

CHAPTER III

RESEARCH METHODOLOGY

This chapter describes the research methodology in order to figure out the answers of the both research questions proposed in chapter one. In accordance with the statement, this chapter covers the statement of problems, clarification of terms, research design, research subject, research instruments, research procedures, and data analysis.

3.1 The Statement of Problems

This research mainly investigates the use of Mind Mapping technique in teaching simple descriptive texts to improve students' vocabulary mastery. The statement of problems are formulated into the following questions:

1. Can the use of Mind Mapping technique in teaching simple descriptive texts improve students' vocabulary mastery?
2. What are the students' responses toward the use of Mind Mapping technique in learning vocabulary?

3.2 Clarification of Terms

The clarification of the terms used in this study can be described as follow:

a. Mind Mapping

Mind Mapping is a technique of making a graphical outline which is used to represent words, ideas, tasks, or another linked to and arranged radically around a central key word or idea by lines and typically it contains words, color, short phrase or pictures (Buzan: 2006, cited in Widyasari, 2010).

b. Technique

Technique is specific activities manifested in the classroom that were consistent with a method and therefore were in harmony with an approach as well (Brown:2001).

c. Vocabulary

Vocabulary may be defined as a list or collection of words arranged in alphabetical order and explained. It is also the total number of words in a language; words known to a person or used in particular book, subject, etc. (Advance learner Dictionary:2006).

d. Simple Descriptive Text

Simple descriptive text is a simple text which is aimed to describe a particular person, place, or thing (Gerot:1995).

3.3 Research Method

Research is defined as a process of searching repeatedly, re-searching for new insights and more comprehensive, cohesive, “elegant” theory. There are probably few, if any “truths” – immutable, never changing facts. Each research project intends to advance our knowledge, getting closer to the “truth” (Brause, 2000, p. 37, cited in Emilia, 2009).

This research was conducted to find out the significance of mind mapping technique in teaching simple descriptive texts to improve students’ vocabulary mastery. To get an empirical data, the researcher employed quantitative method. According to Creswell (1994:2), a quantitative study is an inquiry into a social or human problem, based on testing a theory composed of variables, measured with numbers, and analyzed with statistical procedures, in order to determine whether the predictive generalizations of the theory hold true.

3.3.1 Research Design

The study employed quasi-experimental design using pretest-posttest nonequivalent-control group design. This design was used to maximize internal validity (confidence in cause-effect conclusion) despite being unable to randomly assign. As Hatch and Farhady (1982:23) states that quasi-experimental design is an experimental design used when impracticalities involved in planning research in our field are sometimes overwhelming. The design of the pretest-posttest nonequivalent-control group design is represented below:

Hatch and Farhady (1982:22) with formula:

$$\begin{array}{|c|} \hline G^1T^1XT^2 \\ \hline G^2T^1T^2 \\ \hline \end{array}$$

Where:

G^1 = Experimental group

G^2 = Control group

T^1 = Pretest

T^2 = Posttest

X = Some Treatments

3.3.2 Variables

There are two variables in the research, independent and dependent variable.

1. The independent variable is Mind Mapping as a teaching technique since it is the major variable investigated. Thus, it is selected, manipulated, and measured by the researcher (Hatch and Farhady, 1982:15).
2. The dependent variable is students' vocabulary mastery since it is the variable observed and measured to determine the effect of the independent variable (Hatch and Farhady, 1982:15).

3.4 Research Subject

3.4.1 Population

Sugiyono (2010:117) states that population is generalization area which consists of objects or subjects that have quality and characteristics in common and it is determined by the researcher to be learned and concluded. The population of this research was the seventh grade students of SMP Negeri 1 Soreang which was

Conni Sri Mujiyani, 2012

The Use Of Mind Mapping Technique In Teaching Simple Descriptive Texts To Improve Students' Vocabulary Mastery

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grouped into nine classes. Each class consisted of about 45 students, so the total population was about 405 students.

