

CHAPTER III

RESEARCH METHODOLOGY

This chapter discusses the research methodology applied in the study. The discussions of this chapter include the research method, population and sample, research procedure, data collection, pilot-testing the research instruments, research instruments, time allocation, and technique for analyzing the data.

3.1 Research Method

3.1.1 Research Design

This study applied a quasi-experimental design by using nonrandomized or non-equivalent control group pre-test and post-test since the goal of the study was to investigate the effectiveness of certain method. The design is used because of the limitation of time and school regulation. Besides, it is also used due to the impracticable random assignment of schools and classrooms (Kerlinger, 1970 in Cohen and Manion, 1994:169).

The research design of quasi experimental using non-equivalent control group pre-test and post test design is depicted as follow:

Group	Pre-test	Treatment	Post-test
Experimental Group (R)	O ₁	x	O ₂
Control Group (R)	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)

3.1.2 Variables

There are two types of variable in the study. The first is independent variable which is selected, investigated, and manipulated by the researcher. Thus, the independent variable in this study is the use of reading materials which consist of authentic materials and reading materials in an English book.

The second variable in this study is dependent variable which is observed and measured to determine the effect of the independent variable. Therefore, the dependent variable in this study is EFL students' reading comprehension.

3.2 Population and Sample

According to Best (1981), population is any group of individuals that has one or more characteristics in common that are of interest to the researcher, whereas sample is a small proportion of a population selected for observation and analysis. As quasi-experimental method does not allow random selection of subject, the sample of this study is chosen purposively since the classes used as the sample have the same number of students.

The population of this investigation is the first grade students of SMAN 10 Bandung, whereas the sample of this study is two classes of the first grade. One was taken as experimental class (X 10) and another class was taken as the control class (X 8).

3.3 Research Procedure

The procedure of the study consisted of several steps. The first step was organizing the teaching procedure in experimental and control group. The experimental group was given a treatment by giving authentic materials while the control group was given no treatment. The second step was organizing the research instruments. The research instruments used in the study were reading comprehension test and questionnaire. Then, the reading comprehension test was pilot-tested and analyzed in order to find out the validity, reliability, difficulty index and discrimination index of the instruments. The third step was administering pre-test at the beginning of the study to the experimental and control group in order to find out initial ability of reading comprehension between the two groups. The fourth step was organizing the lesson plan and conducting teaching experiment using authentic materials in experimental group. The fifth step was administering post-test to experimental and control group to find out the result of the treatment at the end of the study. Then, questionnaire was administered to experimental group to know the students perception towards the use of authentic materials. Then, the last step was analyzing the data. All of the data which were obtained from the pre-test, post-test, and questionnaire were analyzed based on data analysis procedure.

3.4 Data Collection

The data of the study were obtained from the research instrument. It were collected through pre-test, post-test, and questionnaire.

3.4.1 Pilot-testing the Research Instruments

One of the instruments in the study is reading comprehension test. The test items were pilot-tested to 36 students taken from a different class out of the samples on October 27, 2008. The reading test consisted of 40 multiple choice items and was composed based on the standard in Indonesian Curriculum of Teaching English of the first grade of SMA.

Table 3.1
The Competencies and Indicators of Items of Reading Test
in Pilot-testing Research Instrument

<i>Standar Kompetensi</i>	<i>Kompetensi Dasar</i>	<i>Indikator</i>	Number of item in reading test	Percentage
<i>Membaca</i> <i>5. Memahami makna teks tulis fungsional pendek esei sederhana berbentuk recount, narrative, procedure, dan descriptive dalam konteks kehidupan sehari-hari dan untuk mengakses ilmu pengetahuan</i>	<i>5.2 Merespon makna dan langkah retorika teks tulis esei secara akurat, lancar, dan berterima dalam konteks kehidupan sehari-hari dan untuk mengakses ilmu pengetahuan dalam teks berbentuk: recount, narrative, procedure, dan descriptive</i>	<i>Mengidentifikasi makna kata dan kalimat dalam teks yang dibaca</i>	No. 9, 10, 15, 24, 32, 35, 36, 37, 38	22.5%
		<i>Mengidentifikasi tokoh dari cerita yang dibaca</i>	No. 2, 11, 16, 19	10%
		<i>Mengidentifikasi urutan peristiwa dalam teks</i>	No. 18, 20, 23	7.5%
		<i>Mengidentifikasi kejadian dalam teks</i>	No. 4, 5, 13, 14, 25, 33, 34, 39, 40	22.5%
		<i>Mengidentifikasi tujuan komunikasi teks yang dibaca</i>	No. 31	2.5%
		<i>Mengidentifikasi informasi yang ada dalam teks yang dibaca</i>	No. 1, 3, 6, 7, 8, 12, 17, 21, 22, 26, 27, 28, 29, 30	35%

