CHAPTER III

METHODOLOGY

This chapter presents the methodology of the study. There are three main sub-titles explained; research design, data collection, and data analysis.

3.1. Research Design

The study used quantitative method in which it demands to use numbers in all steps of the study. In quantitative study, according to Creswell (2012, p. 15), the researchers analyze the data using mathematical procedure, called statistics that deal with numbers. In line with, this study was conducted to find out the effectiveness of implementation of Reciprocal Teaching Procedure through administering pre-test and post-test dealing with scores and numbers.

This study was specifically conducted as a quasi-experimental research. Quasi-experimental design, according to Hatch and Farhaday (1982), can control many variables as researchers wish and limit the interpretation they make about cause-effect relationship. The quasi experimental design uses nonrandomized control group pre-test and post-test design can be figured as follows:

Table 1 Research Design

Group	Pre-test	Treatment	Post-test
Experimental	O_1	X	O_2
Control	O_3	-	O_4

- O refers to observation/measurement
- X refers to treatment given to experimental group.

3.1.1. Variable

According to Hatch and Farhaday (1982, p. 12) "a variable can be defined as an attribute of a person or of an object which varies from person to person or from object to object." Creswell (2012) further describes that variable is an attribute or characteristic of individuals that the researchers study. In addition, Kidder, (1981 cited in Sugiyono, 2012, p. 61) states that variable is quantities in which the researcher studies and makes conclusion.

According to Field (2009, p. 7), variable can be divided into independent variable and dependent variable. Independent variable refers to the cause of effect. Dependent variable refers to the effect which is affected by changes in independent variable, or it can be simplified as an outcome. The independent variable of the study is Reciprocal Teaching Procedure, whereas, the dependent variable is reading scores.

3.1.2. Hypothesis

Hypothesis can be simply defined as a prediction of the result of a study. According to Hatch and Farhaday (1982, p. 3) a hypothesis is a tentative statement about the outcome of the study. Most hypotheses can be expressed into two variables: a proposed cause and a proposed outcome (Field, 2009).

There are two types of hypothesis; null hypothesis which is symbolized by H_0 and alternative hypothesis which is coded by H_1. Alternative hypothesis (Creswell, 2012, p. 127) predicts a change or difference between the variables. It predicts that the score of the selected sample will be higher. The statement of alternative hypothesis is begun with "there is a difference." On the other hand, null hypothesis (Field, 2009) is the opposite of the alternative hypothesis. Therefore, the hypothesis of this study is as follow:

- H_0 = there is no difference between the post-test scores of the experimental group students and the post-test scores of the control group students.

- H_1 = there is a difference between the post-test scores of the experimental group students and the post-test scores of the control group students.

3.2. Data Collection

3.2.1. Population and Sample

Population (Creswell, 2012, p. 142) is a group of individuals who have the same characteristics, while sample, according to Field (2009, p. 34) is a small subset of the population. Since the quasi-experimental design does not randomly select the subjects, the sample of this study was chosen based on the pre-test test results of some classes which were calculated by independent t-test.

The population in this study was second grade students from one of the senior high school in Cirebon, whereas, the samples were only two classes of eleventh grade.

3.2.2. Research Instruments

In quantitative study, instrument is a tool to measure variables in the study and to measure quantitative data (Creswell, 2012, p. 14). Quantitative data, in this case, deals with scores and numbers. The data were collected to answer research questions. Since two research questions had been listed, there were two kinds of research instruments in this study included pre-test and post-test, and questionnaire. The pre-test and the post-test were conducted to find out whether or not the use of Reciprocal Teaching Procedure is effective to improve students' reading comprehension. The pre-test was administered to the experimental and the control groups to know the students' reading capabilities before the treatment. Besides, the post-test was conducted in the experimental and the control groups in order to find out whether or not there was a significant difference between the experimental and the control groups' scores. After the post-test, the questionnaire was employed to the experimental group students. The questionnaire was aimed at

finding out the strengths and weaknesses of Reciprocal Teaching Procedure according to students' point of view.

The pre-test and the post-test used in this study were in the form of 30 numbers of multiple choices since they are appropriate to test the reading skill. The tests comprised three narrative texts.

