

CHAPTER III

RESEARCH METHODOLOGY

A. Method of Research

The method of this study was quantitative method and it used a quasi-experimental design as the method to investigate in this study. According Sugiyono quantitative method is "research methods based on positivist philosophy are used to examine certain populations or samples, use research tools to collect data, and data analysis is quantitative/statistical, with the purpose of testing established hypotheses."¹ Quantitative research method is one type of research whose specifications are systematic, well-planned and clearly structured from the beginning to the making of the research design.

According to Barry Gribbons, a quasi-experimental design is especially useful in addressing evaluation questions about the effectiveness and impact of programs.² This research design is in order to investigate whether the use of Duolingo application could develop students' vocabulary knowledge.

This study used two classes with different treatment between experimental and controlled class. In the experimental class, the researcher

¹ Sugiyono. *Metode Penelitian Kuantitatif, Kualitatif Dan R&D*. (Bandung: Afabetia, 2011) P. 13.

² Gribbons, Barry; Herman, Joan. "Practical Assessment, Research & Evaluation", *Electronic Journal*. Vol. 5, No 14, (1997). P.1.

was applied with the treatment of Duolingo application. Another class was the controlled class which was taught without using Duolingo application.

According to Mackey, experimental research usually uses comparison or control groups to investigate research questions. Many second language research studies involve a comparison between two or more groups. This is known as a between-groups design. This comparison can be made in one of two ways: two or more groups with different treatments; or two or more groups, one of which, the control group, receives no treatment.³

A common situation for implementing experimental study involves several classes or schools that can be used to determine the effect of curricular materials or teaching methods. The writer used pre-test and post-test on the control and experiment class, to see the effectiveness of duoling application by looking pre-test, and post-test measurement and comparing the gained scores between both classes. The effectiveness can be seen from the improvement of students' score of experiment class in the post-test. The score was taken by the writer after student had been given some treatments and from the comparison of both classes. The experiment class was given the technique by using duoling application in the classroom and the controlled class without using duoling application.

³ Alison Makey, Susan M. Gass, *Second Language Research*, (Mahwah, New Jersey London: Lawrence Erlbaum Associates, Publishers, 2005), P. 145

B. Place and Time of Research

The place used by research for this study was one of the schools is Serang district. The name of the school is Mts Al Hamidiyah Kadukacapi Jl. Kh. Machmud Cisitua Kadukacapi, Pabuaran, Serang, Banten. This research was conducted from Mei 2021.

C. Population and Respondents

a. Population

To collect data from this paper, the researcher took the population of this study was the 9th grade of Mts Al Hamidiyah Kadukacapi there are 2 classes, namely classes 8A and 8B with the number of the students 25, meaning that the total number of 8th grades is around 50 students.

b. Respondents

In taking the sample of this study, this research was two classes of the 8th grade. Class 8A consisting of 25 students, was the controlled class which did not receive any treatments. The second class is 8B consisting 25 students was the experimental class which received duolingo application as a treatment.

D. The Research Instrument

The instrument that used by the writer appropriate with the material that given in the school. The form in this instrument is pre-test and post-test by model of the test is making simple sentences.

E. The Technique of Data Collection

The data collection technique is the method the writer uses to collect the necessary data. Observation serves pre-teaching, and writing test for the subject in this study. Teaching includes teaching writing with strategy and teaching without a strategy. To test their understanding in using the strategy as an instrument for teaching writing using these two methods, a teaching test will be carried out in the first and final programs. The author uses several data collection techniques, as follows:

1. Observation

According to Alison Mackey; when using observation techniques to collect data, researchers aim to provide a detailed description of learner activities without unduly affecting the events in which learners participate. Data is usually calculated through a combination of field notes (which may involve the researcher's intuition, impressions, or even detailed impressions of the problem) and audio or video recordings (allowing the researcher to analyze

language usage in more depth in the future) and allow external research Personnel participation in data considerations).⁴

Make observations to collect data about the performance of teachers and students in the teaching process. This study uses a concentrated observation method. This method was chosen because it can improve the judgment of teacher-student activities. Observations were made during the treatment period applicable to the experimental group.

