

CHAPTER III

RESEARCH METHODOLOGY

This part discusses the formulation of research hypotheses, research design, site and participants, data collection, time allocation, research procedure, and data analysis procedure.

3.1 Research Hypotheses

Quantitative research employs quantitative hypotheses in order to test the research question of the research. According to Creswell (2013) a quantitative hypotheses is the prediction which is made by the researcher regarding the expected outcomes of the relationship among variables. In order to test the research question, the researcher should formulate a null hypotheses. A null hypotheses (H_0) makes a prediction that in general population, there is no significant difference between the groups in a variable (Creswell, 2013). The hypotheses in this study is formulated as follows:

“ H_0 : there is no relationship between students’ reading comprehension in pre-test and post-test scores in the experimental and control group”.

3.2 Research Design

3.2.1 Design

This study employed quantitative method to obtain the data for accomplishing the research questions. As stated by Hancock et al (2009) a quantitative research has the intention to focus on ways of describing and understanding reality by the discovery of general “laws”. In line with this, Leedy and Ormrod, 2001 cited in Williams, 2007 state “Quantitative researchers seek explanations and predictions that will generate to other persons and places. The intent is to establish, confirm, or validate relationships and to develop generalizations that contribute to theory”. Moreover, Creswell (2003) states, quantitative research “employ strategies of

inquiry such as experimental and surveys, and collect data on predetermined instruments that yield statistical data”.

This study is an experimental study since the researcher tries to investigate the treatment of an intervention into the study group and then measures the outcomes of the treatment. This study can be categorized as quasi-experimental design. Williams (2007) states a quasi-experimental design involves non-random selection of study participants.

In this study, there were two classes; one class was taught using scaffolding strategy and the other was taught using conventional teaching strategy. According to White & Sabarwal (2014), quasi-experimental designs identify a comparison group that is as similar as possible to the treatment group in terms of baseline (pre-intervention) characteristics.

This study employed pre-test and post-test. Both tests were given to the control and experimental group. Furthermore, the research design is described as follows:

Table 3.1
Scheme of Study

G1	T1	X	T2
G2	T1	-	T2

In which:

G1 = Experimental Group

G2 = Control Group

T1 = Pre-test

T2 = Post-test

X = Treatment

(Hatch and Farhady, 1982)

3.2.2 Variables

According to Hatch and Farhady (1982), variable is defined as “An attribute of a person or of an object which ‘varies’ from person to person or from object to object”. There are two types of variable which are dependent variable and

independent variable. Independent variable is the major variable which is aimed to investigate. Meanwhile dependent variable is the variable which is observed and measured to determine the effect of the independent variable (Hatch and Farhady, 1982).

This study also employed independent and dependent variable. The independent variable in this study is the scaffolding strategy which is used in teaching reading to the students. Meanwhile, the dependent variable in this study is the students' reading comprehension.

3.3 Site and Participants

This research was conducted in one junior high school in Bandung. This study was implemented to the eighth graders of the chosen school. Two classes were randomly chosen for this study. One class for the control group which was taught conventionally and one class was the experimental group which was given the intervention (using scaffolding strategy).

3.4 Data Collection

The data of this study was collected through several techniques. The techniques used are:

3.4.1 Questionnaire

This technique was employed to investigate students' responses to the scaffolding strategy used in this study if this strategy benefits them or not. The questionnaire was only distributed to the experimental group to investigate students' responses to the scaffolding strategy used in this study based on their point of view. The questions were in accordance with the topic and the research question.