As the pre-test and the post-test were the main instrument of the research, validity and reliability were examined. Field's (2009) states that a test can be said to have validity when it actually measures what it is set out to measure. Creswell (2012) further states that:

> Validity is the development of evidence to demonstrate that the test interpretation matches to its purpose. In addition, reliability means that the scores from an instrument are stable and consistence. The scores should be nearly the same when researchers administer the instrument multiple times at different times. also, score need to be consistent. (p. 159)

Field (2009, p. 11) supported that reliability is "whether an instrument can be interpreted consistently across different situations".

In order to check whether or not the tests have possessed the validity and the reliability, a pilot-test was conducted before the real test to classes that would not be given the pre-test. It can be figured out by analyzing the students' test results. After the test items had been proven to have validity and reliability, the pre-test and post-test could be administered to the students as the instrument.

On the other hand, the questionnaire was only administered to all students in the experimental group. It was purposed to find out the students' response towards the application of Reciprocal Teaching Procedure and also the strengths and weaknesses of Reciprocal Teaching Procedure based on the students' point of view.

3.2.3. Research Procedure

There were some steps followed during the study including organize research instrument, organize teaching procedure, testing validity of the pre-test

and the post-test, administering the pre-test, conducting treatment, administering the post-test, and the questionnaire.

3.2.3.1. Organizing Research Instrument

As the first step, the researcher organized the research instruments that include creating the test items for both pre-test and post-test and constructing questions for the questionnaire.

3.2.3.2. Testing Validity and Reliability of the Pre-Test and Post-Test

To find out whether or not the items have validity and reliability, the pilot-test, in this case, was conducted in two classes that have been set not to obtain the pre-test and the post-test. It was administered to XI IPA 1 on Wednesday, October 16th, 2013 and also XI IPA 5 on Saturday, October 19th, 2013.

3.2.4.3. Administering the Pre-Test

The pre-test was conducted to find out the students' reading comprehension in order to determine the experimental and the control groups which have the equal average score according to the result. It was administered to XI IPA 2 and XI IPA 3 on Tuesday, October 22nd, 2013, and to XI IPA 4 on Wednesday, October 23rd, 2013.

3.2.4.4. Conducting Treatment

Two groups, the experimental group and the control group, were treated differently. Reciprocal Teaching Procedure was applied in the experimental group, whereas, Grammar Translation Method was employed in the control group. Despite the teaching method were different, the materials and the context were approximately the same, as can be seen in the following teaching schedule:

Table 2 Research schedule

Day/ Date	Activity	
	Experimental Group	**Control Group**
October 16th, 2013 *(Pilot-test)*	-	-
October 19th, 2013 *(pilot-test)*	-	-
October 22nd, 2013	-	Pre-test
October 23rd, 2013	Pre-test	-
October 29th, 2013	-	Treatment 1
October 30th, 2013	Treatment 1	-
November 2nd, 2013	-	Treatment 2
November 6th, 2013	Treatment 2	-
November 9th, 2013	Treatment 3	Treatment 3
November 12th, 2013	-	Post-test
November 13th, 2013	Post-test	-

3.2.4.5. Administering the Post-Test

After the treatment was applied, the post-test was administered to both experimental and control groups in order to investigate the use of Reciprocal Teaching Procedure in improving the students' reading ability. In addition, it was also purposed to compare the post-test result of the experimental group and the control group to examine which of both implementation of Reciprocal Teaching Procedure and GTM was more effective.

3.2.4.6. Conducting the Questionnaire

As the final step, the questionnaire was conducted in the experimental group to find out the students' response towards the use of implementation. It was administered to the experimental group, XI IPA 4, on Wednesday, November 13th, 2013.

3.3. Data Analysis

3.3.1. Scoring Technique

Since the pre-test and the post-test were in the form of 30 numbers multiple choices, the researcher determined test scores according to the correct numbers answered and divided by 0.3. Therefore, the maximum score that students can obtain is 100.

3.3.2. The Validity Tests of Pre-test and Post-test

To examine the validity of the pre-test and the post-test, Pearson Product-Moment Correlation Coefficient was employed the (Arikunto, 2010, p. 211-221). The formula was proposed as follows:

$$r = \frac{N\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{\{N\Sigma X^2 - (\Sigma X^2)\}\{N\Sigma Y^2 - (\Sigma Y^2)\}}}$$

r = Pearson Product-Moment Correlation Coefficient

X = test item score (correct = 1, wrong = 0)

Y = respondent's score

N = respondent

After correlation coefficient was calculated, it is called obtained value, then, it was compared to $r_{critical}$. If $r_{obtained} > r_{critical}$, the test item is valid, but, if $r_{obtained} < r_{critical}$, the test item is not valid.

