

CHAPTER III

METHODOLOGY

3.1 Research Method

Research method is a method that is interpreted as a series of procedures used in obtaining scientific knowledge or science (Priadana, M. S., & Sunarsi, D, 2021). The research method is the steps that must be taken in collecting data information. The type of research used in this study is quantitative research while the approach method is experimental research. According to Millar (2014) The word “quantitative” means quantity or amounts of information collected in the course of the study and is in a quantified or numeric form in statistical supports.

3.2 Research Design

This research will use one group Pre-Test and Post-Test of Pre-experimental design, the design consists of pre-test, treatment, and post-test only in one experimental group.

As found by (Sudjana, 2020) Research methods are a process of activities in the form of data collection, analysis and related to research objectives.

Table 3. 1 Research design that will be conducted

Pre-test	Treatment	Post-test
O ₁	X	O ₂

Source: Sudjana (2020)

Description:

O₁ : Initial ability test (Pre-test) before treatment

O2 : Final ability test (Post-test) after treatment

X : Gamification learning strategy treatment

3.4 Population and Sample

1. Population

This research will be conducted at SMAN 13 Banda Aceh. The population of this research is the ten grade students. The number of this research population is 15 students.

2. Sample

To represent the total population, the researcher used a sample as a way to ease the researcher to collect the data. In this research the researcher used purposive sampling technique. The researcher takes one class as a sample in class X, the ten grade students of SMAN 13 Banda Aceh in the academic year 2025/2026, this class consists of 15 students.

3.5 Research Variable

A research variable is something that becomes the object of research observation, often also referred to as a factor that plays a role in research or symptoms to be studied. According to Kerlinger (2006: 49) variables are constructs or properties to be studied that have varying values. Kerlinger also said that variables are symbols / symbols on which we put opposite values or numbers. According to Sugiyono (2009: 60) variables are anything in shape. The variables in this study can be as follows:

1. Independent Variables

Independent variables are often referred to as independent variables. According to Sugiyono (2019) “the definition of independent variables are variables that can affect or cause changes or symbols of the dependent variable”. The independent variable in this study is learning outcomes using the gamification strategy.

2. Dependent Variable

The dependent variable is the variable that is affected or that becomes the result of the independent variable (Irfan, A. A. Mahargio, M, 2023). The dependent variable of this study is vocabulary mastery.

3.6 Research Instrument

The writer uses the test and questionnaire as the instrument of this research. In this research, the writer provided two types of the test namely: pre-test and post-test. Pre-test will be given to the student before implementating the Gamification in the learning process. Meanwhile, post-test will be given to the students after the treatment of the use of Gamification in the learning process.

In this research, the researcher will give 20 multiple choice questions, 10 on the post-test and 10 on the pre-test where the questions contain different material but at the same level in vocabulary.

The questionnaire sheet given to students to obtain data on student learning responses from the applied learning model is closed which consists of (5 negative questions and 5 positive questions). The indicators of student learning responses in this study are as follows: The existence of desire and desire to succeed, the existence of encouragement and needs in learning, the existence of appreciation in learning, the

existence of interesting activities in learning and the existence of a conducive learning environment, Anas Sujono (2011)

3.7 Technique of Data Collection

1. Pre-Test

Researchers conducted a Pre-test before carrying out treatment. Students will be given 10 questions in the form of questions about parts of speech (verb). The purpose of holding a Pre-test is to find out how far students' vocabulary skills have progressed. To collect data, each student took a test with parts of speech. The exercise was distributed for experimental groups.

2. Treatment

In the treatment, researchers will hold three meetings. Each meeting uses gamification in the context of vocabulary. The steps are as follows:

Researchers will introduce parts of speech starting from the meaning, social function, and examples of parts of speech. After the activity, researchers will use gamification strategy to increase students' vocabulary.

3. Post-Test

This test will be carried out after the treatment to determine the effectiveness of gamification strategy in increasing students' vocabulary. The test is the same as the Pre-test but in the form of part of speech with the pre-test. They will be asked 10 questions.

3.8 Technique of Data Analysis

Data analysis is the process of compiling, categorizing data, searching or themes, with the intention of knowing its meaning. Data analysis is an effort made to clarify and classify data. The purpose of this research itself is to solve the problem that makes the focus of the research (Susanto, p.c, et al, 2019). This data processing stage is the most important stage in a study, because the results of the study can be formulated after all the data is collected, so that to describe and research can be calculated as follows:

1. Data analysis of vocabulary mastery

In managing data for research on students' vocabulary mastery, the t-test formula is used before testing the research hypothesis, it is necessary to look for an increase in vocabulary skills, through data analysis of test results conducted to measure students' vocabulary skills after taking part in learning by using gamification strategies. The data calculations that will be carried out will be analyzed using the percentage technique as follows:

$$\text{Persentase} = \frac{\text{Skor Total}}{\text{Skor Maksimal}} \times 100\%$$

After the percentage results are obtained from vocabulary mastery, researchers determine the vocabulary mastery category. Giving categories aims to determine the qualifications of students' vocabulary mastery percentage, (According to Nation 2001).