3.5 Time Allocation

The researcher organized the schedule to establish more structured study. The schedule is described in the table below:

Table 3.2
The Distribution of Lesson Plan

No	Experimental Group		Control Group	
	Date	Material	Date	Material
1	Thursday, August 3rd 2017	Pre-test and introduction of scaffolding strategy.	Friday, 4 th August 2017	Pre-test
2	Tuesday, 8th August 2017	Treatment 1: Reading text 1: Danau Toba	Monday, 7th August 2017	Reading text 1: Danau Toba
3	Thursday, 10th August 2017	Treatment 2: Reading text 2: Malin Kundang (Part 1)	Friday, 11th August 2017	Reading text 2: Malin Kundang (Part 1)
4	Tuesday, 14th August 2017	Treatment 3: Reading text 3: Malin Kundang (Part 2)	Monday, 11th August 2017	Reading text 3: Malin Kundang (Part 2)
5	Thursday, 17th August 2017	Post-test	Friday, 18th August 2017	Post-test

3.6 Research Procedure

The procedures of this study were gathered by several steps that can be described as follows:

3.6.1 Text Selection

The text used for the teaching and learning process during the treatment for the experimental group was narrative text. The narrative texts were chosen as the demand of the national curriculum which stated that eight grade students should learn narrative text as one of the text types students should learn during the semester.

3.6.2 Preparing Lesson Plans

Several lesson plans were prepared for the treatment session. The lesson plans were created for five meetings. Two similar lesson plans were used at the first and the last of the study since this aimed for pre-test and post-test and the rests which were written differently for control and experimental group were used for treatment session. The lesson plans for experimental group employed Scaffolding procedure which was adapted from Walqui (2006).

3.6.3 Pilot Test

The pilot test was conducted before the instrument delivered to both experimental and control group. This step was carried out in order to measure the validity and reliability of the instrument. Thus, the instrument was delivered to the students who did not belong to the both experimental and control group.

3.6.4 Pre-test

This study conducted pre-test for both experimental group and control group. Students in both groups get pre-test to reveal their prior level of reading comprehension before they are given treatment. The experimental group got the treatment after they get pre-test while the control group was given no treatment. In this step, the students were required to answer 25 multiple question items of narrative text.

3.6.5 Treatments

Due to the time limitation from the school, the treatment were only conducted three times for the experimental group. The experimental group got treatment twice a week. This study employed modelling, bridging, and schema building as scaffolding strategies.

The duration of each meeting was 90 minutes. The topic of first meeting was Danau Toba while the second meeting was Malin Kundang (part 1). The third meeting was conducted with the next part of Malin Kundang. The details of each meetings are explained below:

Table 3.3
The Scheme of the Treatment

Meeting	Topic	Indicators
1	Pre-test	
2	Danau Toba	<ul style="list-style-type: none"> • Identify explicit information from the text • Identify implicit information from the text • Do guessing • Discuss the text using appropriate language structure
3	Malin Kundang (Part 1)	<ul style="list-style-type: none"> • Identify explicit information from the text • Identify implicit information from the text • Do guessing • Discuss the text using appropriate language structure
4	Malin Kundang (Part 2)	<ul style="list-style-type: none"> • Identify explicit information from the text • Identify implicit information

		from the text <ul style="list-style-type: none"> • Do guessing • Discuss the text using appropriate language structure
6	Post-test Distributing Questionnaire	

3.6.6 Post-test

The post-test was conducted after the whole treatments have been given to the students. The purpose of this test is to investigate whether scaffolding strategy has significant effect on enhancing students' reading comprehension or not by comparing the scores of control and experimental group.

3.7 Data Analysis Procedure

3.7.1 Scoring Technique

Creswell (2009) states data analysis is a stage in which the researcher clarifies the type of statistical analysis that is employed during the experiment. In line with this, Arikunto (2003) explains there are two types of formula that can be employed in the scoring process. They are the formula with punishment and the formula with no punishment. This study employed the formula with no punishment which means the score was given to the right answer and the wrong answer will get zero score.

$$S = R$$

In which:

S: Score

R: Right Answer

3.7.2 Data Analysis on the Pilot Test

3.7.2.1 Validity

Arikunto (2002) defines validity as measurements which show the validity level of quality level of an instrument. In line with this, Hughes (2003) states validity is the accuracy of a test to measure what is intended to measure.

