

## **CHAPTER III**

### **METHODOLOGY**

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

This research will use a quantitative method, namely the experimental method, which is a quantitative research approach that focuses on understanding the cause-and-effect relationships between two or more variables. In this method, researchers administer a specific treatment to the independent variable, then observe and measure its effect on the dependent variable under strictly regulated and controlled conditions (Sugiyono, 2020). Through a systematic and controlled research design, this method allows researchers to obtain empirical evidence regarding the effectiveness of a treatment, so that the results can be used as a basis for drawing valid and scientifically testable conclusions. This study employs a quantitative approach aimed at obtaining objective and measurable data. The method used in this research is a quasi-experimental method, which is applied to determine the effect of a particular treatment on certain variables. Specifically, the design implemented is the nonequivalent control group design, which involves two groups, namely an experimental group and a control group. This design is chosen because it is considered appropriate for observing

and measuring students' learning outcomes (Sugiyono, 2014).

**Tatble 3.1 Pre Test Post Test None equivalent control group Design**

|            |    |   |    |
|------------|----|---|----|
| Experiment | 01 | x | 02 |
| SSSControl | 03 | - | 04 |

Description:

E : Experimental Group

K : Control Group

X : Application Media

01 : Pretest in experimental class

02 : posttest on the experimental class

03 : pretest in control class

04 : posttest on control class

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

This research was conducted on Eighth grade students of MTsN 2 in Kota Bengkulu located on JL. Setia Negara ,kandang Mas,kampung melayu District, Kota Bengkulu ,Provinsi Bengkulu.

## **C. Populasi dan Sample**

### **1. Populasi**

According to Sugiyono (2022:80), the definition of population is a generalized area consisting of

objects/subjects that have certain qualities and characteristics that are determined by researchers to be studied and then drawn conclusions. In research, population refers to an entire group or element that has certain characteristics that are to be studied. Populations can consist of individuals, objects, events, or anything relevant to the research being conducted. Population describes a very large and extensive amount of data in a study (Darmawan, 2016), where population is also a collection of all possible people, objects and other measures that are the object of attention in a study (Suharyadi and Purwanto S. K., 2016).

It can be said that population is an important step in research because it is the basis for identifying who will be studied.. This study will take population of Eighth grade students of MTSn 2 Kota Bengkulu for the 2026/2027 school year. In the study, where the population is shown with the following table:

**Tabel 3.2 Research Population**

| No    | Class  | Women | Men | Total | Menu<br>Score |
|-------|--------|-------|-----|-------|---------------|
| 1     | VIII A | 18    | 12  | 31    | 74            |
| 2     | VIII B | 18    | 13  | 30    | 74            |
| 3     | VIII C | 18    | 13  | 31    | 73            |
| 4     | VIII D | 18    | 13  | 31    | 73            |
| 5     | VIII E | 18    | 13  | 31    | 74            |
| 6     | VIII F | 18    | 13  | 31    | 73            |
| 7     | VIII G | 18    | 12  | 30    | 73            |
| 8     | VIII H | 19    | 11  | 30    | 71            |
| 9     | VIII I | 18    | 12  | 30    | 72            |
| Total |        |       |     | 275   |               |

Source : MTSn 2 Kota Bengkulu 2026

Based on the tabel 2 the research population in this study consists of 9 classes, with an average of 30 and 31 students in each class. Therefore, the total number of students from all classes is 275 students.

## 2. Sample

In this study, a portion of the population is correctly researched and expected to represent the characteristics of the population as a whole using the research sample. According to suriani et al.(2023), a sample is "a portion of the population that is taken as a sample (monster) using a specific method." This study applies the purposive sampling technique, which is a sample selection method that is carried out based on special criteria or considerations that have been set by the researcher. Purposive sampling, also known as assessment-based, selective, or subjective sampling, is a type of non-probability sampling technique that is often used in qualitative research (Adeoye, 2023). The researcher determined the experimental and control groups based on the students' average scores in English. This was done to ensure that both groups had relatively similar initial abilities, so that the comparison of the research results could be conducted objectively. Based on the data obtained, the researcher determined class VIII H as the experimental group with an average score of 71, while class VIII I was determined as the control group with an average score of 72, as shown in the table below:

**Tabel 3.3 Total sample of The Research**

| Class  | Subject of students | Men | Women | Number of students |
|--------|---------------------|-----|-------|--------------------|
| VIII H | Experimental group  | 11  | 19    | 30                 |
| VIII I | Control group       | 12  | 18    | 30                 |
| Total  |                     |     |       | 60                 |

Source : MTSN 2 Kota Bengkulu

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

A variable is a characteristic or attribute of an individual or organization that can be measured or observed and varies among the individuals or organizations being studied (Creswell & Creswell, 2018). Variables in research act as elements that indicate things to be observed or measured in a study. Types of variables include independent, dependent, control, and moderator variables, each of which has a different role and relevance within the research framework. Independent variables are variables that you manipulate or that you change to see how they affect dependent variables. (McCombes, 2022) Dependent variables are outcomes that are measured in experiments and that are influenced by independent variables (McCombes, 2022). The researcher examined the dependent variables to

see the extent to which changes in the independent variables had an impact on the results obtained. Each variable has certain characteristics and values, so that it becomes the center of attention of the researcher in the process of observation and drawing conclusions. The variables are described as follows.

a. Quizalize Application (X)

Quizalize Application is an innovative digital tool that applies gamification principles to enhance students' engagement, motivation, and performance in English language learning.”( Muthmainnah & Al Yakin,2024). Quizalize is a digital learning application that enables teachers to create interactive quizzes to support a more engaging and enjoyable learning process through a game-based learning approach. The application offers various types of questions, such as multiple-choice and short-answer items, and can be accessed flexibly by students using digital devices. In addition, Quizalize provides features such as automatic grading and performance tracking, allowing teachers to monitor students' learning outcomes in real time, as well as a leaderboard that enhances students' motivation. With these features, Quizalize functions not only as an assessment tool but also as an effective learning medium to improve student

engagement and vocabulary mastery in English learning (Utari et al, 2021).

b. Vocabulary (Y)

One of the essential components for everyone in learning a foreign language is vocabulary. Without learning the vocabulary, it is difficult to attain any language proficiency (Afzal , 2019) especially for those whose English is not their first language because it is the foundation of learning a language. This statement is in line with Nathaya (2013) said that vocabulary is one of the important aspects of language teaching. Therefore, the students should have the ability in understanding and use the words and meanings. The students can learn English more easily by understanding the meaning of those words.

**E. Data Collection Technique**

In the research process, data collection is one of the most crucial stages and determines the quality and validity of the research results. Data collected using appropriate methods will provide a strong foundation for analysis and conclusions, thus providing accurate answers to research problems (Mwita ,2022). Data were collected by administering tests to students. Data collection is a crucial step in

understanding research results. The data collection process involved several stages. Data were taken from pre-test and post-test scores. The purpose of this study was to determine whether the Quizalize application was effective in improving students' vocabulary in MTsN 2 Kota Bengkulu. Pre-test and post-test scores were then compared to determine differences. The researchers also assessed students' vocabulary skills before the tests. The following are three data collection techniques:

1. Test

A test is a systematic procedure for observing and describing one or more characteristics of a person with the aid of either a numerical scale or a category system (Kubiszyn & Borich 2024).

- a. Pre-test

A pre-test is an initial measurement administered prior to an intervention or instructional treatment, aimed at determining the baseline performance of learners (Uzun Ogretmen, 2021). In this study, the pre-test will be administered to both the experimental class and the control class.

The pre-test was administered to both the experimental and control classes before the implementation of the treatment to assess the

students' initial vocabulary mastery. The purpose of the pre-test was to obtain baseline data on the students' vocabulary knowledge prior to the use of the Quizalize application as the instructional medium. The results of the pre-test served as a basis for comparison with the post-test scores after the treatment had been implemented. This comparison enabled the researcher to analyze and evaluate the effectiveness of the Quizalize application in improving students' vocabulary mastery.

b. Treatment

Treatment is a key component in experimental research design, as it serves to test the effectiveness of a method, strategy, or learning program on student learning outcomes( Mertler 2024).

