

CHAPTER III

METHODOLOGY

A. Research Design

In order to test the developed hypotheses, this study used a quantitative technique, gathering numerical data and statistically evaluating it.. (Creswell, John W.; 2018). The study used a quasi-experimental pretest-posttest control-group design, allocating two classes: a control group that received instruction using conventional pedagogical techniques and an experimental group that participated in WordWall-based vocabulary exercises. A pre-test was given to both groups to gauge their proficiency with basic vocabulary, and a post-test was given to gauge vocabulary improvements following the intervention.

Below is an explanation of the design:

Table 1
Nonequivalent

Group	Pre-test	Treatment	Post-test
Experimental Class	O1	X	O2
Control Class	O3	X2	O4

Description:

O1 and O3 pre-test (first assessment of pupils' fundamental skills prior to therapy)

X tr treatment Wordwall-assisted learning activity.

Post-test O2 and O4 (final assessments after the intervention)

In order to improve the experimental class's vocabulary knowledge, Wordwall was used as an interactive game-based learning tool. The instructional strategy was implemented systematically throughout the teaching process. The teacher prepared vocabulary

materials using the “Match Ups” feature, introduced the application, explained the learning objectives, and provided clear instructions. Students carried out the activity individually by matching vocabulary items with their meanings or images. During the activity, the teacher monitored students’ participation, provided assistance when needed, and encouraged motivation through score-based feedback. Students were allowed to repeat the activity to reinforce vocabulary understanding. Assessment was conducted through students’ Wordwall scores, classroom observation, and a post-test.

The control group, on the other hand, was taught vocabulary using traditional techniques, such as teacher explanations, class debates, and manual writing assignments devoid of technology. Evaluation in the control class was conducted through written tests or manual quizzes. Both instructional approaches were implemented systematically to improve students’ vocabulary mastery (Ary et al., 2019).

This design was selected because quasi-experimental methods are well-suited for classroom-based research, where full control of external variables is often impractical, but systematic comparisons between groups can nonetheless be achieved. (Creswell, John W.; Creswell, 2018). Such a setup enables the examination of differences in vocabulary outcomes between instructional approaches within a natural learning environment without disrupting regular class activities. The goal was to objectively evaluate the effectiveness of the WordWall intervention by generating measurable, vocabulary-analyzable quantitative data, enabling the findings to be interpreted and compared across similar educational contexts.

To sum up, this study used a quantitative quasi-experimental methodology to evaluate how students' learning outcomes were affected by WordWall, a technology-assisted vocabulary education program.

B. Research Location and Time

The study was carried out in Bengkulu City's Junior High School Negeri 15. The school was purposively selected because it provides adequate learning facilities and supports the use of technology-assisted instructional media such as WordWall. These circumstances are thought to be appropriate for accomplishing the study's goals, which are to investigate how WordWall usage affects students' comprehension of English vocabulary. Furthermore, the learning environment at this school allowed the implementation of a quasi-experimental design while attempting to minimize the influence of external variables. All research procedures were carried out during regular school hours to ensure that the students' participants remained aligned with their academic schedule and did not disrupt ongoing learning activities.

C. Research Population and Sample

1. The Population

The phrase "population" refers to the generalization domain that comprises items or persons with particular attributes chosen by the researcher for study, from which inferences are made. Population is not limited to human subjects but may include natural objects or other entities. Moreover, population is not solely defined by the number of units studied but also encompasses all characteristics

inherent within those units (Sugiyono, 2019). In this research endeavor, the demographic under consideration comprised all Seventh-grade students at Junior High School Negeri 15, Bengkulu City, in the 2024/2025 academic year. Individuals were split up among the following five classes: A, B, C, D, and E. The table below shows the entire population.