2. Test

The test is divided into pre-test and post-test. In this study, the author obtained test results from students. When collecting data, the author conducts pre-test and post-test related to the subject of the course taught. The test is a simple sentence. In short, a test is a method of measuring a person's ability, knowledge or performance in a given field.⁵

(a) Pre test

Pre-test is conducted for the initial equivalence of the experimental group and the control group. The test is for each group, all tested on the same day. The pre-test is a test conducted before the teacher starts learning. The purpose of the pre-test is to determine the student's initial ability of the

⁴ Alison Mackey, Susan M. Gass. *Second Language Research Methodology And Design*. (London: Mahwah, 2005) P. 175

⁵ Brown H. Douglas. *Language Assesment And Classroom Practice*, (Sanfransisco: Longman, 2004), P. 3

materials to be delivered. By understanding these initial capabilities, teachers can more easily determine the models and methods that will be applied to learning. By conducting a pre-test, teachers will understand how many students already have prior knowledge of the materials provided.

(b) Post test

Post-test is carried out to in order to check the differences between learning using strategy and without strategy. Post-test is a test that is carried out after the learning process is completed. Post-test is a form of final evaluation of a lesson. Thus, the post test is carried out at the closing stage of the learning activity. The purpose of the post test is to determine the success of the learning process and to measure the mastery of students' competence in the material taught by the teacher.

F. The Technique of Data Analysis

The data in this study obtained information in the form of student learning outcomes and student responses to the learning that had been carried out. After the researcher collected data from the pre-test and post-test. Researchers compared the scores from the pre-test and post-test. Then, the data were analyzed and determined by:

1. T-test statistic.

The t-test in this study was used to test the results of the mean difference in scores between the experimental and controlled classes, whether there is a significant difference or not

Because the author wants to compare the research results of the experimental class and the control class, the writer take steps as follow:

1. The result of the post-test in experiment class is named variable (X1)
2. The result of the post-test in control class is named variable (X2)

The steps for statistic analyze are:

1. Determining mean of variable X1 with formula:

$$M_1 = \frac{\sum X_1}{N_1}$$

2. Determining mean of variable X2 with formula:

$$M_2 = \frac{\sum X_2}{N_2}$$

- b. Determining derivation score variable x_1 with formula:

$$X_1 = X_1 - M_1$$

- c. Determining derivation score variable x_1 with formula:

$$X_1 = X_1 - M_2$$

After obtaining data from the pre-test and post-test, the author uses the statistical calculation method of the t-test formula to analyze it, and its significance is 5%, and the significance of the formula is:

$$t = \frac{M_1 - M_2}{\sqrt{\left\{ \frac{\sum X_1^2 + \sum X_2^2}{N_1 + N_2 - 2} \right\} \left\{ \frac{N_1 + N_2}{N_1 \cdot N_2} \right\}}}$$

M_1 = the average score of experiment class (Mean X1)

M_2 = the average score of control class (Mean X2)

$\sum X_1^2$ = Sum of square deviation of experiment class

$\sum X_2^2$ = Sum of square deviation of control class

N_1 = Numbers of students of experiment class

N_2 = Numbers of students of control class

2 = Constant number

df = degree of freedom

df = $N_1 + N_2 - 2$

- d. Interpret and calculate by comparing the results of the calculated t-test with the t-table.⁶

2. Effect Size

According Alison Mackey “An effect size is a measure that gives an indication of the strength of one's findings.”⁷ Effect size is showing the standardized difference between the scores of the control and experimental groups. In research, researchers are not only interested in the differences between the control and experimental groups, but also how big the differences are between the control and experimental groups. Effect Size is a standard unit, meaning that Effect Size can be compared between several different scales and can be compared between several studies with different sample sizes.

⁶ J.P.Guilford,Et.Al *Fundamental Statistic In Psychology And Education: International Students Edition* (California: Mcgraw=Hill,1981), P. 157.

⁷ Alison Mackey, Susan M. Gass. *Second Language Research Methodology and Design*. (London: Mahwah, 2005) P. 282

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

r^2 = effect size

t^2 = result of t-test determine

df = result degree of freedom

Percentage of variance explained, r^2 according to the criteria of Gravetter

$0,01 < r^2 < 0,09$ = small effect

$0,09 < r^2 < 0,25$ = medium effect

$r^2 < 0,25$ = large effect⁸

⁸ Frederick J Gravetter, Larry B. Wallnau. *Statistics For The Behavioral Scinces 10* (Canada: Nelson Education, 2015) P. 283