

CHAPTER III

METHODOLOGY OF THE RESEARCH

This chapter presents the research methodology which has been briefly introduced in chapter one. This chapter covers research methods, population and sample, research procedures, research instruments, data collections, teaching and learning procedures, and techniques for analyzing the data.

3.1. Research Method

The research used an experimental research as the research method, in which the writer gave certain treatment to the experimental class to find whether or not there were significant changes of students' reading skill after being treated by Contextual Teaching and Learning (CTL) Approach. This research was conducted based on the experimental method shown in Table 3.1.

Table 3.1
Experimental Design

| Sample | Pre-test | Treatment | Post-test |
|--------------------|----------|-----------|-----------|
| Experimental Group | X1e | T | X2e |
| Control Group | X1c | O | X2c |

(Hatch, E and Farhady, H, 1982:21)

Notes:

X1e : students' reading skill of experimental group pre-test.

X1c : students' reading skill of control group pre-test.

X2e : students' reading skill of experimental group post-test.

X2c : students' reading skill of control group post-test

T : treatment using Contextual Teaching and Learning (CTL)

Two classes were taken as the investigated classes. One class was for an experimental group that was treated by using Contextual Teaching and Learning (CTL), while the other class was for a control group that was treated by using a conventional method.

3.1.1. Variables

Variable is any entity that can take on different values (Sutrisno Hadi, 1994). There were two variables in the present study: independent and dependent variable. Independent variable is the major variable which is investigated. It is the variable which is selected, manipulated and measured in this study. Therefore, the independent variable of this study is the use of CTL. Meanwhile, dependent variable is the variable which determines to investigate the effect of independent variable, which in this study is students' reading comprehension scores.

3.2. Research Hypothesis

A hypothesis is formulated to show the effect of two variables' relationship (Arikunto, 2006). There are two hypotheses in this study, the null hypothesis (denoted by H_0) and alternative hypothesis (denoted by H_a). The null hypothesis (H_0) in this study is that there was no significant difference in mean

adjustment level between those who used *REACT* technique and those who did not. Whereas, the alternative hypothesis (H_a) is that there was significant difference in mean adjustment level between those who used *REACT* technique and those who did not.

Hence, by rejecting the null hypothesis, the study was able to support the correctness of the alternative hypothesis, which means that the experiment worked.

The null hypothesis (H_0) and alternative hypothesis (H_a) are formulated as follows:

$$H_0 = \bar{x}_1 = \bar{x}_2$$

$$H_a = \bar{x}_1 \neq \bar{x}_2$$

3.3. Data Collection

The data collection in this study included population and sample, and research instrument.

3.3.1. Population and Sample

A population is an entire group of people, objects or events which all have at least one characteristic in common, and must be defined in a special and unambiguously (Sudjana, 1983). The population of this research was the first grade students of one private senior high school in Bandung since procedural text was taught in this grade.

Sample is a part of the population which will be investigated (Arikunto, 2006). From seven classes, two classes had been chosen as the sample. The classes were labeled into experimental group (X-E) consisting of 30 students and control group (X-F) consisting of 30 students. Therefore, the total number of students was 60 students. X-E and X-F were involved in this study because these two classes were available to be served as research subject.

The experimental and control groups were given the pre-test and post-test. However, the treatment was only given to experimental group.

3.3.2. Research Instrument

This study employed some particular instruments to gain data to be analyzed.

3.3.2.1. Teaching Material

The teaching material given to the students was taken from several English textbooks, such as English in Focus for Grade X. The material included some procedural texts about giving instruction. It is in line with the Competence Standard number five released by the National Education Ministry of Grade X Senior High School. It is stated that students are expected to comprehend simple written short essay and functional text in descriptive and procedural texts closely to their environment.

In experimental group, the material was taught by CTL Approach through giving a context 'Being Independent' in the very first meeting. The students then

had to propose five ideas on what things should be done to be an independent person. Those five ideas would be used as topic in the next five meetings. In addition, the five topic would be delivered were ‘How to Clean Room’, ‘How to Make a Breakfast’, ‘How to Wash Clothes’, ‘How to Wash Shoes’, and ‘How to Plant Flower’.

In control group, the material used was the same as in experimental group but there was no context and taught with different method.

3.3.2.2.Pre-test and Post-test

Pre-test question, which served as the research instrument, was employed to find the identity of student in what level (high, middle, or low); on the other hand, post-test also served as instrument to find out the improvement of their reading skill.