3.4.2 Sample

This research used purposive sampling technique to select two classes to become sample of the research. The two classes were class VII B as the experimental group and class VII A as the control group. Each class consisted of 45 students. To anticipate the absence of some students during the research, the researcher only took 40 students from each class as the sample. Moreover, to show the improvement of the students' performance in learning vocabulary, the researcher took two students from each category of students' achievement (High average, average, low average) as a sample. The categories are based on a statistical mean or average score of the students in the class. The students in both classes had similar characteristics and the same level in English proficiency, and they had not been taught English by using Mind Mapping technique.

3.5 Research Instrument

Three kinds of instruments were used in collecting data, vocabulary test using simple descriptive texts, questionnaire, and interview.

1. Vocabulary Test

To investigate students' vocabulary mastery, vocabulary test consists of three types of questions and three descriptive texts.

a. Multiple choice

The researcher constructed a descriptive text and 10 items of multiple choices related to the text with four options: A, B, C, D.

b. Matching item

The matching test item consists of two parallel columns with each word in one column being matched to a word in the other column. There are 10 matching item in the test.

c. Completion item

The completion item is a written statement which requires the correct word or short phrase in response to an incomplete sentence, a question or word association. The researcher constructed a descriptive text with 10 completion items.

The vocabulary test was given to the experimental group and the control group in pretest and posttest. Try out test was conducted before the test was given to the experimental group and the control group with purpose to investigate reliability and validity of the test items.

2. Questionnaire

To investigate students' responses of using Mind Mapping technique in learning vocabulary through descriptive texts, the questionnaires were used. The questionnaires consist of 13 items of closed ended questions and open ended questions. The closed ended questions used Guttman scale (Guttman, 1950 cited in Nazir, 1988) to present a number of items to which the person is requested to

agree or not agree. It was done in a 'Yes/No' format which provided reason of the answer 'Yes/No' of each item. The explanation of the answer reason is categorized open ended question.

The closed ended questions limit the respondent to the set of alternatives being offered, while open ended questions allow the respondent to express an opinion without being influenced by the researcher (Foddy, 1993: 127, cited in Reja:2003). This has several consequences for the quality of survey data. The advantages of the open-ended questions include the possibility of discovering the responses that individuals give spontaneously, and thus avoiding the bias that may result from suggesting responses to individuals, a bias which may occur in the case of close-ended questions.

The questions were adapted from John Keller's ARCS Model of Motivational Design. There are four steps for promoting and sustaining motivation in the learning process: Attention, Relevance, Confidence, Satisfaction (ARCS). The questionnaires were given to the experimental group in the end of program with the following categories:

Table 3.1 Questionnaire Categories

No	Categories	Item Number	Total
1.	Students' perception toward English	1	1
2.	Students' responses of Mind Mapping technique in learning vocabulary	2, 3, 5, 6, 7, 9, 10, 12,13	9
3.	Students' responses of Mind Mapping technique toward their vocabulary mastery	4	1
4.	Students' responses of Mind Mapping technique in learning vocabulary through descriptive texts	8,11	2
Total			13

3. Interview

Semi-structured interview was used to investigate the improvement of the students' performance in learning English before and after treatments. In this type of interview the order of the questions can be changed depending on the direction of the interview. As Corbetta (2003 p. 270) explains semi-structured interviews as follows:

The order in which the various topics are dealt with and the wording of the questions are left to the interviewer's discretion. Within each topic, the interviewer is free to conduct the conversation as he thinks fit, to ask the questions he deems appropriate in the words he considers best, to give explanation and ask for clarification if the answer is not clear, to prompt the respondent to elucidate further if necessary, and to establish his own style of conversation (cited in Kajornboon, 2005).

This interview was administered to an English teacher who taught the experimental and control groups before this research was conducted. It used open-ended questions. The questions are about the students' performance (behavior, motivation, and self-confidence) and the students' achievement in English class.

3.6 Research Procedure

3.6.1 Organizing Teaching Procedure

In this study, the researcher acted as a teacher and facilitator in teaching learning process in the experimental group and the control group. In preparing the teaching process, the researcher undertook two steps. *First*, preparing appropriate materials for teaching-learning process during the treatment. *Second*, organizing teaching procedures in the experimental group and the control group.