Table 2

No	Class	Female	Male	Total
1	VII A	13	16	29
2	VII B	14	11	25
3	VII C	13	14	27
4	VII D	10	15	25
5	VII E	13	12	25
Total				135

2. Sample

The sample in this quasi-experimental study represents a portion of the population under investigation, particularly seventh-graders at Bengkulu City's State Junior High School 15. A Purposive sampling methodology was implemented, wherein participants were selected in accordance with specific criteria established by the investigator, typically because they possess characteristics relevant to the research focus (Sugiyono, 2019). Because the research design called for an experimental group and a control group that fulfilled specific requirements, this approach was suitable for the study. The researcher selected Class VII B (with 27 students) as the experimental group and Class VII C (with 27 students) as the control group after assessing variables like similar proficiency levels, instruction by the same English teacher, and uniform class sizes of 27 students each. This resulted in a total sample size of 54 students.

These selections were informed by data from the English teacher at Junior High School 15 in Bengkulu City, ensuring homogeneity in grade level, student numbers, and academic performance. Such considerations helped minimize potential confounding variables and enabled a representative and controlled comparison between groups.

Table 3

No	Class	Classroom	Female	Male	Total
1	Experimental Group	VII B	14	11	25
2	Control Group	VII D	10	15	25
Total					50

D. Operational Definitions of Variables

In the context of this research, variables are defined as characteristics, traits, or objects of study that can vary from one unit to another. (Creswell, John W., 2018; Sugiyono, 2020). A variable that affects or modifies another variable (the dependent variable) is known as an independent variable. An independent variable can influence the dependent variable in either a positive or a negative way because it is a causal variable. The outcome under investigation in this study is referred to as the dependent variable, namely the outcome variable or effect that arises from changes in the independent variable (Creswell, John W.; Creswell, 2018).

1. Vocabulary

In language acquisition, vocabulary is defined as the collection of words that students must be able to identify, comprehend, and employ in both productive and receptive communication. This includes both form and meaning aspects (Schmitt, 2015). Recent empirical findings also show that both breadth and depth significantly influence learners' language comprehension, with

each dimension contributing differently depending on the type of skill assessed, such as listening comprehension. This indicates that vocabulary mastery is a multidimensional construct that must be operationalized through both quantitative size measures and qualitative depth indicators (Luo et al., 2021).

2. Wordwall is an interactive educational platform that provides a variety of game-based activities to facilitate language learning and improve students' vocabulary mastery. The platform offers multiple interactive game formats, such as matching, crossword puzzles, anagrams, and quizzes, that enable learners to practice and strengthen vocabulary in engaging and dynamic ways (Ilahiyati et al., 2023).

E. Data Collection Techniques

Testing and documentation were used to get the data for this study. Pre-test and post-intervention assessments were given to both the experimental and control groups in order to gauge how much the students' English vocabulary had improved before and after the intervention. The purpose of the pre-test was to ascertain the students' initial level of vocabulary competence. In order to evaluate vocabulary mastery brought about by the usage of WordWall media, a post-test was administered concurrently with the treatment.

This study's main tool was a vocabulary exam created to gauge WordWall's efficacy. The experimental and control groups' vocabulary performance was compared using data gathered from the pre-test and post-test. Additionally, documentation, including lesson plans, student attendance records, and classroom activities, was collected to support the research process and ensure its validity.

1. Test

a. Pre-test

A thirty-item multiple-choice pre-test was given to the experimental and control groups in the study. Before receiving any educational therapies, the pre-test was used to gauge pupils' initial vocabulary proficiency. Establishing baseline performance is essential for determining learning gains after the intervention. According to Fraenkel et al. (2019) Pre-tests are used in experimental studies to evaluate initial group equivalence before the treatment is applied.

b. Treatment

Wordwall, a technology-based learning tool, was used as part of the experimental class's treatment to help students master vocabulary. Students engaged in interactive vocabulary activities, such as matching words with their meanings or images, through the Wordwall application. The teaching strategy was systematically designed, starting from teacher preparation, followed by individual student engagement with the game, interaction through technological elements such as scores and instant feedback, and evaluation based on student performance. This treatment was applied to analyze its impact on students' vocabulary skills, which served as the dependent variable.