Table 3.2

The Competences and Indicators of Items in the Test

| Aspect | Competence Standard | Basic Competence | Indicator | Number of Items |
|---------|--|---|--|---|
| Reading | 5. Understanding the meaning of functional written text and very simple short essay in descriptive and procedural forms related to the surrounding | 5.1. Responding the meaning and the rhetorical stages accurately, fluently and acceptably related to the surrounding in descriptive and procedure form. | Identifying the detail information in procedural text. | 3, 5, 8, 10, 11, 14, 16, 17, 22, 23, 24, 25 |
| | | | Identifying the meaning of words or phrases in procedural text | 2, 6, 12, 15, 18, 19, 20, |
| | | | Identifying the function of procedural text. | 1, 4, 7, 9, 13, 21 |

3.3.2.3. Questionnaire

Questionnaire employed in this study involved 8 closed questions and 1 open ended question. It was beneficial to obtain more information about students' opinion towards the use of CTL. Furthermore, the use of closed questions was purposed to lead required answers in the study while the use of open ended question was intended to attain deeper students' opinion.

3.4. Research Procedures

The research was conducted from January to February 2011. The research that the writer had carried out followed these steps:

1. Readability measurement

A readability test has been conducted for assessing text readability. The formula used is Fry Readability Graph. According to Rubin (1982: 409) there are two variables which are used to estimate the reading-grade level of texts materials. The first is the average number of sentence length and the second is words length per 100 words of selection. A sentence length is determined by the total number of syllables in the text. The reading-grade levels of the text are determined by the indexes, we can predict the reading-grade level of the text by plotting them into the graph. The result of the measurement showed that the reading material used as instruments was appropriate for first graders of senior high school.

2. Administering try out test

Try out test was conducted on 4 December 2010. It was administered to the first graders of one private senior high school in Bandung. The test consists of

40 multiple choice items with five options a, b, c, d, and e. Each multiple choice item is scored 1. Thus, the total score is 40. Then, the items were analyzed to check their validity, difficulty level, index of discrimination, reliability and practically to ensure that they can be used for pre-test and post-test. From the result, it showed that the instruments had fulfilled those requirements.

The try out test was given to the first graders who were not the sample. It was given to the students from other class in the same school.

3. Administering pre-test

The pre-test was conducted on 1 February 2011. It was administered to the experimental group and control group with 30 students each. The aim of pre-test is to measure students' prior reading comprehension.

4. Conducting the *REACT* treatment to the experimental group.

REACT (Relating, Experiencing, Applying, Cooperating, Transferring) was implemented from 1 February to 11 February 2011. The materials used are adapted from some books for first grade students.

5. Conducting the conventional treatment to the control group.

The conventional treatment or non-*REACT* method was implemented from 1 February 2010 to 11 February 2011. The materials used are adapted from some books for first grade students.

6. Administering post-test to both of the group.

It was conducted on 11 February 2011 for experimental group and control group. The item in post-test was the same as the per-test, but to avoid the memorization of the test item, the item was rearranged.

7. Administering questionnaire to the experimental group.

Questionnaire was conducted on 11 February 2011 for the experimental group. The questionnaire consists of 8 closed-questions and 1 opened-question.

The research schedule shown in Table 3.3 was set to make the research run well.

Table 3.3

Schedule of Research

| No. | Experimental Group (X-E) | | Control Group (X-F) | |
|-----|--------------------------|---|---------------------|--|
| | Date | Material | Date | Material |
| 1. | February 1, 2011 | Pre-test Giving Context: 'Being Independent' | February 1, 2011 | Pre-test |
| 2. | February 1, 2011 | Procedural text: How to Clean Room | February 1, 2011 | Procedural text: How to Clean Room |
| 3. | February 2, 2011 | Procedural text: How to Prepare Breakfast | February 2, 2011 | Procedural text: How to Prepare Breakfast |
| 4. | February 9, 2011 | Procedural text: How to Wash Clothes | February 9, 2011 | Procedural text: How to Wash Clothes |
| 5. | January 10, 2011 | Procedural text: How to Wash Shoes | January 10, 2011 | Procedural text: How to Wash Shoes |
| 6. | February 11, 2011 | Procedural text: How to Plant Flower | February 11, 2011 | Procedural text: How to Plant Flower |
| 7. | February 11, 2011 | Post-test Questionnaires | February 11, 2011 | Post-test Questionnaires |

3.5. Data Analysis

The data collected by means of the test instruments, were analyzed differently according to specific purposes. In this case, three kinds of analyses were carried out: (1) test instrument analysis, (2) pre-test post-test data analysis, and (3) questionnaire data analysis. The description of data analyses procedures:

3.5.1. Test Instrument Analysis

A good instrument is very useful in research. The analyses of the test instruments are:

3.5.1.1. Validity

Validity is a matter of degree to extend the result of study as one way to measure the validity through carrying out item of instrument analysis (Hatch and Farhady, 1982: 251).

