

CHAPTER III

RESEARCH METHODOLOGY

A. The Design of Research

This research applied a quasi-experimental research design, specifically the non-equivalent control group design. This design was selected to examine the effectiveness of the Wordwall application in improving students' English vocabulary at SDN 50 Bengkalis by comparing the vocabulary achievement of students who received the treatment and those who did not.

In this design, two groups of students were involved: an experimental group and a control group. Both groups were given a pretest to assess their initial vocabulary ability before the treatment. The experimental group received the treatment in the form of vocabulary instruction using the Wordwall application, while the control group was taught using conventional teaching methods without the use of Wordwall. After the treatment was completed, both groups were given a posttest to evaluate their vocabulary achievement. The difference between the pretest and posttest scores of both groups was analyzed to determine the effectiveness of the Wordwall application.

The research design can be represent as follows :

$$\begin{array}{ccccc}
 O_1 & & X & & O_2 \\
 & & & & \\
 O_3 & & & & O_4
 \end{array}$$

Where :

O_1 = Pretest of the experimental group

O_2 = Posttest of the experimental group

O_3 = Pretest of the control group

O_4 = Posttest of the control group

X = represents the treatment in the form of vocabulary instruction using of wordwall application

B. The Location and Time Research

This research took place at SDN 50 Bengkalis, located on Jl. Antara Senggoro Village, Bengkalis, Riau. The research period covered the time frame from the initial stage to the final stage. This research lasted for two months and was adjusted to the school activity schedule.

C. The Subject and Object of Research

The subjects of this study were 44 second-grade students of SDN 50 Bengkalis. They were divided into two groups : the experimental group and the control group. The object of this study was students' vocabulary

development, which was measured through a vocabulary test administered before and after the treatment.

D. The Population and Sample of Research

1. Population

The population of this study was all second grade students at SDN 50 Bengkalis in the 2025/2026 school year. The total number of second grade students at the school is 85, and they were divided into four classes, namely :

TABLE III. 1
List of Population In Grade 2 SDN 50 Bengkalis

Class	Students
2A	22
2B	22
2C	21
2D	20
Total Population	85

2. Sample

This study used cluster sampling as the sampling technique. According to Sugiyono, cluster sampling is a sampling technique that divides the population into groups or clusters. Several clusters are then selected randomly, and all members in the selected clusters become the

research sample⁵⁸. The population consist of four existing second-grade classes at SDN 50 Bengkalis : classes 2A, 2B, 2C, and 2D. In this study, the researcher prepares a list of classes and then selects two class randomly. The class selection is conducted through a lottery, and the selected class becomes the sample of the study. Through this method, class 2B was choosen as the control group, and class 2A was selected as the experimental group.

TABLE III. 2
List of Sample In Grade 2 SDN 50 Bengkalis

Control Class	2B	22
Experimental Class	2A	22
Total		44

The two selected classes will be divided into :

- a. Control Class : Students who will be learning vocabulary using traditional methods without using wordwall application.
- b. Experiment Class : Students who will be learning vocabulary using wordwall application.

⁵⁸ Sugiyono, *Metode penelitian kuantitatif, kulitatif dan R&D*, 2 ed. (ALFABETA, 2021).

E. The Data Collection Technique

In this study, data will collect using the following techniques :

1. Test

This assessment acts as the main tool for this research. The purpose of this method is to evaluate the effectiveness of wordwall application on students' vocabulary mastery. The researcher implemented this assessment in two stages : a pre-test and post-test. Below is comprehensive explanation :

a. Pre-Test

The pre-test will be given to students in both the experimental group and control group before the treatment begins. This assessment is designed to gauge the initial level of students' vocabulary knowledge. It consists of 20 objective questions aimed to measuring the understanding and use of English vocabulary.

b. Post-test

The post-test will be given to students in both the experimental group and control group after the treatment phase is completed. This post-test will feature the same 20 objective questions as the pre-test to assess the enhancement in students' vocabulary mastery after the treatment. The result from the post-test for both experimental and control group will be analyzed to determine the effectiveness of wordwall application in improving students' vocabulary acquisition at SDN 50 Bengkalis.

F. The Data Analysis Technique

In this research, the data analysis techniques were applied to evaluate the impact of wordwall application on students' vocabulary mastery of second-grade at SDN 50 Bengkalis. The sample consisted of 44 students, divided evenly into two classes : class 2A and Class 2B, each with 22 students. The data were analyzed through several stages, including validity and reliability test, descriptive statistics, normality test, homogeneity test, and t-test procedures to determine the effectiveness of the treatment.

1. Validity Test

Validity refers to the extent to which a measuring instrument, such as a test, functions properly in measuring what it is supposed to measure, both in terms of accuracy and consistency⁵⁹. A test is considered to have high validity when it is able to produce results that are in line with its intended purpose. In this case, the scores or data obtained from the test truly represent the actual conditions or facts being measured, not just arbitrary numbers.

$$r_{hitung} = \frac{N(\sum XY) - (\sum X)(\sum Y)}{\sqrt{(N \cdot \sum X^2 - (\sum X)^2)(N \cdot \sum Y^2 - (\sum Y)^2)}}$$

Where:

r_{hitung} = correlation coefficient between item score and total score

X = item score

⁵⁹ Sarrul Bariah et al., *Buku Ajar Konsep Dasar Penelitian* (Jambi: PT Sonpedia Publishing Indonesia, 2024), hal 128

Y = total score

N = number of students

2. Reliability Test

Reliability in other terms, signifies the steadiness of the measurement tool employed and its uniformity over a period⁶⁰.