The control group, on the other hand, received instruction using traditional techniques devoid of digital media. The instructor used explanation to teach vocabulary. textbook guidance, and written exercises. The materials, duration, objectives, and assessment were kept the same as in the

experimental class to ensure comparability, with the only difference being the instructional media used.

Table 4.
Treatment Procedures of Experimental and Control Classes

Stage	Experimental Class (Using Wordwall-Match Up)	Control Class (Conventional Method)
1. Pre-Activity	The teacher prepares materials using Wordwall. The teacher greets students, explains objectives, introduces Wordwall, and gives instructions.	The teacher prepares material from the textbook. The teacher greets students, explains objectives, and introduces the lesson.
2. Whilst-Activity	Students access the Wordwall link and complete the Match Up activity individually. The teacher monitors and motivates students through score-based competition.	Students study vocabulary from the textbook and complete written exercises individually. The teacher monitors and assists students.
3. Post-Activity	Students check answers and view final scores. The teacher discusses difficult vocabulary items.	Students check answers together with the teacher. The teacher discusses difficult vocabulary.
4. Closing Activity	The teacher summarizes the lesson, provides feedback, and motivates students to practice vocabulary independently.	The teacher summarizes the lesson, provides feedback, and closes the class.
5. Assessment	Both a pre-test and a post-test were given, and information from Wordwall exercises and observation sheets was gathered and documented.	The pre-test and post-test were identical. Worksheet scores and observation sheets were recorded.

The treatment was conducted in four meetings for both classes, with each meeting lasting 2x40 minutes. Both groups were provided with identical vocabulary content, learning objectives, and assessment procedures. The only distinction between the two groups was the instructional medium employed; the experimental class utilized Wordwall, In contrast, the control group received education using traditional methods, which preserved the internal validity of the study.

The Wordwall's "Match Up" function is in line with game-based learning theory, which highlights how learning through games can boost students' motivation, active engagement, and learning outcomes through interaction, repetition, and direct feedback (Gee, 2003).

c. Post-test

Both the experimental and control groups were given a thirty-item multiple-choice post-test following the therapy. The post-test's objectives were to assess students' vocabulary mastery following the instructional intervention and to compare the results with their pre-test scores in order to assess improvements in achievement. In experimental research, the post-tests offer proof of treatment effects and learning progress (Creswell, John W.; Creswell, 2018). Each item was scored dichotomously, with 1 point for correct responses and 0 for incorrect responses.

2. Vocabulary Test

A vocabulary test served as the primary instrument for measuring students' lexical knowledge. Lexical knowledge tests are widely employed in language education to assess learners' vocabulary knowledge in terms their ability to use words appropriately in various contexts. According to Bui et al. (2023), a well-constructed vocabulary test must undergo validation procedures to ensure accuracy, reliability, and suitability for assessing learners' vocabulary competence test used to determine students' initial vocabulary acquisition, whereas improvements following the instructional treatment were measured by the post-test. To enable objective scoring, each item

carried one point, with a score of 1 for right answers and 0 for wrong responses. Following test administration, all test results were gathered and statistically examined to see how well the instructional medium improved students' vocabulary achievement. This process complies with the most recent evaluation guidelines, which emphasize the use of validated and systematically structured vocabulary tests to measure learning gains accurately (Putri et al., 2024).

In this study, the vocabulary test was constructed in a multiple-choice format. Each item consisted of four options with only one correct answer. Scoring was objective:

One point for the right response

A wrong response is worth zero points.

All of the right answers were added up to determine the final score (Brown, 2004)

3. Documentation

Documentation was used as a supplementary technique to collect supporting data, including lesson plans, attendance lists, photographs of classroom activities, and students' test results. Documentation enhances the credibility of research findings by providing concrete evidence that complements quantitative data. In educational research, documentation is recognized as a valid form of secondary data used to verify and enrich primary data collected through instruments such as tests. (Creswell, John W.; Creswell, 2018).

