CHAPTER III

RESEARCH METHODOLOGY

3.1 Introduction

This chapter provides the methodology of the conducted study to answer the questions previously stated in Chapter One. It also describes the procedures and process involved in the research. In detail, this chapter explains research design, data collection, research procedure, and data analysis.

3.2 Research Design

Regarding to the main aim of study, experimental research was used in the research. Experimental research is one of the most powerful research methodologies that researchers can use to establish a cause-effect relationship among variables (Fraenkel&Wallen, 1990). It represents a strong chain of reasoning about the links between one variable to another variable. The design used in the research was quasi-experimental design by using nonequivalent control group design. Geoffrey (2006) stated that in nonequivalent control group design is the entire classroom in not individual students which are assigned to treatments.

Table 3.1
The Quasi-Experimental Design

Group	Pre-test	Treatment	Post-Test
Experimental	Xe1	T	Xe2

Control	Xc1	-	Xc2

Note:

T = the treatment for the true experiment

Xe1 = the observation of pre-test in experimental class

Xe2 = the observation of post-test in the experimental class

Xc1 = the observation of pre-test in the control class

Xc2 = the observation of post-test in the control class

The study involved two classes as the investigated groups. The first class was chosen as the experimental group (Xe) which was given big story book treatment (T). The second class was chosen as the control group (Xc) which was not given treatment. The pretest was given before applying the big story book as a treatment. Then, the posttest was given to both groups after the treatment to see whether or not the students make progress in their vocabulary mastery.

3.3 Research Hypothesis

A hypothesis is used to show the effect of two variables' relationship (Arikunto, 2006). The hypothesis used in this research was null hypothesis (denoted by H_o) which is formulated as follow:

$$H_o: \bar{X}_1 = \bar{X}_2$$

The null hypothesis in this study is that there is no significant difference in mean adjustment level between those who received big story book and those who did not. It means that the experiment works if the null hypothesis is rejected.

The hypothesis above was used to show an expected relationship between two variables that was independent variable and dependent variable.

3.4 Data Collection

The data collection in the study includes population and sample, and research instruments.

3.4.1 Population and Sample

Sugiyono (2010:117) stated that population is the generalization of the entire group which consisted of objects or subjects who have certain qualities and characteristics that set by the researchers to study. The population of this research was students of fourth grade of one of the elementary school in Eastern Bandung. The selected population then was narrowed into a sample. According to Arikunto (2006) stated that a sample is a part of the population which will be investigated. Two classes of fifth grade were chosen as a sample. Class 4C was the experimental group and class 4A was the control group. Each of the classes consists of 25 students; therefore, the total numbers of students were 50.

The experimental group and the control group were given pre-test and post-test in order to test their vocabulary knowledge. However, treatment was only given to the experimental group while the control group received English common method.

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3.4.2 Research Instrument

According to Fraenkel and Wallen (1990), an instrument is any kind of device that a researcher uses in collecting data. There were two kinds of instruments used in the study, which are vocabulary test and questionnaire. The vocabulary test was in the form of multiple choices, which consist of 25 items. This vocabulary test was used in pre-test and post-test. Pre-test was used to measure students' previous knowledge of noun vocabularies. Pre-test was administered before treatment to the experimental group, while post-test was held in the end of the program after conducted several treatments. The test instrument was used in the pretest and posttest for both the experimental and the control groups.

The questionnaire was used to gain the data to investigate the advantages and the disadvantages in using the big story book in teaching vocabulary based on students' opinions. In gathering the data, the respondents were chosen only from the experimental group. The questionnaire consisted of 15 items to investigate the students' opinions on the use of the big story book in their class.

3.5 Research Procedure

Research procedure includes organizing teaching procedure, administering the pilot-test, conducting treatment, administering pre-test and post-test and questionnaire.

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3.5.1 Organizing Teaching Procedure

In conducting the research, the researcher acted as a teacher and a facilitator of the experimental and the control group. There were some steps taken in preparing teaching process for the experimental group. The first step was preparing the appropriate materials based on the syllabus of the fourth grade during treatment. The second step was preparing the media that support the materials. The last step was organizing teaching procedure in both the experimental and the control group.

The big story book was used as a treatment for experimental group related to the teaching materials and procedures, while the control group was given conventional vocabulary teaching and procedures.

3.5.2 Administering Pilot-test

Before conducting the research, the researcher held a pilot-test. The pilot-test was administered to investigate the validity, reliability, difficulty, and discrimination of the instrument. The pilot-test was conducted to 35 students of fourth grade from different elementary school that was not the sample. The test consisted of 40 multiple choice items. There was a picture in each item to help students in answering the questions. The test related to vocabulary that has not been taught by the teacher. The vocabulary test was about kinds of marine animals, vegetables, occupations, and transportation.

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3.5.3 Conducting Treatment

The treatment was conducted in five meetings to the experimental group. The researcher carried out the materials related to vocabulary that had been arranged in a lesson plan. The use of the big story book as a treatment was implemented to the experimental group.

