# CHAPTER III

# RESEARCH METHODOLOGY

Chapter three presents the methodology on conducting this study. This chapter provides four main parts of the investigation: research design, data collection technique, research procedures, and data analysis technique.

## 3.1 Research Design

Quantitative method in the forms of quasi-experimental design was employed in this study, with nonrandomized or non-equivalent pre-test and post-test groups. The design was used because, as suggested by Nunan (1992), the condition of the study did not allow the rearrangement of students into different groups or classes at will. Furthermore, the design allows for attempts to fulfill standards of the true experimental design as closely as possible (Hatch and Farhady, 1982).

The quasi-experimental design using nonrandomized control group pre-test and post-test design can be depicted as follows:

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

Note:

- X represents the exposure of a group to an experimental variable

- O refers to the process of observation or measurement

(Campbell and Stanley, 1963, as cited in Cohen and Manion, 1994:169)

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. In research, variables can be classified as dependent and independent variables. The independent variable is the variable which is selected, manipulated, and measured by the researcher, while the dependent variable is the variable which a researcher observes to determine the effect of the independent variable (Hatch and Farhady, 1982). The independent variable of the research is *ThinkQuest*-based Project Learning method and the dependent variable is the procedural text writing scores.

Hypothesis is defined as a formal affirmative statement predicting a single research outcome, a tentative explanation of the relationship between two or more variables. It also limits the focus of the investigation to a definite target and determines what observations are to be made (Best, 1981). However, the most common hypothesis is the null hypothesis which states that there is no difference between the outcome of experimental group and control group (Hatch and Farhady, 1982). Therefore, the hypotheses of this study are as follows:

- $H_0$ = There is no significance difference between students' post-test scores in the experimental group and students' post-test scores in the control group.

- $H_A$ = There is a significance difference between students' post-test scores in the experimental group and students' post-test scores in the control group.

## 3.2 Data Collection

### 3.2.1 Population and Sample

Population, as defined by Best (1981), is any group or individuals that have one or more characteristics in common that are of interest of the researcher, while samples are a small proportion of a population selected for observation and analysis. Since quasi-experimental design does not include random selection of subjects, the sample of this study was chosen purposively, based on the same number of students and absence of significant difference between scores of the two groups. The difference was determined by independent t-test.

The population in this study was first grade students of SMAN 22 Bandung, whereas the samples were only two classes, namely X-7 as the experimental group and X-6 as the control group.

### 3.2.2 Research Instruments

Research instruments are media used by researchers in collecting data (Arikunto, 1996: 136). The data were collected to answer research questions of a study. There were two kinds of research instruments utilized in this study, namely pre-test, post-test, and interviews. The pre-test and post-test were conducted to generate scores that were analyzed to find out whether or not *ThinkQuest*-based Project Learning is effective in writing procedural texts. The pre-test was conducted to both experimental and control

group before the treatment, in order to measure students' initial ability of writing procedural texts. On the contrary, the post-test was conducted to both groups after the treatment, in order to see whether or not there is a change on students' ability of writing procedural texts. After the post-test, interviews were also conducted to several students. The interviews aimed to find out the strengths and weaknesses of *ThinkQuest*-based Project Learning.

The pre-test and post-test used in this study were in the form of composition writing test. The composition test was used because it is potential to portray students' writing abilities to communicate naturally, such as students' ability to organize language materials using their own words and ideas, create appropriation between their writings and the targeted audiences, and so on. Since the composition test aims to produce a communicative piece of writing, its test item has to be in the form of an instruction to write based on a real-life situation where students are pretended to be in, as suggested by Heaton (1983). Therefore, the test used in the pre-test and post-test was only in the form of a written illustration of a real-life situation containing an instruction. Since the learning materials learned in this study were about procedural texts in the context of recycling waste, so that the situation given in the pre-test and post-test item was about the same topic. The test contains demand for students to write a kind of procedural text, namely the procedure to recycle waste. In addition, the procedures were expected to be in the form of magazine article, in order to make the test more real and purposeful.

