

## **CHAPTER III**

### **RESEARCH METHODOLOGY**

#### **A. Research Design**

Quantitative research is a research approach that focuses on numerical data and statistical analysis to understand a phenomenon objectively. In this study, researchers usually formulate hypotheses first, then collect data through standardized instruments such as questionnaires, surveys, or tests with closed questions so that respondents' answers can be measured and calculated. The collected data is then processed using statistical techniques, both descriptive (such as percentages and averages) and inferential (such as t-tests or regression), to see the relationships, differences, or influences between the variables being studied. Quantitative research results are expected to be measurable, testable, and generalizable to a wider population because they typically use large samples and systematic procedures (Ghanad, 2023).

According to Taherdoost, H. (2022), quantitative research is a method that uses numerical values obtained from observations to explain and describe phenomena that can be reflected from these observations. This method uses empirical statements. This method also applies empirical evaluation with the aim of determining the extent to which a norm or standard is met in a particular policy or program. Finally, the numerical data collected is analyzed using mathematical methods. This research uses the experimental method, which in English means an experiment. In the author's opinion, an experiment means carrying out an activity in several ways to produce or confirm something.

Meanwhile, experimental research is research that attempts to find a causal relationship between independent and dependent variables, where the independent variables are deliberately controlled and manipulated. Or, an experiment (experiment research) is an experimental activity (experiment) that aims to identify a phenomenon or effect that arises as a result of a certain

treatment. The design used is quasi-experimental. Quasi-experimental research is a research method used to measure the effect of a treatment on a variable without fully randomizing the subjects. This method is often used in situations where it is difficult to control external variables, such as in the context of education, social issues, or health. Quasi-experimental research designs involve treatment and control groups, but the subjects in both groups are not selected randomly. There are several types of designs in quasi-experimental research, such as non-equivalent control group designs, time series designs, and pre-test post-test designs. The main advantage of quasi-experimental research is its flexibility in real-world situations, allowing researchers to test causal relationships in more natural environments (Anantasia & Rindrayani, 2025).

In addition, this design is particularly suitable for educational research where intact classes cannot be randomly assigned, as students are already grouped administratively. It allows the researcher to maintain the existing classroom structure while still comparing the effectiveness of a treatment between groups. Furthermore, the use of pre-test and post-test helps to measure students' initial ability and learning improvement after the treatment, making the findings more reliable. Therefore, quasi-experimental design is considered appropriate for this study to examine the effect of the Busuu application on students' vocabulary mastery in a real classroom setting.

#### **B. Research Location and Time**

This research was conducted on seventh-grade students at Madrasah Tsanawiyah Nur Rahma in Bengkulu City, located on Bai Island. The research was carried out based on a research permit issued by the campus. The study was conducted from May 11 to June 6, 2026.

### C. Population and Sample

#### 1. Population

The population in this study was is all students of Mts Nur Rahma in Bengkulu city who have certain characteristics and qualities in accordance with the research objectives (Asrulla, et al., 2023). The population is all elements in the study, including objects and subjects with certain traits and characteristics. The population can be divided into three categories: based on number, namely limited population and unlimited population; based on nature, namely homogeneous population and heterogeneous population; and based on other differences, namely target population and survey population. The target population is considered to be the entire group of subjects that are the focus of a study, a population or analysis of a database that is considered or known to be an accurate reflection of the population (Stratton, S. J. 2023). The population in this study can be seen in Table 3.1 below

**Table 3.1. Student population**

| No.   | Grade     | M  | F  | Total |
|-------|-----------|----|----|-------|
| 1.    | Makkah    | 8  | 7  | 15    |
| 2.    | Medina    | 8  | 6  | 14    |
| TOTAL | 2 classes | 16 | 13 | 29    |

As we can see from the table above, the population in this study is all Mts Nur Rahma 7th grade students spread across 2 classes, namely Makkah classes and Madinah classes . The total number of students was 29, consisting of 16 males and 13 females. This number reflects the entire subject population targeted by the study, consistent with the concept of a population as a group of individuals with specific characteristics to be studied comprehensively in order to obtain representative data.

