

## CHAPTER III

### RESEARCH METHODOLOGY

#### A. Form of Research

This research is classified into quasi-experimental research that is included in quantitative research. Ary *et al.* (2010:265) defined that an experiment is a scientific investigation in which the researcher manipulates one or more independent variables, controls any other relevant variables, and observes the effect of the manipulations on the dependent variables. Hence, Creswell (2009:158) stated that in quasi-experiments, the investigator uses control and experimental groups but does not randomly assign participants to groups (e.g., they may be intact groups available to the researcher).

In this research, the researcher took two classes as the experiment and the control class. The researcher gave pre-test before giving treatments to the experiment and control classes, after that the researcher gave the treatments for the experiment class, while control class was given treatment by the teacher by using white board media, then the researcher gave post-test to the both of experiment and control classes in order to know the result before and after giving treatments.

There were five meetings in this research, first meeting the researcher gave tryout test and then the next meeting the researcher gave pre-test to the both of experiment and control classes. Next, in the third meeting until four meeting the researcher gave treatments by teaching simple past tense using Macromedia Flash 8 to the experiment class while control class taught by the

teacher with white board media that the teacher uses every teaching. The last meeting, the researcher gave post-test to the both of control and experiment classes.

**Table 1.3 Form of the Research**

<i>Group</i>	<i>Pre-Test</i>	<i>Independent variable</i>	<i>Post-Test</i>
<i>Experiment Class</i>	Y1	Treatments Macromedia flash 8	Y2
<i>Control Class</i>	Y1	Treatments White board media	Y2

Adopted from Ary *et al.* (2010:316)

## B. Subject of the Research

### 1. Research Population

According to Urdan (2005:1) a population is an individual or group that represents all the members of a certain group or category of interest. The Population of this research were all of first grade students of SMAN 2 Sintang. The total population were 254 students which was divided into seven classes. The classes were XA, XB, XC, XD, XE, XF and XG.

**Table 2.3 Population of the Research**

<i>First Grade Students of SMAN 2 Sintang</i>	
<i>XA</i>	37 Students
<i>XB</i>	37 Students
<i>XC</i>	36 Students
<i>XD</i>	37 Students
<i>XE</i>	37 Students
<i>XF</i>	37 Students
<i>XG</i>	35 Students
<b><i>Total</i></b>	<b>256 Students</b>

In order to know the population of this research were homogeneous or not, the researcher calculated students' English score that the researcher got from the English teacher. Homogeneity test is used to analyze whether the sample variance is homogeneous or whether the two groups are in the same condition. To find out the homogeneity of the sample variance, the researcher calculated by using Levene's-Test. "Levene's test (Levene 1960) is used to test if  $k$  samples have equal variances. Equal variances across samples is called homogeneity of variance. Some statistical tests, for example the analysis of variance, assume that variances are equal across groups or samples. The Levene's-Test can be used to verify that assumption" (NIST/SEMATECH, 2012).

The researcher calculated the Levene's-Test by using Statistical Package for the Social Sciences (SPSS) version 23, the data inputted to SPSS Statistics 23 showed results which can be seen in the table below:

**Table 3.3 Test of Homogeneity of Variances**

Levene Statistic	df1	df2	Sig.
.652	8	248	.734

Based on the score of significant (Sig.) shown on the table 3.3 above. The researcher concludes that the data are homogenous by comparing the Sig. 0.734 which is greater to the  $\alpha$  0.05 and retaining the  $H_0$ .

## 2. Research Sample and Technique Sampling

In this research, researcher used cluster random sampling technique in choosing the classes of the population. According to Ary *at al.* (2010:31) cluster random sampling is a probability sampling technique that randomly selects and uses whole naturally occurring groups such as intact classrooms or entire voting precincts as the samples. So that, the researcher wrote in a piece of paper class XA, XB, XC, XD, XE, XF and XG. They were seven choices and the researcher took two of the papers as the control an experiment class randomly. The classes that chosen as the sample were written in the papers that had chosen by the researcher. The result was that XA as the experiment class considered of 37 students and class XF as the control class considered of 37 students.

### C. Technique of Data Collection

In gaining the data, the researcher used measurement data collection technique. Kothari (2004:69) stated that measurement is a process of assigning numbers to objects or observations, the level of measurement being a function of the rules under which the numbers are assigned, meanwhile Ary *at al.* (2010:101) said that measurement is the assignment of numerals to objects or events according to rules.

However, test was really needed in this research. There were two kinds of test that was conducted by the researcher, there were pre-test and post-test. The pre-test and the post-test was given to the experiment and control classes which was chosen as the samples.

