

CHAPTER III
RESEARCH METHODOLOGY

A. Research Design

In this study, the researcher used quantitative research. The researcher decided to use an experimental design that in the form of quasi experimental design. Quasi experimental design contains of pre- and post – test. The researcher compared two classes of research. One class of students was given special treatment of Duolingo application as experiment class while another class will be a control class. The control class is VI A whereas experiment class is VI B. The design of quasi experimental can be described as the following :

Table 3.1 Nonequivalent Control Group Design

O1	X	O2
O3		O4

O1 is pre – test for the experimental group

O2 is post – test for the experimental group

O3 is pre – test for the controlled group

O4 is post – test for the controlled group

X is treatment for experimental group2 (using Duolingo application)

In this design, there are two tests; those are before and after experiment. Those tests called pre – test, and post – test, in which pre – test is the

observation which is conducted before the experiment and post – test is the observation which is conducted after the experiment. In this design, there are two groups of students as the samples. At the first time, both of groups are given pre – test in order to know their competence in vocabulary mastery before they are given a treatment. In the experimental group, they would be treated by Duolingo application, while the controlled group would be treated by using conventional technique.

B. Research Setting

The research will be conducted in MI Darul Ilmi Banjarbaru at VI A and VI B in 2017/2018 school year, A. Yani street Km. 19,200 Liang Anggang, Banjarbaru city, South Kalimantan.

C. Population and Sample

1. Population of the Research

Population represents entire subject of research. Nawawi (2003) in Iskandar (2009, p. 118) population is grand total of subject research which can consist of human being, object, animal, flora, symptom, assess the test or event as data source owning certain characteristic in a research. While according to Sudjana (2005, p. 74) population is totality of all value which possible, result of counting/calculating or measurement, quantitative and also qualitative hit the certain characteristic from all clear and complete corps member which is learned by the nature.

The Population of this research is all students of VI A grade consists of 26 students, VI B grade consists of 25 students. The total number of students is 51 students.

2. Sample of research

The sample is a part of the population that has the same characteristics of the population. The sample can also be the population itself. According to sugiyono (2012, p.118) "sample is part of the number and characteristics of which are owned by the population". Suharsimi Arikunto (2012, p. 174) states briefly that "the sample is just partly or totally from the whole population".

The consideration of taking the sample in this study is using a purposive sampling technique. Purposive sampling is a technique of determining the sample with a certain consideration (Sugiyono, 2012, p. 183). This type of withdrawal sample by considering the type of research used in this study requires the control class and experiment class.

Then it can be concluded that both class VI A grade and VI B grade will be the two samples were selected from all population classes.

D. Research Instrument

In any scientific research, instrument for collecting data was absolutely important. The accuracy of the result of research was mostly dependent on how accurate the use of instrument. Before the research is carried out, the instrument for the data collection should be well prepared.

The instrument that the researcher used in this research is Test. Heaton (1975, p. 89) states that the test used must be appropriate in term of our object, the dependable in the evidence provides, and applicable to our particular situation. In this case, the researcher gave the students multiple choice test.

This study aimed at knowing the effectiveness of Duolingo application in improving students' vocabulary ability from identifying the result of the test.

The data will be collected from all instruments, as follow:

1. Pre Test

The test is will be given by a series exercises that use for measurig the students' ability of English vocabulary. The pre test will be submitted before doing a treatment. The aim of pre test is for detecting how far the students ability in comprehending the lesson. The type of the test is multiple choice. It is 20 items, that are appropriat with the students' level. There are four topics in this test; greeting, to be and pronoun, family, and occuupation. Greeting are in test item number 1, 2, 4, and 9. To be pronoun are in test item number 3, 8, 13, 16, 17, 18, and 19. Family are in test item number 7, 10, 11, 12, 14, and 15. Occupation are in test item number 4, 5, and 20.

2. Post Test

The post test is the test that will be given after treatment. It is used for measuring students' ability and to know whether there is any

improvement after doing the treatment. The result of the post test will be used to answer the research question in this research. The type of the test is same with pre test, including difficult degree and the number of test. There are four topics in this test; greeting, to be and pronoun, family, and occupation. Greeting are in test item number 1, 2, 4, and 9. To be pronoun are in test item number 3, 8, 13, 16, 17, 18, and 19. Family are in test item number 7, 10, 11, 12, 14, and 15. Occupation are in test item number 4, 5, and 20.

E. Data Collection Procedure

There are several procedures in collecting data, namely:

1. Observation is to know the students' condition during teaching learning process, especially vocabulary.
2. Determining the population and sample.
3. Creating a learning tool in accordance with lesson plans that will be examined, it is useful to support the activities during research.
4. Making the instrument test research, the test is performed to determine learning outcomes. The form of test is multiple choice.
5. Performing the validation of instruments.
6. Conducting teaching and learning by doing in class experiments using Duolingo application in teaching vocabulary to exercise vocabulary in the application, and teaching vocabulary in control

class without using Duolingo application but using textbook. (see in appendix 2, lesson plan)

