

CHAPTER III

METHOD

A. Research Design

This research utilized a quantitative approach. According to Leedy (2019:229), this method aims to predict, control, and explain a phenomenon by examining the relationships between the measured variables. Consequently, quantitative methods are inherently linked to numbers and systematic measurements of phenomena and their relationships. To assess the impact of a treatment on specific subjects in a controlled environment, an experimental research design was employed.

Therefore, a quasi-experimental design was adopted for this study, experimental research seeks to determine whether a treatment yields a result by comparing one or more groups that received the treatment with those that did not. This indicates that a quasi experiment is employed to compare the control group with the experimental group, as illustrated in the following chart

Table 3. 1

quasi experimental Design Pretest Posttest

Quasi Experimental Design			
Experimental Class	<i>Pretest</i>	Treatment by PBL	<i>Posttest</i>
Control Class	<i>Pretest</i>	No Treatment	<i>Posttest</i>

(Creswel, 2016)

Therefore, this research utilized a quasi-experimental design. As noted by John Rogers and Andrea Revesz (2019), a quasi-experiment can incorporate a comparison group, which does not have to be a true control group within the study. This comparison group serves as an additional experimental group that experiences different treatment conditions. Thus, quasi-experiments allow researchers to draw more precise conclusions from the collected data regarding the causal relationship between two variables (Rogers & Revesz, 2019). This approach is appropriate for this research to evaluate the effectiveness of Problem-Based Learning (PBL) on the speaking skills of seventh grade of Islamic junior high school students' 9 Peisir Selatan.

B. Population and Sample

1. Population

Gay (2012:198) states that population was a group of interest to the researcher, the group to which she or he would like the result of the study to be generalized. In this research, the population of this research was seventh grade students of MtsN 9 Pesisir Selatan. Total number of the population was 242 consist six classes (VII.A, VII.B, VII.C, VII.D, VII.E, VII.F, VII.G, VII.H).

2. Sample

In order to effectively achieve the research objectives, the researcher chose to use a purposive sampling technique that allows the selection of the most relevant classes to the focus of the study. In this case, class VII.F consisting of 32 students was chosen as the experimental group, while class VII.G which also consisted of 29 students was chosen as the control group. With this approach, researchers can focus on in-depth and relevant analysis of the influence of Project-Based Learning on students' critical thinking and speaking skills.

C. Research Instrument

The instruments used in this study are:

a. Speaking Skills Test

This instrument is designed to assess students' speaking abilities in the context of English communication. The experimental and control classes underwent a pretest and posttest to assess speaking skills before and after the treatment, which was conducted over three sessions. Additionally, several factors must be considered to ensure students develop strong speaking abilities, such as accurate pronunciation, proper grammar usage, vocabulary, fluency, and comprehension.

b. Observation Sheet

This observation is necessary to determine the implementation of the problem-based learning model and also to directly observe the emergence of several critical thinking skills among students. The observation is not conducted on all students, but only on a few students who can represent the entire group (simple random sampling). The indicators of critical thinking skills observed in this study differ for each session, adjusted to the learning objectives to be achieved.

The relationship between the activities observed during the learning process and the indicators of critical thinking skills being studied can be seen in Table 3.3

Tabel 3.2 Table 3. 2 Observation Sheet format students' critical thinking

Indicator	Kegiatan Siswa
Ability to analyze argument	Students explain the argument clearly.
	Students demonstrate a good understanding of the arguments discussed.

	Students identify logical errors in arguments.
Evaluate information	Students distinguish between valid and invalid information.
	Students evaluate the source of information well.
	Students demonstrate the ability to doubt the information received.
Problem solving	Students identify problems clearly.
	Students create several solutions to the problems they face.
	Students create several solutions to the problems they face.
Ability to make well-reasoned decisions	Students provide logical reasons for the decisions taken.
	Students consider the consequences of the decisions taken.
Clear communication of ideas or solutions	Students consider the consequences of the decisions taken.
	Students listen and respond well to other people's arguments.

(Facione,2015)

D. Place and time

This research will be conducted students' at Islamic junior high school 9 pesisir Selatan. Its has eight classes for class VII. The analysis conducted in academic year 2024/2025 at first semester.

E. Technique of Collecting Data

To obtain more accurate data for this study, the researcher utilized data that corresponded with the study's framework. Pre- and post-tests were employed to collect data for the investigation.

1. Pre-Test

Before commencing the treatment, pre-tests were conducted with both the experimental and control classes. The pre-test aimed to assess the speaking proficiency of the VII G and VII F students prior to the implementation of Project-Based Learning in the experimental class. The researcher carried out the following steps during the pre-test:

- a. Five topics related to the students' experiences were presented by the researcher.
- b. The students were asked to select one topic that resonated with their personal experience
- c. The researcher instructed the students to orally share their experiences based on the chosen topic for 2-3 minutes.
- d. The students' presentations were recorded by the researcher.
- d. The researcher assessed the students' performances and assigned scores.

