# CHAPTER III

# RESEARCH METHODOLOGY

## A.   Research Design

Research is systematic investigative process employed to increase or revise current knowledge by discovering new facts. Based on Singh (2006:1) ''research is simply the process of arriving as dependable solution to a problem through the planned and systematic collection, analysis and interpretation of data''. Therefore, in this research was used an experimental research design. According to Singh (2006:134) ''Experimental method is a scientific method. It is oriented to the future in the sense that the researcher is seeking to evaluate something new''. Moreover, (Singh, 2006:136) argued ''the main focus and scientific study is to analysis the functional relationship of the variables''. Which in this research, researcher need to know the possible establish cause and effect of the problem. The cause and effect of this problem will be experiment is the word wall game (independent variable) effective to vocabulary competence (dependent variable) toward the Students' at the Elementary School. The process of teaching and learning will test the vocabulary competence of the students by using word wall game.

Based on the explanation above, the researcher focused on pre-experimental research design or single group pretest-posttest design. Cohen at all (2000:212) claimed, ''pre experimental design is one groups

pre-test – post-test design. The researcher was measured a group and processed to account for difference between pretest and posttest scores by reference to the effect of treatment''. Moreover, (Scott and Morrison, 2005:103) argued ''A *single-group experimental design* builds into the process pre- and post-testing, so now the changes that have been caused by the intervention can be measured at two different time points (before and after the intervention) and then compared''. Pre-experimental is design to find the effectiveness of word wall in teaching vocabulary to the Elementary School.

The form of pre-experimental design which the researcher was applying is seen below:

| Pre-test | Treatment | Post-test |
|----------|-----------|-----------|
| X1 | T | X2 |

Note as the step follow above:

Pre-test (X1) was applied to know the students first achievement to the vocabulary. Pre-test was given at the beginning before treatment. T is treatment. In this research, treatment refers to the process of given material to the students by using word wall game. The treatment will be given three times to the students. The treatments given after get the pre-test result. After having treatment, the researcher as the researcher conduct post-test (X2) to measure the students achievement after given treatment. In addition, pre-experimental design has no a control group. The influence of

experimental treatment can be seen by seeing the mean score between pre-test and post-test.

### B. Population And Sample

#### 1. Population

Population is a group of individuals or item that share one or more characteristics from which data can be gathered and analyzed. According to Singh (2006:82), "In research methodology population means the characteristics of a specific group". Moreover, (Muijs, 2004:15) argued ''the population is the group of people we want to *generalize* to''. Furthermore, Dowdy at all (2004:25) claimed, ''population is commonly understood to be a natural, geographical, or political collection of people, animals, plants, or objects''. In this research, the population is the fifth grade of Pasifikus Elementary school Pontianak in academic year 2015/2016 because this school only has 1 class for fifth grade. The total of students is 18 students for fifth grade in Pasifikus Elementary school.

#### 2. Sample

Sample is a subset of a population that is used to represent the entire group as a whole. In this research, a sample is a subset of a population that is used to represent the entire group as a whole. Cohen, Manion and Morrison (2007:100) state that this smaller group or subset is the *sample*. Cohen, Manion and Morrison (2007:100) define that

experienced researchers start with the total population and work down to the sample. The research is a pre-experiment research. In conducting this research, the researcher used total sampling in this research because the total numbers of students in fifth grade were 18. So, the sample of this research is class five.

C.    **Technique And Tool Of Data Collecting**

1.  **Technique of Data Collecting**

According to Singh (2006:212), ''the data collection is the accumulation of specific evidence that will enable the researcher to properly analyze the results of all activities by his research design and procedures. The main purpose of data collection is to verify the research hypotheses''. In collecting the data, the researcher used measurement technique to measure the students' ability using word wall. In this case, measurement technique is given to the students after treatment as post-test.

2.  **Tool of Data Collecting**

In this research, the researcheruses the test as a tool of data collection. Tests can be defined as a statement or a task or set of tasks that are planned to obtain information about the trait (trait) or educational or psychological attribute any of the questions or the tasks have the answer or that provision is deemed correct. Similarly, ''test to obtain information''(Hughes, 1989:9). Moreover, Cohen at all

(2007:418) argued '' the purposes of a test are several, for example to *diagnose* a student's strengths, weaknesses and difficulties, to measure *achievement*, to measure *aptitude* and *potential*, to identify *readiness* for a programme''. In this case, the researcher will give the students vocabulary test in form of multiple choice and there are 30 item (see appendix 5 and 8). According to Madsen (1983:12), ''the purpose of vocabulary test is to measure the comprehension and production of words used in speaking or writing''. But, before the researcher giving test to collecting the data, the researcher must be well prepared of test. There are aspects contained in a test. They are:

a. **Validity of Test**

Validity is the most important characteristic to consider when constructing or selecting a test or measurement technique. A valid test or measure is one which measures what it is intended to measure. According to Muijs (2004:66), this means that validity is probably the single most important aspect ''of the design of any measurement instrument in educational research''.