As the pre-test and post-test were main instruments in this study, the validity of the test items had been ensured. Validity refers to the appropriateness, meaningfulness, and usefulness of the inferences a researcher makes (Fraenkel & Wallen, 1990). There

are two kinds of validity that have to be possessed by the pre-test and post-test items for a test, namely face and content validity. A test with face validity should contain understandable instructions on how to do the test as expected by the test makers. Content validity is possessed by a test when the test is likely to be an accurate measure of what it is supposed to measure (Hughes, 1989). In other words, a test is said to have content validity when the test item is successful to direct the test takers to show particular language skills in their works expected by test makers (Heaton, 1983). The description of the language skills and areas is commonly realized by a scoring guide. In order to check whether or not the two kinds of validity has been possessed by the pre-test and post-test items, a pilot test was conducted before the real tests to at least ten students from the same grade and same school with the students in experimental and control group. The students were asked to do the test based on the instruction contained in the test item. If the students are found to be confused in understanding the instruction, it means that the test item has not reached the face validity. Therefore, if this happens, the students should be asked on what parts the instruction is confusing. When the less understandable instruction has been fixed, the test item can be said to have face validity. On the other side, content validity possession can be figured out by examining the students' works of the test. If there are several students whose works perform the particular language skills and areas expected in the test, so the test item has reached the content validity. After the test items were proven to have the two kinds of validity, the items were administered to students in the pre-test and post-test.

Interview as the supplementary instruments in this study was conducted only to experimental group. Interview was conducted to several students who provided the best

insights by being typical of representativeness, such as the most active students and the most passive ones, or the students who attained high scores and low scores in the post test. The interviews consisted of four open-ended questions exploring students' attitudes, opinions, and perspectives about the strengths and weaknesses of teaching writing using *ThinkQuest*-based Project Learning. The open-ended questions allowed for an element of structure without compromising the interviewee's freedom to elaborate on topics of interest to him/her (Bryman, 2004). The open-ended interview also allows for spontaneous questions to be asked that come out of the interviewee's comments.

### 3.2.2 Research Procedure

#### 3.2.2.1 Organizing Teaching Procedure

In organizing teaching procedure, the researcher served as the teacher and facilitator for both experimental and control groups. The teaching procedure was organized through two steps. The first step was preparing appropriate materials for the teaching and learning processes during the treatment. The materials were about the context of the recycling waste. The second step was organizing teaching procedure in experimental and control group. The teaching procedure in experimental group employed *ThinkQuest*-based Project Learning method and in control group employed the conventional method.

#### 3.2.2.2 Organizing the Research Instruments

Organizing the research instruments includes creating the test item for both pre-test and post-test and constructing open-ended questions for the interviews.

**3.2.2.3 Testing the Validity of the Pre-test and Post-test Item through the Pilot Test**

The pre-test and post-test item were examined to find out whether or not the items have face and content validity. To test the two kinds of validity, the test item was pilot-tested to ten students of X-3 in the same school with the subjects in this study. At first, the ten students were asked to read the instruction contained in the test item, in order to find out whether or not the instruction was understandable and clear enough. This was conducted to examine the face validity of the test item. Then, because the instruction was found to be clear, the students were asked to do the test. After that, the students' work in the test were examined, to find out whether or not some works had performed the particular language skills and areas expected in the test. In addition, this was undertaken to examine the content validity of the test item.

**3.2.2.4 Administering Pre-test to Experimental and Control Group**

Administering pre-test to experimental and control group was conducted before conducting the treatment in order to portray the initial ability of writing procedural texts (see table 3.2).

