normally distributed. In contrast, if the asymp.sig ( $p$ ) is less than the level of significance (0.05), the null hypothesis is rejected which means the scores of both groups are not normally distributed.

### **Homogeneity of Variances**

To find out the homogeneity of variances, the formula of Levene's test from the SPSS 16.0 program for windows was used in this study. The steps are:

- 1) Setting the null hypothesis ( $H_0$ ), in which the variances of control and experimental groups are homogeneous
- 2) Setting the level of significance at 0.05
- 3) Analyzing the homogeneity of variances by using Levene's test from the SPSS 16.0 program for windows
- 4) Comparing the asymp.sig (asymptotic significance)/probability ( $p$ ) with the level of significance for testing the hypothesis. If the asymp.sig is more than the level of significance (0.05), the null hypothesis is accepted which means the scores of the experimental and control groups are homogeneous. In contrast, if the asymp.sig is less than the level of significance (0.05), the null hypothesis is rejected which means the scores of the experimental and control groups are not homogeneous.

## **Independent t-test**

Independent t-test was used to investigate whether or not there are any significant differences between the experimental and control groups in mean adjustment level. The procedures of computation on independent t-test are as follows:

- 1) Setting the level of significance at 0.05
- 2) Analyzing the independent test by using SPSS 16 program for windows
- 3) Comparing the asymp.sig (asymptotic significance)/probability ( $p$ ) with the level of significance for testing the hypothesis. If the asymp.sig ( $p$ ) is more than the level of significance (0.05), it can be concluded that there are no significant differences between the experimental and control groups in mean adjustment level; on the other hand, the null hypothesis is accepted. Meanwhile, if the asymp.sig ( $p$ ) is less than the level of significance (0.05), the null hypothesis is rejected, and it can be concluded that there are any significant differences between the experimental and control groups in mean adjustment level; in the other words, the alternative hypothesis is accepted.

## The Calculation of Effect Size

Effect size was also used in this study in order to find out how far independent variable affects the dependent variable (Coolidge, 2000:151). The formula is as follows:

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

Note:

$r$  : effect size

$t$  :  $t_{\text{observe}}$  from the independent t-test

$df$  : degree of freedom ( $N_1 + N_2 - 2$ )

In addition, the scale of effect size was used to interpret the computational result.

The scale is as follows:

Effect Size	r Value
Small	0,100
Medium	0,243
Large	0,371

Table 3.7 the scale of effect size

(Coolidge, 2000:151)

### 3.7.4 Data Analysis on Questionnaire

In this study, the formula of percentage was used to analyze the data obtained from questionnaire. Then, the data were interpreted based on the frequency of students' answer. The formula of percentage of the questionnaire is as follows:

$$P = (100) \frac{F}{N}$$

Note:

P = Percentage

F = Frequency

N = Response

(Hatch and Farhady, 1982:48)