The treatment in this study was administered to the students in the experimental class by using the Quizalize application as a learning medium to improve their English vocabulary mastery. Throughout the instructional process, the students were encouraged to learn and expand their vocabulary through various game-based learning activities provided by the Quizalize application.

This approach was designed to create a more interactive, engaging, and motivating learning environment, encouraging students to participate actively in the learning process. In contrast, the students in the control class received instruction through conventional teaching methods. The learning activities in the control class included educational games designed by the researcher as supplementary classroom activities to support vocabulary learning. However, unlike the experimental class, the control class did not use the Quizalize application or any technology-based learning media. The treatment was conducted over six instructional sessions, with each session lasting 45 minutes, resulting in a total instructional time of 270 minutes. During the treatment, the researcher guided the students in using the Quizalize application, provided instructions on how to complete the game-based activities, assisted them in understanding unfamiliar vocabulary, and offered additional explanations regarding the meanings and appropriate use of the target words in context. Consequently, the students were expected not only to memorize new vocabulary but also to develop a deeper understanding of its

meaning and usage. The purpose of this treatment was to introduce an innovative, technology-enhanced approach to English vocabulary instruction, making the learning process more engaging, enjoyable, and student-centered. Furthermore, the treatment aimed to examine the effectiveness of the Quizalize application in improving students' English vocabulary mastery compared with the conventional teaching method implemented in the control class.

c. Post-test

The post-test was administered to both the experimental and control groups after all treatment sessions had been completed. The purpose of the post-test was to measure the students' English vocabulary mastery after they had received different instructional treatments. By comparing the pre-test and post-test scores, the researcher was able to determine the extent to which the treatment influenced the students' vocabulary mastery. According to Yusuf et al. (2024), administering a post-test after the treatment is essential for evaluating students' learning outcomes and determining the effectiveness of the instructional media used in the teaching and learning process.

In the experimental class, the post-test was administered after the students had learned vocabulary through the Quizalize application as a game-based learning medium.

Meanwhile, in the control class, the post-test was conducted after the students had received instruction through conventional teaching methods supported by educational games designed by the researcher. The post-test employed the same scoring criteria as the pre-test, with each correct answer receiving a score of **1** and each incorrect answer receiving a score of **0**, ensuring an objective assessment of students' vocabulary mastery. The post-test scores were then compared with the pre-test scores to identify any improvement in the students' vocabulary mastery after the treatment. Furthermore, the post-test results of the experimental and control groups were compared to determine whether the use of the Quizalize application had a significant effect on students' English vocabulary mastery compared with the conventional teaching method. Comparing the pre-test and post-test results between experimental and control groups is a fundamental procedure in experimental research to evaluate the

effectiveness of a teaching method or instructional medium in improving students' learning outcomes.

## **F. Research Instrument**

In a research study, instruments are essential tools used to collect data from participants. In quantitative research, instruments play a crucial role because they are used to measure the variables under investigation objectively and systematically. In this study, the instrument used was a vocabulary test consisting of a pre-test and a post-test. The test was designed, developed, and administered to collect data related to students' knowledge, skills, and vocabulary mastery. According to Mertler (2024), the use of instruments such as tests in quantitative research allows researchers “to obtain measurable evidence of learning outcomes and to evaluate the effectiveness of instructional interventions.” In other words, tests serve as the primary means of assessing learning achievement and the impact of instructional strategies.

The vocabulary test in this study aimed to measure how effectively the use of the Quizalize application improved students' vocabulary mastery.

### **a) Vocabulary test**

This study aimed to investigate the effect of using the Quizalize application on the vocabulary

mastery of eighth-grade students in Classes VIII H and VIII I at MTsN 2 Kota Bengkulu. The study involved two groups, namely the experimental class and the control class. The research began with the administration of a pre-test to all students to measure their initial vocabulary mastery before the treatment was implemented. Subsequently, the students in the experimental class participated in vocabulary learning activities using the Quizalize application for six instructional sessions. Quizalize is a game-based learning platform designed to create an interactive, engaging, and challenging learning environment, thereby increasing students' participation during the learning process. In contrast, the students in the control class received instruction through the conventional teaching method supported by *filler games* without the use of the Quizalize application. After the completion of the instructional sessions, both classes were administered a post-test to measure students' vocabulary mastery following the learning process. The tests were scored objectively by assigning one point for each correct answer and zero points for each incorrect answer.

