CHAPTER III

RESEARCH METHODOLOGY

This chapter presents the research design. It includes further elaboration of how the research is carried out. This chapter answers the subject of the research, instruments of the research, the procedures in collecting the data and data analysis.

3.1 Research Design

This research attempted to investigate the use of e-learning in enhancing students' reading comprehension of narrative text. A research design used in the research was quasi experimental. Quasi experimental design provides an alternative to experimental design, not requiring the researcher to have absolute control over the experimental variables (Campbel and Stanley, 1963). In addition, Hatch and Farhady (1982) argue that quasi experimental designs are practical compromises between true experimentation and the nature of human language behavior which the researchers wish to investigate. The design of study is described as follows:

Table 3.1
The Quasi-Experimental Design

Group	Pre-test	Treatment	Post-test
Experimental	Xa1	T	Xa 2
Control	Xb1	O	Xb 2

Where:
Xa1: pre-test for experimental group
Xb1: pre-test for control group
T: e-learning treatment
O: non e-learning treatment
Xa2: post-test for experimental group
Xb2: post-test for control group

The table shows that there are two groups involved in the design of this study; experimental and control groups. Both of the groups were given the pre-test and post-test. However, the experimental group was given the e-learning treatment and the control group was given non e-learning treatment. After conducting the treatment, both experimental and control group were given the post-test in order to find out the effect of e-learning and the data were statistically analyzed using SPSS.

3.2 Research Variables

There were two variables investigated in the experimental research; dependent variable and independent variable. An independent variable is the variable which influences dependent variable; meanwhile a dependent variable is the variable that will be affected by an independent variable (Coolidge, 2000:15). Based on the explanation above, e-learning was the independent variable (the major variable to be investigated), and students' reading comprehension was the dependent variable.

3.3 Research Hypothesis

Hypothesis is a tentative statement about the outcome of the research (Hatch and Farhady, 1982). It is formulated to show the effect of two variables' relationship (Arikunto, 2006). The research was begun with null hypothesis (Ho). The hypothesis of this study was: there is no significant difference in students' reading comprehension in learning narrative through e-learning method and conventional method. The hypothesis is formulated as follows:

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

3.4 Data Collection

The data collection in this study include population and sample, and the research instrument

3.4.1 Population and sample

A research population is generally a large collection of individuals or objects that is the main focus of a scientific query; a research population is also known as a well-defined collection of individuals or objects known to have similar characteristics (Castillo:2009). All individuals or objects within a certain population usually have a common, binding characteristic or trait. The population of this study was the first grade of senior high school at one of public school in South Bandung academic year 2011/2012. The total population of this study was more than 150 students.

Sample is a subset of population (Arikunto, 2006). It should be representing the population. The researcher employed purposive sampling to determine the sample. Fraenkel and Wallen (1993) and Nunan (1992) propose that

quasi experimental designs do not include the use of random sampling assignment. In addition, Fraenkel and Wallen (1990) also affirm that in purposive sampling the researcher choose the sample based on his personal judgment for specific purpose. The samples of this study were two different classes; they were class X2 as the experimental group and X5 as the control group. Each class had 30 students.

The sample has been chosen since the sample never received the e-learning treatment. Moreover, the teacher wanted to optimize the use of facility in the school, because the school has wireless connected to the internet but there is no maximum utilization from the teachers.

3.4.2 Research instrument

Instrument is a tool used to collect the data. According to Arikunto (2006: 149) instruments are media utilized by the researcher in collecting the data. This study employed some particular instruments to gain data to be analyzed.

3.4.2.1 Teaching materials

Teaching materials given to the students were taken from English Books (Look ahead: an English Course 1 and Developing English Competencies 1) and Internet (http://readingnarrative.blogspot.com). The materials included some narrative texts about fantasy. It is in line with the Competence Standard number five released by the National Education Ministry of grade X of senior high school. It is stated that the students are expected to comprehend simple written short

essays and functional texts in recount, narrative and procedural texts closely to their environment.

