CHAPTER III

RESEARCH METHODS

3.1 Quantitative Research Methods

Research methods are scientific ways to obtain data with a purpose and certain uses (Sugiyono, 2019). According to Rahardjo, (2017) method Research is one way to obtain and search for the truth which is tentative, not absolute truth. The result is scientific truth. Scientific truth is a truth that is open to continuous testing and criticism even revised. Therefore there is no best method to search for the truth, but what exists is the right method for a particular purpose according to the phenomenon which exists. The choice of research method must be adapted to the research is being carried out so that the results are optimal (Budiharto, 2019).

According to Sugiyono (2019), quantitative research is also called traditional research because it has been used for a long time. Creswell in (Kusumastuti et al. 2020) states that quantitative research methods are a method for testing certain theories by examining the relationships between variables. Sugiyono (2019) states that quantitative methods are used if;

1. If the problem which is the starting point for the research is clear. Problem is a deviation between what should be and what is happens, between rules and implementation, between theory and practice, between plan with implementation. In preparing a research proposal, problems This must be demonstrated with data, both data from your own research and other research results documentation. For example, research will be carried out to find eradication patterns poverty, then data on poor people as a problem must be shown.

2. If researchers want to get extensive information from a population. Quantitative research methods are suitable for obtaining information broad but not deep. If the population is too broad, then research can use samples taken from the population.
3. If you want to know the effect of certain treatments on the person other. For this purpose, the experimental method is most suitable to use. For example, the effect of certain herbs on health status.
4. If the researcher intends to test the research hypothesis. Research hypothesis can be in the form of descriptive, comparative and associative hypotheses.
5. If researchers want to get accurate data, based on phenomena that is empirical and can be measured. For example, if you want to know the IQ of your children certain communities, then measurements are carried out using IQ tests
6. If you want to test whether there are doubts about the validity of knowledge, specific theories and products.

Based on the objectives of this research, it is to support the process This research used quantitative research methods. Quantitative approach considered to be able to answer the problems that will be raised in thes research.

3.2 Research Methods

is a research method that aims to explain and predict what will happen to a variable if a certain treatment is given to other variables. An experiment has the following characteristics:

a). It is closely related to the population and sample, because the treatment given to the experimental group or control group (which is not given treatment) is a number of sample members so that it is representative of the population.

b). Related to hypotheses, in quantitative experimental research, the researcher proposes a hypothesis (temporary guess) whose truth or error will be proven through experimentation.

3.3 Population and Sample

Population and Sample This study was conducted at UPTD SPF SPM N 3 Simpang Kanan located at JL. Pendidikan. Village/Sub-district, Sukarejo. Simpang Kanan District, Aceh Singkil Regency. The population of this study was 24 students of class VIIl UPTD SPF SPM N 3 Simpang Kanan 2022/2023. The population defines the scope of the study and offers environmental and contextual information to the reader (Casteel & Bridier, 2021). In selecting the sample, the sampling technique used was total population sampling. This technique was chosen because the population was less than 100 students. Sugiyono (2015) defined a sample as a representation of the size and characteristics of a population. In conducting the questionnaire, the total sample used was 24 students. 9 were male and 15 were female. Of the 24 participants, 5 had experience using Duolingo while the rest had never used Duolingo before. This sample was selected based on the researcher's own assessment and the assistance of English teachers at the research location. After that, 5 students were selected as representatives to advance to the interview stage.

3.4 Research Sites

What is meant by the location of this research is a place where researcher capture the actual conditions of the object being studied to obtain the data or information needed. In accordance with the problems that have been raised in the previous chapter, the determination of the location of the research was carried out at the UPTD SPF SMP N 3 Simpang Kanan which is located in Sukarejo, Simpang Kanan District, Aceh Singkil Regency.

3.5 Data Source

The subjects of this study were grade VIII students at UPTD SPF SMP N 3 Simpang Kanan in the 2022/2023 academic year. The reason is because before I conducted the research I had done a field experience practice (PPL) at UPTD SPF SMP N 3 Simpang Kanan for 3 months. Based on the results of the researcher's observations, students face English lessons every week and some students feel bored so they tend to chat with their friends. and then most students have androids to communicate with others because this study uses the duolingo application as a tool to improve students' listening skills, so it is worthy of being selected as a data source. In this research the author uses research quantitative, because the data obtained will be in the form of numbers. From the figures obtained will be explained further in the data analysis.