## 2. Sample

A sample is defined as a part of the population that represents the entire group and serves as the main source of data in a study, Asrulla,et al., (2023). Sampling is a statistical method used to select a subset of individuals in order to draw conclusions about the population, (Samudra et al., 2023). It is important that the sample accurately reflects the population to ensure valid results.

Sugiyono (2017) states that this method is suitable for small populations to minimize error, while Williams and Carter (2024) explain that it allows for a more comprehensive understanding by involving the entire population. Therefore, the sample in this study consists of all 29 students of MTs Nur Rahma, meaning the whole population is used as the sample.

**Table 3. 2. Total Sample of The Research**

| Class        | Subject of student | M | F | Number of Students |
|--------------|--------------------|---|---|--------------------|
| VII Makkah   | Experimental group | 8 | 7 | 15                 |
| VII Madinah  | Control group      | 8 | 6 | 14                 |
| <b>Total</b> |                    |   |   | <b>29</b>          |

In this study, the researcher used total sampling, a technique in which all members of the population are included as research participants.

### **D. Operational Definition of Variables**

In research, variables are any characteristics that can have different values, such as height, age, temperature, or test scores (Bhandari, P. 2023). Independent variables are variables that are manipulated or changed in an experimental study to explore their impact. These variables are called

"independent" because they are not influenced by other variables in the study. Independent variables are also called: explanatory variables (they explain an event or outcome), predictor variables (they can be used to predict the value of dependent variables), right-hand side variables (they appear on the right side of the regression equation). These terms are primarily used in statistics, where you estimate the extent to which changes in independent variables can explain or predict changes in dependent variables (Bhandari, P. 2023).

A dependent variable is a variable that changes as a result of manipulating the independent variable. It is the outcome you want to measure, and it "depends" on your independent variable. In statistics, dependent variables are also called response variables (they respond to changes in other variables), outcome variables (they represent the outcome you want to measure), or left-hand side variables (they appear on the left side of the regression equation). Dependent variables are the data you record after manipulating the independent variables. This measurement data is used to examine whether and to what extent independent variables affect dependent variables through statistical analysis (Bhandari, P. 2023). These variables have various characteristics or values, making them the focus of researchers' attention for study and drawing conclusions. These variables are as follows:

#### 1. Vocabulary

Vocabulary as a collection of words and idioms that are interrelated in the lexical system of a language, covering aspects of meaning, form, usage, collocation, and semantic relationships such as synonymy and hyponymy. (McCarthy, M. 1990) describes how words and expressions are organized in language, how vocabulary is learned and stored in memory, and the differences between receptive and productive vocabulary in effective second language learners. Vocabulary is the total number of words known and used by a person in language activities, a group of words and meanings used to communicate with others as a major part of

language. Vocabulary is an important subject for students to speak, read, write, and listen to (Salawazo et al., 2020).

## 2. Busuu Application

Busuu is the world's largest social network for learning languages, offering 12 language courses. The Busuu app is specifically designed to help users learn foreign languages through a combination of interactive materials and communication exercises with native speakers. Busuu combines reading, writing, listening, and speaking exercises in short lessons that can be accessed via mobile phone or the web, making it convenient to use anytime. The app offers courses in various languages with levels based on the CEFR framework (A1–C1) and provides a community feature where users can get immediate corrections from native speakers. Busuu was founded in 2008 by Bernhard Niesner and Adrian Hilti, who initially developed it as their final business studies project because they felt traditional language learning methods were rigid, expensive, and impractical. The name "Busuu" itself is taken from an endangered language in Cameroon, symbolizing their mission to make language learning more accessible globally. The learning levels used in this app follow international standards, ranging from beginner (A1), basic (A2), intermediate (B1), and advanced (B2) levels. The app provides learning materials in audio-visual format (Arneson, K. 2020).