Table 3.4
Category of Coefficient Correlation of Validity

Raw Score	Interpretation
0.80-1.00	Very High
0.60-0.80	High
0.40-0.60	Moderate
0.20-0.40	Low
0.00-0.20	Very Low

(Arikunto, 2002)

The table above figures out the criteria of validity which reveals whether the instrument is valid or not (Riduwan and Sunarto, 2010). Then, the instrument determines the result of the variable.

3.7.2.2 Reliability

Carr (2011) defines reliability as the consistency of measurement. Thus, Hatch and Farhady (1982) states that reliability reveals a consistent result of a test when it is conducted under typical condition. This study employed SPSS 16.00 for windows to find out the reliability of test items. This was used to confirm whether the test items are valid or not to be used in both pre-test and post-test. The criteria of reliability can be described as follows:

Table 3.5
Category of Coefficient Correlation of Reliability

Coefficient Correlation	Interpretation
0.00-0.20	Low
0.20-0.40	Moderate
0.40-0.70	High
above 0.70	Very High

(Arikunto, 2002)

The table above figures out the criteria of reliability which then determines whether the test items are consistent or not (Riduwan and Sunarto, 2010). It is said that the test items are reliable if they have the raw score between 0.40-0.70.

3.7.2.3 Difficulty Level

The difficulty level was administered to test how relevant the test items for students' ability. The difficulty level tend to find out whether the test items are too easy or too difficult for the participants of the study. This can be analysed using items difficulty index or facility value.

Table 3.6

Criteria of Difficulty Index

Index of Difficulty	Interpretation
0.00-0.30	Difficult
0.30-0.70	Moderate
0.70-1.00	Easy

(Arikunto, 2002)

The table above figures out the criteria of difficulty index which led into the interpretation of difficult, moderate and easy.

3.7.2.4 Discrimination Power

Discrimination index is used to investigate how far the test item can differentiate the upper group class and lower group class.

Table 3.7

Criteria of Discrimination Power

Index of Discrimination	Interpretation
0.00-0.20	Poor
0.20-0.40	Moderate
0.40-0.70	Good
0.70-1.00	Excellent

(Arikunto, 2002)

The table above figures out the criteria of discrimination power which distinguish the upper and lower group class.

3.7.3 Data Analysis on the Pre-test and Post-test

Data collected from the pre-test and post-test will be analysed quantitatively using the t-test. It is stated that the t-test is used to analyse the pre-test and post-test score and to investigate whether there is significant difference on each group (Hatch & Faradhy, 1982). Furthermore, t-test will be used to find out whether the hypothesis (null hypothesis) was rejected or accepted. If the null hypothesis is accepted, it means that there is no difference between the experimental and control groups after implementing the scaffolding strategy.

The following process conducted after the pilot test analyses are conducted. The whole processes were administered using SPSS 16.00 for windows.

3.7.3.1 Normality of Distribution Test

The score from pre-test and post-test were analysed before t-test to see whether the distributions of pre-test and post-test score of the two groups are normally distributed. The statistical calculation of normal test used Kolmogorov-Smirnov formula. The steps are as follows:

1. Looking at the hypothesis
 - H_0 : The data of experimental and control group are normally distributed.
 - H_1 : The data of experimental and control group are not normally distributed.
2. Analysing the normal distribution by using the Kolmogorov-Smirnov formula in SPSS 16.00 for windows.
3. Comparing the level of significance to test hypothesis. If the result is more than level of significance (0.05), the null hypothesis is accepted, then the score are normally distributed.

3.7.3.2 Homogeneity of Variance Test

The homogeneity of variance test used Levene test in SPSS 16.00 for windows. Therefore, there are several steps conducted, which are:

1. Stating the hypothesis
 - (H_0): the variance of the experimental and control group are homogeneous

(H₁): the variance of the experimental and control group are not homogeneous

2. Setting the level of significance (p) at 0.05.
3. Analysing the homogeneity of variance test using Levene test in SPSS 16.00 for windows
4. Comparing the level of significance value to test the hypothesis. If Levene's test is significant at $p \leq 0.05$, it indicates that the null hypothesis is incorrect and the variances are significantly different. Meanwhile, when the Levene's test is not significant at $p > 0.05$, it indicates that the variance is approximately equal.