3.3.3. The Reliability Test of Pre-Test and Post-Test

Consistency of results is the basic concept of reliability (Hatch and Farhaday, 1982, p. 244). To test the reliability, the Cronbach's alpha in SPSS 20 for Windows is used.

The finding was interpreted according to the following criteria:

Table 3 The criteria of reliability

0.00-0.20	Almost none
0.21-0.40	Low
0.41-0.60	Moderate
0.61-0.80	High
0.81-1.00	Very High

If the value of Cronbach's Alpha of the test reaches the range 0.41 to 1.00, the test is considered to be reliable to be used. In contrast, if the value is less than 0.40, the test is considered inappropriate to be used in the study.

3.3.4. Difficulty level

The ideal test is not too difficult and not too easy. Therefore, the difficulty level of the test should be properly organized. It was examined according to the pilot-test. The difficulty level was measured based on the amount of the students who answered selected item correctly divided by amount of the students taking the test. The formula is figured out as follows:

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

P = difficulty index

B = number of students who answered correctly

JS = number of students

(Arikunto, 2012)

The result can be interpreted according to the following criteria:

Table 4 The ANATES criteria of difficulty level

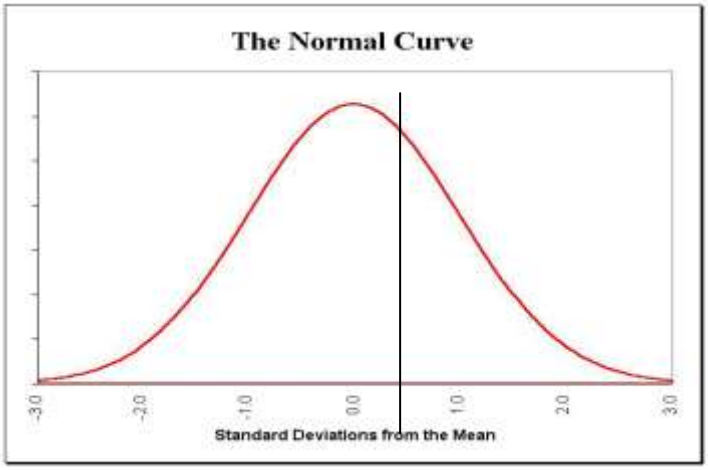
1-14	Most difficult
15-29	Difficult
30-69	Moderate
70-85	Easy
86-100	Most easy

3.3.5. Data Analysis on the Pre-test and the Post-Test Scores

3.3.5.1. Normal distribution test

Normally distributed data can be reached when the students' scores are closed to the average score, above or below one standard deviation. In a normal distribution, figured out in a bell-shape curve (figure 1), half scores are above the mean score, and the rests are below (Hatch & Farhaday, 1982, p. 82).

Figure 1 Normal curve



According to Field (2009, p. 144), to investigate the normal distribution, the Kolmogorov-Smirnov test is one of tests that can be employed. It compares the scores in the sample to a normally distributed set of scores with the same mean and standard deviation.

There are several steps conducting the normal distribution test including: stating the hypothesis and setting the alpha level; analyzing the groups' scores using the Kolmogorov-Smirnov formula in SPSS 20; and interpreting the output data. For the first step, the alpha level set is at 0.05 (two-tailed test) and the hypotheses are as follows:

- H_0 = the score of the experimental and control groups are not significantly different, approximately normal
- H_A = the score of the experimental and control groups are significantly different, not normal

The output data are interpreted by this ways: if the test is non-significant ($p > .05$) it tells us that the distribution of the sample is not significantly different from a normal distribution (probably normal); in contrast, if the test is significant ($p < .05$) then the distribution is significantly different from a normal distribution (non-normal) (Field, 2009, p. 144)

3.3.5.2. Homogeneity of Variance Test

According to Field (2009, p. 149), homogeneity of variance means as you go through levels of one variable, the variance of the other should not change. If you have collected groups of data then this means that the variance of your outcome variables should be the same in each of these groups. The more homogeneous the group, the lower the variance (Kranzler & Moursund, 1999).