**3.2.2.5 Conducting the Treatment**

The treatment in the form of *ThinkQuest*-based Project Learning was only carried out in the experimental group, while the conventional method was carried out in the control group. Although the methods were different, the learning materials and context were approximately similar, as can be seen in the following teaching schedule:

**Table 3.1**

| Day/ Date | Activity (Inclass Instruction) | |
| --- | --- | --- |
| | **Experimental Group** | **Control Group** |
| | NB: before the class, students in this group had to access *ThinkQuest* and did the task as an introduction to the task in the class. | 18 juli, 9 agus |
| *Fri/ 30-Jul-10 (Pilot test)* | - | |
| *Mon/ 19-Jul-10* | Pre test | Pre test |
| *Thur/ 20-Jul -10* | Pre launch (introduction of *ThinkQuest* use) | - |
| *Mon/ 22-Jul -10* | Project launch | - |
| *Mon/ 26-Jul -10* | Project Orientation 1: Modeling of Listening Text and Creating Report | Modeling of Listening Text |
| *Thur/ 29-Jul -10* | Project Orientation 2: Speaking Exercise in the form of Giving Opinion per team | Listening & Speaking Exercise |
| *Mon/ 2-Aug-10* | Activity 1: Searching Own Procedure, Reading the Procedure, and Giving Opinion about the Procedure to Teammates | Speaking Exercise |
| *Thur/ 5-Aug-10* | Activity 2: Writing a Procedure Text in Teams | Modeling of Reading Text |
| *Tue/ 9-Aug -10* | Activity 3: Getting Feedback of the Procedure Text in Teams | Reading & Writing Exercise |
| *Tue/ 12-Aug -10* | Special Activity: Selling the Products in Teams | - |
| *Thur/16-Aug-10* | Activity 4: | Writing Exercise |

| | Giving Presentation to Adult Expert in Teams | |
|---|---|---|
| *Fri/19-Aug-10* | Post test, Celebration (Award-giving), Reflection and Evaluation, Interview | Post test |

### 3.2.2.6 Administering Post-test to Experimental and Control Group

After the treatment was given, post-test was administered to both experimental and control groups at the end of the program (see table 3.2) in order to investigate the effectiveness of *ThinkQuest*-based Project Learning in teaching writing procedural texts.

### 3.2.2.7 Conducting Interview

In order to find out the students' perception of the strength and weaknesses of the new method, four open-ended questions were posed to several students in experimental group in interview sessions. The students were chosen based on their achievement in the post-test and their performance throughout the learning, namely the most active and passive students. The interview began after the post-test the same day (see table 3.2).

### 3.2.3 Data Analysis

### 3.2.3.1 Scoring Rubric

As the pre-test and post-test scores were the main data analyzed in this study, the process of generating scores from the students' work in the pre-test and post-test should use appropriate scoring rubric. The scoring rubric used in this study was adapted from the British Council writing assessment standard which is based on the holistic scoring method, namely assessing a written work based on the holistic impression of the scorers

on the work. Thus, the rubric used in this method consists of scores that each of them represents holistic quality of aspects of the written work. As suggested by Hughes (1989), the holistic scoring method to assess a piece of writing is considered better than the analytic scoring method, which requires a separate score for each of a number of aspects of a task. This is because the analytic scoring method has been proven to raise two difficulties. Firstly, the method tends to be time-consuming for scorers to give scores to each different aspects of the task. Secondly, the scorers' concentration on scoring the different aspects may divert attention from the overall effect of the piece of writing for communicative purpose. Unlike the analytic scoring method, the holistic scoring method tends to save time as well as provide a better assessment basis which assesses both the different aspects needed in a written work and the work's overall effect in terms of communication.

### 3.2.3.2 Data Analysis on the Validity Tests of the Pre-test and Post-test items

In the pilot test, the instruction contained in the pre-test and post-test items was found to be clear and understandable enough. Therefore, it was proven that the test items had face validity. After the pilot test, the students' works were examined to check the whether or not the content validity had been possessed. From the students' works, it was found that some students were able to perform the particular language skills and areas expected in the test. This means that the test items had possessed the content validity.