## E. Research Instruments

Research instruments are tools used to collect data or measure research variables. To obtain accurate data that reflects the actual situation, instruments that are valid, consistent, and appropriate for providing research data are required. (Yusup, F. 2018). In this study, the measurement instrument used was a vocabulary test, consisting of a pre-test and post-test. Therefore, the vocabulary test was given to students, consisting of twenty questions to evaluate their vocabulary skills. This test included a pre-test and post-test, which

were given to two groups: the experimental class and the control class. Before being used in the study, the validity and reliability of this vocabulary test measurement instrument also had to be tested to ensure the accuracy and consistency of the instrument. The questions could be used for the pre-test and post-test for both groups after they had been tested and met the eligibility standards.

#### 1. Test

A test is a standardized instrument used to measure dependent variables such as students' knowledge or skills, allowing the results to be compared fairly between participants. In a pre-test post-test control group design, the same test is administered before and after the intervention to both the experimental group and the control group in order to objectively assess any changes that occur. The questions in the test are carefully designed to represent the predetermined learning objectives, ensuring that the instrument accurately measures students' abilities.

In the experimental group, participants are given a specific treatment before taking the post-test, while the control group does not receive the treatment or is given a different one. This allows the researcher to identify whether any differences in the results are caused by the intervention. In this study, the test used consists of 60 questions that have been arranged systematically to measure students' understanding and skills based on the learning material (Bobbit, Z. 2021).

#### 2. Vocabulary test

A vocabulary test is a tool used to measure the extent to which students understand and master the vocabulary they have learned. This test assesses students' ability to recognize, understand, and use words appropriately in various oral and written contexts. To help students improve their vocabulary mastery, researchers can conduct studies by providing a planned treatment, such as applying context-based vocabulary learning strategies, using reading texts rich in target vocabulary, or intensive practice through word games and interactive digital media. These treatments are usually given in several learning

sessions, then their effectiveness is evaluated by comparing the results of vocabulary tests before and after the treatment, so that it can be seen whether there is a significant increase in students' vocabulary mastery (Bowles, R. P., & Salthouse, T. A. 2008).

In English vocabulary instruction, the score range is calculated based on the maximum score. The formula used to calculate the score range is:

$$\text{Score} = \frac{\text{The makimum score}}{\text{The total number of item}} \times 20$$

The total number of item

$$\text{Score} = \frac{53}{60} \times 20$$

60

$$\text{Score} = 17$$

**Table 3.3. Score Interval for English Teaching**

| The Range of Scores | Score Category  |                                                                                                          |
|---------------------|-----------------|----------------------------------------------------------------------------------------------------------|
| 20                  | Excellent       | Sophisticated range-effective word idiom choice and usage, etc.                                          |
| 17-14               | Good to Average | Adequate range with occasional errors in word/idiom form, choice, or usage, but meaning is not obscured. |
| 13-10               | Fair to Poor    | Limited range, frequent errors in word/idiom form, choice, usage, etc.                                   |
| 9-7                 | Very Poor       | Essentially translation with little knowledge of English vocabulary.                                     |

Source: J.B. Heaton, 1997

## **F. Data Collection Technique**

Data collection is defined as the process of gathering, evaluating, and analyzing accurate information for research using verified methods. Researchers can evaluate hypotheses based on the data collected. In almost all cases, data collection is the most important step in research, regardless of the field of study. Data collection methods vary according to different fields of study, depending on the essential information. The main purpose of data collection is to ensure that rich and consistent data is collected for statistical analysis and to assist in data-based decision making for research (Mazhar, S. A., et al, 2021). In this study, the researchers gave pre-tests and post-tests to all students, both in the control class and the experimental class. Data was collected by giving tests to students. Data collection is one of the important steps in determining the results of the study. The data collection process was carried out in several stages. Data was taken from pre-test and post-test scores. The purpose of this study was to determine whether the Busuu application was effective in improving the vocabulary of students at Mts Nur Rahma in Bengkulu City. Then, the pre-test and post-test scores were compared to see the difference. The researchers also observed the students' vocabulary skills before the test was conducted.

