CHAPTER III

RESEARCH METHODOLOGY

A. Research Design

This research study employs experimental research, which is a method used to assess the effects of specific treatments on subjects within controlled conditions (Sugiyono, 2017). On the other hand, experimental research aims to explore and observe the cause-and-effect relationships between variables and assess whether a given treatment produces an effect. This study is designed to examine the effect relationship involving the use of Padlet and to determine whether Padlet influences students' ability to write personal letters.

The researcher employs a quasi-experimental method, involving two groups: an experimental group and a control group. This design is used when obtaining a control group is difficult in real-world settings (Sugiyono, 2017). This design includes a control group; however, it cannot completely manage all external variables that might influence the experiment (Sugiyono, 2017). The researcher uses a quasi-experimental method, which involves an experimental group and a control group, to conduct research in situations where obtaining a control group is challenging.

This research employs a quasi-experimental design known as the nonequivalent control group design. While similar to the pretest-posttest control group design, this approach differs in that the experimental and control groups are not randomly assigned (Sugiyono, 2017). The researcher employs this design because randomization is not feasible in this study due to SMA Muhammadiyah 1 Pekalongan's regulations, which prohibit the random division of classes. Initially, a pre-test is administered to assess students' personal letter-writing skills before the treatment. The experimental group then receives the treatment using Padlet media, while the control group continues with conventional media. Following the treatment, a post-test is given to evaluate the impact of Padlet on personal letter writing and to identify any significant differences between the experimental and control groups. The research design is as follows:

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

(Sugiyono, 2017)

Symbol :

O1 = The pre-test is to measure the personal letter-writing skills of the experimental class before the treatment.

03 = The pre-test is to measure the personal letter-writing skills of the control class without the treatment.

X = The treatment of the experimental class with the application of Padlet as a learning media

O2 = The post-test is to measure the personal letter-writing skill of the experimental class after the treatment.

04 = The post-test is to measure the personal letter-writing skill of the control class without Padlet treatment.

B. Research Variable

Research variables refer to aspects of people, objects, or actions that change in some way, which the researcher chooses to investigate and draw conclusions from (Sugiyono, 2017). In this study, there are two types of variables: the independent variable and the dependent variable.

1. Independent Variable

Independent variable is often referred to as a stimulus variable, predictor, or antecedent (Sugiyono, 2017). The independent variable in this study is the use of Padlet. This variable is of interest because it is anticipated to influence the dependent.

2. The dependent variable

The dependent variable is the variable that is influenced or affected by the independent variable (Sugiyono, 2017). The dependent variable in this study is the skill of writing personal letters, specifically focusing on aspects such as vocabulary, grammar, mechanics, organization, and content.

C. Population and Sample

1. Population

The population refers to the broader group of objects or subjects with specific qualities and characteristics that researchers aim to study and analyze to draw conclusions (Sugiyono, 2017). The population in this study are 11th-grade students of SMA Muhammadiyah 1 Pekalongan, totaling 2 classes with 26 students.

Table 4.The Data of Class XI SMA Muhammadiyah 1 Pekalongan

No	Class	The number of students
1	**XI IPA**	14
2	**XI IPS**	12
	Total	26

2. Sample

The sample is a subset of the population that represents its characteristics and size (Sugiyono, 2017). The sample consists of 26 class XI students from SMA Muhammadiyah 1 Pekalongan, divided into two groups: the experimental class and the control class. The experimental class, XI IPA, includes 14 students who are taught using Padlet as a learning medium. The control class, XI IPS, comprises 12 students who are taught using conventional media.

3. Sampling Technique

This study uses saturation sampling. Saturation sampling is a technique where all members of the population are included in the sample (Sugiyono, 2017). This is often used when the population is relatively small.

The sample for this study consists of 26 grade XI students from SMA Muhammadiyah 1 Pekalongan. This includes 14 students from XI IPA, who form the experimental class, and 12 students from XI IPS, who make up the control class. Based on the consideration of the teacher, the researcher chooses XI IPA as an experimental group because the IPA class shows high interest and wisdom in utilizing technology, making it easier to adapt to Padlet. Meanwhile, XI IPS became the control group because IPS is more familiar with conventional media.

D. Research Instrument

A research instrument is a tool used to achieve the goals of a study. In this research, the instrument used is a personal letter writing test. This test aims to determine the effectiveness of using Padlet on students' ability to write personal letters.

In this study, the researcher employs written tests to gather data, including two types of tests: the pre-test and the post-test. Most of the test items are adopted from the book Sara Cushing Weigle (2002), which includes stimulus material and instruction relevant to the purpose of the study.

1. Pre-test

The researcher administers a pre-test to assess students' ability to write personal letters before the treatment. This pre-test consists of an essay task where students are required to write a personal letter.

2. Post-test

The researcher administers a post-test to evaluate students' personal letter-writing skills after the treatment with Padlet. This post-test also consists of an essay task requiring students to write a personal letter.

