

CHAPTER III RESEARCH METHODOLOGY

A. Research Design

According to Creswell (Chu, PH. and Chang 2017) research design is the specific procedures involved in the research process, including data collection, analysis, and report writing. Research methods can be defined as the means to achieve research objectives. A very important decision in the research design process is the choice to be made regarding the research approach as this determines how relevant information for a study will be obtained; however, the research design process involves many interrelated decisions. The research design used by the current researcher is a quasi-experimental design. The basic purpose of an experimental design is to test and determine the impact of treatment on the final outcome and control for other influencing factors.

This study used two classes as a comparison. The first class is the experimental class treated with the information gap technique. The second is the control class which is treated with conventional technique (teacher-centered) or not treated with the information gap technique. In summary, this study was designed with the following table :

Table 3.1
Research Design

Class	Pre-Test	Treatment	Post-Test
Experimental	T1	X	T2
Control	T1	Θ	T2

Note :

T1 : Pre-test to experiment and control class

T2 : Post-test to experiment and control class

X : Receiving treatment, that is using imagery strategy

Θ : No treatment

Sugiyono (Sugiyono 2016)

Based on the table above, the researcher conducted a pre-test in the experimental class and control class which aimed to determine the students' speaking skills. The experimental class (second-grade B) was given special treatment using the information gap technique.) The control class (Second-grade C) was given conventional techniques, i.e. teacher-centered as usually done by teachers. After giving the treatment, the researcher conducted a post-test to measure the effect of using the information gap

technique in second-grade B, and the use of conventional techniques, namely teacher-centered in second-grade C.

B. Research Variables

Based on (Sugiyono 2016) Research variables are attributes of a study, variables are everything that is determined by researchers to study so that information is obtained about it. The variables used by researchers in this study are independent variables (X) and dependent variables (Y).

According to (Sugiyono 2016) independent variables are often referred to as stimulus, predictor, or antecedent variables. Independent variables are variables that affect or cause changes or the emergence of dependent variables. Meanwhile, dependent variables are often referred to as output variables, criteria, or consequent variables. The dependent variable is the variable that is affected or that is the result of the independent variable. The description of both variables is as follows:

- Dependent Variable (Y) students' speaking skill
- Independent Variable (X) the information gap technique

F. Research Population and Sample

1. Population

According to (Arikunto 2019) the population is defined as all members of a specific group of people, events, or objects. Referring to the definition of population, it can be said that population is the entire object of research designed for a group of people or events as a source of data. The population in this study were second-grade students at SMP Muhammadiyah 1 Metro. There are four classes namely second-grade A, B, C, and D with 29 students in each class. The total population is 114 students.

2. Sample

Based on (Arikunto 2018) sample is a subset of a population that can represent all observed populations. Samples taken from the population must be truly representative. In this study, researchers chose two classes as samples. Researchers used random sampling techniques to select classes. In the second grade, there are four classes namely second-grade A, B, C, and D. To select the experimental and control classes, researchers used cluster random sampling techniques, and the selected classes were class VIII B as the experimental class and class VIII C as the control class of SMP Muhammadiyah 1 Metro, totaling 58 students. This can be seen from the following table :

Table 3.2
Sample Research

Experiment Class (Second Grade B)	29
Control Class (Second Grade C)	29
Total	54

Source: Second-grade student data SMP Muhammadiyah 1 Metro during the pre-survey research

3. Sampling Technique

According to (Bhardwaj 2019) sampling is defined as a procedure to select a sample from an individual or from a large group of people for a certain kind of research purpose. In this study, the researcher used simple random sampling. Simple random sampling is a sampling technique from a population that is carried out randomly regardless of its position in that population. The following are the steps taken by researchers to select the experimental group and control group:

- a. First, the researcher wrote all the second graders (A, B, C, and D) on a piece of paper
- b. Second, the paper was rolled and then put into the glass.
- c. The glass has shaken until getting the rolling of paper is out.
- d. The first roll of paper was B class as the subject of the experimental class
- e. The second roll of paper was C as the subject of the control class

C. Research Instruments

Research instruments are used in the process of finding correct data. According to Ali (Ali and Asrori 2018) research instruments are any tools that can be used in research to achieve research objectives. Instruments are tools used by researchers in carrying out research through certain techniques.

