CHAPTER III

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methodology of the conducted study to answer the two questions previously stated in chapter one. It covers research design, data collection, research procedure, and data analysis.

In conducting the study, research methodology is very essential as a guideline to get the answer to the problem proposed in the study. According to Nunan (1993, p.3) research is a methodical investigation that consist of three elements, namely a question, a problem or a hypothesis, and analysis or interpretation of data. In addition, according to Fraenkel and Wallen (1990, p. 481) research is the formal and systematic application of scholarship, disciplined inquiry, and most often the scientific method to the study of problems.

3.2 Research Design

The design used in this study was quasi experimental design by using pre-test and post-test nonequivalent groups design. Experimental research is one of the most powerful research methodologies that can be used by the researcher. It is the only type of research that directly attempts to influence a particular variable, and it is the

only type that can really test hypothesis about cause and effect relationship (Fraenkel and Wallen, 1990, p.230). Besides, according to Hatch and Farhady (1982, p.22) the pre-test post-test nonequivalent groups design is often used in classroom experiments when experimental and control groups are such naturally assembled groups as intact classes which may be similar.

The formula is represented as follows:

G1 (random) T1 X T2

G2 (random) T1 T2

Notes:

G1 = *Experimental Group*

G2 = *Control Group*

T1 = *Pretest*

T2 = *Posttest*

X = *Treatment (Spelling Bee)*

Two classes were selected in this study. They were categorized as different groups. First class was selected as an experimental group (G1) and was given Spelling Bee game as the treatment (X). The second class was selected as a control group (G2) which was not given treatment. Pre-test (T1) was administered before the

implementation of Spelling Bee game as the treatment, and then at the end of the treatment period, post-test was held to evaluate students' understanding on narrative text.

The design of this study above was arranged to answer the research questions. According to Fraenkel and Wallen (1990, p.40) a research question is often restated as a hypothesis. Hypothesis is a prediction of some sort regarding the possible outcomes of a study. It can also be assumed as a question that must be answered by doing an experimental or series of observation. Two hypotheses are formulated as follows:

$$H_0 : \overline{X_1} = \overline{X_2}$$

$$H_a : \overline{X_1} \neq \overline{X_2}$$

In other words the hypothesis in this study was in the form of null hypothesis and alternative hypothesis. The null hypothesis states that there is no difference in mean adjustment level between those who receive Spelling Bee and those who do not. By using null hypothesis, every possibility of the study can be shown. If the null hypothesis is rejected, it can be concluded that the experiment works. While, if the hypothesis is accepted, the experiment does not work. Whereas the alternative hypothesis states that there is a difference between those who receive Spelling Bee and those who do not.

According to the explanation above, it can be assumed that the hypothesis of a study indicates the relationships expected between the variables that are being

investigated. Fraenkel and Wallen (1990, p.36) stated that a variable is a noun that stands for variation within a class of objects, such as chair, gender, eye color, achievement, motivation, or running speed. Variables are the condition or characteristics which the researcher can manipulate, control, or observe. There are two variables in this study, independent variable and dependent variable.

Fraenkel and Wallen (1990, p.39) said that independent variable is the variable which was chosen by the investigator to the study in order to assess their possible effects on one or more variables. In this study, the Spelling Bee game as the teaching technique was the independent variable and became the major variable to be investigated. Still, According to Fraenkel and Wallen (1990, p.39) dependent variable is the variable that the independent variable is presumed to affect. Moreover, Fraenkel and Wallen (1990, p.39) assumed that the nature of the dependent variable is depends on what the independent variable does to it, how it affects it. Accordingly, the variable that was influenced by the independent variable in this study was the students' understanding on narrative text.

3.2.1 Data Collection

3.2.1.1 Population and Sample

According to Sudjana (1983) a population is an entire group of people, objects or events which all have at least one characteristic in common, and must be defined special an unambiguously. Thus, the population in this study is 370 students of the

tenth grade of SMAN 5 Cimahi which consist of nine classes, enrolled in academic year 2009/2010.

In addition, the sample of this study was selected randomly by using cluster random sampling technique. The researcher identified naturally occurring units, such as schools, classes, not individual subject and then randomly selected some of these units for the study. (Fraenkel and Wallen, 1990, p.72). Cluster sampling was employed since it was difficult to select a random sample of the individuals. It was also easier to implement in school and it was less time-consuming (Fraenkel and Wallen, 1990, p.73).