In conducting this study, all the things related to teaching and learning process were prepared. The first was preparing teaching and learning materials. The second was preparing the website that would be used for experimental group. The layout of website is presented in Appendix A. The website was designed by a programmer and the teacher. The last, was arranging the digital teaching and learning materials attached into the website and preparing the learning materials that used in classroom.

Moreover, the teaching materials and procedures in the experimental group were highly related to use e-learning in teaching narrative text. While in the control group, the conventional method was used in teaching and learning process.

3.4.2.2 Pre-test and Post-test

Pre-test questions, which served as the research instrument, is employed to find out initial differences between experimental group and control before they received the treatment; on the other hand, post-test also served as instrument in order to find out the improvement of students' reading skill (Fraenkel & Wallen, 1993; Hatch & Farhady, 1982:114). The procedure of post-test was similar to the pre-test. Both pre-test and post-test consisted of 30 multiple choice questions and are presented in Appendix B.

Table 3.2
The competences and indicators of item in the texts

Aspect	Competence standard	Basic competence	Indicators	Number of items
Reading	Understanding the meaning of functional written text and very simple short essays in recount, narrative, and procedure form in daily life context to access knowledge.	Responding the meaning and the theoretical stages accurately, fluently and acceptably related to the surrounding in recount, narrative, and procedure form.	- Getting specific information of the text.	2,4,5,11,12, 13,15,23,24 26,27,28,30
			- Defining synonym of the words in a text.	1,3,6,7,8,14 16,25
			- Determining generic structure and language feature of the text.	9,10,17,18 19,20,21,22 29

Source: School-based curriculum 2006

3.4.2.3 Questionnaire

Questionnaire is a method to gain answers from the respondent in a one-way communication (Arikunto, 2006:151). The most beneficial thing of the questionnaire is that it can be mailed or can be given to large number of people at the same time (Fraenkel and Wallen, 1990). The kind of questionnaire used in this study was closed questionnaire. Closed questionnaire provides respondents with alternative answers (Sudjana,1990). Moreover, closed questionnaire was used since according to Aaraisan et.al (2006:175), it facilitates the formula of analyzing the data in the form of number. So, it is more objective and efficient. The purpose of using questionnaire in this study was to find out students' responses toward the used of e-learning in teaching and learning narrative text. Hence, the questionnaire was delivered only for experimental group and it was spread out in the classroom after the post test. The questionnaire consisted of 15 closed questions, and it is presented in Appendix B.

3.5 Research Procedures

The research was conducted from July to August 2011. The research was carried out through the following steps:

1. Administering pilot test.

    A pilot test was intended to measure the validity, level of difficulty, discrimination, and reliability of the test instrument (Cohen & Manion ,1994:173). The pilot test was administered to a different class of the sample on July 20, 2011. The pilot test was given to the students before the study began. The test consisted of 50 multiple choices items and it is presented in Appendix B.

2. Administering pre-test

    A pre-test was conducted to both experimental and control groups on July 23, 2011. The pre-test was conducted after the pilot test and it was intended to know the students' initial ability in reading (Freankel & Wallen, 1993:241). The pre-test instrument is presented in Appendix B.

3. Conducting e-learning treatment to the experimental group

    In this research, e-learning was used as a treatment to increase students' reading comprehension. First, the teacher introduced the website and gave some explanation about how to use the website. The teacher gave a guide book and work sheet about the website in order to increase the students' understanding in using the website. After that, the students should open the website, read the materials and did some exercises after classroom activities. Then, in the next

meeting the students were asked to discuss about the text that they had read at website in the classroom. Further explanation of the activities is presented in Appendix A. The treatments were implemented from July to August, 2011. The website recorded the students tracking; it helped the teacher to know the people who visited the website.