3.6 Data Collection Technique/Research Instruments

According to Arikunto (2003:40) an instrument is a tool used to measure students' abilities or skills that will be assessed or evaluated. This means that an instrument can be used to assist the evaluation process so that the results obtained will be better.

A test is an instrument or tool for collecting data regarding the abilities of research subjects by means of measurement, for example, to measure the abilities of research subjects in mastering certain material, tests (in the form of questions) will be used regarding that subject matter. Thus, there are many types or varieties of research instruments that can be used. Therefore, researchers chose test instruments. There are 2 types of test instruments, namely:

1.PreTest

Pretest means an evaluation or test carried out before starting learning. The aim is to obtain initial competency parameters, how much students know about the learning material.

2. Post Test

Post test is an evaluation or test carried out after the learning material has been provided by the teaching staff. The goal is to obtain final competency, how much students master the learning material that has been presented.

3. Questionnaire

questionnaire is a tool or method used to collect data in research. Although many people use questionnaires as a data collection method, it's still possible that some people neglect how to properly construct a questionnaire.

According to Sugiyono (2017), a questionnaire is a data collection tool consisting of a series of written questions given to respondents to answer.

Questionnaires can contain open-ended questions, closed-ended questions, or a combination of both.

3.7 Data Analysis

Data analysis is a process of examining, cleaning, transforming, and modeling data with the aim of finding useful information and informing conclusions. Data analysis is the process of systematically searching and compiling data obtained from interviews, field notes, and other materials, so that it can be easily understood and the findings can be communicated to others. Data analysis is done by organizing data, describing it into units, synthesizing it, arranging it into patterns, choosing which is important and which will be studied and making conclusions that can be told to others. Data obtained from research can be quantitative data and qualitative data. Quantitative data from qualitative data that is converted into quantitative data. To analyze the data obtained using testing.

1. Quantitative Data Analysis

   The data analysis technique in this study was adapted from Creswell (2012). The steps in the process of analyzing and interpreting quantitative data include preparing the numerical data for analysis using statistical programs, conducting descriptive analysis using statistics reported in descriptive results, presenting and reporting the results using tables, figures, and discussions of each statistical test, and finally interpreting the results by restating the general findings, comparing the findings to previous literature, noting potential limitations of the study, and proposing ideas that will expand future research (Creswell, 2012:p.200-201).

3.8 Checking the Validity of Findings/Hypothesis Testing

a. T-test: The data is normally distributed, followed by a two-sample t-test (independent-samples t test) using the SPSS program version 18.00. The hypothesis is formed if the P-value (signification) (2-tailed) ≥ α, where α = 0.05; then H0 is accepted and interpreted as no significant difference in social skills or student cognitive learning outcomes between the experimental class and the control class.

b. Normalized Gain (N-Gain) The normalized gain (N-Gain) test was carried out to determine the increase in students' cognitive learning outcomes after being given treatment. This increase is taken from the pretest and posttest scores obtained by students. Normalized gain or abbreviated as N-Gain is a comparison of the actual gain score with the maximum gain score. (Richard R. Hake, 1998: 65). The actual gain score is the gain score obtained by the student, while the maximum gain score is the highest possible gain score the student can obtain. The calculation of the normalized gain score (N-Gain) can be expressed in the following formula:

$$< g >= \frac{<sf> - <si>}{100 - <si>} 100\%$$

Information:

$g =$ normalized gain (N-Gain)

$< sf >=$ Post test score

$< si > =$ Pretest Score

The size of the effect provided by the Make a Match type Cooperative Learning approach can be determined through effect size analysis. According to Cohen (Dali S. Naga, 2005:2), the magnitude of the effect size is the average difference expressed in standard deviation, namely.

$$d = \frac{x\,GE - xGK}{sd}$$

Information:

d: effect size

xGE: average normalized gain (N-Gain) of experimental class

xGK: average normalized gain (N-Gain) of control class

The effect size criteria according to Cohen (Dali S. Naga, 2005: 2), can be seen in the following table.

Effect Size Criteria Table

Effect size	Criteria
$0 < d \leq 0{,}2$	Little effect
$0{,}2 < d \leq 0{,}8$	Medium effect
$d > 0{,}8$	Great effect

Source: Dali S. Naga (2005: 2)