Commonly assessing validity employs Pearson Product Moment correlation. The formula as follows:

$$r_{XY} = \frac{n(\sum XY) - (\sum X) \cdot (\sum Y)}{\sqrt{\{n \cdot \sum X^2 - (\sum X)^2\} \cdot \{n \cdot \sum Y^2 - (\sum Y)^2\}}}$$

Note:

r_{xy} = coefficient correlation between variable X and Y

X = item which its validity is assessed

Y = total score gained by the sample

(Arikunto, 2003)

Even though, in this study SPSS 17.0 was applied to measure validity with Pearson Product Moment correlation type. Here is the analysis.

Table 3.4

r Coefficient Correlation (Validity)

| Raw Score | Interpretation |
|---------------|----------------|
| 0.000 – 0.200 | Very Low |
| 0.200 – 0.400 | Low |
| 0.400 – 0.600 | Moderate |
| 0.600 – 0.800 | High |
| 0.800 – 1.000 | Very High |

(Arikunto, 2007: 147)

Based on the result, there were 25 items valid. Then, those appropriately became the instrument to apply in this study. The rest of 15 items were invalid (1, 2, 3, 4, 5, 6, 8, 9, 23, 27, 36, 37, 38, 39, 40), so those were not appropriate to use as the instrument. To sum up, 25 valid items attained were used in the instrument.

3.5.1.2. Difficulty

Another requirement that needs to be considered as excellent instrument is difficulty test. Arikunto (1993: 209) argued that difficulty test aims to get the level of difficulty for each item of the instrument. The formula employed to measure difficulty as follows:

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

Note:

P = index of difficulty

B = the number of students who can answer the item correctly

JB = the number of students

The following criteria are used to interpret the index of difficulty:

Table 3.5
The Criteria of Difficulty

| Facility Value | Interpretation |
|----------------|----------------|
| 0.000 – 0.300 | Difficult |
| 0.300 – 0.700 | Moderate |
| 0.700 – 1.000 | Easy |

(Arikunto, 1993: 210)

From the result, 1 item was categorized difficult. Meanwhile, 32 items were considered moderate. The rest of 7 items were categorized easy. Because the items taken as the instrument were only 25 items, the instrument consists of 19 moderate items, and 6 easy items.

3.5.1.3. Discrimination Index

The ability to discriminate is important in an approach to scoring because getting correct answer is directly related to more ability in question and getting wrong answer is directly related to less ability in question (Fulcher, 2007).

The *Discrimination Index* refers to how well an assessment differentiates between high and low scorers. In other words, we should be able to expect that the high-performing students would select the correct answer for each question more often than the low-performing students. If this is true, then the assessment is said to have a *positive discrimination index* (between 0 and 1) - indicating that students who received a high total score chose the correct answer for a specific item more often than the students who had a lower overall score. If, however, you find that more of the low-performing students got a specific item correct, then the item has a *negative discrimination index* (between -1 and 0).

Dantes's formula was used to calculate the Discrimination Index. Here is the formula:

$$D = \frac{R_U - R_L}{f}$$

(Dante, 2001: 8)

Where:

D = Discrimination Index

R_U = Number of students in the upper group who got the item correct

R_L = Number of students in the lower group who got the item correct

f = Number of students in each group

The result presented that 33 from 40 items were positive discrimination (index 0 and 1). It indicated that students who received a high total score chose

the correct answer for a specific item more often than the students who had a lower overall score. In other words, those items are good for research instrument.

Besides, 7 items were classified as negative discrimination (index between -1 and 0). It indicated more of the low-performing students got a specific item correct. Therefore they should be deleted or changed.

3.5.1.4. Reliability

Reliability is the extent to which the result can be regarded consistent or stable (Brown, 1990: 98).

In this study, Cronbach's Alpha formula in SPSS 17.0 was applied to reveal the reliability of instrument. To interpret the coefficient of reliability, the following criteria are employed:

Table 3.6
Coefficient Reliability

| Coefficient Reliability | Interpretation |
|-------------------------|----------------|
| 0.00 – 0.19 | Very Poor |
| 0.20 – 0.39 | Poor |
| 0.40 – 0.59 | Moderate |
| 0.60 – 0.79 | Good |
| 0.80 – 1.0 | Excellent |

(Sugiono, 2001: 149)

Based on the result, the reliability of the instrument measured was 0.844. In keeping with Sugiono (2001: 149), the value of alpha is considered excellent for the items. Thus, the items were appropriate to be the instrument given to learners in the study.