4. Conducting treatment to the control group

The teaching procedure in the control group was constructed through non-e-learning treatment (lecturing and discussion). First, students were given the passage which was similar to the experimental group. After reading the passage, the students were asked to do some exercises and discuss the passage in order to measure students' comprehension.

The treatment schedule comprised five meetings to the experimental group from July to August, 2011. The detail of schedule can be seen in the following table:

Table 3.3
Schedule of experiment

No	Experimental group		Control group	
	Date	Material	Date	Material
1.	23 July 2011	Pre- test		Pre-test
2.	30 July 2011	Treatment 1: Classroom: "The Fly and The Bull" Sumber: Look a head: an English course 1 E-learning: "The Ugly Duckling" Sumber: http://readingnarrative. blogspot.com	30 July 2011	Treatment 1 - "The Fly and The Bull" - "The Ugly Duckling" Sumber: Look a head: an English course 1
3.	6 August 2011	Treatment 2: Classroom:"A Poor Fish"	6 August 2011	Treatment 2 - "A Poor Fish"

		Sumber: Look a head: an English course 1 E-learning: "Rapunzel" Sumber: http://readingnarrative. blogspot.com		- "Rapunzel" Sumber: Look a head: an English course 1
4.	6 August 2011	Treatment 3: Classroom: "The legend of Minos, King of Care" Sumber: Look a head: an English course 1 E-learning: "Beauty and the Beast" Sumber: http://readingnarrative. blogspot.com	6 August 2011	Treatment 3 - "The legend of Minos, King of Care" - "Beauty and the Beast" Sumber: Look a head: an English course 1
5.	8 August 2011	Treatment 4: Classroom: "Bandung bondowoso and Roro jongrang" Sumber: Look a head: an English course 1 E-learning: "The Emperor's new clothes" Sumber: http://readingnarrative. blogspot.com	10 August 2011	Treatment 4 - "Bandung bondowoso and Roro jongrang" - The Emperor's new clothes" Sumber: Look a head: an English course 1
6.	13 August 2011	Post-test		Post-test

5. Administering post-test to both experimental and control groups

A post-test was conducted after the whole treatment was completed on August 13, 2011. It was conducted to both experimental and control groups. The post-test was conducted to investigate whether the implemented e-learning influenced the students' reading comprehension. The test instrument of the post-test is presented in Appendix B.

6. Administering questionnaire to the experimental group.

A questionnaire was administered to the experimental group in order to find out the students' response towards the use of e-learning in reading narrative

text. Accordingly, the questionnaire was used to answer the second research question of this study. The questionnaire was administered after the treatment was completed only for the experimental group. The questionnaire is presented in Appendix B.

3.6 Data Analysis

The collected data of the instruments were analyzed differently according to its purposes. In this study, three kinds of analyses were carried out: 1) test instrument analysis, 2) pre-test and post-test data analysis and 3) questionnaire analysis. The description of the data analysis is outlined below.

3.6.1 Test instrument analysis

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

3.6.1.1 Validity

Before conducting the pre-test and post-test, the instrument should be piloted to know the validity and reliability of the instrument (Cohen & Manion :1994). McMillan & Schumacher (2001:181) define that validity is the extent to which inferences and uses made on the basis of scores from an instrument are reasonable and appropriate.

Person product moment formula was used to test the instrument. The data were calculated by SPSS 17 for windows. The criteria for the validity test were as follow:

Table 3.4
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, 2006:147)

The result of statistical computation on the pilot test showed that there were 42 items that were valid and could be used as the research instrument. While 8 items (2, 4, 16, 22,30,31,37,40) were invalid and could not be used as the research instrument. The pilot scores and the result of validity test are presented in Appendix C.

