CHAPTER III
RESEARCH METHODOLOGY

A. Form of Research

The form of research that was implemented in this research was pre-experimental research. Pre-test and post-test with a quantitative approach because the researcher wants to know possible cause and effect between dependent and independent variables. Pre-experimental research design by using pre-test and post-test to measure a change in an outcome before and after an intervention is implemented Brewer, (2011: 2).

In this research, the researcher uses a pre-experimental design by using pre-test and post-test. The researcher chose this design because the researcher wants to know the effectiveness of using the quizizz application on students' grammar ability. Quantitative approaches have established and widely agree on general formulations of steps that guide researchers in their work. The pre-experimental research design involves three steps. They are arranging a pre-test to measure the dependent variable, implement the treatment in the sample, and arrange a post-test to measure the dependent variable (Ary, Jacobs, Sorensen & Razavieh, 2005). According to the explanation above, the researcher explains the form of the pre-experimental below:

Table 3.1

Design of Research

Pre-test	Treatment	Post-test
Y1	X	Y2

Taken from Ary et al (2010)

Where:

Y1: Students' scores before treatment

X: Treatment

Y2: Students' scores after treatment

B. Population, Sample, and Sampling

1. Population

A population is a group that shares one or more characteristics from which data can be gathered and analyzed. A population is a group of individuals, objects, or items from among which samples are for measurement Singh (2007:88). Also, Frenkl*et* al, (2012:91) state that the population is the larger group to which one hopes to apply the result. The population in this research is all Eighth Grade Students of SMP Karya Budi Putussibau in the Academic Year of 2021.

2. Sample

The sample is the part of the population that shows all the populations. As stated by Ary et al (2010:148) the observed small group is called the sample. Supported Fraenkel et al, (2012:9) also state that the sample is the group in which the information was obtained. Thus, the study concluded that the sample was representative of the population to be involved in the study. In this research, the sample will be taken is grade 8A from 3 classes SMP Karya Budi Putussibau.

3. Sampling

Sampling is fundamental to all statistical techniques and statistical analysis. The quality of a piece of research stands or falls not only by the appropriateness of methodology and instrumentation but also by the suitability of the sampling strategy that has been adopted by Cohen *et al* (2007:100).

In this research, the researcher will take simple sampling where the researcher will choose only one class randomly to make limitation of population. Simple random sampling is a type of sampling where every item in the population has an equal chance of inclusion in the sample and each one of the possible samples, in the case of finite unreserve, has the same probability of being selected (Kothari 2004:15).

In this technique, the number of students is less than 15 participants Cohen *et al* (2007:101) mentions a sample size of thirty is held by many to be a minimum number of cases if researcher plan to use some form of statistical analysis on their data, though is a very small number and we would advise very considerably more. The researcher will prepare a piece of paper and divide the paper into two pieces then write each of the papers with codes namely. Afterward, the researcher will shake one of the papers from a container as a lottery. The class that was chosen is the class that is written in the paper to present the population.

C. The technique of Collecting Data

In this research, the researcher applied measurement techniques to find out the effectiveness of Teaching Grammar by using quizizz as the media. Creswell (2012, p. 623) explains that "measurement means that the writer observes and records on an instrument". Also, in this research, the researcher measured the performance of the sample by utilizing a pre-test and post-test in form of an achievement test. Furthermore, Sugiyono (2014: 76) states that measurement is the process of assigning meaningful numbers or labels to persons or objects based on the degree to which they process some characteristics.

In this study, the purpose of the measurement technique is to measure students' grammar skills by giving a quiz test. The tool is a quizizz application, it is used to compare student achievement before and after treatment. The last one is a quiz test too. This means testing students' grammar skills after treatment.

D. Tools of Collecting Data

1. Quantifier test

In this research, the researcher applied quantifier tests for pre-test and post-test to collect the data. As Ary *et al* (2010:201) state "A test is a set of stimuli presented to an individual to elicit responses based on which a numerical score can be assigned. This score based on a representative

sample of individual's behavior is an indicator of the extent to which the subject has the characteristic being measured". The tool of this research is the quantifier test. A test is a method of measuring a person's ability, knowledge, or performance in a given domain (Brown, 2004: 3). Quantifier test is used with pre-test and post-test. The researcher will instruct students and take the students' scores.

