CHAPTER III

RESEARCH METHODOLOGY

This chapter presents the research methodology including research method, research design, subject, location, and instrument of the research.

3.1 Research Method

This research will use quantitative approach. Quantitative research is a rigorous, scientific analysis of the constituents, phenomena, and linkages between them (Hardani:2020). The objectives of quantitative research include the creation and application of mathematical hypotheses, models, or theories relating to natural events. The methodology used for measuring is crucial in quantitative research. This explains or clarifies how the quantitative relationship's fundamental link works (Siyoto: 2015). In quantitative research, numerical data are systematically gathered and analyzed to find patterns, correlations, and trends in a certain event or population. A clear research question and a suitable study design are the first steps taken by the researcher. They then collect data using structured methods such as surveys, experiments, or observations. The collected data is organized and analyzed using statistical techniques, such as descriptive and inferential statistics, to draw objective and generalizable conclusions.

The number of samples will use in research with a quantitative method is often chosen based on the population. By utilizing a certain formula, the number of samples is calculating. Choosing the appropriate formula then modifying it (Priyono:2008). Due to sample collecting and data processing, quantitative research focuses on design challenges, measurement, and planning that are explicitly

outlined (Sutinah:2007). The findings of this study can be utilized as a foundation for generalizations to the population represented since the method of assembling a quantitative study and sample size employed are believed to reflect the population.

3.2 Research Design

The model of the research design will be used by researcher is pre-experimental design of one group pre-test and post-test design. The characteristics of pre-experimental design is the design may have pre-test and post-test without a control group (Nunan:2002). Furthermore, according to Gay (2000), the one group pre-test and post-test design takes a group that is pre-tested, exposed to treatment, and post-tested. In conducting the research, the researcher will use one class of the first year students at SMA N 1 Geumpang.

In the first meeting, the students will be given the pre-test in order to know their ablity of speaking performance before using project-based learning. Then, the students will be given the treatment. At the end, they are given post-test; it measured the students' abilty in of speaking performance after using project-based learning. According to Sugiyono (2005), the type of pre-experimental design of this research is comparing the result after and before giving treatment. The researcher only compares score of pretest and posttest, where the first is before using project-based learning method and the second is after using project-based learning method.

3.3 Location of the Research

The researcher will conduct this research at SMA N 1 Geumpang. It is one of the schools in Geumpang. The location is Bangkeh village, Pidie District and Aceh Province.

3.4 Population and sample

In research it is important to determine the population and the sample so the research opt the population and the sample as follow:

3.4.1 Population

The term "population" in research, as articulated by Sugiyono (2018) and Handayani (2020), encompasses the overarching group characterized by specific features and traits relevant to the study. According to Sugiyono, the population represents the leveling region that encapsulates phenomena or themes exhibiting certain powers and characteristics. It serves as the comprehensive context from which conclusions can be drawn. In the context of the current research, the population constitutes the broader category within which specific powers and features are identified, primarily comprising the students at SMA N 1 Geumpang. On the other hand, Handayani (2020) defines population as the aggregate of all elements under investigation sharing common traits. These elements can encompass individuals, events, or other entities possessing similar characteristics pertinent to the research inquiry. In this research, the population comprises all students at SMA N 1 Geumpang, united by the common trait of being enrolled in the school. Together, these students form the collective group under scrutiny, and the identification of shared traits provides a foundation for drawing conclusions and making generalizations about the targeted research phenomena or themes.

3.4.2 Sample

In this research, the use of purposive sampling was chosen with careful consideration from the researcher's point of view. Sugiyono (2018) emphasized that

the sample is part of the population, and the characteristics of the population must be well reflected in the sample taken. In this context, the sample size of 28 students to be taken from class X Science 1 at SMA N 1 Geumpang was deliberately arranged based on certain considerations. Researchers chose to use purposive sampling because they have a specific research objective, namely to gain an in-depth understanding of students' characteristics or performance in certain subjects. By selecting students from specific classes and majors, researchers can focus on characteristics deemed relevant to the research question, such as academic achievement and interest in natural sciences (science). Although the results may not be directly applicable to a larger population, the use of purposive sampling provides flexibility in selecting the most representative sample to efficiently achieve the research objectives.

3.5 Research instrument

3.5.1 Test

The researcher has identified a specific problem in their research, focusing on the enhancement of speaking skills among Grade I students. To address this issue, the researcher employed project-based learning as an instructional approach. Project-based learning involves students engaging in real-world projects that require them to apply and develop various skills, including speaking.

To evaluate the effectiveness of this teaching method in addressing the identified problem, the researcher conducted tests directly related to speaking skills. These tests were designed to measure the students' proficiency and improvement in verbal communication as a result of the project-based learning approach. The

choice of assessments reflects a clear alignment with the research problem, allowing the researcher to gather data specifically relevant to the desired outcome—improved speaking skills.

By employing these tests, the researcher aims to quantitatively and qualitatively assess the impact of project-based learning on the students' speaking abilities. This evaluation is crucial for determining whether the chosen instructional strategy is effective in achieving the desired improvement in speaking skills among Grade I students. The emphasis on using relevant tests directly linked to the identified problem enhances the validity of the research findings and ensures a focused investigation into the specified educational objective.