3.6.1.2 Difficulty Level

A difficulty test was analyze based on assumption that a good item should not be too difficult or too easy (Arikunto, 2006). The test instrument can be accepted as a good test if it is not too easy or too difficult for the population of the research. The formula to calculate the index of difficulty of an item was adopted from Heaton (1955:178), where:

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

FV   : Index of difficulty
R   :The number of correct answers
N   :The number of students taking the test

Table 3.5
Criteria of difficulty Index

Index of Difficulty	Difficulty Degree
0.00 – 0.30	Difficult item
0.30 -0.70	Moderate item
0.70 – 1.00	Easy item

(Arikunto: 2006)

From the result shows that 1 item was categorized difficult. Meanwhile, 32 items were considered moderate and 17 items were categorized easy. Because the items taken as the instrument were only 30 items, the instruments consist of 22 moderate items and 8 easy items.

3.6.1.3 Discrimination level

Discrimination index of an item indicates the extent to which the item distinguishes between the tests, separating the more able tests from the less able (Heaton, 1995: 179) . There are some stages in finding discrimination index of each item: arrange the obtained scores from the highest to the lowest, divide the subjects into two groups based on their scores, calculate the discrimination index of each item, and interpret the quality of each item based on criteria of discrimination index proposed by Arikunto (2006).

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

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

where:

D	= Discrimination Index
U	= Upper half
L	= Lower half
n	= Number of students in one group; n= ½ N

(Heaton, 1995: p. 179)

Table 3.6
Criteria of discrimination index

Discrimination Index	Interpretation
00.00 – 0.20	Poor
0.20 – 0.40	Moderate
0.40 – 0.70	Good
0.70 – 1.00	Excellent

The result presented that 37 items were accepted and could be used as research instrument. Meanwhile, 13 items were not accepted because the value of discrimination index < 20.

3.6.1.4 Reliability

Hatch and Farhady (1982) state that reliability is the extent which a test is produced in constant result when administered under similar condition. In the research, the reliability of instrument was measured by Cronbach's alpha formula in SPSS 17 for windows. The result of the calculation was interpreted by the following criteria in Table 3.7 below.

Table 3.7
r Coefficient Correlation

Alpha	Reliability degree
0.00 – 0.199	Very low
0.20 – 0.399	Low
0.40 – 0.599	Fair
0.60 – 0.799	High
0.80 – 1.00	Very high

The result from Cronbach's alpha calculation was 0.92. Based on the criteria above, the reliability of test item was very high. It is supported by Triton (2006), if the level of alpha is in between 0.800 – 1.000, it can be assumed that the reliability of test items was very high and could be used as the research instrument. The output of the result is presented in Appendix C.

3.6.2 Data analysis on pre-test and post-test

A pre-test was administered at the beginning of the study in order to find out initial equivalence between the groups, while a post-test was administered after the treatment. The data obtained from pre-test and post-test were used to investigate students reading comprehension. The data were analyzed by t-test. Before calculating the data using t-test, the normal distribution test, homogeneity of variances test and independent t-test were performed (Coolidge, 2000:143).

3.6.2.1 Normality of Distribution Test

Kolmogrov-smirnov's formula in SPSS 17.00 for Windows was used to analyze the normal distribution in this study. The steps of normal distribution analysis were as follows:

1. Stating the hypothesis and setting the alpha level at 0,05.

    H_o = the scores are normally distributed

    H_1 = the score are not normally distributed

2. Analyzing the normal distribution using Kolmogrov- smirnov formula in SPSS 17.00 for windows.

3. Comparing the Asymp.sig with the level of significance (p) to test the hypothesis. If Asymp. Sig > 0.05, the null hypothesis is accepted which means the distribution of data is normal. In contrast, if Asymp. Sig < 0.05, the hypothesis is rejected which means the data is not normal (Field, 2005).

3.6.2.2 Homogeneity of variance Test

Levene's formula in SPSS 17.00 for windows was used to analyze the variance homogeneity. SPSS 17 used in this study because it is windows based statistical tool that is suitable for accurate data analysis and easy to use. Moreover, SPSS 17 is the most preferred for research, academic, and decision purposes (IBM : 2009) The procedures of variance homogeneity test were follows:

1. Sating the hypothesis and setting alpha level at 0,05.

    H_o = the variance of experimental and control groups are homogenous.

