

CHAPTER III

RESEARCH METHODOLOGY

A. Research Design

In this research, a pre-experimental design will be used, according to Thyer (2012), pre-experimental design is a quantitative research design used to examine the effect of a treatment or intervention without random assignment and without a well-defined control group. This design typically involves only a single group and is applied when the researcher has limited ability to control extraneous variables, in which the researchers will apply concept mapping in teaching English listening so that the effectiveness of using concept maps in improving students' English listening skills at MAN 1 Padang can be identified.

Table 3. 1 Pre-Experimental (One-Group Pretest–Posttest Design)

Group	Pre-test	Treatment	Post-test
Experimental Group	Y₁	X	Y₂

This research employed a pre-experimental design using a one-group pretest–posttest model. The students were given a pre-test (Y₁) to measure their initial listening ability. After that, the treatment (X) was administered by teaching listening using concept maps. At the end of the treatment, a post-test (Y₂) was given to measure the students' listening achievement after the implementation of concept maps.

B. Population and Sample of the Research

Research variables will be all elements that the researcher determines in order to obtain information and draw conclusions. There will be two variables in this study, namely the independent variable and the dependent variable.

1. Independent Variable (X)

According to Sugiyono (2013), the independent variable is the variable that influences or causes a change in the dependent variable. In this study, the independent variable will be the use of concept maps.

2. Dependent Variable (Y)

According to Sugiyono (2013), the dependent variable is the variable that is affected or becomes the result of the independent variable. The dependent variable in this study will be students' listening skills.

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 et al., 2010). The population of this study is all the students in class XII at MAN 1 Padang. There are 1 classes in grade XII F2, with a total of 36 students.

C. Instrument of the Research

Research Instrument according to Sugiyono (2013), is a tool used to measure natural and social phenomena being observed. In this study, the researcher will collect data through a pre-test and a post-test.

1. Pre-Test

According to Sugiyono (2013), a pre-test is a test administered before the implementation of a treatment or intervention in order to determine the initial condition or prior ability of the research subjects. The pre-test is used to measure the baseline level of the dependent variable before the independent variable is applied. The type of pre-test that will be used is a multiple-choice and short answer test consisting of 40 questions.

2. Post-Test

According to Sugiyono (2013), a post-test is a test administered to determine whether the important teaching materials have been understood by students after receiving instruction. In this study, the post-test will be used to measure the students' knowledge after the treatment is given. The type of post-test that will be used is the same as the pre-test, namely a multiple-choice and short answer test consisting of 40 questions; however, the items in the post-test will be randomized or modified while maintaining the same level of difficulty and complexity.

D. Procedure of the Research

1. Pre-experimental stage

The pre-experimental stage was the preparatory phase before conducting the treatment. First, the researcher consulted with lecturers and teachers to ensure that the content of the concept map aligned with the listening material taught in Grade XII at State Islamic High School 1 Padang as stated in the Independent Curriculum. The researcher then measured the validity of the research instrument by conducting a trial of the test instrument. This stage was carried out to determine whether the use of concept maps in teaching listening at Grade XII of State Islamic High School 1 Padang could be effectively applied.

2. Implementation of Experiments

a. Pre-Test

The pre-test stage (*see appendix 5*) was the initial test administered to determine the students' level of achievement before receiving the treatment. This stage was carried out to compare the effectiveness of using concept maps in teaching listening before and after the treatment was applied.

b. Experiment

The implementation of the experimental stage involved giving treatment to the students. The treatment consisted of teaching listening skills by using concept maps as an instructional strategy.

c. Post-Test

After the treatment had been completed, the students were given a post-test (*see appendix 5*). This post-test was administered to determine the effectiveness of using concept maps in teaching listening at Grade XII of State Islamic High School 1 Padang by comparing students' achievement before and after the treatment was given..

3. Post-Experimental Stage

This stage was the completion phase of the research. The data obtained from the implementation of the experiment were analyzed using statistical calculations..

E. Technique of Data Collection

There was one type of data collected in this study, namely quantitative data obtained through testing. The data were in the form of students' scores on listening comprehension tests. The pre-test was administered in the first meeting to measure students' initial listening ability before the treatment. After several treatment sessions using concept maps in teaching narrative listening texts, the post-test was administered to measure students' listening achievement after the treatment.

In this study, the researcher used the same test items for both the pre-test and post-test to ensure consistency of measurement. After the treatment was completed, the researcher compared the students' pre-test and post-test scores to determine whether there was a significant improvement in students' listening comprehension after the implementation of concept maps. The difference between the pre-test and post-test results was analyzed statistically

to examine the effectiveness of using concept maps in teaching listening.

F. Technique of Data Analysis

In analyzing the data, the researcher used quantitative statistical procedures to determine the effectiveness of using concept maps in teaching listening. The data obtained from the pretest and posttest were analyzed through descriptive statistics, prerequisite analysis, inferential statistics, and interpretation of the results. The data analysis was conducted using IBM SPSS Statistics 26.

1. Descriptive Statistics

Descriptive statistics were used to describe and summarize the students' listening scores in the pretest and posttest. The researcher calculated the mean score, median, standard deviation, minimum score, maximum score, range, and frequency distribution of the scores.

The mean score was used to determine the average performance of students, while the standard deviation showed the spread of the scores. These descriptive statistics provided an overview of students' listening ability before and after the implementation of concept maps in teaching listening.

2. Prerequisite Analysis

Before conducting hypothesis testing, prerequisite analysis was carried out to ensure that the data met the assumptions required for parametric testing.

1) Normality Test

The normality test was conducted to determine whether the pretest and posttest data were normally distributed. Since the sample consisted of 36 students (less than 50), the Shapiro–Wilk test was used. The criteria for decision making were as follows:

- If the significance value (Sig.) > 0.05 , the data are normally distributed.
- If the significance value (Sig.) < 0.05 , the data are not normally distributed.

If the data were normally distributed, the hypothesis testing was continued using a parametric test, namely the paired-sample t-test.

3. Inferential Statistics

To test the research hypothesis, the researcher used a paired-sample t-test. This test was used to determine whether there was a significant difference between students' listening scores before and after the treatment.

The paired-sample t-test was appropriate because the research used a one-group pretest–posttest design, where the same students were tested twice.

The level of significance used in this research was $\alpha = 0.05$. The criteria for hypothesis testing were:

- If the significance value (Sig. 2-tailed) < 0.05 , H_0 (Null Hypothesis) is rejected and H_a (Alternative Hypothesis) is accepted.
- If the significance value (Sig. 2-tailed) > 0.05 , H_0 is accepted and H_a is rejected.

The null hypothesis (H_0) stated that concept maps were not effective in teaching listening at MAN 1 Padang.

The alternative hypothesis (H_a) stated that concept maps were effective in teaching listening at MAN 1 Padang.

4. Interpretation of Data

After obtaining the results of the paired-sample t-test, the researcher interpreted the findings based on the significance value and the comparison between the mean scores of the pretest and posttest.

If the posttest mean score was higher than the pretest mean score and the significance value was less than 0.05, it indicated that there was a significant improvement in students' listening comprehension after the implementation of concept maps. Therefore, it could be concluded that the use of concept maps was effective in teaching listening.

Conversely, if there was no significant difference between the pretest and posttest scores, it indicated that the use of concept maps was not effective.