F. Research Instrument

Research instruments were used in this study to gather participant data. Instruments are essential to quantitative research because they allow researchers to measure and quantify variables in an objective manner (Creswell, John W.; Creswell, 2018; Sugiyono, 2020). A vocabulary test with pre-test and post-test portions was the main tool used in this study to gauge students' vocabulary growth both before and after treatment.

G. Data Analysis Techniques

To assess how using WordWall media affected students' acquisition of English vocabulary, data from the pre-test and post-test results of the experimental and control groups were examined. According to Creswell (2018), this quantitative study employs a quasi-experimental methodology grounded in the concepts of empirical testing and causal inference, which highlights objective measurement and hypothesis testing through numerical data. The quasi-experimental approach in this study follows the (Campbell & Stanley, 1963) Framework, which stresses the importance of controlling extraneous variables in non-randomized settings to minimize threats to internal validity and strengthen causal interpretation of treatment effects. Several statistical techniques, such as normality testing, homogeneity testing, and t-test analysis, were employed with SPSS (Statistical Package for the Social Sciences) to guarantee the validity and reliability of the results. A broad explanation for these procedures is necessary since it guarantees the validity and dependability of the data analysis, fosters confidence in the study's findings, and supports the hypothesis regarding WordWall's impact on students' vocabulary acquisition. If

the data do not meet the assumptions, non-parametric alternatives will be employed to prevent bias.

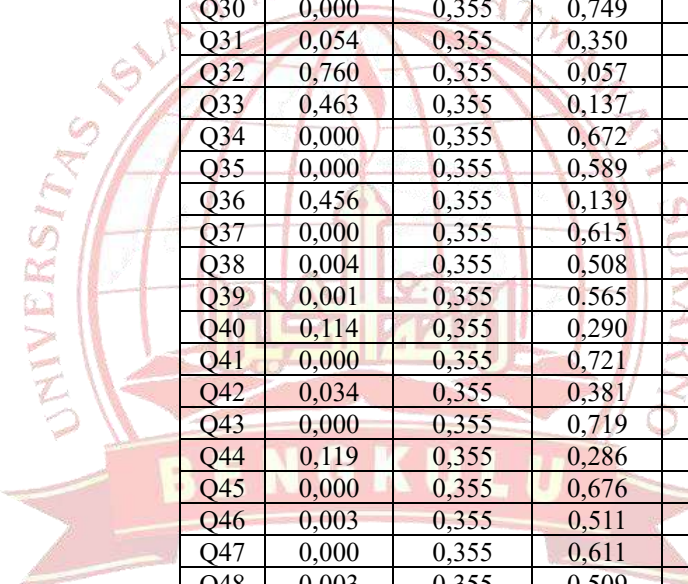
1. Validity of the test

The degree to which interpretations drawn from an assessment tool are backed by sufficient theoretical and empirical reason is known as test validity. A valid test, therefore, requires that its items meaningfully represent the construct being measured and reflect the knowledge or skills intended for evaluation. (Messick, 1994).

Additionally, the Statistical Package for the Social Sciences (SPSS) version 25 was used by the researcher to evaluate the test data. The test of fifty multiple-choice questions intended to evaluate students' command of terminology associated with dwellings and their use in basic sentences. The purpose of the investigation was to ascertain whether learners' vocabulary knowledge was significantly impacted by using the digital wordwall game.