### **a. Pre-test**

A pretest is an assessment conducted before the implementation of an intervention or learning program to measure the initial knowledge, skills, or abilities of students. This assessment is carried out to determine the initial condition of the participants, which serves as a critical reference point in evaluating changes in learning outcomes after the intervention is implemented. Through the pretest, the initial competencies of participants are documented and analyzed, allowing researchers to identify strengths and weaknesses that may influence the subsequent learning process.

The data obtained from the pretest is used to control for initial differences among participants and ensure that the improvements

observed in the posttest can be confidently attributed to the instructional intervention, rather than to prior knowledge, experience, or other external factors. In educational research, pretests are considered an essential component of experimental and quasi-experimental designs, especially in pretest–posttest studies, as they contribute to the validity and reliability of findings. Additionally, pretests provide useful

information for educators and researchers to adjust instructional strategies, target areas of difficulty, and improve the overall effectiveness of the learning process, making them an irreplaceable tool in teaching and research environments (Bobbitt, 2021). The pretest was carried out on May 11, 2026, with seventh-grade students at MTS NUR RAHMA, Bengkulu City.

b. Post-test

In a posttest design with a control group, there are two groups: an experimental group that receives the intervention and a control (comparison) group that does not receive the intervention (Gray, 2023). Both groups are measured after the intervention. For example, a posttest-only design with a control group can be used to assess the impact of a new hand hygiene intervention among hospital staff to reduce healthcare-associated infection rates. Another opinion is that a post-test is a follow-up measurement after the intervention is given only to the experimental group, while the control group remains untreated. A comparison of post-test scores between groups, with the pre-test as a covariate, shows the effectiveness of the intervention (Dugard,d P., & Todman, J. 1995). The posttest was carried out on June 6, 2026, with seventh-grade students at MTS NUR RAHMA, Bengkulu City.

c. Treatment

Treatment in experimental research is any form of intervention that is deliberately designed and administered by researchers to the experimental group with the aim of changing or improving dependent variables, such as learning outcomes, attitudes, or skills of participants.

Treatment can take the form of a specific learning model, the use of new media, special teaching strategies, or training programs that are planned and systematically designed to be implemented over a certain period of time.

During the treatment, the implementation procedures are usually standardized, so that the steps, time, and learning conditions are the same for all participants in the experimental group, in order to more reliably attribute any changes to the treatment rather than to external factors. The treatment is only given to the experimental group, while the control group does not receive the treatment or receives conventional learning, so that the difference in scores between the two groups after the post-test can be used to assess the extent of the effect of the treatment that has been applied (Jafargholi R., 2020). In this study, the experimental class received treatment using the Busuu application for 4 meetings, while the control class used instructional videos from YouTube.

d. Documentation

Documentation in this study is defined as a record of the process of creating and processing data (paradata) according to Huvila, I., et al. (2022), which includes information about how, when, and why data is generated or processed, so that the entire research flow can be traced transparently. Process documentation is used to support data reuse, clarify the context in which the data was formed, and maintain the integrity and credibility of the data set for other researchers who may perform reanalysis or verification of findings. In line with document analysis procedures, this study adopted the READ (Ready, Extract, Analyze, Distill) approach recommended by Dalglish, S. H. et al. (2020), which consists of the stages of material preparation, extraction of relevant information, analysis, and formulation of conclusions so that document analysis is carried out systematically and consistently. In this thesis research, documentation took the form of photographs taken

during the conduct of the study in both the experimental and control classes.

### G. Data Analysis Technique

The prerequisite data analysis used in this study includes normality tests, homogeneity tests, T-tests, and hypothesis testing.