E. Research Material Treatment

This research uses personal letter materials from English books and the internet, as well as delivering material and exercises using Padlet media.

Table 5. Research Material Treatment

Meetings	Topics
Treatment 1	• Material of Personal Letter : – Definition – Purpose – Structure – Language features
Treatment 2	• Analyse an example of a personal letter and answer questions
Treatment 3	• Generating ideas by discussion and expressing students' ideas in personal letter writing
Treatment 4	• Answering questions of personal letter in the form of polls and discussing the answers

F. Validity and Reliability

Validity and reliability are crucial elements for enhancing the effectiveness of the data collection process (Sugiyono, 2017). To ensure the accuracy of research data, the validity and reliability of the instrument must be verified. It is expected that by using valid and reliable tools, reliable and accurate research results can be achieved.

1. Validity

Validity measures how accurately an instrument assesses what it is intended to measure. An instrument is considered valid if it effectively captures the desired data from the variables under study. Thus, a well-designed test should have strong validity. There are two internal validity instruments, namely construct validity and content validity (Sugiyono, 2017). In this study, content validity is used by the researcher to determine the relevance of the lesson plan and pretest-posttest essay test to students' abilities, knowledge, lessons, experiences, or backgrounds. Adequate coverage of the subjects studied is achieved through content validity. To ensure data validity, measuring and testing of students' writing ability of personal letters is conducted by using content validity. To validate the content of this study, the researcher uses expert validity. The content validity test is carried out utilizing expert judgment or assessment carried out by an expert. The first expert validator for the validity of the pretest-posttest essay test instrument is Dedi Turmudi, S.Pd., M.A. TESOL. The second expert validator for the validity of the lesson plan instrument validity is Atmaliyati, S.S.

2. Reliability

Reliability refers to the consistency of an instrument in producing stable and repeatable results. According to Sugiyono (Sugiyono, 2017), the reliability test measures the extent to which an instrument yields consistent results when used to measure the same object under the same conditions.

Split-half reliability is a method used to measure the internal consistency of a test. To measure split-half reliability on essay tests, To assess the two-sided reliability of the essay test in this study, the researcher compares the results of the pre-survey and pre-test. The test includes five aspects of writing: content, vocabulary, grammar, mechanics, and organization. Then correlate the scores of each part. The reliability test of the instrument can be done with the split-half technique from Guttman:

$$r_i = \frac{2r_{\chi\gamma}}{1 + r_{\chi\gamma}}$$

Note :

r I = The internal reliability of all instruments refers to the consistency of results within the instrument itself, ensuring that different parts of the instrument produce similar outcomes when measuring the same construct.

r b = The correlation between the first and second halves of the test is used to assess its reliability, ensuring that the results from both halves are consistent and dependable.

G. Data Collection

In data collection, the researcher uses both a pre-test and a post-test. The pre-test is administered before the treatment to assess students' initial writing ability in personal letters at SMA Muhammadiyah 1 Pekalongan. The post-test is given after the treatment, which includes four classroom meetings using Padlet, to determine if there is a significant difference in students' writing scores and the effect of Padlet on their writing ability.

The data collection procedure is outlined chronologically as follows:

1. Pre-test: Conducted before introducing the personal letter material. The researcher administers the pre-test to both the experimental and control classes to assess students' writing abilities before any treatment.
2. Post-test: Administered after the personal letter material has been taught. The researcher gives the post-test to both the experimental and control classes to evaluate students' writing progress following the treatment. This test aims to identify differences in scores and assess the significant impact of using Padlet on students' personal letter-writing abilities.

H. Data Analysis

1. Normality Test

The normality test is conducted to assess if the residual values follow a normal distribution and to check if the data from both the experimental and control classes are normally distributed. The Shapiro-Wilk test is a statistical method used for this purpose, comparing the order of sample statistics to the order expected from a normal distribution. The following is the formula and explanation for the Shapiro-Wilk test.

The Shapiro-Wilk formula is as follows:

$$\mathcal{T}_{3} = \frac{1}{D}\left[\sum_{i=1}^{k} a_i \ (\mathcal{X}_{n-i+1} - \mathcal{X}_i)\right]$$

Description:

T3: Calculated Shapiro-Wilk test statistic.

D: Shapiro-Wilk test coefficient.

ai: Coefficient determined based on sample size n and the covariance matrix of the normal distribution.

Xn-i+1: Sample data sorted from largest to smallest.

Xi: Sample data sorted from smallest to largest.

K: Sample size.