Since this study focuses on speaking, the instrument to collect data was a speaking test. This test consists of a pre-test and a post-test. This test was used to find out the significant difference between the effect of using the information gap technique on the experimental class and using the conventional (teacher-centered) technique on the control class in speaking ability between second-grade students. The topics for the pre-test and post-test were the same, i.e. students were given a conversation task sheet with the theme of asking for and giving directions. Students were divided into several groups, each group consisting of two people who played the role of student A and student B. Then they were asked to conduct a conversation in front of the researcher for

2-5 minutes. The criteria on the speaking rubric, include pronunciation, grammar, vocabulary, fluency, and comprehension.

D. Validity and Reliability

1. Validity of Instrument

Validity means the extent to which the accuracy or suitability of the measurement instrument in measuring data. According to Sugiyono (Sugiyono 2016), validity refers to the degree to which a study accurately reflects or assesses the specific concept that the researcher wants to measure. Validity is related to the success of research in measuring what the researcher determines. According to Arikunto (Arikunto 2019), validity is a standard that shows the levels of validity or validity of an instrument. Therefore, validity is a tool that can be used to see the validity of an instrument used by researchers. In this study, researchers analyzed the test from content validity. Content validity tests whether the test is a good representation of the material to be tested. That is, the test items represent the material discussed. The validity instrument was corrected by a validator. There were two experts who provided assessments, namely Mrs. Aulia Hanifah Qomar M.Pd as a speaking lecturer in the English education study program at Muhammadiyah University of Metro, and Mr. Apung Sugiarto S.Pd as an English teacher in second grade at SMP Muhammadiyah 1 Metro. The experts reviewed the process used in developing the test as well as the test itself and made judgments regarding how well the items represented the intended purpose.

2. Reliability of the Test

Reliability refers to the extent to which the test is consistent in giving scores and gives an indication of how accurate the test scores are. According to Arikunto (Arikunto 2019), that test reliability is an instrument that can be trusted enough to be used as a data collection instrument because it is good. Based on the explanation above, reliability is a good measuring instrument used as a data collection instrument.

Test reliability shows whether the instrument is reliable and can be used as a tool for collecting data. Reliability means the stability of test scores when the test is used. A test is reliable to the extent that it measures consistently, over time.

In this study, researchers need to know the reliability after calculating the validity of the instrument, to measure the reliability of the test. The formula can be seen below:

$$K = \frac{\text{Pr}(a) - \text{Pr}(e)}{1 - \text{Pr}(e)}$$

Where:

K : Cohen's Kappa Index Value

Pr(a) : Relative Observed Agreement

Pr(e) : Hypothetical Probability of chance agreement

With :

$$\text{Pr}(a) = \frac{a}{n}$$

Where :

Pr(a) : Relative Observed Agreement

n : Number of Subjects

$$\text{Pr}(e) : (n_{i+} \times n_{+i}) + (n_{ii+} \times n_{+ii}) + (n_{iii+} \times n_{+iii}) \dots\dots$$

Where :

Pr(e) : Hypothetical probability of chance agreement

n_{i+} : Total score of the first category of inter-rater I

n_{+i} : Total score of the first category of inter-rater II

n_{ii+} : Total score of the second category of inter-rater I

n_{+ii} : Total score of the second category of inter-rater II

n_{iii+} : Total score of the third category of inter-rater I

n_{+iii} : Total score of the third category of inter-rater II

(Tuan 2012)

The criteria of reliability which based on Sugiyono's criteria as follows :

Table III.3
Kappa Score Criterion

K Value	Strength of Agreement
< 0.20	Poor
0.21 – 0.40	Fair
0.41 – 0.60	Moderate
0.61 – 0.80	Good
0.81 – 1.00	Very Good

Source: Sugiyono (Sugiyono 2016)

E. Data Collecting Technique

The gathering of the data necessary to establish the study's outcome is of utmost importance. In (Shofiyah 2014), Brown makes the case that a test is a way to gauge a person's aptitude and subject-matter expertise. So, using a test as a tool, it is possible to assess if student achievement has improved. The researcher assesses the students'

speaking skills using a test. The type of test the researcher uses is an oral test. The full explanation is provided below:

1. Pre-Test

The pre-test used to identify the real problems and students' competence in speaking which was conducted at the beginning of the research before the treatment process.