The pre-test and post-test scores were then analyzed and compared to determine the

improvement in students' vocabulary mastery before and after the treatment. techniques to determine the effectiveness of the Quizalize application in improving students' vocabulary mastery. Vocabulary mastery is one of the fundamental aspects of language learning because it serves as the foundation for all language skills. As stated by Zheng (2024), Vocabulary is one of the three essential elements of language and the foundation of all linguistic activities. Without vocabulary, nothing can be conveyed. Researchers will conduct a trial using the Quizalize application.

**Table 3.4 Score Interval for English Teaching Vocabulary**

| The Range of Score | Scores       | Category |                                                                                              |
|--------------------|--------------|----------|----------------------------------------------------------------------------------------------|
| 20-18              | Excellent    |          | Sophisticated range-effective word idiom choice and usage etc.                               |
| 17-14              | Good Avarage | To       | Adequate range occasional errors of word/idiom form, choice, usage but meaning not obscured. |

|       |              |                                                                               |
|-------|--------------|-------------------------------------------------------------------------------|
| 13-10 | Fair To Poor | Limited range<br>frequent errors of<br>word/idiom form,<br>choice, usage etc. |
| 9-7   | Very Poor    | Essentially<br>translation little<br>knowledge of<br>English<br>vocabulary.   |

Source: J.B.Heaton, 1997

#### b) Documentation

Documentation is a data collection technique that involves gathering information from various types of documents or written sources relevant to the research focus. These documents can include reports, archives, academic records, test results, activity photos, journals, or other written materials. The primary purpose of this method is to obtain factual data that supports the results of observations and interviews and strengthens the validity of research findings. Documentation includes a list of student names as research subjects, as well as the grades required for the study. Furthermore, documentation also includes photographs of learning activities and the results of initial and final tests for the material

presented. According to Vretblom (2025), documentation serves as a primary supporting tool in educational research because it helps researchers obtain written evidence that can be objectively verified. Through documentation, researchers can track learning development, identify student data, and systematically record learning outcomes.

#### **G. Data Analysis Technique**

Data analysis is one of the important stages in research because through this process, the collected data are processed, analyzed, and interpreted to produce meaningful information that can be used to answer the research problems (Sugiyono, 2014). There are various methods and techniques for conducting data analysis, depending on the industry and the purpose of the analysis. In general, these methods are largely based on two main types of data analysis techniques, namely quantitative and qualitative data analysis in research. Quantitative data analysis is a method used to process and analyze numerical data by applying statistical calculations in order to produce objective conclusions and to answer the research problems

## 1. Validity of the Test

Before conducting the research, the researcher tested the validity of the research instrument. Validity refers to the ability of an instrument to measure the intended research variable accurately. The validity test aims to ensure that each item in the instrument measures the appropriate construct according to the research objectives, thereby producing accurate and representative data. Therefore, an instrument that meets the validity criteria is considered appropriate for collecting research data (Subhaktiyasa, 2024).

**Tabel 3.5 Test Instrument Validity Criteria**

| No | Cronbach's Alpa | Validity Level |
|----|-----------------|----------------|
| 1  | 0,81 – 1,00     | Highly         |
| 2  | 0,61 – 0,80     | High           |
| 3  | 0,41 – 0,60     | Fairly         |
| 4  | 0,21 – 0,40     | Low            |
| 5  | 0,00 – 0,20     | Very Low       |

To assess the validity of the research instrument, the researcher initially tested the instrument on students who were not part of the research sample. The process began with an expert judgment, in which an expert lecturer evaluated the

content validity of the instrument. After revising the instrument according to the expert's recommendations, the researcher conducted a try-out with the non-sample participants. The results of the validity analysis showed that, of the 60 test items, 35 were considered valid and met the required criteria for use in the study. The remaining 25 items were identified as invalid and, therefore, were not included in the pre-test and post-test.

