

CHAPTER III

RESEARCH METHODOLOGY

This chapter discusses the research methods in this research. Includes discussion of Research Approach, Time and Place of Research, Research Sample, Data collection technique, Research Instrument, Instrument Validity and Reliability, Data analysis.

3.1 Research Design

This research uses quantitative research methods with a correlational research design. Sugiyono (2019), explains that quantitative research methods are methods based on the philosophy of positivism, used in researching research samples and populations. Quantitative research is research that presents data in the form of numbers as the results of the research. Correlational research design is a type of research that aims to identify and measure the relationship between two or more variables without any intervention or manipulation from the researcher. According to Creswell (2016), correlational research aims to measure the strength and direction of the relationship between the variables studied, without directly assessing cause and effect.

3.1 Time and Place of Research

This research was conducted at SMPN 1 Kluet Selatan having an address at Tim, Sapik, Kec. Kluet Tim, South Aceh Regency, Aceh Postal Code 23772. Data collection will be carried out on 23-31 February 2025.

3.1 Research Population and Sample

Research population and sample are basic concepts in methodology that determine the group of subjects to be studied as well as the smaller subset selected for the research. Majid (2018), stated that sample selection and sampling methods play a crucial role in determining the reliability and validity of research findings. Therefore, a proper relationship between population and sample is vital to maintain the methodological rigor of a study. A carefully selected sample will ensure that the research results accurately reflect the characteristics of the population. In this research, the researcher applies two points of explanation that refer to the population and sample that are relevant to the focus of the study.

3.1.1 Research population

Research population refers to all subjects or objects that have certain characteristics and are the focus in a study. This population includes elements that are relevant to the research objectives and that the researcher wishes to study. According to Hossan (2023), population is all elements that have certain characteristics that are relevant to the problem being studied. In research with large

populations, sampling is often carried out because it is impractical to examine all elements of the population.

In the context of this research, the population in question is all grade 7 students at SMPN 1 Kluet Selatan. The population consists of students studying English, with varying levels of speaking ability. This variation in speaking ability is very important to obtain representative data regarding the contribution of vocabulary to students' speaking skills.

3.3.2 Research Sample

The research sample will be taken from this population using random population techniques. Random population techniques are used in the field of analysis to ensure that samples taken from a population can represent the characteristics of the population. By using the random selection method, everyone in the population has the same chance of being selected, so the results obtained are more generalizable and reliable. The sample size can be adjusted to statistical needs and limitations of time and research resources but is expected to be large enough to obtain valid and generalizable results, namely from 46 students.

$$P = 1 - (N-1/N) (N-2/N-1)$$

3.2 Research Instrument

Research instruments are tools used to collect data that can be measured and

analyzed statistically, with the aim of producing numerical data that allows researchers to test hypotheses and measure variables objectively. According to Taherdoost (2017), quantitative instruments, such as questionnaires or tests, function to measure the variables that have been determined in the research. In this research, researchers used several types of instruments to collect data, as follows:

3.2.1 Test

An exam is a tool to gauge a person's knowledge or sample of Information. Ovan (2020), states that the exam consists of several questions that need to be answered. The purpose of the test is to assess an individual's aptitude or uncover hidden characteristics about them. Written, oral, and action exams are the three categories into which the test forms can be separated based on how pupils respond. The exam consists of a collection of questions that are administered to the students in three different ways: practically, in writing, often known as a test written, orally, sometimes called an oral test. The exam assesses how well students have learned about cognitive capacities, particularly how well they have mastered the course materials about the learning objectives.

3.3 Data Analysis Techniques

Data Analysis Techniques aim to identify patterns, trends and relationships in data that can help decision making or provide deeper insight into the problems faced, Islam (2020), states that data analysis techniques must be based on a

scientific approach, using statistical or computational tools to ensure that the analysis results are valid and can be accounted for.

3.3.1 Validity and Reliability Test

The validity test aims to ensure that the instruments used, such as vocabulary tests and speaking tests, accurately measure the construct in question, namely students' vocabulary mastery and speaking ability. Meanwhile, reliability testing aims to assess the consistency of the instrument, ensuring that the results obtained are stable and can be replicated. By conducting validity and reliability tests, researchers can guarantee that the data collected is valid, consistent, and provides an accurate picture of the relationship between vocabulary mastery and students' speaking abilities.