The students are divided into groups of two and play the role of Student A and Student B according to the worksheet given by the researcher. Then they are given 5 minutes to have a conversation in front of the researcher. The criteria on the speaking test rubric, including pronunciation, grammar, vocabulary, flow, and comprehension, were used to determine the pre-test score.

2. Treatment

After the pre-test, the researcher gave the treatment to the students. The treatment aims to improve the student's speaking skills. This treatment was carried out in five meetings, in the experimental class. The researcher explains the material being studied and uses the information gap technique. While in the control class, the researcher only explained the material using conventional learning (teacher-centered).

3. Post-Test

The post-test was given after the treatment using the information gap technique. The purpose was to observe students' progress in English proficiency after receiving the treatment. The steps in the sequence given by the researcher resemble the pre-test. The criteria on the speaking exam rubric, namely pronunciation, grammar, vocabulary, fluency, and comprehension, were used to determine the results of the post-test.

F. Data Analyzing Technique

After gathering the data, the researcher used the formulas for the normalcy test, homogeneity test, and hypothesis test to examine the pre-test results relating to both of them.

The following are the steps to treat the data:

1. Normality Test

According to Ghazali (Boonkit 2010), the object test for normality is used to determine whether or not the data distribution is normal. The data must meet the requirements of the normal distribution, which is one of the test assumptions of the statistic compilation. Therefore, it is essential to examine the normalcy of the distribution of the student's scores. The detailed explanation is given below. Normality test using the formula Kolmogorov-Smirnov as follows:

a. The hypothesis formula :

H0 : Normal population distribution

H1 : The population distribution is not normal

b. Statistic formula :

$$D = \max_{1 < i < N} \left(F(Y_i) - \frac{i-1}{N}, \frac{i-1}{N} F(Y_i) \right)$$

The researcher calculated the data using SPSS

2. Homogeneity Test

The purpose of the homogeneity test is to determine whether the variance between the control group and the experimental group is homogeneous or heterogeneous. If the data for both groups have the same variance, it means homogeneous. (Setiadi 2018). At this stage, the homogeneity test uses One Way ANOVA. There are two criteria at this stage, namely:

- 1) If the significance value is > 0.05 it means homogeneous
- 2) If the significance value is <0.05 it means not homogeneous

3. Hypothesis Test

Sugiyono (Sugiyono 2019) states that comparing the two data sets and figuring out whether the variables are the same or different is the goal of the t-test with two samples. The t-test illustrates the extent to which the variance in the dependent variable can be explained by the influence of a single independent variable. The pre-test and post-test results for the experimental class are compared to those of the control class in this test. The researcher in this study calculated the T value using the T-test formula or SPSS.

The hypothesis formula is:

H_a : There is a significant effect of using Information Gap Technique toward students' speaking skill at SMP Muhammadiyah 1 Metro

H_o : There is no a significant effect of using Information Gap Technique toward students' speaking skill at SMP Muhammadiyah 1 Metro

To decide which hypothesis is accepted or not accepted, the t-test formula is used to compare two samples. The t-test formula is as follows :

$$t - \text{test} = \frac{X_1 - X_2}{\frac{\sqrt{S_1^2 + S_2^2}}{N_1 N_2}}$$

Notes:

X₁ : The means of the experiment class

X₂ : The means of the control class

S : The standard deviation

N_1 : The number of students in the experimental class

N_2 : The number of students in the control class

The average variant (S^2) would be determined prior to employing the t-test formula.

The variant (S^2) is calculated by formula :

$$S^2 = \frac{(N_1-1)S_1^2 + (N_2-1)S_2^2}{N_2(N^2-1)}$$

Notes :

N_1 : Number of students in experimental class

N_2 : Number of students in control class

S_1^2 : Variant of experimental class

S_2^2 : Variant of control class

S^2 : Variant

The criteria are:

H_0 : H_0 is accepted if t-ratio < t-table

H_a : H_a is accepted if t-ratio > t-table