### 3.2.3.4 Data Analysis on the Pre-test and the Post-Test Scores

After the pre-test of the experimental and group was conducted, the next step was analyzing the results of the pre-test. The scores obtained were analyzed using the independent t-test to prove that the both groups were equivalent. Independent t-test is a tool to determine whether or not there is a significant difference between the means of two independent samples (Fraenkel and Wallen, 1990). The equivalence of the groups is important as it becomes the requirement of conducting the independent t-test for the groups' post-test scores, which aims to investigate the effectiveness of the new teaching method in this study. Furthermore, the equivalence is needed to justify that if there is a difference between both groups' post-test scores, the cause will be the different treatments. After both groups were proven to be equivalent, the next step was analyzing the groups' post-test scores in order to investigate the effectiveness of the new teaching method in this study. The analysis was undertaken also by conducting the independent t-test.

For conducting the independent t-test, both experimental and control group's scores should be approximately normally distributed and equal in terms of homogeneity of variance (Hatch and Farhady, 1992). Therefore, prior to conducting the independent t-test, the normal distribution test and homogeneity of variance test were conducted in order to fulfill the two criteria.

### 3.2.3.4.1 The Normal Distribution Test

In order to test the distribution normality of a set of data, the Kolmogorov-Smirnov test was used in this study. The test compares the scores in the sample to a

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normally distributed set of scores with the same mean and standard deviation (Field, 2005). The test was employed through SPSS 16 for Windows.

Conducting the normal distribution test includes three steps: stating the hypothesis and setting the alpha level; analyzing the groups' scores using the Kolmogorov-Smirnov formula; and interpreting the output data. For the first step, the alpha level set is at 0.05 (two-tailed test) and the hypothesis is as follows:

- $H_0 =$ the score of the experimental and the control group are normally distributed
- $H_A =$ the score of the experimental and the control group are not normally distributed

The output data are interpreted by this way: if the result is non-significant ($p < 0.05$) it tells us that the distribution of the sample is significantly different from normal distribution (probably normal). If the result is significant ($p > 0.05$) then the distribution is not significantly different from normal distribution (Field, 2005).

### 3.2.3.4.2 The Homogeneity of Variance Test

In order to analyze the homogeneity of variance of the scores, Levene's test was employed in this study. The Levene's test tests hypothesis that the variances in the groups are equal; the difference between the variances is zero (Field, 2005). The test was employed through SPSS 16 for Windows.

Conducting the Levene's test includes three steps. Firstly, stating the hypothesis and setting the alpha level. The null hypothesis ($H_0$) is that the variances of the control and experimental groups are homogenous and for the alternative hypothesis ($H_A$) the variance of both groups are not homogenous. The alpha level is at 0.05 ($\alpha = .05$). This is

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the maximum error points that can be tolerated. Secondly, analyzing the scores using Levene's test through SPSS 16. Thirdly, interpreting the output data. The result of the test is interpreted to be significant at $p \leq .05$ and it is concluded that the null hypothesis is incorrect and the variances are significantly difference. On the contrary, the result is interpreted to be non-significant if $p > .05$ and it means that the null hypothesis is accepted and the variances are approximately equal (Field, 2005).

### 3.2.3.4.3 The Independent *T*-test

The 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). Conducting the independent group $t$-test includes three steps: stating the hypothesis and setting the alpha level; analyzing the groups' scores using the independent group $t$-test in SPSS 16 for Windows which results in the $t$ value or $t_{obt}$; and comparing the $t_{obt}$ with the level of significance for testing the hypothesis. For the first step, the alpha level set is at 0.05 (two-tailed test) and the hypothesis is as follows:

- $H_0$ = the two samples are from the same population; there is no significant difference between the two samples.
- $H_A$ = the two samples are from the same population; there is a significant difference between the two samples.

For the third step, if the $t_{obt}$ is equal to or greater the level of significance ($t_{crit}$), the null hypothesis is rejected; the two groups are significantly different.

### 1.2.3.4 Data Analysis on The Interview

For analyzing the data from the interview, the interview was transcribed. The transcription then was labeled and coded based on the respondents' answers, and then the answers were classified into smaller groups of answer. In the end, the transcription was used as a source in answering the research problem. The transcription of the interview can be found in appendix.