In this research, the researcher used content validity; Content validity refers to whether or not the content of the manifest variables (e.g. items of a test or questions of a questionnaire) is right to measure the latent concept (self-esteem, achievement, attitudes,…) that we are trying to measure (Muijs, 2004:66). Moreover, a comparison of test specification and test content is the

basis for judgements as to content validity, ideally the judgements should be made by people who are familiar with language teaching and testing  but who are not directly concerned with the production of the test in question (Hughes, 1989: 22). Therefore, validity in this research was determined by one of lecturers of English Study Program of IKIP-PGRI Pontianak as a validator to measure the validity of test item.

b. **Reliability of Test**

Reliability refers to the degree to which a measuring procedure gives consistent results. That is, a reliable test is a test which would provide a consistent set of scores for a group of individuals if it was administered independently on several occasions. In the other word, reliability is a key concept (Muijs, 2004:71). Cohen, Manion and Morrison, (2007:146) define that reliable instrument for a piece of research will yield similar data from similar respondents over time. The formula to calculate the reliability of test according to Fraenkel and Wallen (1993:149):

$$KR21 = \left[\frac{K}{K-1}\right] 1 - \frac{M(K-M)}{K(SD^2)}$$

Notes:

KR21      : KuderRicharson 21

K          : number of item in the test

M         : mean score

SD       : the students deviation of the test score

**Table 3.1**

**The Reliability Coefficient**

| Value | Meaning |
|-------|---------|
| >0.90 | Very high reliable |
| 0.80-0.90 | Highly reliable |
| 0.70-0.79 | Reliable |
| 0.60-0.69 | Marginally/minimally reliable |
| <0.60 | Unacceptably low reliability |

Adapted from Cohen, *et* al, (2007:506)

**Reliability of pre-test:**

KR21 : KuderRicharson 21

K : 30

M : 50, 51

SD : 12, 363

$$KR21 = \left[\frac{K}{K-1}\right] 1 - \frac{M(K-M)}{K(SD^2)}$$

$$= \left[\frac{30}{30-1}\right] 1 - \frac{50,51(30-50,51)}{30(12,363^2)}$$

$$= \left[\frac{30}{19}\right] 1 - \frac{50,51(-33,5)}{30(152,84)}$$

$$= [1.03] 1 - \frac{-1725,25}{4585,2}$$

$$= [1.03] 1 - (-0,37)$$

$$= 1, 4$$

**Interpretation :**

Based on the result of the calculation above, the reability of pre-test is 1, 4. The score of reability was categorized as ''Very high reliable'' with KR21 > 0,9 is categorized as Very high reliable. It meant that the item of pre test is very high reliable.

**Reliability of post-test**:

KR21 : KuderRicharson 21

K : 30

M : 71, 50

SD : 14, 936

$$KR21 = \left[\frac{K}{K-1}\right] 1 - \frac{M(K-M)}{K(SD^2)}$$

$$= \left[\frac{30}{30-1}\right] 1 - \frac{71,50(30-71,50)}{30(14,936^2)}$$

$$= \left[\frac{30}{19}\right] 1 - \frac{71,50(-41,5)}{30(223,0841)}$$

$$= [1.03] 1 - \frac{-2967,25}{6692,523}$$

$$= [1.03] 1 - (-0,44)$$

$$= 1, 47$$

**Interpretation:**

Based on the result of the calculation above, the reability of pre-test is 1, 47. The score of reability was categorized as ''Very high reliable'' with KR21 > 0,9 is

categorized as Very high reliable. It meant that the item of

pre test is very high reliable.

### c. Standard Deviation

According to Kothari (2004:135), "Standard deviation is

defined as the square-root of the average of squares of deviations,

when such deviations for the values of individual items in a series

are obtained from the arithmetic average". The formula to calculate

standard deviation of test:

$$SD = \sqrt{\frac{\sum d^2}{N-1}}$$

Cohen, et al, (2007:512)

Where:
$d^2$ : The deviation of the score from the mean (average), squared
$\sum$ : the sum of
N : the number cases

The result of Standard deviation of pre test is 12, 363 and

post test is 14, 936 (see appendix 14).

### D. Technique Of Data Analysis

In this research, the researcher used a quantitative design.