## 2. Reliability of the test

Reliability is one of the main characteristics of a good measurement instrument according to Saifuddin Azwar (2023). An instrument is considered reliable if it produces consistent results when used repeatedly under the same conditions. Reliability values were measured using Cronbach's Alpha; if the Cronbach Alpha value is greater than the r-table, the variable can be considered valid.

**Tabel 3.6 Test Instrument Reliability Criteria**

| No | Cronbach's Alpa | Reliability Level  |
|----|-----------------|--------------------|
| 1. | -1,00 < 0,50    | Poor Reliability   |
| 2. | 0,50 – 0,75     | Medium Reliability |
| 3. | 0,75 – 0,90     | Good Reliability   |
| 4. | 1,00 -0,90      | Very High          |

## Realibility

Source : ( Setyaedhi, 2024)

The researcher analyzed the reliability of the instrument using statistical software, namely SPSS version 27. The reliability calculation was conducted using the Cronbach's Alpha method, which measures the degree of internal consistency or the interrelatedness among the items in the instrument. The results of the analysis indicated that the instrument had a high reliability coefficient, as reflected by the Cronbach's Alpha value as follows:

**Table 3.7Instrument Reliability**

| <b>Reability Statistics</b> |                    |
|-----------------------------|--------------------|
| <b>Cronbach's Alpa</b>      | <b>No of Items</b> |
| 0.908                       | 60                 |
| Reliable (High)             |                    |

### 3. Normality test

According to Ghasemi and Zahediasl (2024),Testing the normality of data is essential in parametric analysis because many statistical tests assume that the data are normally distributed; violations of this assumption may lead to inaccurate

conclusions. In this study, the normality test was conducted to verify whether the data obtained from students' vocabulary test scores were normally distributed, ensuring the appropriateness of subsequent statistical analyses. The SPSS software was used to perform the normality test and analyze the results. The decision criteria for interpreting the normality test were as follows:

- a) If the Sig. value (p-value)  $< 0,05$  the data are not normally distributed.
- b) If the Sig. value (p-value)  $> 0,05$  the data are normally distributed.

#### 4. Homogeneity test

According to Babatimehin and Paramole (2024), Homogeneity testing is essential in educational research because it ensures that data groups have comparable variances, thereby validating the assumptions underlying inferential statistical procedures. In this study, the homogeneity test was applied to assess whether the population variances between the experimental and control groups were similar. The analysis was carried out using SPSS software, with interpretation based on the following criteria:

Significance level ( $\alpha$ ) = 0.05.

- c. If  $\text{Sig} > \alpha$  then the variance of each sample is the same (Homogeneity).
- d. If  $\text{Sig} < \alpha$  , then the variance of each sample is the not same ( not homogeneity) to determine it the researcher uses SPSS.

### 3. T-test

The t-test is one of the most commonly used hypothesis tests in educational research, as it provides a statistical basis for determining significant differences between sample means.”This indicates that the t-test helps researchers draw inferences about population parameters from sample data, ensuring objectivity and accuracy in conclusions (Adhikari et al.,2023) .In practice, researchers often use SPSS or similar statistical software to calculate the t-value and the p-value (significance value). The criteria for interpretation are:

- a. If the significance level is  $< \alpha$  ( 0.05) then the independent variables individually influence the dependent variable .

- b. If the level of significance  $> \alpha$  (0.05) the independent variable individually has no effect on the dependent variable.

#### 4. Statistical Hypothesis

Hypothesis testing was conducted to determine whether the null hypothesis ( $H_0$ ) was accepted or rejected. The hypotheses in this research were tested using SPSS version 25. The decision rules are as follows:

- a. If Sig. (2-tailed)  $< 0.05$ , the alternative hypothesis ( $H_1$ ) is accepted and the null hypothesis ( $H_0$ ) is rejected.
- b. If Sig. (2-tailed)  $> 0.05$ , the null hypothesis ( $H_0$ ) is accepted and the alternative hypothesis ( $H_1$ ) is rejected.