Table 5.
Instrument Validity

Variable	Item	Sig.(2-tailed)	r-table	r-count	Result
QUESTION	Q1	.	0,355	a	Unvalid
	Q2	0,070	0,355	0,330	Unvalid
	Q3	.	0,355	a	Unvalid
	Q4	0,179	0,355	0,249	Unvalid
	Q5	0,302	0,355	0,191	Unvalid
	Q6	0,000	0,355	0,715	Valid
	Q7	0,014	0,355	0,436	valid
	Q8	0,001	0,355	0,565	Valid
	Q9	0,373	0,355	0,166	Unvalid
	Q10	0,000	0,355	0,706	Valid
	Q11	0,062	0,355	339	Unvalid
	Q12	0,008	0,355	0,465	Valid
	Q13	0,000	0,355	0706	Valid
	Q14	0,000	0,355	0,645	Valid



Q15	0,000	0,355	0,755	Valid
Q16	0,000	0,355	0,608	Valid
Q17	0,002	0,355	0,539	Valid
Q18	0,001	0,355	0,560	Valid
Q19	0,032	0,355	0,386	Valid
Q20	0,097	0,355	303	Unvalid
Q21	0,168	0,355	0,254	Unvalid
Q22	0,000	0,355	0,591	Valid
Q23	0,072	0,355	0,328	Unvalid
Q24	0,006	0,355	0,482	Valid
Q25	0,001	0,355	0,573	Valid
Q26	0,000	0,355	0,603	Valid
Q27	0,000	0,355	0,709	Valid
Q28	0,000	0,355	0,755	Valid
Q29	0,000	0,355	0,676	Valid
Q30	0,000	0,355	0,749	Valid
Q31	0,054	0,355	0,350	Unvalid
Q32	0,760	0,355	0,057	Unvalid
Q33	0,463	0,355	0,137	Unvalid
Q34	0,000	0,355	0,672	Valid
Q35	0,000	0,355	0,589	Valid
Q36	0,456	0,355	0,139	Unvalid
Q37	0,000	0,355	0,615	Valid
Q38	0,004	0,355	0,508	Valid
Q39	0,001	0,355	0,565	Valid
Q40	0,114	0,355	0,290	Unvalid
Q41	0,000	0,355	0,721	Valid
Q42	0,034	0,355	0,381	Valid
Q43	0,000	0,355	0,719	Valid
Q44	0,119	0,355	0,286	Unvalid
Q45	0,000	0,355	0,676	Valid
Q46	0,003	0,355	0,511	Valid
Q47	0,000	0,355	0,611	Valid
Q48	0,003	0,355	0,509	Valid
Q49	0,867	0,355	0,031	Unvalid
Q50	0,000	0,355	0,605	Valid

The condition specified is that the computed r is higher than the table r , which is 0.355, based on the validity test results for the questions in the aforementioned table. It is invalid if the r value is less than 0.355. As can be seen, 33 of the 50 test items were determined to be genuine, while 17 items were deemed invalid due to correlation coefficients below the crucial value of 0.355. Additionally, the significance level of 0.05 is displayed in the Sig. table. If the question item's Sig. value is less than 0.05, it is deemed valid; if it is more than 0.05, it is deemed invalid.

Table 6.
Test Instrument Validity Criteria

No	r-value Interval	Validity Level
1	0,80 – 1,00	Very High
2	0,60 – 0,79	High
3	0,40 – 0,59	Moderate
4	0,20 – 0,39	Low
5	0,00 – 0,19	Very Low

Source: Sugiyono, 2019

The researcher created fifty multiple-choice vocabulary questions and used them in a pilot test to determine the instrument's validity. The pilot study was conducted at a junior high school that mirrored the target school's student characteristics and accreditation level. Thirty-one students participated in the pilot test. The researcher then examined the validity of each test item. According to the findings, 33 of the 50 items were selected for use in the primary study because they met the validity requirements. The following table displays the item validity indicators.