2. Treatment

The experimental procedure in this study is designed systematically to ensure the accuracy and reliability of the data obtained. The research is carried out through stages that include preparation, implementation, and data collection.

The first stage is preparation, which involves selecting the research sample using purposive sampling techniques, choosing class VII F as the experimental group and class VII G as the control group at SMP Negeri 9 Pesisir Selatan. To measure students' critical

thinking skills, the instruments used include an oral communication test and an observation sheet focused on five critical thinking indicators based on Facione's theory (2011). These indicators include the ability to analyze arguments, evaluate information, solve problems, make reasoned decisions, and communicate ideas or solutions clearly. Additionally, learning materials are prepared, including a Problem-Based Learning (PBL)-based module for the experimental group, while the control group uses conventional learning methods such as lectures and individual exercises.

Once the preparation is complete, the research begins with administering a pre-test to both classes to measure students' initial critical thinking skills. The results of this pre-test are used to ensure that both classes have comparable initial abilities before treatment is applied. The core stage of the research begins with teacher preparation, which includes checking the students' readiness and explaining the learning objectives. Next, the teacher introduces the topic of family to the students, explaining roles, relationships, and values within the family. Students are then divided into small groups to create a Family Tree and discuss the roles and values in their families.

After the discussion, each group prepares a brief report based on their discussion and prepares a presentation. Group presentations are conducted in front of the class, followed by teacher feedback on the students' presentations. Students are also given the opportunity to provide feedback on their peers' presentations.

At the end of the session, the entire class participates in a group discussion to draw conclusions about family values based on the experiences and results shared by the students. The learning ends with a reflection on the process of the day's lesson.

In contrast, the control group's learning takes place using conventional methods consisting of lectures, individual exercises, and a Q&A session. This approach does not involve collaboration or problem-solving elements like those applied in the PBL model.

After the learning process is completed, both classes are given a post-test to measure the improvement in students' critical thinking skills after the treatment. The results of this post-test are analyzed to evaluate the effectiveness of the PBL model in enhancing critical thinking skills.

Additionally, during the learning process, observations are conducted to monitor the development of students' critical thinking skills in the experimental class. The teacher uses observation sheets to record students' abilities based on the established indicators. These observation data complement the test results and provide a deeper insight into the development of students' critical thinking skills throughout the experiment.

3. Post-Test

Both the experimental and control classes completed a post-test administered by the researcher at the end of the study. This post-test enables us to assess any notable changes in students' speaking abilities following the use of project-based learning.

The researcher conducted the post-test using the following steps:

- a. Five topics related to students' experiences were provided.
- b. The teacher asked each student to choose one topic connected to their own experience.
- c. The researcher then asked the students to orally share their experience on the selected topic for 3-5 minutes.
- d. The researcher recorded the students as they spoke.

- e. The researcher scored the students based on their performance.

4. Observation sheet

Data collection in this study was conducted through observation using an observation sheet designed to assess students' critical thinking skills in the context of Problem-Based Learning (PBL). The following are the steps taken in this data collection technique: a. Preparation of Observation Sheet:

The observation sheet used has been clearly designed, including indicators of critical thinking skills, observed student activities, and the established assessment scale (scores 0-4). Observers are expected to fully understand the objectives of the observation and the predetermined assessment criteria.

- a. Subject Selection:

Students to be observed were selected using the simple random sampling technique. This method aims to ensure that the chosen students can represent the entire student population.

- b. Observation Implementation:

Observations were carried out during scheduled learning sessions. Observers actively monitored student interactions and various activities occurring in the classroom.

Student activities relevant to the indicators of critical thinking skills were recorded in the observation sheet. Observers are expected to accurately note students' responses and behaviors.

- c. Scoring:

After the observation, observers assign scores based on the criteria outlined in the observation sheet. Scoring can be performed immediately after the observation or at the end of the learning session.

Observers are also encouraged to include a brief explanation related to the assigned scores, especially for lower scores.

d. Data Analysis:

After the entire observation process is completed, the filled observation sheets will be collected. Observers then analyze the data to identify patterns and trends in students' critical thinking skills. The scores of students will be compared to determine areas showing strong skills and areas needing improvement.

e. Reporting Results:

The results of the observation will be compiled into a report summarizing the obtained data, including descriptive statistics such as average scores and score distribution. Qualitative analysis of student activities will also be presented to provide deeper insights.

f. Feedback:

Observers will provide feedback to students regarding their critical thinking skills based on the observation results. This aims to help students understand their strengths and weaknesses and encourage further development of critical thinking skills in the future.