The treatment schedule was set to make the experiment run well. The materials, themes and lesson plans were also set to follow the material schedule of the school.

The details of the treatment activity were shown in the following table.

Table 3.2
Schedule of the Study

No.	Experimental Group (4C)		Control Group (4A)	
	Date	Material/Theme	Date	Material/Theme
1.	18th October 2010	Pre-test	18th October 2010	Pre-test
2.	25th October 2010	The Sea is Home	25th October 2010	The Sea is Home
3.	1st November 2010	The Occupations in the World	1st November 2010	The Occupations in the World
4.	8th November 2010	The Caterpillar's Favorite Vegetables	8th November 2010	The Caterpillar's Favorite Vegetables
5.	15th November	The World's Transportation	15th November	Transportation in the World

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	2010		2010	
6.	22nd November 2010	Post-test	22nd November 2010	Post-test
7.	29th November 2010	Questionnaire	29th November 2010	-

3.5.4 Administering Pre-test and Post-test

Pre-test was administered to measure students' prior vocabulary knowledge. Pre-test was given to both the experimental and the control group in order to find out the students' mastery in vocabulary before the researcher conducted treatment. Pre-test was in the form of multiple choice that consisted of 25 items. After the pre-test was given, the treatment of using the big story book was given to the experimental group only. Then, post-test was held after students received the treatment to find out whether or not the students improve their vocabulary mastery. The post-test was given to the experimental and the control group in the end of study. The procedure and the instrument of post-test and pre-test were similar.

3.5.5 Questionnaire

Questionnaire was used in this study to investigate the advantages and the disadvantages of using the big story book in teaching vocabulary based on students' opinions. The questionnaire was closed-questionnaire in the form of

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Gutman-scale questionnaire. The advantages of questionnaire are they can be mailed or given to large numbers of people at the same time (Fraenkel&Wallen, 2000: 123). The questionnaire was consisted of up to 15 statements in Indonesian language which was categorized into some points, such as the advantages and the disadvantages found in the use of the big story book. It was given to 25 students who were the samples.

3.6 Data Analysis

Data analysis includes data analysis on the pilot-test, data analysis on pre-test and post-test, and data analysis on the questionnaire.

After collecting the data, data from pilot test, pre-test, and post-test of both the experimental and the control group were analyzed. The data from pilot test ware analyzed to measure the validity, reliability, level of difficulty, and discrimination level of the instrument. While the data from pre-test and pots-test was used to analyze the independent and dependent *t*-test.

3.6.1 Data Analysis on the Pilot-test

After conducting the pilot test, the data were analyzed to measure the validity, reliability, level of difficulty, and discrimination level of the instrument.

3.6.1.1 Validity Test

Validity refers to the appropriateness, meaningfulness, correctness, and usefulness of the inferences a researcher makes (Fraenkel&Wallen, 1990:147). In

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the other word, a test is valid if it measures what it purposes to measure. Therefore, validity was measured to support any inferences that the writer made based on the gained data by using a particular instrument.

Pearson correlation coefficient was used to analyze and calculate the validity of each item and SPSS 17 for windows was used to calculate the item.

The criteria that determine the degree of the item validity are shown below.

Table 3.3
R Coefficient Correlation (Validity)

Raw score	Interpretation
0.800 – 1.00	Very High
0.600 – 0.800	High
0.400 – 0.600	Moderate
0.200 – 0.400	Low
0.00 – 0.200	Very Low

(Arikunto, 2008: 75)

3.6.1.2 Difficulty Level

Difficulty level was defined as the difficulty or item facility as the proportion of the test takers who answer the correct item (Flutcher, 2007). The item should be neither too easy nor too difficult for certain population that the test has been designed for them. According to Henning (1987) as cited from Fulcher and Davidson (2007), the items considered to be ideal if the facility value is around 0.500, with an acceptable range being from around 0.250 to 0.750.

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The formula of difficulty index is:

$$FV \quad = \quad \frac{R}{N}$$

FV   : Facility of value / index of difficulty

R   : The number of correct answer

N   : The number of student taking the test

Table 3.4
Index of Difficulty

Score	Interpretation
FV 0.1 – 0.30	Difficult
FV 0.30 – 0.70	Medium
FV 0.70 – 1.00	Easy

(Arikunto, 2001, p. 210)

3.6.1.3 Discrimination

The index of discrimination was used to indicate how far a single test item can differentiate the upper group from the lower group of the class (Arikunto, 2003). Point biserial correlation is the most commonly used in calculating the discrimination responses to any specific item and the score on the whole test. The test item can be calculated by using the formula below:

$$r_{pbi} = \frac{\bar{X}p - \bar{X}q}{S_x}\sqrt{pq}$$

Where

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r_{pbi} = point biserial correlation

$\bar{X}p$ = mean score on the test for those who get the item correct

$\bar{X}q$ = mean score on the test for those who get the item incorrect

S_x = standard deviation of test scores

p = the proportion of test takers who get the item correct (facility value)

q = the proportion of test takers who get the item incorrect

Table 3.5
Discrimination Index

Score	Interpretation
D: 0.00 – 0.20	Poor
D: 0.20 – 0.40	Satisfactory
D: 0.40 – 0.70	Good
D: 0.70 – 1.00	Excellent

(Arikunto, p.210)

Items with an r_{pbi} of 0.25 or greater are considered acceptable, while those with lower value would be rewritten or excluded from the test (Henning, 1987 cited from Fulcher and Davidson, 2007).