3.7.3.3 The Independent t-test

This study employed independent t-test to statistically analyse the data. The independent t-test was calculated to reveal the comparison between experimental and control group (Wright, 1976). Here are the steps of the t-test calculation:

1. Stating the hypothesis

(H₀): The two samples are from the same population and null hypothesis means there is no significance difference between the two samples.

(H₁): there is significant difference between students' reading comprehension in pre-test and post-test score experimental and control group.

2. Finding the t value.

The formula used is as follows:

$$t_{obt} = \frac{M1 - M2}{S_{M1-M2}}$$

In which :

M1 = Mean of group 1

M2 = Mean of group 2

S = Variance

3. Comparing the probability with the level of significance for testing the hypothesis. If the probability is more than or equal to the level of

significance, the null hypothesis is accepted; the two groups are equivalent (the calculation is performed in SPSS 16.00 for windows).

3.7.3.4 Dependent t-test

The dependent t-test is employed to analyse whether or not the pre-test and post-test of the experimental group different significantly. The steps as follows:

1. Stating the hypothesis

(H₀): there is no significant difference between pre-test and post-test score.

(H₁): there is significant difference between students' pre-test and post-test score.

2. Finding the t value with dependent t-test computation in SPSS 16.00 for windows. The formula used is as follows:

$$t_{obt} = \frac{M_D}{\sqrt{\frac{n\sum D^2 - (\sum D)^2}{n(n-1)}}$$

In which :

$\sum D$: the sum of post-test score – pre-test score

M_D : the mean difference

N : the number of pair scores

3. Comparing the level of significance from the calculation of dependent t- test with the level of significance for testing the hypothesis. If the probability is more than or equal than the level of significance, the null hypothesis is accepted, but if the probability is less than the level of significance, the null hypothesis is rejected.

3.7.3.5 The Strength of Association (Eta Squared)

The strength of association or eta squared was employed to find out the degree of association between the groups and the effect of the treatment on the score of the experimental group. The calculation of eta squared proposed by Hatch and Lazarton (1991) can be described as follows.

$$\eta^2 = \frac{t^2}{t^2 + df}$$

In which

η^2 = the eta squared

t^2 = the squared from t value from the calculation of independent t-test

df = the degree of freedom from the samples (N_1+N_2-2)

After obtaining the value of the eta squared, the score was matched with the following table:

Table 3.8
Interpretation of Eta Squared

Effect Size	r value
Small	≤ 0.2
Medium	≤ 0.5
Large	≤ 0.8

(Cohend, 1988 in Becker, 2000)

3.7.4 Data Analysis on the Questionnaire

The data gained from the questionnaire was used to find out students' responses through the use of scaffolding strategy if it benefits them or not. This study employs Guttman scaling to find out students' responses. According to Ardi (2010), the goal of the analysis is to develop a single dimension that can be used to position both the subjects and the questions which then will be used to obtain numerical value.

Data collected from the questionnaire will be quantitatively analysed. The data was presented in percentage. The formula of the analysis is described as follows:

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

In which:

P = percentage

fo = frequency of observed

n = number of samples

There are two types of answer in the questionnaire which are yes and no answer. The “yes” answer will be calculated as one and “no” answer will be calculated as zero. After calculating the result with the formula, the result is presented using percentages as follows.

Table 3.9
Interpretation of Questionnaire Analysis

No	Percentage (%)	Criterion
1	0	None
2	1-25	Small number
3	26-49	Nearly half
4	50	Half
5	51-75	More than half
6	76-99	Almost all
7	100	All of

(Sudjana, 1984)

3.8 Concluding Remarks

This chapter described the research hypotheses, research design, site and participants, data collection, time allocation, research procedure, and data analysis procedure. The following chapter will describe the findings and discussion of the research.