3.6 Data Collection

Data is needed in order to answer research questions. In this research, the data will collect by using several technique of collecting data. There are two kinds of test in conducting the research. First is pre test, it is given before experimental teaching is conducted. It aims to know the students' ability in speaking skill before using project-based learning method in experimental class. Second is post test, it is given after the treatment is done. It is given in order to know the students' development in speaking skill after using project-based learning method. Experimental teaching is done for three meetings. In experimental class, the researcher will teach the students by project-based learning method. The illustration of the meetings is described as follows:

3.6.1 Pre-test

In the initial stage of the research, the researcher was determined to hold the first meeting with the experimental class. During this session, the researcher plans to administer a pre-test tailored to the experimental group. A pre-test is a diagnostic assessment designed by researchers to measure a student's level of proficiency or knowledge in a targeted skill, which in this case is most likely speaking skills.

In the pre-test, students in the experimental class given an assignment in the form of making a video that assesses their speaking skills before being given project-based learning intervention. The purpose of this pretest is to establish a baseline measure, which provides an idea of the student's initial speaking skills. This basic data is important to compare with post-test results after implementing project-based learning.

Administering a pre-test allowed the researcher to measure the starting point of the experimental group and evaluate the effectiveness of the project-based learning approach in improving speaking skills. By systematically measuring progress from pre-test to post-test, researchers can draw conclusions about the impact of learning methods on students' speaking abilities during learning. This step is integral to assessing the success of the intervention and contributes valuable insights to research on improving speaking skills using project-based learning.

3.6.2 Treatment

After conducting the pre-test, the researcher gave treatment to the students. It takes 4 meetings and spends 45 minutes in each meeting. Several treatment steps in class will use a project-based learning method where the teacher chooses the

topic "asking giving an opinion" as a project to be discussed with students in each group. In one group there are 4 students.

3.6.3 Post-test

In the experimental research, the post-test is administered after the experimental group has undergone the prescribed treatment, which, in this case, involves being taught using the Project-based learning method. The post-test is a tool carefully designed by the researcher to assess the students' speaking skills after the implementation of the instructional treatment.

The post-test is structured similarly to the pre-test, ensuring consistency in evaluating the targeted skill in this instance, speaking abilities. By comparing the results of the post-test with the baseline established by the pre-test, the researcher can measure the effectiveness of the Project-based learning method in enhancing the students' speaking skills.

Administering the post-test serves several purposes. Firstly, it allows the researcher to evaluate the immediate impact of the instructional approach on the students' speaking abilities. Secondly, it provides data for comparing the progress made by the experimental group from the pre-treatment stage to the post-treatment stage. Finally, the post-test results contribute valuable insights into the overall success and efficacy of the Project-based learning method in achieving the research objectives related to improving speaking skills among the students in the experimental class. The careful design and application of both pre-test and post-test strengthen the validity of the research findings and contribute to the robustness of the study's conclusions.

3.7 Data Analysis Techniques

In completing the data, the next step is data analysis. The data analysis method is a method for processing and searching for data for research. What the researchers focused on was analyzing the effectiveness of students' speaking skills in the project-based learning (PJBL).

In assessing student test results, evaluate them based on one of the five aspects of speaking below:

Table 3.1 Speaking Rubric Assessment

ASPECT	SCORE	INFORMATION
Pronunciation	5	Easy to understand and like a native speaker
	4	Easy to understand even with a certain accent
	3	There are pronunciation problems that make hearing have to be fully concentrated and sometimes there are misunderstandings
	2	Difficult to understand because there is a problem of pronunciation often asking to repeat
	1	Serious pronunciation problems that cannot be understood
Grammar	5	No or slightest grammatical error
	4	Sometimes makes grammatical errors but does not affect the meaning
	3	Often make grammatical errors that affect meaning.
	2	Many grammatical errors hinder meaning and often rearrange sentences
	1	Grammatical errors are so severe that they are difficult to understand
Vocabulary	5	Use vocabulary and expressions like native speakers
	4	Sometimes Use Inappropriate Vocabulary Sometimes
	3	Often use inappropriate vocabulary, conversations become limited due to vocabulary limitations

	2	Using vocabulary incorrectly and vocabulary is limited so that it is difficult to understand
	1	Vocabulary is so limited that conversations are impossible
Fluency	5	Fluent as a foreign speaker
	4	Fluency seems a little distracted by language issues
	3	Fluency is somewhat interrupted by language problems
	2	Often hesitating and stalled due to language disability
	1	Intermittent and Stopped Speech Until the Conversation Is Impossible
Understanding	5	Understand all without experiencing difficulties
	4	Understand almost everything, even if there is repetition in certain parts
	3	Understand most of what to say when speaking is somewhat slowed down despite the repetition
	2	It's hard to follow what is said
	1	Can't understand the conversation even if it's simple

(Hanik, 2011)

Calculating the scores of the students with the following formula:

$$\text{Total score x } \frac{100}{25}$$

Table 3.2 Assessment Score of Aspect Speaking Skill

No	Classification	Scale
1	Very Good	86-100
2	Good	71-85
3	Poor	56-70
4	Verry Poor	>55

The data analysis technique in this quantitative research uses statistics. Data analysis techniques aim to find answers to research questions contained in the problem formulation, it is continued with a non-parametric Wilcoxon test to see whether there is a difference between the pre-test before treatment and the post-test after treatment. Test above using application SPSS.

1. Wilcoxon Test

The Wilcoxon test is a non-parametric statistical method used to test differences in two paired data. This test is also known as the match pair test. This test does not assume normality of data, it can be used if this assumption is violated.