Hypothesis Testing Criteria:

- If the significant value is greater than 0.05 then H0 is accepted
- If the significant value is smaller than 0.05 then H0 is rejected

2. Homogeneity Test

Before conducting a t-test, it is essential to ensure that the data are homogeneous, meaning that the variances of the data in the experimental and control groups are equal. This test, known as the homogeneity of variance test, checks whether the variability in the two groups is comparable, which is a prerequisite for accurately performing the t-test. Furthermore, the homogeneity stage is carried out, as follows (Ridwan, 2017):

$$F_{count} = \frac{V_b}{V_k}$$

Note :

Vb = represents the bigger variance

Vk = represents the smaller variance

The hypotheses are:

Ho = The variances are equal (homogeneous). This is mathematically represented as $\sigma\frac{2}{1} = \sigma\frac{2}{2}$

Ha = The variances are not equal (non-homogeneous). This is mathematically represented as $\sigma\frac{2}{1} \neq \sigma\frac{2}{2}$

In this study, the criteria for the homogeneity test are as follows:

Ha (Alternative Hypothesis): Accepted if F observed > F critical

Ho (Null Hypothesis): Accepted if F observed ≤ F

These criteria help determine whether the variances between the experimental and control groups are significantly different.

3. Hypothesis Test

To determine if there is a significant difference between the experimental group and the control group, the researcher uses SPSS version 25 to calculate the paired sample t-test. This involves applying an independent t-test to compare the pre-test and post-test results of the experimental group and assess the effect of using Padlet on students' personal letter writing skills. The significance level for the t-test is set at 0.05.:

Table 6. Hypothesis Testing

Testing	Hypothesis	
	Ho	Ha
t-test < t-table	Accepted	Rejected
t-test > t-table	Rejected	Accepted

This test uses the t-test to compare the t-test value with the t-table value. The hypothesis testing is conducted under the following conditions::

1) If the t-test value is greater than the t-table value, Ha is accepted, indicating that the average score for writing personal letters in XI IPA is higher than in XI IPS.
2) If the t-test value is less than the t-table value, H0 is accepted, indicating that the average score for writing personal letters in XI IPA is lower than in XI IPS.

Additionally, this test involves evaluating the significance of the t-value at the α (0.05) level. The analysis compares the significant t-value with the significance level of 0.05. The decision criteria for the t-test are as follows:

1) If the p-value is less than 0.05, Ha is accepted, indicating that there is a significant effect of the independent variable on the dependent variable.
2) If the p-value is greater than 0.05, H0 is accepted, indicating that there is no significant effect of the independent variable on the dependent variable.

I. Formula of Writing Assessment

To assess students' personal letter writing, the researcher employs an analytic scale that evaluates five key aspects: content, organization, vocabulary, language use, and mechanics (Brown, 2007). The rubric is modified and enhanced with specific assessments tailored to the aspects of personal letter writing. Each component of the writing is evaluated on a four-point scale: poor, fair, good, very good, and excellent.

Table 7. The Holistic Scale Aspect of Writing

The Aspect of Writing	Score	Description
Content	1	The topic is not clear and the details are not related to the topic
	2	The topic is completely clear but the details are not related to the topic
	3	The topic is complete and clear but the details are almost related to the topic
	4	The topic is complete and clear and the details related to the topic
Vocabulary	1	Very poor knowledge of words, and word forms, are not under stable
	2	A limited range of confusing words and words form
	3	Few misuse of vocabulary, and word forms, but no change in the meaning
	4	Effective choice of words and words form
Mechanics	1	It is dominated by errors in spelling, punctuation, and capitalization
	2	It has frequent errors in spelling, punctuation, and capitalization
	3	It has occasional errors in spelling, punctuation, and capitalization
	4	It uses correct spelling, punctuation, and capitalization
Grammar (language features)	1	Frequent grammatical, sentence structure, and stylistic inaccuracies in the personal letter.
	2	Numerous grammatical, sentence structure, and stylistic inaccuracies in the personal letter.
	3	few grammatical, sentence structure, and stylistic inaccuracies in the personal letter.
	4	Very few grammatical, sentence structure, and stylistic inaccuracies in the personal letter.
Organization (structure of personal letter)	1	Identification is incomplete and the personal letter text structure is organized with incorrect connections
	2	Identification is incomplete and the personal letter text structure is organized with few incorrect connections
	3	Identification is incomplete and the personal letter text structure is organized with almost proper connections
	4	Identification is complete and the personal letter text structure is organized with proper connections

(Brown, 2007)

Table 8. Scoring Classification of Writing

NO	Classification	Score
1	Excellent	81 – 100
2	Very Good	61 – 80
3	Good	41 – 60
4	Fair	21 – 40
5	Poor	0 – 20

(Depatemen Pendidikan, 2008)

To determine the total score for each writing aspect by the students, the researcher employs an analytic scale. The formula used for this calculation is:

$$TS = C + O + V + G + M$$

Note :

TS = Total score

C = Content

O = Organization

V = Vocabulary

G = Grammar

M = Mechanic

The final score of each student is calculated by:

$$FS = \frac{TS}{20} X\ 100$$

Note :

FS = Score of each student

TS = Total score of the aspect of writing