

CHAPTER III

RESEARCH METHODOLOGY

A. Research Design

In this research, the researcher is using experimental research. Experimental research involves a study of the effect of the systematic manipulation of one variable(s) on another variable (Ary, D., Jacobs, L. C., & Sorensen, 2010). The manipulated variable is called the experimental treatment or the independent variable. The observed and measured variable is called the dependent variable. According to Ary, D., Jacobs, L. C., & Sorensen (2010), experimental designs may also be classified according to how well they provide control of the threats to internal validity: pre-experimental, true experimental, and quasi-experimental designs. This research is conducted using an experimental design to test the effect of the 4/3/2 technique on students' speaking fluency at MTsS Madinatul Munawwarah Bukittinggi.

A quasi-experimental design is used in this study. Quasi-experimental designs involve manipulating an independent variable but do not randomly assign subjects to groups. (Ary, D., Jacobs, L. C., & Sorensen, 2010). There are four types of quasi-experimental designs: nonrandomized control group-pretest and post-test design, a counterbalanced design with two treatments, one-group time-series design, and control group time-series design. In this study, a

nonrandomized control group, pretest-posttest design, is used. This design is a quasi-experimental design commonly applied in educational research, where two preexisting groups, not randomly assigned, are compared by administering a pretest and posttest to evaluate the effect of an intervention on the experimental class. The experimental class receives the treatment using the 4/3/2 technique, while the control group receives treatment with a different technique, namely group discussion. For more details, see the following table:

Table 3.1
Quasi Pretest- Posttest Design

Class	Pre-test	Independent-Variable	Post-test
Experiment	Y 1	X	Y 2
Control	Y 2		Y 2

This design was intended to evaluate the effectiveness of the 4/3/2 technique for nine-grade students in junior high school. The researcher conducted a pre-test for both the experimental and control groups, followed by the implementation of the 4/3/2 technique in the experimental group only. Afterward, a post-test was administered to both groups. If the experimental group shows significantly greater achievement in the post-test, the researcher can conclude that the 4/3/2 technique is effective.

B. Variable of the Research

In this study there are two variables, namely the independent variable and

the dependent variable. A variable is a construct or characteristic that can take on different values or scores (Ary, D., Jacobs, L. C., & Sorensen, 2010). The most important classification of variables is based on their use in the research being considered, where the variable is classified as either an independent or a dependent variable. The independent variable is the antecedent of the dependent variable and is known or hypothesized to affect the dependent variable, which is the outcome. In experimental studies, the treatment is the independent variable, and the result is the dependent variable. In this research, the use of the 4/3/2 technique in the experimental class is treated as the independent variable (X), while students' speaking fluency achievement is treated as the dependent variable (Y).

C. Population and Sample of the Research

1. Population

In a study, determining the population is an important step to ensure that the results obtained reflect the actual conditions. The population refers to a group of individuals or objects that have specific characteristics aligned with the research objectives. This research implements a group population, in which 4 classes of the ninth grade will be the population. The population is made up of all individuals who belong to a specific class of persons, things, or events (Ary, D., Jacobs, L.C., & Sorensen, 2010). The population of this study is all the students in class IX

at MTsS Madinatul Munawwarah Bukittinggi. There are 4 classes in grade IX: IX A, IX B, IX C, IX D, with a total of 123 students.

Table 3.2
The population

No	Class	Male	Female	Total
1.	IX A	13	18	31
2.	IX B	14	16	30
3.	IX C	13	18	31
4.	IX D	12	19	31
TOTAL				123

Source: The English Teacher at MTsS Madinatul Munawwarah Bukittinggi

1. Sample

Sampling in this research is done to represent the characteristics of the entire population so that the research results can be generalized more accurately. The sample is part of the population (Ary, D., Jacobs, L.C., & Sorensen, 2010). There are several techniques for sample selection.