3.6.2 Administering Try-Out Test

Before the instrument was used in the research, the researcher administered try out test to investigate the validity and reliability of the instrument. Try-out test consists of one text with 10 multiple choices related to the text, 10 matching items, one text with 10 completion items. The materials were adapted from several textbooks at the seventh grade of junior high school students. The try out test was conducted in class VII D of SMPN 1 Soreang on April 20th 2011.

3.6.3 Administering Pretest, Posttest and Questionnaire

To investigate the students' initial ability, the pretest was conducted. It was given to both the experimental group and the control group. At the end of program, posttest was given to both groups in order to investigate the effectiveness of Mind Mapping technique in improving students' vocabulary mastery. And the last, the questionnaires were held out to the experimental group in order to investigate students' responses toward the use of Mind Mapping technique in improving their vocabulary mastery.

3.6.4 Experiment

Both of the groups got different treatments. Mind mapping technique was given to the experimental group as the treatment while control group got conventional teaching technique. However, the materials and the teaching

procedures, except the teaching technique, that were conducted in the control group were the same as in the experimental group.

The experiment was held from May 4th until May 24th 2011 consisting three treatments. Each meeting consisted of two hours of instruction (80 minutes).

Table 3.1 below is research schedule:

Table 3.2
Research Schedule

No	Date	Experimental Group (VII B)	Control Group (VII A)
1.	Selasa, 3 Mei 2011	Pretest	-
2.	Rabu, 4 Mei 2011	-	Pretest
3.	Selasa, 10 Mei 2011	Text 1 (1 st treatment)	-
4.	Rabu, 11 Mei 2011	Text 2 (2 nd treatment)	Text 1
5.	Sabtu, 14 Mei 2011	-	Text 2
6.	Rabu, 18 Mei 2011	Text 3 (3 rd treatment)	Text 3
7.	Sabtu, 21 Mei 2011	-	Posttest
8.	Selasa, 24 Mei 2011	Posttest & Questionnaire	-

3.7 Data Analysis

3.7.1 Try-out Test Data Analysis

The obtained data from try out test were analyzed to investigate the validity and reliability of the test items. Furthermore, the valid and reliable items were used as the research instrument.

3.7.1.1 Validity

Validity is the extent to which inferences made on the basis of scores from an instrument are appropriate, meaningful, and useful. Validity is a judgment of the appropriateness of a measure for specific inferences or decisions that result from the scores that are generated (McMillan and Schumacher, 1989:241). According to Sugiyono (2010:255), Pearson Product Moment Correlation can be used to analyze the validity of each item.

The formula as follows:

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

Note:

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

N = The number of subjects

\sum = Sum of each variable

X = Sum of score X

Y = Sum of score Y

The data were calculated by SPSS 16 to measure validity with pearson product moment correlation type. The criteria for validity test were as follow:

Table 3.3
(Coefficient Correlation Validity)

Row 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

(Sugiyono:2010)

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3.7.1.2 Reliability

According to McMillan and Schumacher (1989:243), reliability refers to the consistency of measurement the extent to which the results are similar to different forms of the same instrument or occasions of data collection. The goal of developing reliable measures is to minimize the influence of chance or other variables unrelated to the intent of the measure. In this study, Cronbach's Alpha formula in SPSS 16 was employed to reveal the reliability of instrument. To interpret the coefficient of reliability, the following criteria are employed:

Table 3.4
(The Criteria of Reliability Test)

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 – 1.00	Excellent

(Sugiyono, 2010:257)

3.7.1.3 Difficulty

Arikunto (1993:209, cited in Mulyadin, 2010) argued that difficulty test aims to get level of difficulty for each item of the instrument. The formula is 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

Table 3.5

(The Criteria of Difficulty Test)

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

(Arikunto, 1993:210 cited in Mulyadin, 2010)

3.7.2 Pre-test Data Analysis

The aims of pretest are to investigate the students' initial ability and the initial equivalence between the control group and the experimental group. The researcher used t-test formula. Hatch & Farhady (1982:114) state three assumptions underlying the t-test as follows:

1. The subject is assigned to one group in the experiment.
2. The scores on the independent variable are continuous.
3. The variances of the scores in the populations are equal and normally distributed.

For the reasons, the researcher took the normality distribution and variance homogeneity test before calculated data using t-test formula.