3.6.1.4 Reliability Test

Reliability test also plays an important part in gathering the data in a research study. According to Fraenkel&Wallen (1990), refers to the consistency of the scores obtained from one administration of an instrument to another and

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from one set of items to another. Whereas, according to Hatch &, Farhady (1982:244), reliability defined as an extent to which a test produces the consistent results when administered under similar conditions.

A method used to test reliability in order to find out the stability of the test was the Kuder-Richardson formula 21 (KR-21). The material was twenty items and tested to thirty students of the fourth grade.

Reliability was searched with the formula:

$$r_{pbi} = \frac{k}{k-1}\left[1 - \frac{x\,(k-\bar{x})}{ks^2}\right]$$

Where:

k = the number of items in the test

$\bar{x}$ = the mean of the sample

s^2 = the variance of the sample

3.6.2 Data Analysis on the Pre-test and Post-test

The homogeneity of variance test and normal distribution test were conducted before data from pre-test and post-test were analyzed to calculate the independent and dependent t-test.

3.6.2.1 Homogeneity of Variance Test

One of the assumptions of analysis of variance is that variances of the observations in the individual groups are equal. In analyzing the homogeneity of variances of the scores, Levene's test formula was used in this study. Levene'stest

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formula in SPSS 17 for windows was used to assess the equality of variances in different samples. If the significant value is more than the level of significance (0.05) the null hypothesis is accepted; the variance of the control group and experimental group are homogeneous. On the other hand, if the significance value is less than the level significance (0.05), the null hypothesis is rejected, the variance of the control and experimental group are not homogenous.

3.6.2.2 Normal Distribution Test

In analyzing the distribution of the score, Kolmogrov-Smirnov formula was used in this study. Kolmogorov-Smirnov test in SPSS 17 was used to calculate the normal distribution. By using this test, the sample scores are compared with the normally distributed set of scores with the same mean and standard deviation (Field, 2005). If the test is not significant (p> 0.05) it tells us that the distribution of the sample is not significantly different from a normal distribution. However, if the test is significant (p < .05) then the distribution of the sample is significantly different from a normal distribution (Field, 2005).

3.6.2.3 The Independent t-test

The Independent t-test is a method that used to test the means of two independent populations. According to Kranzler & Moursund (1999) the independent t-test was used to determine whether there are significant difference scores of means between two groups. Before conducting the independent t-test there are three assumptions that must be considered. First, the participants must

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be different in each group. Second, the data has normal distribution. Third, the variance of the two groups is equal (Coolidge, 2000, p.143).

Then, to find out the differences between the experimental and control groups, the independent t-test in SPSS 17 was used. If the significant value is more than or equal to the level of significance (0.05) the null hypothesis is accepted, and it means that there is no significant difference between two means. On the other hand, if the significant value is less than the level significance (0.05), the null hypothesis is rejected and it means that there is significant difference between the two means.

3.6.2.4 The Dependent t-test

Dependent t-test was used to analyze the difference between the means of two groups in experimental design where the participants in both groups are related to each other in some way (Coolidge, 2000). In the study, the dependent t-test was analyzed using SPSS 17 by comparing the significant value with the level of significance to test the hypothesis stated before. If the significant value is less than the level of significance (0.05) the null hypothesis is rejected and it means that there is no significant difference between two means. On the other hand, if the significant value is more than the level of significance (0.05), so the null hypothesis is accepted. It means that there is significant difference between two means.

3.6.2.5 The Calculation of Effect Size

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Although the result of t-test is statistically significant and the treatment goes well, it does not mean that the effect of the treatment is good. In order to know how big the effect of the treatment, it can be tested using the correlation coefficient of effect size by calculating t-value of independent t-test. According to Coolidge (2000) effect size refers to the effect of influence of independent variable upon the dependent variable. If there is a large difference between the two groups' means, it can be said that the effect size is large. It means the treatment works well.

The formula of effect size is:

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

Where:

r = effect size

t = t value from the calculation of independent t-test

df = N₁ + N₂ - 2

After getting the r value, match the score with the following scale to interpret the effect size.

Table 3.6
Effect Size Value

Effect Size	*r* value
Small	.100
Medium	.243

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Large	.371

<div align="right">(Coolidge, 2000: p.151)</div>

3.6.3 Data Analysis on the Questionnaire

In analyzing the data of the questionnaire, the answer of the students on the questionnaire was categorized. Then, the answer was categorized into two categories were related to the advantages and the disadvantages of using the big story book as treatment.

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