F. Technique of Data Analysis

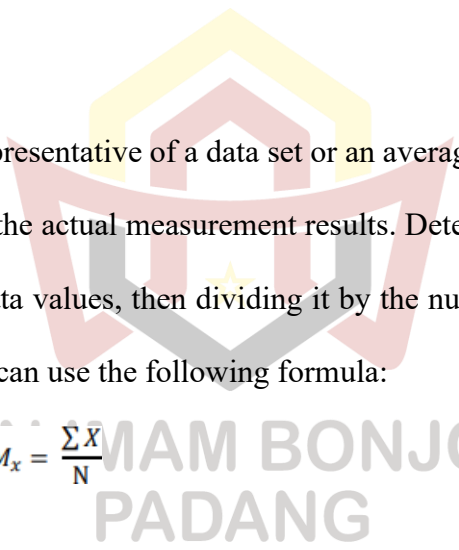
Data Analysis is the process of systematically applying statistical techniques to describe and illustrate, condense and recap, and evaluate data. The following is the Data analysis of this research

1. Descriptive Data Analysis

Descriptive analysis is a statistical analysis used to describe the data that will be used in research to make conclusions that apply generally. The results of this descriptive data analysis are a summary of the samples to be processed, such as average, middle value, mode, etc.

a. Mean

The mean is a representative of a data set or an average value which is considered to be the value closest to the actual measurement results. Determining the mean can be done by adding up all the data values, then dividing it by the number of data. For more details to determine the mean can use the following formula:


$$M_x = \frac{\sum X}{N}$$

b. Standard Deviation

Standard deviation is the distribution of data in a sample to see how far or how close the data values are to the average. One of the functions of the standard deviation formula is to provide an overview of the distribution of data relative to the average. To determine the deviation data can use the following formula:

$$SD = \sqrt{\frac{\sum x^2}{N}}$$

c. MAX

The MAX function is used to display the maximum (largest) value or number contained in a data cell/range.

d. MIN

The MIN function is the opposite of MAX where MIN is used to display the minimum (smallest) value or number contained in a cell/range.

2. Normality Test

Normality test aims to determine the distribution of data. Data normality is important, because with normally distributed data, the data is considered to represent the population (Purnomo, 2016). The data subjected to the normality test included the pretest, posttest, and gain scores from the two research classes. The normality of the data distribution was assessed using the conventional normal distribution in conjunction with the Kolmogorov-Smirnov test. This test was conducted using IBM SPSS version 26 for Windows. It clarified whether the distribution was normal or not based on the pre- and post-test results between the experimental and control classes, with the significance level set at $\alpha = 0.05$. The interpretation of the normality test is as follows:

- a. If the Sig value is greater than 0.05, the data is drawn from populations that are normally distributed.
- b. If the Sig value is less than 0.05, the data distribution is considered not normal.

2. Homogeneity Test

A homogeneity test is a statistical method used to determine whether multiple groups or samples come from populations with the same distribution (Fleiss et al., 2003). The aim of this test is to check if the data from each sample group has the same population variance or

different variances. If both groups are normally distributed, the next step is to test the homogeneity of variance between the two groups using Levene's test, with a significance level of 5% via the IBM SPSS 26 program for Windows. The criteria for the test are as follows: a. If the significance value (sig) is less than 0.05, it suggests that the population from which the data originates has heterogeneous variation. b. If the significance value (sig) is greater than 0.05, the data is considered to come from a population with homogeneous variance.

a. Observation Result Data

Analyzing the observation results conducted on all students, which consisted of 5 groups. The data from this observation is used to complement the research data that has been processed. The data obtained from the observation sheet is analyzed by:

1. Summing the number of check marks (✓) in each column of the observation sheet for each indicator of critical thinking skills that emerged.
2. Calculating the percentage for each indicator based on the formula:

The percentage value is calculated using the formula:

$$S = \frac{R \times 100}{N}$$

Explanation:

S = Nilai yang diharapkan (dicari)

R = Skor yang diperoleh siswa

N = Skor maksimum dari lembar observasi yang bersangkutan

3. Interpreting descriptively the percentage data for each aspect of the critical thinking skills indicators that emerged during the learning process.

Table 3. 3 Kriteria Kemampuan Siswa Melalui Observasi (Surhasimi,2005)

Skor (%)	Kriteria
81-100	Sangat Baik
61-80	Baik
41-60	Cukup
21-40	Kurang
0-20	Sangat Kurang

3.Hypothesis Test

The researcher utilized IBM SPSS 26 to analyze the pre- and post-test results of the experimental and control groups. T-tests were performed to evaluate the hypotheses of the investigation, formulated as follows when α is less than 0.05:

H1 : There is a significant effect of using problem-based learning towards students' critical thinking to improve students' speaking skill

Ho: There is no significant effect of using Problem-based learning towards students' critical thinking to improve students' speaking skill

The t-test results are interpreted using the following criteria:

- a. If the sig value is greater than or equal to 0.05, Ho is accepted, indicating that the average score of the experimental class is higher than that of the control class, and the use of PBL is effective in enhancing students' speaking skills.
- b. If the sig value is less than 0.05, Ho is rejected, suggesting that the mean score of the experimental class is the same as or lower than that of the control class, indicating that the use of PBL is not effective for improving students' speaking skills.