With the reason above, two classes were selected for the study. The classes were X1 and X2, in which the experimental group was X1 and the control group was X2. X1 as the experimental group has 40 students, besides the X2 as the control group has 40 students. Both classes were chosen as the sample with a consideration from the English teacher of SMAN 4 Cimahi that the classes have the same level of English competence.

3.2.1.2 Research Instrument

According to Arikunto (1996, p.136), instrument is a media used by the researcher in collecting the data. The instruments were used to collect data in order to answer the research questions. It was aimed to see the students' reading achievement before and

after treatment. There were two kinds of instrument used in this study namely test instrument and non test instrument.

Test instrument was used in the pre-test and post-test for both control and experimental groups. The test instrument was a reading comprehension test. Pre-test was given to the experimental and control group to find out the initial ability of students' understanding on narrative text. The pre-test was undertaken on September 9, 2009.

After conducted several treatments, researcher administered the post-test to both experimental and control group. This post-test was given to find out whether there is any difference between those groups as a result of the treatment given. The items of the post-test were same as those in the pre-test. The test was administered to both classes on October 16, 2009. The items in pre-test and post-test were composed based on the standard in Indonesia curriculum of teaching English for the first grade of Senior High School.

Table 3.1

The Competencies and Indicators of Items in Reading Test

Aspect	Standard Competence	Basic Competence	Indicators	Number of Item
Reading	**5.** Understanding the meaning	**5.2** Responding the meaning	Determining social function and moral value	13, 22, 26

	of short functional text and simple essay in the form of narrative in daily life context to access the science	and the rhetorical steps of the written text in the form of narrative accurately, smoothly and acceptable in daily life context to access science	from narrative text	
			Identifying the generic structures of the text which include theme, plot, and characters.	1, 2, 3, 7, 9, 10, 14, 15, 16, 23, 24, 28
			Identifying simple past tense as one of the language features of the narrative text	5, 6, 8, 21, 30

The non test instruments used in this study was a questionnaire. The questionnaire was used to find out the aspects which contribute to the effectiveness of Spelling Bee game in teaching narrative text. It consisted of three questions about their respond to Spelling Bee game. Accordingly, the questionnaire was used only for the experimental group.

Questionnaire is basically a tool to gain information and answers directly from the respondent. Moreover, according to Arikunto (2007, p. 27-30), a questionnaire is a method used to gain answers from the respondent in a one-way communication. This means that the respondent is not permitted to question the

investigator, while the investigator is not allowed to help the correspondent to answer the questions.

Questionnaire was used as a non test instrument in this study as regards on its advantage. The most advantage of the questionnaire is that they can be mailed or given to large numbers of people at the same time (Frankel and Wallen, 1990, p.100). For that reason, questionnaire was used in completing the data of the study.

3.2.2 Research Procedure

3.2.2.1 Organizing Teaching Procedure

The writer performed as teacher and facilitator in both experimental and control group. In preparing the teaching process, the writer carried out two steps. The first step was preparing the appropriate materials for teaching and learning process during the experiment. The second step was organizing teaching procedures in the control and the experimental groups.

Moreover, in the experimental group, the teaching materials and procedures were highly related to the implementation of Spelling Bee game in teaching narrative text. While in the control group, conventional narrative reading materials and teaching procedures were applied.

3.2.2.2 Administering Pilot-test

The pilot test was conducted before the instrument used in this study. It was conducted to investigate the validity, level of difficulty, discrimination and reliability of the test-instrument. The items were pilot-tested to 40 students taken from a different class out of the sample on August 28, 2009. The test consisted of 30 multiple choice items.

3.2.2.3 Conducting Treatment

In conducting the treatment, Spelling Bee game was used in teaching narrative text only in the experimental group. The treatment was conducted in five meetings. In every meeting, students were asked to read a narrative text then played the Spelling Bee game. The details of the activity in the classroom can be seen in the following table.