According to Creswell (2002), ''Quantitative design is describing a

research problem through a description of trends and in quantitative data

analysis; you analyze the data using mathematical procedures, called

*statistics.*To measure the data is valid the researcher used statistical design

of experiment. According to Montgomery (2001:11) state that: ''the

statistical approach to experimental design is necessary if we wish to draw meaningful conclusion from the data''. The researcher will analyze the effectiveness of word wall game toward the Students' Vocabulary Competence at Fifth grade of Pasifikus elementary school Pontianak. The technique of data analysis, used here is statistical analysis. The data has analyzed as follows:

1. The students Individual Score

   The formula to got students' individual score using (see appendix 10 and 12):

$$S = \frac{R}{K} X 100$$

   Where:

   S  : the students' individual score

   R  : the number of right answer on pre-test and post-test

   K  : the total number of test item

2. The formula to determine mean score (see appendix 14):

$$M = \frac{\sum X}{N}$$

   Singh, (2006:286)

   Where:

   $\sum X$  : stands of the sum of the score or value of items

   N    : the total numbers of item

**Table 3.2**

**Mean Score Classifications**

| Test Score | Classifications |
|---|---|
| 80.0 – 100.0 | Excellent |
| 70.0 – 79.0 | Good |
| 60.0 – 69.0 | Average |
| 50.0 – 59.0 | Poor |
| 0.0 – 49.0 | Very Poor |

(Adapted from Cohen et al, 2005:338)

3. The analysis on the students different score of pretest and post test

$$MD = M_2 - M_1$$

Where:

MD     = the different students mean score of pre-test and post test

$M_2$     = the students mean score of post test

$M_1$     = the students mean score of pre test

MD     $= M_2 - M_1$

        $= 71, 50 - 51, 50$

        $= 20$

4. The Normality test

To check the normality, the researcher used chi square $(x^2)$ with the formula (see appendix 15):

$$x^2 = \sum \left[ \frac{(f_o - f_e)^2}{f_e} \right]$$

(Adapted from sing 2006:240)

Note:   $x^2$ = Chi − square

$f_o$ = frequency observed

$f_e$ = expected frequency

5.  The significance of the interval score of pretest and post test

The significance of the interval score of pretest and post-test was

calculated using t-test formula:

$$t = \frac{MD}{\sqrt{\frac{\sum D^2 - \frac{(\sum D)^2}{N}}{N\,(N-1)}}}$$

Note:

t                = t-test value for correlated means

MD           = the mean of student' interval score of pretest and post test

$\sum D$          = the sum of students' interval score of pretest and posttest

$\sum D^2$        = the sum of the students' interval score of pretest and post

But if the data were not normal distribution, the significance

between pretest and posttest would be calculated with nonparametric

statistic namely Wilcoxon Test.In this research, the data pre test is

normal and the post test is not normal. Therefore, the researcher used

Wilcoxon formula to calculted the normality test. Therefore, the

researcher used Shapiro-wilk to calculate the data (See appendix 15).

6. Effect Size

Effect Size was measured in order to know the effect of treatment toward the students. According to Muijs (2004:136) the formula of effect size is:

$$ES = \frac{M_1 - M_2}{pooled\ SD}$$

Note:

ES = Effect Size

$M_2$ = Mean score of Pre-test

$M_1$ = Mean score of post test

Pooled SD = (Standard deviation of pre-test + standarddeviation of post-test) / 2.

The qualification to determining of effect size of treatment based on Muijs (2004:139) can be seen in the following table:

**Table 3.3**

**Qualification of the Effect Size**

| Effect size | Qualification |
|---|---|
| 0 – 0.20 | weak effect, |
| 0.21 – 0.50 | modest effect, |
| 0.51 – 1.00 | moderate effect |
| >1.00 | strong effect |

**E. Preparation And Implementation Of Research**

**1. The Preparation Of Research**

The preparation of the research was started by the proposing of the research design which the approval to be conducted and discussed in a

seminar. The seminar was held on December $11^{th}$ 2015. The research design contained what the entire researcher wanted to which then to be discussed more in the thesis. In conducting the research, the researcher used test to collect the data from the students that will be analyzed.

2. **The Implementation Of Research**

Based on pre-experiment method, the steps of this research included of:

a. The Implementation of Research

1) Pre – Test

Pre-test (X1) was applied to know the students first achievement to the vocabulary. Pre-test was given at the beginning before treatment. The test is about vocabulary test. The researcher asked the students to answer the test related to the meaning,spelling and grammatical function. Pre-test take from 18 students of Pasifikus Elementary School class V.The pre-test was held on February$1^{st}$ 2016.

2) Treatment

The treatment was given two times in two meetings. The treatment was teaching some materials by using Word Wall Game.The first treatment was held on February$2^{nd}$ 2016 and the second treatment was held on February$15^{st}$ 2016.

3) Post – Test

The last step in pre-experiment research is post-test. Post test to measure the student's achievement after given the treatment had been done by using word wall game and to know is the word wall game has given effective or not toward students in vocabulary competence. The test is same in specification of pre-test. The pre-post was held on February$16^{st}$ 2016.