    H_1 = the variance of experimental and control groups are not homogenous.

2. Analyzing the variance homogeneity using SPSS 17.00 for windows.

3. Comparing the significance value with significance level in order to test the hypothesis. If Levene's test is significant at $p \leq .05$ then we can conclude that the null hypothesis is incorrect and the variances are significantly difference. But if levene's is non significance at $p > .05$. it means that the variance are approximately equal (Field, 2005).

3.6.2.3 The independent t-test

Independent t-test was applied to investigate the significant differences between the means two groups (Hatch & Farhady, 1982:155). There are some requirements of the data that must be considered before conducting t-test. First, the data should be measured in form of interval or ratio. Second, the data should be homogeneous or formed in the same type. Third, the data should have a normal distribution (Coolidge, 2000:143). The independent t-test in SPSS 17.0 for windows was conducted.

The procedures of t-test computation were as follows:

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

   H_o = there is no difference between the pre-test/post-test mean for the experimental group and control group.

   H1= there is significance difference between the pre-test and post-test mean for the experimental group and for the control group.

2. Finding the t value with independent sample test computation in SPSS 17.00 for windows

3. Comparing the t *obt* and t *crit* at $p = 0.05$ and $df^* = 58$ to examine the hypothesis. If t *obt* > t *crit*, it means that the hypothesis is rejected. It explains that there is difference of means between experimental and control group. In contrary, If t *obt** < t *crit**, the hypothesis is accepted. It declares that there is no difference of means between experimental and control group (Coolidge, 2000).

3.6.2.4 The dependent t-test

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Assumptions of the dependent t-test were similar to the independent t-test. The dependent variable is assumed to come from a population of scores that is normally distributed (Coolidge, 2000: 158). According to Hatch and Farhady (1982: 114) the pre-test and post-test score were analyzed by using dependent t-test to investigate whether or not the difference of the pre-test and post-test of experimental groups' score is significant. The procedures to calculate the independent t-test were as follows:

1. stating the hypothesis

   Ho= there is no significant difference between the pre-test and post-test score

   H1= there is significance difference between the pre-test and post-test score.

2. Finding the t value with dependent sample test computation in SPSS 17.0 for windows

3. Comparing the t *obt* and t *crit* at $p = 0.05$ and $df^* = 29$ to examine the hypothesis. If t *obt* > t *crit*, it means that the hypothesis is rejected. It explains that there is significant difference of means between pre-test and post-test in experimental group. In contrary, If t *obt** < t *crit**, the hypothesis is accepted. It declares that there is no significant difference of means between pre-test and post-test in experimental group (Coolidge, 2000).

3.6.2.5 The calculation of effect size

Calculation of the effect size is important to be administered to determine the effect of the influence of independent variable upon the dependent variable (Coolidge, 2000: 151). It is 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:

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

Where:
r = effect size
t = t_{obt} or t value from the calculation of the independent t-test
df = $N_1 + N_2 - 2$

After the value of r was obtained, then the score was matched with the following scale to interpret the effect size:

Table 3.8
Effect Size Value

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

(Coolidge, 2000: 151)

3.6.3 Data analysis of questionnaire

In analyzing the questionnaire, the percentage formula was used. There were three steps used to analyze the data from questionnaire. First of all, the data were listed and coded based on the data obtained. Second, the data were categorized according to the data that have similar characteristics in order to produce a smaller category of data. Finally, the data were interpreted based on the categories. The formula, used in analyzing the questionnaire, is described as follows:

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

Where,

P = Percentage

F = Frequency observed   N = Number of sample

3.7   Concluding Remark

This chapter has presented the research method of the study which covers, research design, research variables, research hypothesis, data collection, research procedure and data analysis. This study was aimed to investigate the use of e-learning in improving students reading comprehension and to know students response toward the used of e-learning.