3.7.2.1 Normality of Distribution Test

In this research, the researcher used SPSS 16.0 to analyze the normality distribution of the scores with the following steps:

1. Stating the hypothesis.

H_0 = the scores of the control and the experimental group are normally distributed.

2. Setting the alpha level at 0.05 (two tailed test).
3. Analyzing the normality distribution using Kolmogorov-Sminov formula in SPSS 16.0 for windows.
4. Comparing the Asymp. Sig with the level of significance for testing the hypothesis. If the Asymp. Sig is more than the level of significance (0.05) the null hypothesis is accepted, the scores are normally distributed.

3.7.2.2 The Homogeneity of Variance Test

SPSS 16.0 was used in this research to test the homogeneity of variance through following steps:

1. Stating the hypothesis.

H_0 = the score of the control and the experimental group are homogenous.

2. Setting the alpha level at 0.05 (two tailed test).
3. Analyzing the homogeneity of variance using Levene test formula in SPSS 16.0 for windows.
4. Comparing the Asymp. Sig (probability) with the level of significance for testing the hypothesis. If the Asymp. Sig is more than the level of significance

(0.05) the null hypothesis is accepted, the variance of the groups are homogenous.

3.7.2.3 The Calculation of t-test

The steps of the t-test calculation were as follows:

1. Stating the hypothesis.

H_0 = the two samples are from the same population; there is no significant difference between the two samples ($\bar{X}_e = \bar{X}_c$).

H_1 = the two samples are from the same population; there is a significant difference between the two samples ($\bar{X}_e \neq \bar{X}_c$).

2. Setting the alpha level at 0.05 (two tailed test).

3. Finding the value

$$t_{\text{obs}} = \frac{(\bar{X}_e - \bar{X}_c)}{S_{(\bar{X}_e - \bar{X}_c)}}$$

$$S_{(\bar{X}_e - \bar{X}_c)}$$

Note:

\bar{X}_e = mean of experimental group

\bar{X}_c = mean of control group

$S_{(\bar{X}_e - \bar{X}_c)}$ = standard error of differences between means

4. Comparing t-obs and t-crit. If the observed statistics is less than the critical statistic, the null hypothesis is accepted. On contrary, if the observed statistics is more than the critical statistic, the null hypothesis is rejected.

3.7.3 Post-test Data Analysis

The analysis of post-test worked as well as pre-test analysis. The whole formulas were calculated SPSS 16.0.

3.7.3.1 Effect Size on Independent t-test of the Posttest Scores

The calculation of effect size was conducted by applying a formula developed by Coolidge (2000:151).

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

Where:

r = effect size

t = t value from the independent t-test calculation

df = $N_1 + N_2 - 2$

Table 3.6

Effect Size value

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

(Coolidge, 2000:151)

3.7.4 The Data Analysis of Questionnaire

The questionnaire was administered to the experimental group after receiving the treatment in several meetings. This study employed close-ended questionnaire and open-ended questionnaire to investigate students' responses of using Mind Mapping technique in improving their vocabulary mastery. The questionnaire consisted of 13 questions which divided into four categories.

The formula of percentage was applied to analyze the questionnaire data. The numbers of respondent choosing 'Yes' and 'No' were counted and changed into percentage form. The option 'Yes' was counted 1 and the option 'No' was counted 0. The formula of percentage of questionnaire was as follows:

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

Note :

P = percentage

N = response

F = frequency

100 = constant

(Ningrat, 2000:33 cited in Mulyadin, 2010)

Table 3.7

Percentage of respondent

Percentage	Interpretation
0%	None of the students
1%-25%	A small number
26%-49%	Nearly half of
50%	Half of
51%-75%	More than half of
76%-99%	Most of
100%	All of

3.7.5 Data Analysis of Interview

Semi-structured interview was used to investigate the improvement of the students' performance in learning English before and after treatments. This interview was administered to an English teacher who taught the experimental and control groups before this research was conducted. It used open-ended questions. The questions are about the students' performance (behavior, motivation, and self-confidence) and the students' achievement in English class. The analysis of students' performance in English class is referred to Meece's (2001) behavioral indicators of highly motivated students.