Table 3. 2 Vocabulary mastery Category

Percentage of Correct Answers	Vocabulary Mastery Category
85–100%	Very Good
70–84%	Good
55-69%	Fair
41-54%	Less

below 40%	Very Poor
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Buku Model Penilaian Kelas KBK (BSNP) 2007

According to the Arikunto (2010:275) To find the scurs of the test, the researcher counted up all score from some indicators of the learners, they are: main idea, vocabulary, references, detail information, and explicit information.

It is to facilitate the computation; the researcher composed the data which are needed in the computation using this following pattern:

1. Mean of Pre test

The formula:

$$X0_1 = (\Sigma X) / N$$

Where: $X0_1$ = The Means of Pre-Test

Σx = The Sum of the Pre-Test

N = The number of the students

2. Mean of Post Test

The formula:

$$X0_2 = \frac{\Sigma x}{N}$$

Where: $X0_2$ = The Mean of Post Test

E_x = The Sum of the Post Test

N = The number of the students

And then, the researcher searched about the differences between the pre-test score with the post test score:

The formula:

$$d = X0_1 - X0_2$$

Where: d = Gain

$$X0_1 = \text{Pre-Test}$$

$$X0_2 = \text{Post-Test}$$

The researcher searched the gain (Md) the formula is:

$$Md = \frac{\Sigma d}{N}$$

Where: Md = The mean of gain

Σd = The sum of gain

N = The Number of students

Then the researcher searched the deviation (Xd), the formula is:

$$Xd = d - Md$$

Where: Xd = The deviation

d = Gain

Md = The mean of gain

After the researcher finds the deviation, the researcher searched the sum of Quadrate ($\Sigma x^2 d$). Finally, the researcher put the data into Wilcoxon signed-rank test.

$$N\text{-Gain} = \frac{\text{Score post test} - \text{Score Pretest}}{\text{Score Max} - \text{Score Pretest}}$$

The results of the Normalized Gain score are divided in three categories:

Table 3. 3 Normalized Gain Criteria

Presentase	Klasifikasi
N-gain > 70	Tinggi
$30 \leq \text{N-gain} \leq 70$	Sedang
N-gain < 30	Rendah

(According to Archambault, 2008)

The Formula:

$$Z = \frac{T - \sigma_T}{\sigma_T} = \frac{T - \frac{N(N+1)}{4}}{\sqrt{\frac{N(N+1)(2N+1)}{24}}}$$

T = Number of small ranks

N = Number of pairs that are not equal in value

Based on the explanation above, the researcher will describe the hypothesis criteria in this study according to Bungin (2005, p. 185) using the Wilcoxon Signed-Rank Test as follows:

1. If the calculated Z value (Z_{count}) is greater than or equal to the Z table value at a certain significance level (e.g., 0.05 or 0.01), then this indicates a significant difference, and the alternative hypothesis (H_a) is accepted.
2. If the calculated Z value (Z_{count}) is lower than the Z table value, this indicates that there is no significant difference, and the null hypothesis (H_0) is accepted.

Criteria of testing hypothesis

The statistical hypothesis in this research is as follows:

1. Null Hypothesis (H_0): The use of gamification strategies is not effective to improve students' vocabulary mastery.
2. Alternative Hypothesis (H_a): The use of gamification strategies is effective to improve students' vocabulary mastery.

1. Student Response Questionnaire

After obtaining the questionnaire data, the questionnaire processing can use a Likert scale. Then the data is processed in percentage using the following formula:

$$\text{Percentage} = \frac{\text{Total Score}}{\text{Maximum Score}} \times 100\%$$

Analysis of questionnaire data in this study helps assess the extent to which the application of gamification strategies is effective. By calculating the average score or

seeing the pattern of answers, researchers can find out what students like or dislike, researchers find areas that need to be improved in the learning process.

The data process is discussed the results of the data acquisition are entered into the table as below which includes the criteria that have been determined as follows:

Table 3. 4 Student Response Questionnaire Criteria

Number 100	Number	Letter	Description
81 - 100	8,0 – 10,0	A	Excellent
66 - 80	6,6 – 7,9	B	Good
56 - 65	5,6 – 6,5	C	Fair
41 – 55	4,0 – 5,5	D	Poor
0 - 40	3,0 – 3,9	E	Failed

To calculate the percentage of the Questionnaire, it must provide a value for each option as described in table 3.5

Table 3. 5 Likert Scale Rating Weight

Learning Response	Scores for Questions	
	Positive	Negative
Strongly Agree (SA)	4	1
Agree (A)	3	2
Disagree (D)	2	3
Strongly Disagree (SD)	1	4