3.5.2 Pearson Correlation

Pearson correlation is a statistical method used to measure the strength and direction of the linear relationship between two variables, in this case between vocabulary mastery and students' speaking ability. The Pearson correlation test allows researchers to determine the extent to which changes in one variable, such as increased vocabulary, are related to changes in another variable, namely speaking ability. Pearson correlation values range from -1 to +1, with a value of +1 indicating

a very strong positive relationship, -1 indicating a very strong negative relationship, and 0 indicating there is no linear relationship between the two variables. In this research, the Pearson correlation test will provide a clear picture of the contribution of vocabulary mastery to students' speaking abilities and measure the extent to which the two are related to each other. The results of this analysis will provide important objective insights to determine the role of vocabulary in improving students' speaking abilities.

3.5.3 Regression Analysis

Regression analysis is a statistical method for measuring the relationship between dependent and independent variables. In this study, regression analysis was used to assess the contribution of vocabulary to students' speaking abilities. This method allows researchers to measure how much influence vocabulary has on speaking ability and whether increasing vocabulary can predict improving speaking ability. The results of the regression analysis will show the strength and direction of the influence of vocabulary on speaking ability, as well as assess its statistical significance. Thus, regression analysis provides insight into the role of vocabulary in improving students' speaking abilities.

$$Y=a+bX+\epsilon$$

Y = dependent variable (what you want to predict).

X = independent variable (predictor).

a = intercept (constant), namely the value of Y when $X=0$.

b = regression coefficient, which shows the average change in Y for each unit change in X .

ϵ = error term, which indicates deviations from the regression model that cannot be explained by a linear relationship.

3.6 Research Procedures

Research procedures refer to a systematic and structured series of steps that a researcher follows to collect, analyze, and interpret data to answer a research question or test a specific hypothesis. These procedures are important to ensure that the research process is conducted in a logical, transparent and reproducible manner. According to Dzwigol (2020), integrity in research procedures is very important to produce valid, credible and ethical knowledge. In this research, researchers applied three types of research procedures, namely:

3.6.1 Preparation

Preparation is an important initial stage in research to ensure smooth implementation. The first step is to design a valid and reliable test instrument to measure students' vocabulary mastery and speaking abilities. This instrument can

be a vocabulary test, speaking test, or a combination of both. Apart from that, researchers also set a schedule for carrying out the research, including the time for giving tests and collecting data. Logistical preparations such as space and equipment are also ensured to be available. With thorough preparation, research can run smoothly and produce valid data.

3.6.2 Implementation

Data collection was carried out at SMPN 1 Kluet Selatan using prepared instruments, such as vocabulary tests and speaking tests. Students are given clear instructions on how to take the test, then asked to complete the test within the specified time. Researchers monitor test administration to ensure proper procedures and ensure equipment, such as recorders for speaking tests, is functioning properly. The purpose of this data collection is to obtain accurate information regarding students' vocabulary mastery and speaking abilities which will be analysed further.

3.6.3 Data analysis

After the data was collected, data analysis was carried out to identify the relationship between vocabulary mastery and students' speaking abilities using statistical software such as SPSS. Researchers will use the Pearson correlation test to measure the relationship between the two variables and regression analysis to

assess the contribution of vocabulary to speaking ability. Additionally, the validity and reliability of the data will be checked to ensure the accuracy of the results. The purpose of this analysis is to provide a clear picture of the role of vocabulary in improving students' speaking abilities and draw conclusions to answer the research hypothesis.