Table 3.2

Schedule of the Study

No.	Experimental Group		Control Group	
	Date	Material	Date	Material
1.	9th September 2009	Pre-test Introduction of narrative text and Spelling Bee Game	9th September 2009	Pre-test Introduction of narrative text

2.	2nd October 2009	Spelling Bee Game using words that indicate social function and moral value of narrative text	5th October 2009	Social function and moral value of narrative text
3.	7th October 2009	Spelling Bee Game using words that indicates theme, characters, events or structures of narrative text	7th October 2009	Theme, characters, events or structures of narrative text
4.	9th October 2009	Spelling Bee Game using words that indicate theme, characters, events or structures of narrative text (review of the previous meeting) and also simple past tense as a feature of narrative text	12th October 2009	General structure of narrative text and simple past tense
5.	14th October 2009	Spelling Bee Game using words that indicate simple past tense as a feature of narrative text (Review)	14th October 2009	Review of simple past tense
6.	16th October 2009	Post-test and administering questionnaires	17th October 2009	Post-test

3.2.2.4 Administering Pre-test and Post-test

Pretest was conducted to investigate the students' initial ability. It was given to both experimental and control groups. Afterwards, to investigate the effectiveness of spelling bee games in teaching narrative text, at the end of the program post-test was administered to both groups.

3.2.2.5 Administering Questionnaire

Questionnaire was administered to the experimental group in order to find out the obstacles from the students perception in using Spelling Bee game in learning narrative text. Furthermore, the questionnaire was used to answer the second and the third questions of this study.

3.2.3 Data Analysis

3.2.3.1 Scoring Technique

After collecting the data by using the instruments, the data from pretest and posttest of experimental and control groups students were analyzed. The pre-test and post-test data were multiple choices. In this study the formula which was used to analyzed pre-test and post-test data is as follows:

S = R

Where,

S: score

R: right answer

3.2.3.2 Data Analysis on the Pilot-test

The data obtained from the pilot test were analyzed to calculate the validity, reliability, level of difficulty, and discrimination level of the instrument.

Validity Test

One of the important things to be considered when researcher prepared or selected an instrument used is validity. According to Fraenkel and Wallen (1993, p.139) validity refers to the appropriateness, meaningfulness and usefulness of the specific assumptions that researcher makes based on the collected data. For that reason, it is necessary to try out the test and compute the result with appropriate formula of validity. In order to measure the criterion-related validity of the test, the Person product Moment was used in this study. Pearson product moment can be used to analyze the validity of each item. The data were calculated by SPSS 16 for windows. The criteria for the validity test were as follow:

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, 2007: 147)

Difficulty Test

A good test is a test which contains items which are not too difficult or too easy. According to Fulcher and Davidson (2007), difficulty is defined simple as the proportion of test takers who answer an item correctly. It is generally assumed that items should not to be too easy or too difficult for the population for whom the test has been designed. Item with facility values around 0.5 are therefore considered to be ideal, with an acceptable range being from around 0.3 to 0.7 (Henning, 1987: 50 cited from Fulcher and Davidson, 2007).

Discrimination

According to Heaton (1995, cited from Cakrawati 2009), the level of discrimination indicates the extent to which the item of the test distinguishes between the participants, separating the more able participant from the less able one. The most commonly used method of calculating item of discrimination is the point of biserial correlation. This is a measure of association between responses to any specific item

and the score on the whole test (Henning, 1987 cited from Fulcher and Davidson, 2007). The formula to compute discrimination will look as follows:

$$r_{pbi} = \frac{\bar{X}_p - \bar{X}_q}{S_x} \sqrt{pq}$$

Where

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

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

Reliability Test

Another important thing in preparing an instrument is reliability. According to Hatch and Farhady (1982, p.244), reliability is the extent to which a test produces consistent result when administered under similar condition. Reliability is defined as the consistency of the obtained scores. It showed how consistent the scores for each individual from one administration of an instrument to another and from one set of items to another.

Reliability is always dependent to the context in which an instrument used. Depending on the context, an instrument may or may not submit reliable scores. If the data unreliable, they cannot lead inference. In this research, the reliability of instrument would be measured by Cronbach's alpha formula in SPSS 16 for windows. According to Vaus (2002, p.21) from others reliability test Cronbach's alpha is the most widely used and is the most suitable. An alpha of 0.7 is normally considered to indicate a reliable set of item.

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

Normal Distribution Test

The normality test in the study was conducted by using Kolmogrov-Smirnov test in SPSS 16 for windows. According to Field (2005, p.93) Kolmogrov-Smirnov compares the scores in the sample to a normally distributed set of scores with the

same mean and standard deviation. The steps of normality distribution analysis were as follows:

1. Stating the hypotheses and set the alpha level at 0.05 (two tailed test)

   H_0: the score of the experimental and the control group are normally distributed

   H_1: the score of the experimental and the control group are not normally distributed

2. Analyzing the normality distribution using Kolmogrov-Smirnov test in SPSS 16 for windows.

3. Comparing the Asymp Sig. (probability) with the level of significance to test the hypothesis. If the Asymp Sig. is more than the level of significance (0.05), the null hypothesis accepted; the score are normally distributed.