Table 3.2

Test Specifications

Objective	Material	Indicator	Type of Test	Total Item
Students can answer questions according to the material that has been studied	Quantifier	Students can answer questions correctly	Multiple Choice	20 questions

2. Test Validity

To conduct research, an instrument is needed. An instrument can be used to measure something if the instrument is valid. A valid instrument means that the measuring instrument used to obtain the data is valid. Validity is related to the instrument used to measure something that can measure exactly what is to be measured.

To analyze the validity of this test, the researcher conducted a trial of 20 items to 15 students who were not included in the study sample and the questions, researcher used the Learn British Council website.

E. The technique of Data Analysis

There were six kinds of data analysis will use in this study such as student individual score, mean score, standard deviation, t-test, testing hypotheses, and effect size. These data analyses act as a critical point of this study in finding and answering both the research question and finding the research hypotheses.

Moreover, to analyze the data the writer will use the computer software Excel. The reason for this choice is simply told by Cohen, Manion and, Marrison (2007:501) state that "Numerical analysis can be performed using software, for example, the Statistical Package for Social Sciences (SPSS, Minitab, Excel)."

In other words, using such computer software would help the writer in analyzing the data, especially in form of numbers whereas in quantitative research numbers can tell a lot of information within it if properly analyzed.

Concerning the tool of data collection where quizizz is the prime choice of the writer, the data calculation result from the grammar test evaluates through SPSS to interpret figures to result from calculating the data. The formula for data analyses of this study is as follows;

1. **Students' Score for Pre-test and Post-test**

   The researcher will use an analytic score to be more reliable in scoring students' grammar mastery. This technique is depending on the marking composition suggested by Jacob, *et al* (1981) in Hughes, (2003: 104) and categorizes it into five components. They are content, organization, vocabulary, language use, and mechanics. After that the writer will use the formula below:

   $X_1 = C_1 + O_1 + V_1 + L_1 + M_1$

   $X_2 = C_2 + O_2 + V_2 + L_2 + M_2$

   Taken from Hughes, et al (2003: 014)

   Note:

   X_1 = Student's score of pre-test

   C_1 = Student's content score of pre-test

2. **Students' Mean Score Pre-test and Post-test**

   After the researcher calculates the whole individual score then the next step is to calculate the mean score of the individual score. According to Brase (2012: 85) states that "The mean is the average usually used to compute a test average." Furthermore, the formula for finding the Mean score is as follows:

a. Pre-test

$$\overline{X_1} = \frac{\sum x_1}{N_1}$$

Taken from Singh (2007: 138)
Where:
$\overline{X_1}$ = Mean Score
$\sum x_1$ = The sum of the scores
N_1 = Total Samples

b. Post-test

$$\overline{X_1} = \frac{\sum x_1}{N_1}$$

Taken from Singh (2007: 138)
Where:
$\overline{X_1}$ = Mean Score
$\sum x_1$ = The sum of the scores
N_1 = Total Samples

4. **Standard Deviation (SD)**

Standard deviation is utilized by the researcher to calculate the depth of the Mean that was previously acquired by the researcher. In-depth here means that to see the distribution of the spread around the Mean score the correct formula to see this data is the Standard Deviation formula. Furthermore, BraseandBrase (2012: 95) argues that Standard Deviation is used to picture the dispersion around the Mean Score. The formula of standard deviation is as follows:

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

Taken from Cohen, Manion, and Morrison (2007: 512)

Where:

d^2 = The deviation of the score from the mean (average), squared

$\sum$ = The total value

N = The number of subjects

Cohen, Manion, and Marrison (2007: 512) argue that "A low standard deviation indicates that the scores cluster together, while a high standard deviation indicates that the scores are widely dispersed. "In

other words, to enrich the finding of this research seeking the dispersal value is a great addition to finding the dispersal rate of the mean scores.