#### 1. Validity of the Test

In assessment studies, validity is defined as the degree to which a test actually measures what it is supposed to measure, rather than other unwanted constructs. A vocabulary test, for example, is said to have good content validity if the items proportionally represent the entire domain of vocabulary material taught, not just a small part or irrelevant material. In addition, criterion-related validity appears when test scores correlate strongly with relevant external criteria, such as standard test scores or students' actual performance in using vocabulary, while construct validity requires evidence that the test truly reflects the theoretical construct of "vocabulary mastery" through theoretical arguments and empirical data, such as intercomponent correlation analysis or measurement models (Yu, C. H. 2005).

**Table 3.4. Test Instrument Validity Criteria**

| NO | Cronbach's Alpha | Validity Level |
|----|------------------|----------------|
| 1  | 0.81-1.00        | High           |
| 2  | 0.61–0.80        | High           |
| 3  | 0.41-0.60        | Fair           |
| 4  | 0.21–0.40        | Low            |
| 5  | 0.00-0.20        | Very low       |

*Source: Widodo et al, 2023*

In addition, the researchers analyzed the test results using

statistical software such as SPSS version 27. The test consisted of 60 questions covering three predetermined indicators. The following are the results of the data analysis from the instrument validity test. Valid item numbers: 1,2,5,6,7,8,9,10,12,14,15,17,18,20,21,23, 25,26,27,28,29,33,34,36,38,39,42,43,45,47,48,49,50,51,52,53,54,55,56,57, 59,60. Invalid item numbers: 3,4,11,13,16,19,22,24,30,31,32,35,40,41,44,46,58.

In this validity test, the researcher used 60 multiple-choice questions with pre-determined indicators, and the instrument was tested at SMP Negeri 5 Bengkulu, a school whose accreditation level is estimated to be equivalent to the schools to be studied, using 30 students as test subjects. The main research location was a Madrasah Tsanawiyah, namely MTs Nur Rahma. Upon completion, the researcher analyzed the data by determining the validity of each item. Based on the findings of the analysis, 42 of the 60 items tested were declared valid using certain indicators listed in the appendix 9.

## 2. Reliability of the test

Reliability in assessment is defined based on classical test theory as the square of the correlation between the observed score and the true score, which reflects the extent to which a test produces consistent scores and is free from random measurement errors. A test is said to be reliable if the results are relatively stable when administered repeatedly to the same group or when several items in the test are consistently correlated with each other (Yu, C. H. 2005).

**Table 3.5. Test Instrument Reliability Criteria**

| NO | Cronbach's Alpha | Reliability Level   |
|----|------------------|---------------------|
| 1  | 0.00-0.20        | Lack of Reliability |
| 2  | 0.20–0.40        | Somewhat Reliable   |
| 3  | 0.40-0.60        | Fairly Reliable     |
| 4  | 0.60-0.80        | Reliable            |
| 5  | 0.80-1.00        | Highly Reliable     |

Source: Nuzulia, 2019

The researchers used SPSS version 27 to analyze reliability. This reliability test was used to determine whether the research instrument produced consistent results. The calculation was performed using Cronbach's alpha, which measures the strength of the relationship among the items in the instrument. The results showed that the reliability coefficient (Cronbach's alpha) was as follows

**Table 3. 6. Test Instrument Reliability Coefficient**

| Reliability statistics |            |
|------------------------|------------|
| Cronbach's Alpha       | N of Items |
| <b>0,921</b>           | <b>60</b>  |
| <b>Highly reliable</b> |            |