3.5.2. Data Analysis on Pre-test and Post-test

After the pre-test on control and experimental group were held, the next step was analyzing the output data. The output data were analyzed using independent t-test to determine whether there is a significant difference between the means of two independent samples (Fraenkel and Wallen, 1990). Before performing the independent t-test, the output data of the pre-test should fulfill the criteria underlying t-test as stated in Coolidge (2000) as follows:

1. The data should have a normal distribution
2. The variance of the two groups must be homogenous
3. The participant must be different in each group

For that reason, normal distribution test, homogeneity of variances test, and independent t-test were performed before calculating the data using t-test formula.

3.5.2.1. Normality of Distribution Test

To analyze the distribution of the score, Kolmogorov-Smirnov formula was used in this study. Kolmogorov-Smirnov compared the scores in the sample

to a normally distributed set of scores with the same mean and standard deviation (Field, 2005). The Kolmogorov-Smirnov test was performed by using SPSS 17 for Windows.

The table of the data output from the SPSS 17 computation was simply concluded as: if the test is non-significant (column labeled sig. > 0.05) it tells us that the distribution of the sample is not significantly different from normal distribution (probably normal). If, however, the test is significant (column labeled sig. < 0.05) then the distribution is significantly different from normal distribution (Field, 2005).

3.5.2.2. Homogeneity of Variance Test

In an experimental research, one of requirements that should be fulfilled is experimental group and control group must be homogenous or having same characteristic (Sugiono, 2001). To analyze that, Fisher test was used. The formula is as follows:

$$F_{value} = \frac{\text{highest variance}}{\text{lowest variance}}$$

Variance is the square of standard deviation, so the result of the equation is the F_{value} . This F_{value} then to be compared to F_{table} , the hypothesis are:

H_0 : no difference between both experimental and control groups in pre-test. (Both experimental and control groups are homogenous).

H_a : there is difference between experimental and control groups in pre-test. (Experimental and control groups are not homogenous).

The decision of variance homogeneity is as $F_{\text{value}} < F_{\text{table}}$, H_0 is accepted. On the contrary; as $F_{\text{value}} > F_{\text{table}}$, H_0 is rejected (Sugiono: 2001).

3.5.2.3.The Independent t-test

Independent group t-test is used to analyze a causative relationship between the independent variable (treatment) and the dependent variable that is measured on both groups (Coolidge, 2000).

Therefore, after the data had been proven as a normal distribution, the data were calculated using independent t-test. The independent t-test was analyzed by using SPSS 17 for windows by comparing the significance value with the level of significance to test the hypothesis. If the significance value is more than or equal to the level of significance (0.05), the null hypothesis is retained, and it will be concluded that there is no significance difference between the two means. On the other hand, if the significance value is less than the level of significance (0.05), the null hypothesis is rejected, and it will be concluded that the mean is significantly different from the other mean.

3.5.2.4.The Dependent t-test

Dependent t-test was used to analyze the difference between two groups' means in experimental design where the participants in both groups are related each other in some way (Coolidge, 2000). In line with this, Hatch and Farhady (1982: 114) state that dependent t-test or matched t-test is used to analyze the

pretest and posttest score and to investigate whether or not the difference of pretest and posttest means of each group are significant.

In the study, the dependent sample test was analyzed using SPSS 17 by comparing the significance value with the level of significance to test the hypothesis. If the significance value is more than the level of significance (0.05), the null hypothesis is retained, and it will be concluded that there is no significance difference between two means. On the other hand, if the significance value is less than the level of significance (0.05), the null hypothesis is rejected, and it will be concluded that the mean is significantly different from the other mean.

3.5.3. The Calculation of Effect Size

The effect size refers to the effect of the influence of independent variable upon the dependent variable (Coolidge, 2000: 151). The calculation of effect size was conducted to measure how well the treatment works. For instance, if the difference between the two groups' means is large, then there is said to be a large effect size; if the difference between the two groups' means is small, then there is said to be a small effect size.

In order to determine the effect size in the independent t-test, a correlation coefficient of effect size can be derived as follows:

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

Where:

r = effect size

$t = t_{\text{obt}}$ or t-value from the calculation of independent t-test

$$df = N_1 + N_2 - 2$$

To interpret the computational result, the following scale was used as guidance in determining the effect size on the dependent variable.

Table 3.7

The effect size scale

| Effect size | r value |
|-------------|---------|
| Small | 0.100 |
| Medium | 0.243 |
| Large | 0.371 |

(Coolidge, 2000)

3.5.4. The Data Analysis of Questionnaire

The formula of percentage was applied to analyze the questionnaire data. Therefore, the interpretation of data was drawn from the frequency of students' answer. The formula of percentage can be described as follows:

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

Note:

P = percentage N = response

F = frequency 100 % = constant

(Ningrat, 2000: 33)

The criteria of percentage category are:

1% - 25% = a small number of students

26% - 49% = nearly half of students

50% = half of students

51% - 75% = more than half of students

76% - 99% = almost all of students

100% = all of students