5. **T-Test**

   After the researcher calculate the individual score along with the mean and the standard deviation from the individual score, then the researcher used a dependent t-test or paired samples t-test. Field (2005:286) says that a dependent t-test or paired samples t-test is used when there are two experimental conditions and the same participants took part in both conditions of the experiment. The one group as a sample in this study would be given a test before the treatment (pre-test) and a test after the treatment (post-test).

   The researcher will compare the students' mean scores on the pre-test and post-test to see the difference before and after the treatment by using quiz practice. The calculation of the dependent t-test will be done through SPSS. The researcher used paired T-test according to Ary *et al* (2006: 195) with the following formulation:

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

   Taken from Ary, et al (2006: 195)

   Noted:

   t = the students' significant score

   $\bar{D}$ = the deviation score of the pre-test and post-test

   $\sum D$ = the sum of the deviation score of the pre-test and post-test

   N = number of samples

6. **Testing Hypothesis**

   To answer question number one the researcher will use the testing hypothesis. The hypothesis will be tested by using the critical value of the t-distribution table test. Since the degree of freedom (df) in N, N-1 (N-1) and level of significance is 5% or 0,05 with a two-tailed test, the critical value is in the t-table (Hatch and Lazaraton 1991: 595).

The criteria used are as follows:

a. If t-test (to) > t-table (tt) insignificant degree of 0.05, Ho (null hypothesis) is rejected. It means that the rates of mean score of the post-test are higher than pre-test. The use of the Quizizz application as media is effective in learning grammar.

b. If the t-test (to) < t-table (tt) insignificant degree of 0.05, Ho (the null hypothesis) is accepted. It means that the rates of means score of the post-test are the same as or lower than the pre-test. The use of Quizizz applications as media is not effective in learning grammar.

7. **Effect Size**

   After testing the hypothesis the researcher will continue to the next step of answering question number two of this study which is to determine the effect size of the treatment. According to Cohen, Manion, and Morrison (2007: 293). Effect size is a measure of the degree to which a phenomenon is present or the degree to which a null hypothesis is not supported. The formula is as follows:

$$ES = \frac{\overline{X_2} - \overline{X_1}}{Sd}$$

Taken from Cohen, Manion, and Morrison (2007: 521)

Where:

ES = Effect size

$\overline{X_2}$ = Mean of Post-test

$\overline{X_1}$ = Mean of Pre-test

SD = Standard Deviation this formula

Can be easily calculated manually, the result of this formula would reveal the value of the effect size from the treatment. Moreover, to interpret the value from this calculation the writer refers to Cohen, Manion, and Marrison's (2007: 521) interpretation as described in the table below:

Table 3.3

Effect Size Level

Value	Level
0 – 0.20	Weak Effect
0.21 – 0.50	Modest Effect
0.51– 1.00	Moderate Effect
>1.00	Strong Effect

Taken from Cohen, Manion, and Marrison (2007: 521)

If the value of the effect size is between 0 – 0.20 means it is categorized as a weak effect. If the value is between 0.21 – 0.50 means it is categorized as a modest effect if the value is between 0.51 – 1.00 means it is categorized as a moderate effect and if the value is more than> 1.00 means it is categorized as a strong effect.

F. Procedures of Research

Before conducting the research, a procedure is necessary to make the study on track and systematic to achieve maximum efficiency over time and precision in the research. Furthermore, Cresswell (2003: 22) states that "Because quantitative studies are the traditional mode of research, carefully worked out procedures and rules exist for the researcher." In other words, a systematic step in conducting the study is necessary to maintain the precision and time efficiency of the study. The researcher researched implementing Quizizz application media to see the effect of that media on the students' grammar ability.

The procedures of the research are as follows:

1. Pre-test

    The researcher was given students a pre-test to know student scores before treatment.

2. Treatment

In this section, the researcher has given students treatment. Treatment here means the researcher was teaching students by using Quizizz as media in teaching Quantifier.

3. Post-test

Students were given a posttest after the researcher finished giving the treatment. The purpose of the post-test is to evaluate whether or not the students' scores will change after treatment. The posttest was conducted and used the same test as the pretest.