#### **D. Tool of Data Collection**

In collecting the data, researcher used test as the instrument. “A test is a set of stimuli presented to an individual in order to elicit responses on the basis of which a numerical score can be assigned. This score, based on a representative sample of the individual’s behavior, is an indicator of the extent to which the subject has the characteristic being measured” (Ary *et al*, 2010:201). Meanwhile, Brown (2003:3) stated that a test, in simple term, is a method of measuring a person’s ability, knowledge, or performance in a given domain.

The test that the researcher used to test students’ simple past tense mastery was multiple-choice test. Brown (2003:194) stated that by far the most popular method of testing a reading knowledge of vocabulary and grammar is the multiple-choice format, mainly for reasons of particularity: it is easy to administer and can be scored quickly. The most straightforward multiple-choice items may have little context, but might serve as vocabulary or grammar check. Therefore, there was 25 valid multiple-choice questions that the researcher gave to the both of experiment and control classes.

Furthermore, pre-test conducted before carrying out the teaching. The pre-test was given to the experiment and control classes, in order to make sure that both of the experimental or the control classes had similar and equal level of proficiencies. After being taught by Macromedia Flash 8 to the experiment class and white board media to the control class, post-test was given to the both of experimental and control classes.

## E. Validity and Reliability of the Test

### 1. Validity of the test

Validity was necessary needed in the test, Brown (2003:22) stated that by far the most complex criterion of an affective test and arguably the most important principle is validity. To check the validity of instruments, researcher checked the content validity by asking the validator to check the instruments relate to the blueprint.

To know the validity of the test, the researcher asked the professional to act as validator, checking the content of the test that determined whether the test valid or not. After that, the researcher gave tryout test to the class XG with the total students were 35 students. The researcher chose the class randomly and class XG was chosen as the tester of validity of the test. The researcher tested 50 question to the class XG with the blueprint can be seen on appendix 3. After the researcher analyzed the validity of the tryout test, the researcher got 29 valid questions. There were 25 valid questions of simple past tense that the researcher tested to the students. Before the researcher took 25 valid questions, the researcher tested 50 questions of simple past tense to class XG to know the validity of the questions of the test, after the researcher knew that the questions were valid then the researcher took 25 questions to test students' simple past tense mastery to the both of control and experiment classes.

In analyzing the validity of the test, the researcher used Pearson product moment correlation coefficient (Pearson  $r$ ) which is available on

Statistical Package for the Social Sciences (SPSS) version 23. Ary *et al.* (2010:129) stated that Pearson  $r$  indicates both the direction and the magnitude of the relationship between two variables without needing a scatter plot to show it.

The formula of Pearson  $r$  as follow:

$$r = \frac{\Sigma XY - \frac{(\Sigma X)(\Sigma Y)}{N}}{\sqrt{\left(\Sigma X^2 - \frac{(\Sigma X)^2}{N}\right)\left(\Sigma Y^2 - \frac{(\Sigma Y)^2}{N}\right)}}$$

Note:

- $r$  = Pearson  $r$
- $\Sigma X$  = sum of scores in X distribution
- $\Sigma Y$  = sum of scores in Y distribution
- $\Sigma X^2$  = sum of the squared scores in X distribution
- $\Sigma Y^2$  = sum of the squared scores in Y distribution
- $\Sigma XY$  = sum of products of paired X and Y scores
- $N$  = number of paired X and Y scores (subjects)

Adopted from Ary *et al.* (2010:129)

## 2. Reliability of the test

Reliability was the extent to which a test produces consistent results when administered under similar condition. Brown (2003:22) cited that sometimes the nature of the test itself can cause measurement errors. If a test is too long, test-takers may become faigued by the time they reach the later items and hasility respond incorrectly.

In order to know the reliability of the test, the researcher conducted try-out to the students of different classes other than experimental and control classes. The data was calculated by Cronbach alpha. “Researchers use Cronbach alpha when measures have items that are not scored simply

as right or wrong, such as attitude scales or essay tests” (Ary *et al*, 2010:246). The formula for Cronbach alpha is as follow:

$$\alpha = \left( \frac{K}{K-1} \right) \left( \frac{s_x^2 - \sum s_i^2}{s_x^2} \right)$$

Note:

K = number of items on the test

$\sum s_i^2$  = sum of variances of the item scores

$s_x^2$  = variance of the test scores (all K items)

Adopted from Ary *et al*. (2010:246)

The reliability of the test was calculated by Statistical Package for the Social Sciences (SPSS) version 23, the result of the calculation can be seen on the table 4.3.

**Table 4.3 Reliability statistics**

Cronbach's Alpha	N of Items
.850	50

Based on the calculation of Cronbach alpha which is showed on the table 4.3 the score of Cronbach alpha was 0.850. The researcher compared the score of Cronbach alpha to the *r* table with the value of N=50 and the significancy 5% it is gotten 0.279 of the *r* table value (the *r* table shown in the appendix 14) . It can be concluded that Alpha was higher than *r* table (0.850>0.279), it means that the test that the researcher tested to the students was reliable.