3.7 Test Requirements

Test requirements, especially normality tests, have a crucial role in research which aims to ensure that the data collected can be analysed with appropriate statistical methods. The normality test is used to check whether the data distribution follows a normal distribution pattern, which is a basic assumption in many parametric analyses such as *regression and t tests*. According to Usmani (2020), if the data is not normally distributed, then the use of parametric statistical techniques can produce invalid conclusions, so adjustments or alternative methods need to be made. In the context of this research, the normality test is very important to find out whether the data relating to students' vocabulary mastery and speaking ability at SMPN 1 Kluet Selatan meets the normality assumption, so that the research results can be relied on.

$$L_{hitung} = | F(Z_i) - S(Z_i) |.$$

3.7.1 Linearity

Linearity in this research refers to a consistent and proportional relationship between the two variables analysed, namely vocabulary mastery and students' speaking ability. The linearity test aims to ensure that the relationship between the two variables can be described with a straight line, which is the basic assumption in linear regression analysis. If the relationship between the vocabulary mastery variable and students' speaking ability is linear, then the regression model used will be more appropriate and the results obtained will be more valid in describing the contribution of vocabulary mastery to speaking ability. On the other hand, if the relationship is not linear, then other more appropriate models, such as polynomial regression, need to be considered.

$$Y = \beta_0 + \beta_1 X + \epsilon$$

Where:

- Y is the dependent variable.
- X is the independent variable.
- β_0 is the intercept (constant).
- β_1 is the regression coefficient (slope).
- ϵ is an error (residual).

3.7.2 Homogeneity

Homogeneity in this research refers to the similarity of variance between groups or samples used in the analysis. The homogeneity test was carried out to ensure that groups of students who had different levels of vocabulary mastery did not show significant differences in the variance of their speaking abilities. In other words, homogeneity of variance ensures that the comparisons made between groups are valid and statistically acceptable. One test that is often used to test homogeneity is Levene's test, which can detect whether the variance between groups is the same. Therefore, homogeneity testing is very important in ensuring that the results of research on the contribution of vocabulary mastery to students' speaking abilities can be scientifically justified.

$$W = \frac{N-k}{k-1} \frac{\sum_{i=1}^k n_i (Z_i - Z)^2}{\sum_{i=1}^k \sum_{j=1}^{n_i} (X_{ij} - Z_{ij})^2}$$

Where:

- N is the total number of samples.
- n_i is the number of samples in the i th group.
- Z_i is the average of the absolute values of the deviations in the i th group.
- Z is the average absolute deviation of all data.

3.8 Hypothesis Test

This research used SPSS version 25 to determine whether a hypothesis was accepted or rejected by statistically testing its relevance. According to Mizrahi (2020), hypothesis testing is conducted to statistically test the truth of a statement and draw conclusions to accept or reject that statement. To help make informed conclusions about a given hypothesis, hypothesis testing is done.

The type of hypothesis test used in this research is simple linear regression. The research aims to examine whether there is a significant influence between vocabulary mastery and students' speaking proficiency. Simple linear regression was chosen because it measures the relationship between one independent variable, vocabulary mastery, and one dependent variable, speaking ability. Researchers seek to understand the extent to which vocabulary mastery contributes to improving students' speaking abilities at SMPN 1 Kluet Selatan.

To test this relationship, two hypotheses are proposed. The null hypothesis (H_0) states that there is no significant influence between vocabulary mastery and students' speaking ability, meaning vocabulary mastery does not contribute to speaking ability. In contrast, the alternative hypothesis (H_1) suggests a significant contribution between vocabulary mastery and speaking ability, implying that better vocabulary mastery leads to better speaking proficiency. This relationship will be tested using simple linear regression to determine if there is a strong and significant

connection between these two variables.

Main Hypothesis (H_1)

There is a significant contribution between vocabulary mastery (X) to students' speaking ability (Y) at SMPN 1 Kluet Selatan.

H_1 :

$X \rightarrow Y$

(Where X is vocabulary mastery and Y is speaking ability)

X (mastery of vocabulary): Independent variables, measured by mastery tests of vocabulary which include various types of words mastered by students, such as verbs, nouns, adjectives, and variations of words used in speaking.

Y (Speaking Ability): Dependent variable, measured by speaking tests, such as live conversations, presentations, or other speaking tests that measure fluency, pronunciation, and use of vocabulary in communication.

Null Hypothesis (H_0)

$H_0: P = P_0$ (There is significant contribution between vocabulary mastery (X) to students' speaking ability (Y) at SMPN 1 Kluet Selatan).

$X = Y$

$H_a: P \neq P_0$ (There is no contribution between vocabulary mastery and students' speaking ability).