### 3. The level difficulty test

One important component in the development of research instruments is the item difficulty test. Analyzing the difficulty level of test items means examining the test questions in terms of difficulty so that it can be determined which questions are the most difficult or easy (Magdalena, Fauziah, et al., 2021). This test was conducted to evaluate the effect of the Wordscapes application on students' vocabulary

mastery. This test is conducted to analyze the difficulty level of the game so that each question is appropriate for the students' abilities. In this process, data are collected from students who complete the game vocabulary test and then the results are analyzed. To determine whether a question is easy, difficult, or moderate, the difficulty level is calculated by dividing the number of students who answered correctly by the total number of test participants. The general formula

$$\text{is: } P \frac{R_h + R_i}{N_h + N_i} \times 100\%$$

Description:

P = Difficulty level in percent

N<sub>h</sub> = Number of test takers in the high score group

R<sub>(h)</sub> = Number of correct answers in the high score group

N<sub>i</sub> = Number of test takers in the low score group

R<sub>i</sub> = Number of correct answers in the low score group

**Table 3.7. level difficulty test**

| Question category       | Interpretation of results |
|-------------------------|---------------------------|
| Classified as easy      | 0.71%-----100%            |
| Classified as medium    | 0.31%-----0.70%           |
| Classified as difficult | 0% -----0.30%             |

Source: (Gde Yadnyawati, 2019)

In item testing, it is important to ensure the level of difficulty is balanced so that items are neither too easy nor too difficult. Based on the calculation results, the item difficulty reached 67.9%. This value falls into the medium category, as it is within the range of 31% to 70%. Thus, the items are considered appropriate and suitable for use in the research.

$$DP = \frac{U - L}{N}$$

Description:

DP = Question discriminating power

U = Number of correct answers from high score group test takers

L = Number of correct answers from low score group test takers

N = Number of students in each group

Table 4. Interpretation of the power difference test

**Table 3.8. Interpretation of difficult question categories**

| T-test                   | Interpretation of results |
|--------------------------|---------------------------|
| $0.71 \leq DP \leq 1.00$ | Very good                 |
| $0.41 \leq DP \leq 0.70$ | Good                      |
| If $+ 0.21 < DP < 0.40$  | Sufficiently qualified    |
| If $0 < DP \leq 0.20$    | Weak                      |

Source: (Desman et al., 2025)

Discrimination power testing was conducted to ensure that the test used could effectively assess differences in students' vocabulary mastery levels. Based on the calculations, the Discrimination Power value reached 22.44%. When compared to the category considered to meet the criteria, namely in the range  $0.21 \leq DP (0.33) < 0.40$ , it can be concluded that the Discrimination Power in this study falls into the fairly acceptable category.

#### 4. Normality Test

Normality tests are carried out to determine whether the research data are normally distributed so they can be analyzed using parametric statistics. Data are considered normally distributed if the significance value of the normality test is greater than 0.05. Based on the normality test results

referring to the Data Analysis Technique for Normality Tests in J-CEKI, the data in this study show significance values above 0.05; therefore, it can be concluded that the data are normally distributed and

meet the assumptions for parametric analysis. For further results, see Chapter 4. (Isnaini, M., et al., 2025). This test is often used to determine whether data are normal. The normality test is performed to ensure that the instruments are normal and that the research is functioning well overall. The researcher used SPSS to test and determine data normality.

#### 5. Homogeneity test

Homogeneity tests are statistical procedures used to determine whether two or more data groups have the same variance, allowing fair and objective comparisons between groups. This test is an important prerequisite for parametric statistical analyses such as the t-test and ANOVA because excessively large differences in variance between groups can lead to inaccurate or biased conclusions. In practice, several common techniques are used to test homogeneity of variance, including Levene's test, Bartlett's test, and Cochran's test; each has its own strengths and limitations depending on the characteristics of the data being analyzed. By performing a homogeneity test, researchers can ensure that observed differences between study groups stem from the treatment or variables under investigation, not from inherent variance within the data itself (Rusli et al., 2024)

Homogeneity tests are used to determine whether data within a population are homogeneous. The significance level  $\alpha = 0.05$  is the basis for decision-making. If the significance value (Sig) is greater than 0.05, the sample variances are considered equal or homogeneous; conversely, if the significance value is less than or equal to 0.05, the variances are considered different or not homogeneous. Researchers typically use statistical software, such as SPSS, to perform this test, and the homogeneity test results in this study indicate that the data are homogeneous.