Based on the above population size, it is large enough to be used as a research sample. The sample is homogeneous, so cluster random sampling is used. This technique involves selecting one class to be used as a sample. Cluster random sampling is a technique in which the population is divided into several smaller and heterogeneous groups or clusters. Then, some clusters are randomly selected for the study, and all members within the selected clusters are taken as the sample (Subhaktiyasa, 2024). The

researcher prepares small pieces of paper, each containing a number representing the available groups, for example, numbers 1 through 4 for the classes. Then, using the cluster random sampling technique, the researcher selects a group randomly by drawing papers from a closed container. The samples of this research are class IX C, consisting of 31 students as the experimental class, and IX D, consisting of 31 students as the control class.

Table 3.3
Sample of the Research

No	Class	Students
1	IX C	31
2	IX B	31
Total	2 Classes	62 Students

D. Instruments of the Research

Research tools are essential for gathering accurate and comprehensive data. The choice of tools depends on the research questions, objectives, and nature of the data needed. Effective tools directly impact the quality and reliability of research findings.

The instrument utilized in this investigation was a test. The test used is an oral test by presenting the images obtained by the students. So this speaking test is carried out by the head of both classes by dividing them into 2 groups in each class, namely the male group and the female group. The researcher took two classes as sample classes and arranged them into the experimental class and the control class. In the learning process, the experimental class will use the 4/3/2

technique and the control class will use the discussion technique.

Initially, researchers gave them a pre-test to measure their initial speaking abilities. Students will practice the 4/3/2 technique by having enough time to prepare the topics that will be covered, and then they will each present an exercise to three separate listeners that is focused on that topic. The 4/3/2 technique will be carried out in the experimental class.

E. Technique of the Data Collection

Techniques to collect data or facts needed to answer research questions or test hypotheses are referred to as data collection techniques in research. The types of data needed and the goals of the research must be taken into consideration when selecting these methods. A number of approaches were employed by the researchers, including sample selection, pre-testing, treatment, and post-testing.

1) Determine the sample.

This study employs both a control class and an experimental class. At MTs Madinatul Munawarah, there are four eighth-grade classes that constitute the study population. The sample was selected using a random sampling technique. Through this method, two classes were chosen as the study sample: one serving as the control class and the other as the experimental class.

2) Material Collections

In this research, procedural texts will be used as open-source material.

The steps for making fried rice in a procedural text will serve as the primary focus. The researcher will provide a procedural text corresponding to the first lesson, which explains how to prepare fried rice. Prior to the lesson, students will receive the text and be expected to comprehend it

3) Pre-test

Before applying the 4/3/2 technique, a pre-test will be conducted to assess students' speaking proficiency. Students will be given an image related to the taught material (Procedural Text: How to Make Fried Rice). They will then be allotted time to verbally explain the steps for making fried rice as outlined in the procedural text.

4) Treatment

The 4/3/2 technique will be applied exclusively to the experimental class. The implementation of the 4/3/2 technique follows these steps:

1. Step 1: 4 Minutes

- a. Students are divided into pairs.
- b. Each student has 4 minutes to explain the process of making something in detail to their partner based on the provided image.
- c. Students must include an opening greeting, an introduction, an explanation of the tools and ingredients, a step-by-step procedure, and a closing statement.
- d. After 4 minutes, partners take turns explaining within the same timeframe.
- e. Rest for 30 seconds (switching partners)

2. Step 2: 3 Minutes

- a. After switching partners, students now have only 3 minutes to explain the process, following the same procedure but with a reduced timeframe.
- b. Partners then take turns explaining within the same duration.
- c. Rest for 30 seconds (switching partners)

3. Step 3: 2 Minutes

- a. After switching partners again, students are given only 2 minutes to briefly explain the process using the image.
- b. Partners then take turns explaining within the same duration.

5) Post-test

The post-test is intended to evaluate students' growth after receiving teaching using the 4/3/2 technique. A handful of the elements that were looked at in the pre-test and post-test were similar. The researcher gave the same text as the pre-test. This aims to determine the effect of the 4/3/2 technique on students' speaking fluency abilities. Researchers and English teachers will evaluate the students' performances because the students' voices will be recorded. In taking data will use 2 smartphones to talk to students. Data will be analyzed using additional applications and website such as the Notta application, syllable counter, and Microsoft Excel.