Source: Standar Kompetensi Mata Pelajaran Bahasa Inggris Sekolah Menengah Atas dan Madrasah Aliyah

The purpose of pilot-testing the research instrument was to analyze the validity and reliability of the test. The analysis of the research instrument was also determined by item analysis. The analysis of the test items was conducted by

doing several steps as follows: arranging try out score of each student, calculating the validity and reliability of the test, determining the difficulty index of each item, and determining the discrimination index of each item.

3.4.1.1 Validity

Validity and reliability of the test determine whether or not the test is appropriate as the research instrument. Since the items of the test were developed based on the course objectives of teaching reading in Indonesian context (see table 3.1 and table 3.7), it can be said that the test has content validity.

Moreover, because the item analysis is used in pilot-testing the research instrument, the item validity was calculated to find out the validity of particular item. Borg and Gall (1979) define item validity as the correlation between subject response to a particular item and their scores. Thus, validity coefficient tells the degree to which correct response on the given item relates to the subject performance.

The validity of each item in the test was calculated by using SPSS 15.0. The procedure to find out the validity of the instrument is by estimating the validity of the test items using Pearson's Product Moment Correlation formula.

$$r_{xy} = \frac{N\sum(XY) - (\sum X)(\sum Y)}{\sqrt{[N\sum X^2 - (\sum X)^2][N\sum Y^2 - (\sum Y)^2]}}$$

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

N = total number of students

X = score of each item for every student

Y = total score of every student

Then, the correlation coefficient of each item was verified through the criteria of validity. Besides that, the researcher can compare the r (correlation coefficient) obtained with the r table according to the number of students (N) who took the test.

Table 3.2
Criteria of Validity

$r_{xy} < 0.20$	The validity of item is very low
$0.20 \leq r_{xy} < 0.40$	The validity of item is low
$0.40 \leq r_{xy} < 0.60$	The validity of item is moderate
$0.60 \leq r_{xy} < 0.80$	The validity of item is high
$r_{xy} \geq 0.80$	The validity of item is very high

3.4.1.2 Reliability

Reliability is the extent to which a test produces consistent result when administered under similar condition (Hatch and Farhady, 1982: 244).

The reliability of the test was calculated using SPSS 15.0. There were two steps to find out the reliability of the test. The first was computing the reliability of the half of the test by using split-half method. The data of try out were divided into two halves. The first half consists of odd items and the second half consists of even items. The second was correlating the two sets of scores using Pearson's product moment correlation. After obtaining reliability of the half of the test, to find out reliability of the whole test, Spearman-Brown formula is used. Then, the reliability of the test was verified through the criteria of reliability.

$$r_{11} = \frac{2 r_{\frac{1}{2} \frac{1}{2}}}{(1 + r_{\frac{1}{2} \frac{1}{2}})}$$

$r_{\frac{1}{2} \frac{1}{2}}$ = the correlation between the scores in each split

r_{11} = the adjusted reliability coefficient

Table 3.3
Criteria of Reliability

$0.80 < r_{11} \leq 1.00$	Very high reliability
$0.60 < r_{11} \leq 0.80$	High reliability
$0.40 < r_{11} \leq 0.60$	Moderate reliability
$0.20 < r_{11} \leq 0.40$	Low reliability
$0.00 < r_{11} \leq 0.20$	Very low reliability

3.4.1.3 Index of Difficulty

A good test is a test which contains items which are not too difficult and also are not too easy. Heaton (1995:178) states that the index of difficulty or facility value (FV) of an item illustrates how easy or difficult the certain item established in the test. The following formula is used to calculate the index of difficulty of an item:

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

FV = facility value/index of difficulty

R = the number of correct answers

N = the number of students taking the test

Table 3.4
Criteria of Difficulty Index

FV 0.00 – 0.30	Difficult item
FV 0.30 – 0.70	Moderate item
FV 0.70 – 1.00	Easy item

3.4.1.4 Discrimination Index

According to Heaton (1995:179), the discrimination index of an item indicates the extent to which the item distinguishes between the testees, separating the more able testees from the less able. The index of discrimination (D) tells us whether students who do well on the entire test tend to do well or badly on each item of the test.

To find out the discrimination index, some procedures were used are as follows: (1) arranging the students' total score and dividing the score into two groups of equal size (the top half and the bottom half), (2) counting the number of the students in the upper group who answer each item correctly; then counting the number of lower group students who answer the item correctly, (3) subtracting the number of correct answers in the lower group from the number of correct answers in the upper group to find the difference in the proportion passing in the upper group and the proportion passing the lower group, and (4) dividing the difference by the total number of students in one group.

The following formula is used to calculate the discrimination index of an item:

$$D = \frac{\text{Correct } U - \text{Correct } L}{n}$$

D = discrimination index

U = upper half

L = lower half

n = number of students in one group; $n = \frac{1}{2} N$

Table 3.5
Criteria of Discrimination Index

D 0.00 - 0.20	Poor
D 0.20 - 0.40	Moderate
D 0.40 - 0.70	Good
D 0.70 - 1.00	Excellent

3.4.2 Research Instruments

As mentioned before, two types of instruments are used in collecting the data. The first instrument is reading test and the second is questionnaire. In detail, the research instrument in this study can be explained as follows:

3.4.2.1 Pre-test

Pre-test was given to experimental group and control group to find out the initial ability of students' reading comprehension. After the pilot-testing instrument, the items that were used as research instrument consist of twenty five multiple choice items. This test was developed to see to what extent students comprehend certain texts. Therefore, reading sub-skills which were developed in the test cover reading for specific information, deducing word meaning from contextual clues, and reading between the lines and inferring. Moreover, in

Indonesian context of teaching English, the reading sub-skills are divided into some indicators based on the curriculum (table 3.6).

3.4.2.2 Post-test

Post-test was given to find out whether there is any difference between the experimental group and control group as a result of the treatment. The items of the test were same as with those in pre-test.

The items in pre-test and post-test were composed based on the standard in Indonesian Curriculum of Teaching English in the first grade of SMA.

Table 3.6
The Competencies and Indicators of Items in Reading Test

<i>Standar Kompetensi</i>	<i>Kompetensi Dasar</i>	<i>Indikator</i>	Number of item in reading test	Percentage
<i>Membaca</i> <i>5. Memahami makna teks tulis fungsional pendek esei sederhana berbentuk recount, narrative, procedure, dan descriptive dalam konteks kehidupan sehari-hari dan untuk mengakses ilmu pengetahuan</i>	<i>5.2 Merespon makna dan langkah retorika teks tulis esei secara akurat, lancar, dan berterima dalam konteks kehidupan sehari-hari dan untuk mengakses ilmu pengetahuan dalam teks berbentuk: recount, narrative, procedure, dan descriptive</i>	<i>Mengidentifikasi makna kata dan kalimat dalam teks yang dibaca</i>	No. 7, 8, 15, 23, 24, 25, 21	28%
		<i>Mengidentifikasi tokoh dari cerita yang dibaca</i>	No. 1, 9, 11	12%
		<i>Mengidentifikasi urutan peristiwa dalam teks</i>	No. 10, 12, 14	12%
		<i>Mengidentifikasi kejadian dalam teks</i>	No. 2, 13, 22	12%
		<i>Mengidentifikasi tujuan komunikasi teks yang dibaca</i>	No. 3	4%
		<i>Mengidentifikasi informasi yang ada dalam teks yang dibaca</i>	No. 4, 5, 6, 16, 17, 18, 19, 20	32%

Source: Standar Kompetensi Mata Pelajaran Bahasa Inggris Sekolah Menengah Atas dan Madrasah Aliyah

3.4.2.3 Questionnaire

Questionnaire that is used in the study is close questionnaire. It is given to find out the students' response towards the use of authentic materials in reading.