In this case, Levene's test in SPSS 20 for Windows was used to find out the homogeneity of the variances. There were several steps to figure out the homogeneity of the variance through Levene's test. Firstly, stating alpha level that is 0.05. Second, stating null hypothesis and alternative hypothesis. The null hypothesis (H_0) is that the experimental and the control groups are homogenous, and the alternative hypothesis is the experimental and the control groups are not homogenous. Third, analyzing the result by using Levene's test in SPSS 20 for Windows. Lastly, interpreting the result. The result can be interpreted by this ways: if the Levene's test (F) is greater than alpha level ($F > 0.05$) which means non-significant, the null hypothesis is accepted; if the Levene's test (F) is less than alpha level ($F < 0.05$) which means significant, the null hypothesis is rejected.

3.3.5.3. Independent T-Test

The independent t-test is employed to analyze a relationship between independent variable (treatment) and dependent variable (reading score) in both experimental group and control group. According to Field (2009, p. 239) the concept of the *t*-tests is a measurement tool to find out whether the predictor (independent variable) is making a significant contribution to the model (dependent variable).

The null hypothesis was firstly decided: there is no significant difference between the experimental and the control groups. As follows, the data collected according to the pre-test and the post-test.

After the data was gained, it was analyzed according to the independent t-test by using SPSS 10. The formula of the independent t-test is as follows:

$$t = \frac{M_i - M_j}{\sqrt{\frac{S_i^2}{N_j} + \frac{S_j^2}{N_i}}}$$

t = independent t-test

M = mean

s^2 = variance

N = numbers of respondent

(Kranzler & Moursund, 1999)

The outcome of the process is to find out whether or not the means between the experimental group and the control group are significant different. The result can be interpreted by this way: if $t_{obtained}$ is greater than $t_{critical}$ with df = N1 + N2 – 2 and p = 0.05, the null hypothesis is rejected which means a significant difference of mean is obtained; in contrast, if $t_{obtained}$ is less than $t_{critical}$, the null hypothesis is accepted which means no significant difference of mean is obtained.

3.3.5.4. Dependent T-Test

The dependent t-test, in this case, was employed to find out the progress of the experimental group. To examine the dependent t-test, there are some steps to follow: stating alpha level (p =.05); stating null hypothesis; employing the dependent t-test; and interpreting the result.

The null hypothesis is that there is no difference between the pre-test and the post-test score which means no progress or improvement. As follows, the data obtained was calculated by using the dependent t-test. The formula is as follows:

$$t = \frac{M_D}{\frac{n\Sigma D^2 - (\Sigma D)^2}{n(n-1)}}$$

t = dependent t-test

M = mean difference (obtained by dividing ΣD by n)

n = numbers of respondent

D = difference between pre-test and post-test

(Kranzler & Moursund, 1999)

As the result obtained, it was compared to $t_{critical}$. If $t_{obtained}$ is equal to or greater than $t_{critical}$, the null hypothesis can be rejected, and if $t_{obtained} < t_{critical}$, the null hypothesis is accepted.

3.3.5.5. Calculation of Effect Size

Effect size was defined as a measure of the strength of relationship between two variables (Field, 2009, p. 57) independent and dependent variables. In this study, the researcher used Pearson's coefficient correlation to measure effect size. The formula of Pearson's coefficient correlation is as follow:

$$r = \frac{N\Sigma XY - (\Sigma X)(\Sigma Y)}{\sqrt{\{N\Sigma X^2 - (\Sigma X^2)\}\{N\Sigma Y^2 - (\Sigma Y^2)\}}}$$

r = Pearson Correlation Coefficient

X = respondent's pre-test score

Y = respondent's post-test score

N = respondent

The result was interpreted according to Cohen's criterion.

Table 5 The criteria of effect size

Effect Size	*r* value
small effect	.10
medium effect	.30
large effect	.50

Field (2009: 57) added that when correlation coefficient reaches 1.0, it means a perfect effect, but if correlation coefficient reaches 0, it means no effect.

3.3.6. Data Analysis on the Questionnaire

The questionnaire was employed to find out the strengths and weaknesses of RTP according to students' point of view. The data obtained from the questionnaire was interpreted according to the frequency of the students' answer of each number. The percentile was formulated as follows (Hatch and Farhaday, 2009, p. 46):

$$Percentile = 100\frac{F}{N}$$

F = frequency of students answer

N = amount of respondent