For fluency assessment use the 4/3/2 technique as follows:

1. Transcribing Recordings

All audio recordings are transcribed into written form to facilitate the identification of errors in students' speech. The researchers utilize the Notta application on smartphones to transcribe the recordings, using three different accounts.

2. Listening to Recordings

The recordings are played to assess students' fluency based on the predetermined assessment indicators.

3. Counting Syllables

After obtaining the relevant numerical data from the student recordings, the researchers determine the total number of syllables using the Syllable Counter website.

4. Data Calculation

Initially, the data were calculated manually using a calculator. To improve efficiency in data presentation and analysis, the data were subsequently processed and analyzed using Microsoft Excel. In calculating data using the following formula

a. Speech Rate (SR)

The speech rate can be determined using the following formula:

$$Sr = \frac{\text{number of syllable}}{\text{times in second}} \times 60$$

$$\text{Speech rate score} = \frac{\text{speech rate}}{230} \times 100$$

b. Pause Rate (PR)

The pause rate can be determined using the following formula:

$$Pr = \frac{\text{number of pruned syllable}}{\text{time in second}} \times 100$$

$$PRS = 100 - \left(\frac{\text{number of pruned syllable}}{\text{time in second}} \times 100 \right)$$

c. Dysfluent Syllables (DS)

The dysfluent syllables can be determined using the following formula:

$$Ds = \frac{\text{the number of disfluent syllable}}{230} \times \text{time in second}$$

$$DFS = 100 - \left(\frac{\text{total number of disfluent syllable}}{230} \times \text{time in second} \right)$$

d. Mean Length of Runs (MLR)

The mean length of runs can be determined using the following formula:

$$MLR = \frac{ns - np}{\text{average syllables per minute}}$$

F. Technique of The Data Analysis

To examine the effect of the 4/3/2 technique towards students' speaking fluency ability at MTsS Madinatul Munawwarah Bukittinggi, the researchers process and analyze the data through several stages, as outlined below.

1. Data Description

The data obtained in this study are presented first to provide an initial overview before further analysis is carried out. According to Putri & Fitria (2021), descriptive data is an effort to display data so that the data can be presented well and interpreted easily. Data presentation is done in the form of tables and graphs to make it easier to understand. This data includes the results of students' speaking tests before and after

treatment, which will later be analyzed to see the patterns of change and trends that occur. This data description aims to provide an initial understanding of the data collected before entering a more in-depth analysis stage.

In the data description, the N gain value is also presented in each pre-test and post-test of the control class and the experimental class. This aims to determine the effectiveness of using the 4/3/2 Technique. The N-gained score test is carried out by calculating the difference between the post-test value and the pre-test value. The following assessment indicators can be seen from Hake (1999):

Table 3.4
The Criteria of Normalized N-Gain Index

Normalized <i>N-Gain</i>	Interpretation
$g > 0,7$	High
$0,3 \leq g \leq 0,7$	Moderate
$g < 0,3$	Low

Table 3.5
Interpretation of Effectiveness of N-Gain

Percentage (%)	Interpretation
<40	Ineffective
40-55	Less Effective
56-75	Effective Enough
>78	Effective

$$N \text{ Gain} = \frac{\text{Post Test Score} - \text{Pre test Score}}{\text{Ideal Score} - \text{Pre test Score}}$$

2. Descriptive Data Analysis

Descriptive statistical analysis is a statistic used to analyze data by describing or depicting the collected data as it is without intending to make conclusions that apply to the public or generalization. This analysis is only an accumulation of basic data in the form of descriptions alone in the sense that it does not seek or explain interrelationships, test hypotheses, make predictions or draw conclusions (Muhson, 2006). Descriptive statistical analysis techniques that can be used include:

1. Presentation of data in the form of tables or frequency distributions and crosstabs. With this analysis, the tendency of research findings will be known, whether they fall into the low, medium or high category.
 2. Presentation of data in visual form such as histograms, polygons, ogives, bar charts, pie charts, and symbol diagrams.
 3. Calculation of measures of central tendency (mean, median, mode).
 4. Calculation of measures of location (quartiles, deciles, and percentiles).
 5. Calculation of measures of distribution (standard deviation, variance, range, quartile deviation, mean deviation, and so on).
 - 6.
3. Pre-Requisite Data Analysis
- a. Normality Test

The Normality test is a test that is carried out as a prerequisite for conducting data analysis. A Normality test is carried out to

determine good and feasible data to prove whether the data is normally distributed or not. Normality test is seen from the pretest and post-test data results. The normality test of the pretest and post-test data results used is Shapiro-Wilk using Statistical Package For Social Sciences (SPSS) 25 for Windows software. The decision criteria in the normality test in SPSS according to Arifin (2017) are:

- a. If the significance value is $p > 0.05$, the data is normally distributed.
- b. If the significance value is $p < 0.05$, the data is not normally distributed.

After the normality test is carried out using the Shapiro - Wilk test and the data is stated to be normally distributed, it is then continued with a homogeneity test of two variances on the pretest and post-test data results using the Levene test with Statistical Package For Social Sciences (SPSS) 25 for Windows software.

b. Homogeneity Test

Homogeneity test is conducted to determine whether students in the class have homogeneous variance or not. Homogeneity test of two variances on the results of pretest and posttest data using Levene's test with Statistical Package For Social Sciences (SPSS) 25 for Windows software. The decision criteria in the homogeneity test in SPSS according to Arifin (2017) are:

- a. If the significance value $p < 0.05$ means that the data is declared non-homogeneous.
- b. If the significance value $p > 0.05$ means that the data is declared homogeneous.

From the test results, the data of both groups have the same variance, so the hypothesis test is carried out with the sameness using the one sample t test.

4. Hypothesis Testing

Hypothesis testing is a statistical method used to determine whether there is enough evidence in a data sample to draw conclusions about a population. This involves formulating a hypothesis that has been set by the researcher where the hypothesis is There is a significant effect of the 4/3/2 technique on students' speaking fluency at MTs Madinatul Munawarah Bukittinggi (The alternative hypothesis) and there is no significant effect of the 4/3/2 technique on students' speaking fluency at MTs Madinatul Munawarah Bukittinggi (The null hypothesis)

In this study, the researcher used the t-test to test the hypothesis that had been proposed. The t-test is used to test whether there is a significant effect on the level of teaching success on students' speaking fluency between using the 4/3/2 technique and not using other techniques (group discussion techniques). The t-test used in this study is specifically the Independent Sample t-test. This test is to determine

the difference in the average of two independent populations/data groups (Nuryadi, et.al., 2017). The t-test will be analyzed using SPSS version 25 software with the following criteria:

1. Levene's Test is used to test the equality of variance between two groups.
 - a. If $p < 0.05 \rightarrow$ different variances.
 - b. If $p > 0.05 \rightarrow$ equal variances

2. Selection of t-Value

- a. If the variances are equal (Levene's Test is not significant), use the t-value in the equal variance assumed row.
- b. If the variances are different (Levene's Test is significant), use the t-value in the equal variance not assumed row.

If the t-value is significant ($p < 0.05$) in the equal variance assumed row, then there is a significant difference between the experimental group and the control group. Conversely, if the t-value is not significant ($p > 0.05$) in the equal variance assumed row, then there is no significant difference between the two groups.

1. If $p < 0.05 \rightarrow$ there is a significant difference between the two groups. H_0 is rejected, H_a is accepted, meaning that the 4/3/2 technique has an effect on students' speaking fluency.
2. If $p > 0.05 \rightarrow$ there is no significant difference. H_0 is accepted, H_a is rejected, meaning that the 4/3/2 technique has no effect on students' speaking fluency.