Table 7.
Indicators of Vocabulary Validity Test

NO	Indicators	Number of Items	Items
1	Identifying vocabulary related to rooms in the house	7	8, 16, 17, 18, 24, 25, 26,
2	Identifying vocabulary related to parts of a house	4	27, 28, 29, 38
3	Identifying vocabulary related to household furniture in the house	4	6, 22, 43, 48
4	Identifying vocabulary related to kitchen utensils and household objects	7	7, 10, 19, 30, 41, 42, 50
5	Identifying vocabulary related to cleanliness, cleaning tools, and activities	4	12, 13, 14, 15
6	Identifying vocabulary related to household appliances	2	35, 45
7	Identifying vocabulary related to household areas and surroundings	2	37, 47
8	Identifying vocabulary related to bathroom items and household objects	2	39, 46
9	Identifying the function or use of household objects and rooms	1	34
Total			33

2. Reliability of the test

The internal consistency and stability of test results under comparable circumstances are referred to as reliability. When a test's items provide consistent findings and have high inter-item correlations, it is deemed dependable. (Tavakol & Dennick, 2011). Cronbach's Alpha was used to assess instrument reliability. When an instrument's coefficient value is higher than 0.70, it can be deemed dependable for research purposes and has acceptable internal consistency. (Creswell, 2018).

The reliability categorization table that follows provides an explanation of the Cronbach's Alpha coefficient:

Table 8.
Test Instruments Reliability Categorization

Test Reliability Coefficient	Categorization
$1,00 > 0,90$	Very high reliability
$0,75 - 0,90$	Good reliability
$0,50 - 0,75$	Medium reliability
$-1,00 < 0,50$	Poor reliability

Source: (Setyaedhi & Sugiharto, 2024)

The vocabulary test reliability coefficient was 0.933 based on reliability analysis using Cronbach's Alpha. 31 kids from schools with the same accreditation and grade level took the 50-item test. A Cronbach's Alpha number higher than 0.90 denotes extremely high dependability, according to the reliability category. The vocabulary test employed in this study can be regarded as a trustworthy tool for data collection based on the analysis.

Table 9.
The Result of Reliability

Reliability Statistics	
Cronbach's Alpha	N of Items
0.933	50

3. Item Difficulty Test

The degree to which an item is simple or complex for test-takers to complete is referred to as item difficulty. To distinguish between students with high and poor ability, a good test should contain items with a suitable range of difficulty levels. The test's efficacy is diminished by items that are either too simple or too complex, and they may need to be changed or eliminated. According to Brown (2004) item analysis aids in deciding whether

an item should be kept, changed, or eliminated in order to guarantee that the tool appropriately assesses students' skills. To make sure the vocabulary test contained items of suitable complexity, item difficulty was calculated in this study.

The criteria for interpreting the item difficulty index are presented as follows:

The item difficulty index was calculated using the following formula:

$$P = \frac{R_u}{T_u} + \frac{R_L}{T_L} \times 100\%$$

Where:

P = Item difficulty index (percentage)

R_u = Number of students in the upper group who answered the item correctly

R_L = Number of students in the lower group who answered the item correctly

T_U = Total number of students in the upper group

T_L = Total number of students in the lower group

$$P = \frac{380}{8} + \frac{175}{8} \times 100\%$$

$$P = 69.37 \%$$

Table 10.
Interpretation item difficulty test

Criteria Score	Interpretation
0,21 – 0,40	Difficult Category
0,41 – 0,70	Medium Category
0,71 – 1,00	Easy Category

Source: (Yadnyawati, 2019)

In addition, the difficulty level of each test item was examined to determine whether the vocabulary test consisted of questions with suitable levels of challenge. This analysis is important to avoid including questions that are too easy or too difficult, thus maintaining the quality of the instrument. Furthermore, this analysis helps determine whether the items are appropriate for the abilities of seventh-grade students. The calculation showed an overall difficulty index of 69.37%, which places the items classified as moderate. This indicates that the questions were appropriately aligned with the learning objectives and the students' level of ability.

4. Item Discrimination

The degree to which a test item can distinguish between students who perform well and those who do not is measured by the discrimination index. A high-quality item should be answered correctly by students with high test scores and incorrectly by students with lower scores. Consequently, the discrimination index serves as an important measure of test-item quality in educational assessment.