3.5 Time Allocation

The study was held for about one month. The treatment was given to experimental group in six sessions. The following table presents the treatments' schedule of the study:

Table 3.7
The Schedule of the Study

No.	Date		
1	November 12, 2008	Pre-test	Experimental and Control Group
2	November 13, 2008	1 st treatment: Descriptive: US Holidays	Experimental group
3	November 19, 2008	2 nd treatment: Book review: Walks Two Moons	Experimental group
4	November 20, 2008	3 rd treatment: First person narrative: How You Can Change the World One Step at a Time	Experimental group
5	November 26, 2008	4 th treatment: Tourism brochure: London: what to see-where to stay & Explore Minnesota	Experimental group
6	November 27, 2008	5 th treatment: Advertisements	Experimental group
7	December 3, 2008	6 th treatment: News	Experimental group
8	December 4, 2008	Post-test	Experimental and Control Group

3.6 Technique for Analyzing the Data

3.6.1 Pre-test Data Analysis

The procedures to analyze pre-test data are as follows:

3.6.1.1 Normality Test

The normality test in the study was conducted by using *Kolmogorov-Smirnov* test in SPSS 15.0. The hypotheses used were as follows:

H_0 : sample is from the population with normal distribution

H_1 : sample is from the population with not normal distribution

By using 5% level of significance (α), the criteria of normality test is H_0 is rejected if the significance value (Sig.) < 0.05 , meanwhile, if significance value (Sig.) > 0.05 , H_0 is accepted.

3.6.1.2 Variance Homogeneity Test

After the result of normality test was found, the researcher conducted variance homogeneity test. The hypotheses used were as follows:

H_0 : the variances of pre-test of experimental and control group are homogenous

H_1 : the variances of pre-test of experimental and control group are not homogenous

The variance homogeneity test used was *Levene Test* at 5% level of significance (α). The criteria of the test are H_0 is rejected if the significance value (Sig.) < 0.05 . Meanwhile, if significance value (Sig.) > 0.05 , H_0 is accepted.

3.6.1.3 The Analysis of *t*-test

Independent *t*-test in SPSS version 15.0 is used to compare the means from two different groups. According to Brown (1990:166), there are two assumptions that must be fulfilled in conducting *t*-test (parametric statistic). The assumptions underlying the *t*-test are the normality distribution of the scores in each group and the homogeneity of variances for the scores of the two groups.

On the other hand, if the data do not fulfill the requirements, formula in non-parametric statistic could be used to compare two means of experimental and control group.

3.6.2 Post-test Data Analysis

Post-test was conducted to find out whether there is any difference between students' score of experimental group and control group after treatments. The procedures of data analysis in post-test were exactly same as pre-test data analysis. Besides calculating independent *t*-test, paired sample *t*-test in SPSS 15.0 was also calculated. It was aimed to find out the differences between the pre-test and post test scores in each group.

In addition, the coefficient correlation of effect size was calculated to determine the effect size in the independent *t*-test and to know the influence of independent variable upon the dependent variable. (Coolidge, 2000:151).

The following formula is used to calculate the effect size of independent *t*-test.

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

After obtaining the correlation of effect size, the following scale is used to interpret the magnitude of effect size.

Table 3.8

The Scale of Effect Size

Effect size	r value
Small	.100
Medium	.243
Large	.371

3.6.3 Questionnaire Analysis

The formula of percentage is used to analyze the questionnaire. The data will be interpreted based on the frequency of the students' answer. The formula of percentage for calculating the questionnaire is as follow:

$$P = \frac{Fo}{n} \times 100\%$$

P = percentage

Fo = frequency observed

n = number of sample

Table 3.9
Criteria of Percentage Categories

Percentage of respondent	Criteria
1-25%	Small number of the students
26-49%	Nearly half of the students
50%	Half of the students
51-75%	More than half of the students
76-99%	Almost all of the students
100%	All of the students