In educational research, a Cronbach's Alpha value above 0,70 is considered reliable, meaning that the instrument is consistent and trustworthy in measuring students' vocabulary mastery. Therefore, the test items used in the pre-test and post-test are appropriate to be used as measurement tools in this study.

3. Descriptive statistic

Descriptive statistics were applied to give a detailed overview of the data gathered from both the pre-test and post-test. The data analyzed includes :

- a. Mean (average) : This statistic is used to calculate the average scores of students prior to and following the treatment.
- b. Standard deviation : This measure evaluates the extent of variation in student scores compared to the mean.
- c. Minimum and maximum scores : These figures represent the range of scores obtained by students on the assessment.

⁶⁰ Sarrul Bariah et al., *Buku Ajar Konsep Dasar Penelitian* (Jambi: PT Sonpedia Publishing Indonesia, 2024), hlm. 128

The results from these descriptive statistics will provide an initial insight into the enhancement of vocabulary mastery scores after the implementation of wordwall application.

4. Normality Test

The normality test is conducted to determine whether the data from the pre-test and post-test are normally distributed⁶¹.

- 1) If $p > 0.05$, the data is deemed normally distributed, which permits the application of the t-test.
- 2) If $p < 0.05$, the data does not conform to a normal distribution, indicating that non-parametric tests should be utilized

This evaluation is essential for selecting the appropriate statistical technique to analyze the effectiveness of wordwall application on the vocabulary mastery of students at SDN 50 Bengkalis.

5. Homogeneity Test

The homogeneity test is conducted to examine whether the data variances between groups are equal⁶².

- a. If $p > 0.05$, the variances of both groups are regarded as homogeneous, which permits the application of the t-test.
- b. If $p < 0.05$, the variances are deemed non-homogeneous, indicating that alternative testing methods should be explored.

⁶¹ Ig. Dodiet Aditya Setyawan, *Buku Petunjuk Praktikum: Uji Normalitas dan Homogenitas Data dengan SPSS* (Surakarta: Politeknik Kesehatan Kementerian Kesehatan Surakarta, 2021), p. 5.

⁶² Ig. Dodiet Aditya Setyawan, *Buku Petunjuk Praktikum: Uji Normalitas dan Homogenitas Data dengan SPSS* (Surakarta: Politeknik Kesehatan Kementerian Kesehatan Surakarta, 2021), p. 14.

This evaluation is crucial for selecting the appropriate statistical methods to assess the effectiveness of wordwall application on the students vocabulary mastery os students at SDN 50 Bengkalis.

6. T-Test

The t-test is a statistical test used to test whether the null hypothesis is true or false. T-test is used in this study to examine the differences in students' vocabulary mastery scores. All calculations were carried out systematically using SPSS version 25, ensuring the accuracy and reliability of the results. If the analysis show that significance value (p-value) was less than 0,05, the alternative hypothesis (Ha) was accepted, indicating that the use of wordwall application had a significant effect on the vocabulary mastery of second grade students at SDN 50 Bengkalis.

a. Paired Sample T-Test

The Paired Sample T-test was used to determine whether there was a significant difference between the pre-test and post-test scores within the same group. This test aimed to measure the improvement in students' vocabulary mastery before and after the implementation of the Wordwall application. By comparing the results of the initial test and the final test, the researcher was able to identify the students' progress after the learning process was conducted.

$$t = \frac{\bar{D}}{\frac{S_D}{\sqrt{N}}}$$

Where:

$\bar{D}$ = mean difference between pre-test and post-test

S_D = standard deviation of the differences

N = number of students

The decision is based on the significance level ($\alpha = 0.05$):

- 1) If p-value < 0.05 , there is a significant improvement.
- 2) If p-value ≥ 0.05 , there is no significant improvement.

b. Independent Sample T-Test

The Independent Sample T-test was used to determine whether there was a significant difference between the post-test scores of the experimental group and the control group. This test aimed to compare the vocabulary mastery of students who were taught by using the Wordwall application with those who were taught through conventional teaching methods. Through this analysis, the researcher was able to evaluate the effectiveness of the Wordwall application in improving students' vocabulary mastery.

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2}}}$$

Where:

$\bar{X}_1, \bar{X}_2$ = mean scores of each group

S_1^2, S_2^2 = variances

N_1, N_2 = number of students

The decision is based on the significance level ($\alpha = 0.05$):

- 1) If p-value < 0.05 , there is a significant difference.
- 2) If p-value ≥ 0.05 , there is no significant difference.

7. Rubric Score for Vocabulary

The students' vocabulary scores were classified into several categories to determine their level of mastery. According to Suharsimi Arikunto, learning outcomes can be grouped into five categories, namely Excellent, Good, Fair, Poor, and Very Poor⁶³ These categories are used to interpret students' achievement levels based on their score intervals, where higher scores indicate better mastery of vocabulary, while lower scores reflect limited understanding. This classification helps to provide a clearer description of students' vocabulary ability.

TABLE III.3
Rubric Score for Vocabulary

Score Range	Category	Interpretation
86-100	Excellent	Students fully understand vocabulary and can identify meanings accurately

⁶³ Prof. Dr. Suharsimi Arikunto, *Dasar Dasar Evaluasi Pendidikan*, 9 ed. (PT. Bumi Aksara, 2009).

71-85	Good	Students show a good understanding of vocabulary with only minor mistakes
56-70	Fair	Students have a sufficient level of vocabulary mastery but still make several mistakes
41-55	Poor	Students have limited vocabulary mastery and experience difficulties in understanding words
< 40	Very Poor	Students have very low vocabulary mastery and are unable to understand basic vocabulary