## F. Technique of Data Analysis

Technique of data analysis is a part to analyze the data and to interpret the data of data collection, it used to find out the answer of research question as well as to test the hypothesis of research. In this research, the researcher used



Statistical Package for the Social Sciences (SPSS) version 23 to calculate all of the numerical data. There were two data analysis techniques that the researcher used.

### 1. Descriptive statistics

The descriptive statistics was aimed at describing the results of the data. It was to provide the answer to the research question formulated about whether there was a significant difference in the simple past tense mastery between the students who were taught using Macromedia Flash 8 and those who were taught by white board media. In this part, the researcher divided the descriptive analysis into four parts of analysis:

#### a. Analysis of students' individual scores in tryout test, pre-test and post-test.

In analyzing students pre-test and post-test in both of the classes, the researcher used the formula below.

$$X = \frac{A}{N} \times 100$$

Note:

**X** = an individual score

**A** = the students' right answer

**N** = the number of test items

Adopted from Cohen *et al.* (2007:423)

#### b. Analysis student' Mean score of pre-test and post-test in control and experiment classes.

Urdan (2005:7) stated that the mean is probably the most commonly used statistic in all social science research. The mean is simply the arithmetic average of a distribution of scores, and

researchers like it because it provides a single, simple number that gives a rough summary of the distribution. The formula to calculate mean score of the students was below.

$$\bar{X} = \frac{\sum X}{n}$$

Note:

$\bar{X}$  = the students' mean score  
 $\sum X$  = the total score of students  
 $n$  = the total number of students

Adopted from Urdan (2005:8)

**c. Analysis the students' difference score of pre-test and post-test in control and experiment classes.**

Analyzing students' score of pre-test and post-test was to know the differences of their pre-test and post-test result, to analyze students' difference score of pre-test and post-test use the formula as follow.

$$\bar{D} = \bar{X}_2 - \bar{X}_1$$

Note:

$\bar{D}$  = Interval of pretest and post test  
 $\bar{X}_1$  = The main score of pre test  
 $\bar{X}_2$  = The main score of post test

Adopted from Cohen *et al.* (2007:423)

**d. Analysis of the students' standard deviation**

According to Urdan (2005:14) the best way to understand a standard deviation is to consider what the two words mean. Deviation, in this case, refers to the difference between an individual score in a distribution and the average score for the distribution. To formulate the standard deviation the researcher used formula as follow.

$$s = \sqrt{\frac{\sum(x - \bar{X})^2}{n - 1}}$$

Note:

$s$  = Standard deviation

$x$  = the score in the distribution

$\bar{X}$  = the mean score

$n$  = the number of items

Adopted from Urdan (2005:16)

## 2. Inferential Statistics

Inferential statistics was employed to make inferences about a population based on the data obtained from a sample, it was used to test the hypothesis whether there was significant difference in the simple past tenses mastery of the students who were taught using Macromedia Flash 8 and those who were taught using white board media. The statistic used in this computation were test of normality, means score of pre-test and post-test, and the last was effect size.

### a. The normality test

The normality test used to see whether or not the distribution of responses to the instrument was normal or not. In this case, the researcher used Kolmogorov-Smirnov and Shapiro-Wilk test that available in SPSS. The Kolmogorov-Smirnov and Shapiro-Wilk test was found out the data distribution by comparing the p-value ( $p$ ) to the alpha-value ( $\alpha$ ). If the value of ( $p$ )  $<$  0.05 ( $\alpha$ ), it means that the data is not normally distributed. If the value of ( $p$ )  $\geq$  0.05 ( $\alpha$ ) it means that the data was normally distributed.

With the degrees of freedom as follow:

$$df = n - 1$$

df = degrees of freedom

n = the number of class interval

Adopted from Ary *et al.* (2010:173)

**b. The analysis of comparing means score of pre-test and post-test in control and experiment classes.**

To compare means score of pre-test and post-test both of experiment and control classes, the researcher used one-way analysis of variance (one-way ANOVA). According to Urdan (2005:101) the purpose of a one-way analysis of variance (one-way ANOVA) is to compare the means of two or more groups (the independent variable) on one dependent variable to see if the group means are significantly different from each other.

The formula to calculate the *F* value was as followed:

$$F = \frac{\text{mean square between}}{\text{mean square error}}$$

Or

$$F = \frac{MS_b}{MS_e}$$

Note:

*F* = F value

$MS_b$  = Mean square between group

$MS_e$  = Mean square error, or within groups

Adopted from Urdan (2005:103)