## 6. T-test

The Student's t-test consists of three main types: the one-sample t-test, the two-sample t-test, and the paired t-test, each used based on the data characteristics and research objectives. The one-sample t-test compares the mean of a single group to a specific value, the two-sample t-test compares the means of two independent groups, and the paired t-test is used for related measurements, such as pre-test and post-test data. Each test produces a statistic that is converted into a p-value to determine whether the null hypothesis can be rejected; if the p-value is smaller than the alpha level, the result is considered significant. Before conducting a t-test, researchers must ensure that the assumptions are met and appropriately determine the alpha and beta values in the research design (Wadhwa & Marappa, 2025). The Student's t-test (also called the t-test) is used to compare means between two groups and does not require multiple comparisons because a single unique p-value is observed, Mishra et al (2019).

From the two theories above, it can be concluded that the t-test (Student's t-test) is an effective and specific statistical method for comparing the mean values of two data groups, with three main variants adjusted to research conditions: the one-sample t-test, the independent two-sample t-test, and the paired t-test

### a. Independent Test

The independent samples t-test applies to two groups of data that are not related to one another, meaning that each subject in one group is distinct and does not influence subjects in the other group, such as a comparison between men and women. In this test, data from both groups are considered independent of one another, unlike paired data, which come from the same subjects, (Kim, 2019). The independent t-test, also called the unpaired t-test, is an inferential statistical test that determines whether there is a statistically significant difference between the means of two unrelated (independent) groups,

Mishra et al (2019) .Therefore, the independent t-test is used to compare the means of two unrelated groups to determine whether there is a significant difference between them. The use of this test must also satisfy certain assumptions, such as a normal data distribution and equal variances across groups, so that the analysis results can be considered valid and reliable.

1. The independent variable uniquely affects the dependent variable if the significance level is less than 0.05.
2. The independent variable does not affect the dependent variable if the significance level is greater than  $\alpha$  (0.05).

#### 7. Effect size

Effect size is an indicator used to explain the magnitude of the influence or strength of the relationship between two variables in a study. This measure is important because it not only shows whether there is an effect or not, but also describes how strong or large the effect is. Two types of effect size that are often used are Cohen's d, which is used to assess the magnitude of the difference in means between two groups, and Pearson's correlation coefficient (r), which is used to indicate the strength of the relationship between two variables (Funder & Ozer, 2019) . Based on the effect size values, researchers can categorize the magnitude of the influence or relationship between the variables being studied. The following are the effect size value categories used to measure the magnitude of the influence or relationship between two variables in a study:

**Table 3.9. Value of the effect size**

| No | Value      | Effect size      |
|----|------------|------------------|
| 1  | 0.00-0.195 | Very weak effect |
| 2  | 0.20–0.395 | Weak effect      |
| 3  | 0.40–0.595 | Moderate effect  |

|   |            |                    |
|---|------------|--------------------|
| 4 | 0.60–0.749 | Strong effect      |
| 5 | 0.80–1.00  | Very strong effect |

Source: Cohen, 2019

#### 8. Statistical Hypothesis

Hypothesis testing aims to determine whether the null hypothesis ( $H_0$ ) is rejected or not rejected and to assess whether the alternative hypothesis ( $H_a$ ) can be accepted. Hypothesis testing in this study was conducted using SPSS version 25. The decision criteria are as follows:

- a. If the Sig. (2-tailed) value  $< 0.05$ , then  $H_0$  is rejected and  $H_a$  is accepted.

If the Sig. (2-tailed) value is  $\geq 0.05$ , then  $H_0$  is not rejected and  $H_a$  is not accepted.