7. Drawing up post test.
8. Doing a test on a sample of students who are treated.
9. Analyzing data and conclusion.

F. Data Analysis Procedure

Before the instrument is used for the research, it will be tried in VI grade of Madrasah Ibtidaiyah Darun Najah who have gotten a material. Instrument will be processed and analyzed after that. The following analysis that is used to know the validity, reliability, and suitability of research instrument:

1. Validity Test

According to Arikunto, a test will be called to be valid if there is sufficient evidence that test score correlated fairly highly with actual ability in the skills being tested, and then it may feel reasonable safe in assuming that the test is valid for the purpose of the research. The researcher corrects all of the items to know whether each of them valid or not. Is measurement that shows the validity of instrument? It is counted using product moment formula:

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

Explanations:

r_{xy} = Correlation coefficient between X variable with Y variable

N= Total of test participant

X= Score for each item

Y= Total Score

After getting the result, the writer categorizes it into the standard validity as follows:

Table 3.2
Standard Validity

Value	Category
0, 80 - 1, 00	Very Valid
0, 60 - 0, 79	Valid
0, 40 - 0, 50	Valid Enough
0, 20 - 0, 39	Less Valid
0, 00 - 0, 19	Not Valid

A test is said valid when it can measure what is intended to measure. Calculation result of r_{xy} is compared with r table of product moment by 5% degree of significance. If r_{xy} is higher than r table, the item of question is valid.

2. Reliability Test

According Sugiyono (2013: 121) "Reliability is the instrument when used several times to measure same object who will generate same data".

Reliability Instrument have level for understanding engineering and creativity is calculated by the formula KR 20 (Kuder Richardson), because instrument score is not a stretch, but correct or wrong. Formula KR 20 (Sugiyono, 2012: 359) are as follows:

$$r_i = \frac{k}{(k-1)} \left\{ \frac{s_t^2 - \sum p_i q_i}{s_t^2} \right\}$$

Keterangan:

r_i = koefisien reliabilitas instrumen

k = jumlah item dalam instrumen

p_i = proporsi banyaknya subjek yang menjawab pada item 1

q_i = $1 - p_i$

s_t^2 = varians total

After get *rhitung*, then compared with the criteria from Guilford to know about the interpretation of reliability has been calculated. Guilford Criteria split into 5 reliability criteria like very low, low, moderate, high and very high.

Tabel 3.3 Classification Reliability Coefficient

The reliability coefficient (r)	Interpretation
$0.00 \leq r \leq 0.20$	Very Low
$0.20 \leq r \leq 0.40$	Low
$0.40 \leq r \leq 0.60$	Medium / Fair
$0.60 \leq r \leq 0.80$	High
$0.80 \leq r \leq 0,100$	Very High

3. Normality Test

It will test the normally data that will be tested in this study.

Researcher uses Chi-Square test of Sudjana (2005, p. 273) as follow:

a. The significance Level

The significance level used $\alpha = 5\%$

b. Statistic test $\chi^2 = \sum_{i=1}^k \frac{(O_i - E_i)^2}{E_i}$

Explanations:

O_i : Frequency of hope

E_i : the expected Frequency

K : the number of observations

This test uses program SPSS 22.0 of Kolmogrov Smirnov Test of normality in the study carried out using the program SPSS 17.0.

With the provisions if the significance is greater than 0.05 then it can be inferred.

4. Homogeneity Test

Is used to know whether experimental group and control group, that are decided, come from population that has relatively same variant or

not. The formula is:

$$F = \frac{Vb}{Vk}$$

Notice:

Vb : bigger varian

Vk : smaller varian

5. Hypothesis Test

Hypothesis will be counted with:

$$H_0 : \mu_1 \leq \mu_0$$

$$H_a : \mu_1 > \mu_0$$

Hypothesis test will use formula as follow:

$$t_{hitung} = \frac{\bar{X} - \mu_0}{\frac{s}{\sqrt{n}}}$$

Where :

\bar{X} = mean from *post-test*

μ_0 = mean from *pre-test*

s = deviation standard *post-test*

n = total of sample

Test Criteria as follow:

If $t_h \leq t_0$, H_0 accepted.

If $t_0 > t_h$, H_0 ignored.

6. Significant of Hypothesis test

Determine the significant standard $\alpha = 0,05$. Then, looking for t table with a pattern $db = n-1$.

Test Criteria as follow:

If $t_h \leq t_0$, H_0 significant.

If $t_0 > t_h$, H_0 not significant.

In this research, the data gained from post test was organized and summarized by using descriptive statistics. After that, the data was statically computed by using inferential statistics.

7. a Descriptive Statistics

“Descriptive Statistics” for gets the result, the effectiveness of Duolingo application in teaching English. Descriptive statistics was tabulated the results of students’ vocabulary test score in the form of frequency table. After the frequency distribution was set up, it

was summarized which was aimed at finding out mean, median, and modus.

7.a.1 Mean

The 'Mean' (Average). And the formula is

$$\bar{X} = \frac{\sum_{i=1}^K f_i M_i}{\sum_{i=1}^K f_i}$$

dimana:

M_i adalah nilai tengah kelompok data ke-i

f_i adalah frekuensi atau banyaknya observasi pada kelompok data ke-i

K adalah banyaknya kelompok data (kelas).