Afterwards, still in line with Field (2005, p.93), if the is non significant ($p > .05$) it tells us that the distribution of the sample is not significantly different from a normal distribution. On the contrary, if the test is significant ($p < .05$) then the distribution in question is significantly different from a normal distribution.

The Homogeneity of Variance Test

The research of Homogeneity of variance test was conducted to test whether or not the score of research was homogeneous variance. The testing carried out was Lavene test formula in SPSS 16 for windows. The procedures of test were as follows:

1. Stating hypothesis and setting the alpha level at 0.05 (two-tailed test)

   H_0: the variance of the experimental group and the control group are homogeneous.

   H_1: the variance of the experimental group and the control group are not homogeneous.

2. Analyzing the homogeneity of variance by using Lavene test formula in SPSS 16 for windows.

3. Comparing the significant value with the level of significance for testing the hypothesis. If the significant value is more that the level of significance (0.05) the null hypothesis is accepted; the variance of control group and experimental group are homogeneous.

The Independent *t*-test

According to (Kranzler and Moursund, 1999, p.89), the primary purpose of *t*-test is to determine whether the means of two groups of scores differ to a statistically

significant degree. There are some requirements of the data that must be considered before conducting *t*-test. The data should: (1) be in formed of interval ratio; (2) be homogenous or formed in the same type; and (3) have a normal distribution (Coolidge, 2000, p.143).

To investigate the significant differences between the two groups, an independent *t*-test was applied. It was applied to the groups whose members are independent of each other. Since the experimental and control groups in this study were not paired in any way, an independent sample *t*-test in SPSS 16 for windows was conducted. The procedures of the test were as follows:

1. Stating the hypothesis and setting the alpha level at 0.05 (two-tailed test)

   H_0: there is no significant difference between the pre-test/post-test means for the experimental group and for the control group.

   H_1: there is significant difference between the pre-test/post-test mean for experimental group and for the control group.

2. Finding the *t* value with the independent sample test computation in SPSS 16 for windows

3. Comparing the significant value with the level of significance for testing the hypothesis. If the significant value is less than the level of significance (0.05) the null hypothesis is accepted; the two groups are equivalent.

The Calculation of Effect Size

Coolidge (2000, p.151) stated that the calculation of the effect size is used to determine the effect of the influence of independent variable upon the dependent variable. Effect size was calculated to investigate how important the effect of the independent variable in practical terms. If the treatment works well then there will be a large effect size. The formula of effect size is:

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

Where:

r = effect size

t = t_{obt} or t value from the calculation of independent *t*-test

df = $N_1 + N_2 - 2$

After the value of *r* has been obtained, then the score was matched with the following scale to interpret the effect size.

Table 3.5

Effect Size Value

Effect size	*r* value
small	.100
Medium	.243
Large	.371

(Coolidge, 2000: 151)

The Dependent *t*-test

To investigate whether or not the difference of the pre-test and post-test means of experimental group's score is significant, the researcher analyzed the pre-test and post-test scores using dependent or matched *t*-test (Hatch and Farhady, 1982, p.114). The steps are as follows:

1. Stating the hypothesis and setting the alpha level at 0.05 (two-tailed test)

   H_0: there is no significant difference between the pre-test and post-test score

   H_1: there is significant difference between the pre-test and post-test score

2. Finding the *t* value with the dependent sample test computation in SPSS 16 for windows

3. Comparing the level of significance from the calculation of dependent *t*-test with the level of significance for testing the hypothesis. If the probability is more than or equal to the level of significance, the null hypothesis is accepted. In other words, if the probability is less than the level of significance, so the null hypothesis is rejected.

3.2.3.4 Data Analysis on the Questionnaire

The formula percentage was used to analyze the questionnaire. All of the data were listed and coded based on the data obtained. Afterwards the data were categorized according to the data that have similar characteristics in order to produce a smaller category of data. Then data were interpreted based on the categories. The formula is described as follow:

$$P = \frac{F_0}{N} \times 100\%$$

Where,

P = Percentage

F = Frequency observed

N = Number of sample