According to Brown (2004), item discrimination is a component of item analysis used to determine whether items function effectively in differentiating student ability levels and helps ensure that each item makes a meaningful contribution to the overall measurement of student ability. To assess item discrimination, this study utilized the upper-lower group technique, which contrasts the performance of students in the highest- and lowest-scoring categories.

The item discrimination index was calculated using the following formula:

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

Where:

DP = Question Distinguishing Power

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

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

N = Number of students per group (27% of the total sample)

$$DP = \frac{48-22}{69}$$

$$DP = 37\%$$

Then there were testing criteria in the item discrimination test:

Table 11.
Interpretation Item Discrimination Test

Item discrimination test	Interpretation of the result
$DP \geq 0,40$	Good
$+0,21 < DP < 0,40$	Fairly Qualified
$0, < DP \leq 0,20$	Weak

Source: (Restiyawati, 2023)

Test items were categorized as fairly qualified ($+0,21 < 0,37 < 0,40$) based on the item discrimination analysis results, suggesting that the items' capacity to differentiate students' talents was restricted. As a result, the final test did not include these items. For the pre-test and post-test in this study, only valid items from the tryout results were chosen.

5. Normality Test

To determine if the pre-test and post-test data were regularly distributed, a normality test was performed. Before performing

parametric analysis, assumption testing is necessary to guarantee the validity of statistical conclusions (Field, 2018). The Shapiro-Wilk test, which is frequently employed for samples with fewer than 50 participants, was utilized in this study to evaluate the assumption of normalcy using SPSS. The following standards were used to assess the normalcy of the data:

- a) The data are regarded as regularly distributed if the significance value (Sig.) is higher than 0.05.
- b) The data are deemed non-normally distributed if the significance value (Sig.) is less than 0.05.

6. Homogeneity Test

The assumption of homogeneity of variance must be satisfied prior to performing the independent samples t-test. Levene's test for equality of variances is used to evaluate this assumption, according to Field (2018). The following were the conditions for interpretation:

- a) The data are homogenous (equal variance) if $\text{Sig.} > 0.05$.
- b) The data are not homogenous (unequal variance) if $\text{Sig.} < 0.05$.

7. T-Test

To ascertain whether the post-test mean scores of the experimental and control groups differed statistically significantly, an independent samples t-test was employed. Assuming that the data are normally distributed and have identical variances, this statistical method is suitable for comparing two independent groups. (Field, 2018).

The interpretation guidelines were as follows:

The following were the guidelines for interpretation:

- a) Using WordWall has a substantial impact on students' vocabulary acquisition if Sig. (2-tailed) < 0.05.
- b) There is no significant effect if Sig. (2-tailed) > 0.05.

8. F-test

In an analysis of variance (ANOVA) or regression model, the F-test is used to compare variances between two or more groups in order to ascertain whether the observed mean differences are statistically significant. This test works by comparing the ratio of between-group and within-group variances to an F distribution. According to Field (2018) The F-test is an important procedure in ANOVA because it helps evaluate whether the variation between groups is greater than the random variation that occurs within the groups.

9. The effect size

A statistical measure that indicates the magnitude of the difference or strength of the relationship between variables, supplying useful context that goes above the relevance level p . Cohen (1988) used Cohen's d to create an effect size classification for mean differences (0.2 = small, 0.5 = medium, 0.8 = large). Meanwhile, modern analysis guidelines emphasize that effect size must be reported in quantitative research because it provides a substantive interpretation of statistical results. (Lakens, 2013).

10. Statistical Hypothesis

used to assess if the sample data provides enough evidence to reject the null hypothesis (H_0). Decisions in quantitative analysis are based on a statistical test's significance value (Sig.). The following are the guidelines for making decisions, per Field (2018) The decision-making rules are as follows:

- a. A significant difference is indicated if Sig. (2-tailed) < 0.05, rejecting H0 and accepting H1.
- b. H0 is accepted and H1 is denied, indicating no significant difference, if Sig. (2-tailed) > 0.05.

