

CHAPTER THREE

RESEARCH METHODOLOGY

The methodological techniques used in this study to assess how well podcast-based learning enhances students' listening abilities are described in this chapter. It describes the general research design, research subjects, research environment, data collection methods, research tools, data analysis methods, and ethical issues. These elements offer a methodical account of the planning, execution, and analysis of the investigation.

3.1 Research Design

This study employed a mixed-methods approach with an explanatory sequential design. In the first stage, the study employed a quantitative approach using a quasi-experimental design with a nonequivalent control group. In the second stage, the study employed a qualitative approach through semi-structured interviews with students from the experimental and control groups. Both types of data were then integrated during the interpretation stage to gain a more comprehensive understanding of the use of podcasts in listening instruction.

According to Creswell (2012), experimental research is conducted to determine whether a particular treatment influences participants' outcomes by comparing groups that receive different learning conditions. Following this principle, the present study compared an experimental group receiving podcast-assisted instruction with a control group taught through conventional listening materials.

The research specifically employed a Nonequivalent Control Group Design, in which both groups completed a pre-test before the treatment and a post-test after the instructional period. The experimental group participated in listening activities using podcasts, whereas the control group continued learning through conventional classroom audio materials. As explained by Creswell & Creswell, (2018) states this design allows researchers to evaluate treatment effects in naturally existing classes without random allocation while still enabling comparisons between groups through pre-test and post-test measurements.

One characteristic of qualitative research is the use of interviews as a qualitative data collection technique. This is because interviews allow researchers to obtain more in-depth information about the experiences and perceptions of research participants (Chand, 2025). To obtain qualitative data, interviews do not need to be combined with observation or focus groups. As long as interview data are analyzed systematically and integrated with quantitative results, they can serve as the qualitative component in mixed-methods research.

Qualitative data function as explanatory data that help elucidate the students' experiences underlying the quantitative findings of the study, while quantitative data serve as the primary data for identifying differences in listening skills between the two groups. Mixed-methods research is crucial for combining these two types of data because doing so allows researchers to gain a broader understanding than using a single research approach alone (Costa, 2024; Mekheimer, 2025).

Table 3. 1 Research Design

Group	Test 1	Usage of an Independent Variable	Test 2
Experimental	Pre-Test	With Experimental Treatment	Post-Test
Controlled	Pre-Test	Without Experimental Treatment	Post-Test

This design was selected because the researcher was unable to reorganize students into new classes through random assignment. Instead, two intact classes with relatively similar learning conditions were used to maintain the authenticity of the classroom setting while allowing the effectiveness of podcast-based instruction to be examined objectively.

3.2 Population and Sample

One of the main focuses is identifying the target group, which is a fundamental step in experimental research. This group may include various stakeholders, such as students, teachers, or institutions, who possess the data needed for this study. And because studying the entire population is often impractical, researchers must select a smaller but representative subgroup to participate in the study. A population "refers to the collection of elements, individuals, items, and objects about which the researcher desires to collect the information" (*Indian Institute of Materials Management I I M M, 2024, p. 60*). This group may include students, teachers, or institutions, depending on the focus of the research. Meanwhile, to represent that larger group, a sample is selected.

Fraenkel et al., (2012) define a sample as "the group on which information is obtained". The sample must be taken in an approach that precisely conveys the features of the population. ensuring that the research findings can be generalized effectively.

The population of this study consisted of 24 second-year students enrolled in the English Education Study Program at a private university. These students were divided into two intact classes. One class, consisting of 12 students, served as the experimental group and received podcast-based instruction, while the remaining 12 students formed the control group and received conventional listening instruction. The selection of these classes was carried out after consultation with the listening course lecturer to ensure that both classes were appropriate for the implementation of the research.

3.3 Research Site

This research was conducted in the Department of English Education at a private university, where the subjects of the research are enrolled in a listening skills course. The researcher chose this location because the listening course has never utilized podcasts as a learning medium. Furthermore, the class provides a suitable context for the research media and offers easy access to the required classroom technology. This location also allowed for integration with the existing teaching schedule.

3.4 Data Collection and Instrument

3.4.1 Data Collection

Techniques for gathering field data to address research topics are known as data collecting techniques. A pre-test and a post-test are used in the data collection process because the focus of this study is student learning outcomes using podcast media. The full description is as follows:

a. Pre-test

A pre-test was administered to the experimental and control groups before instruction began. The purpose of the pre-test was to measure the students' initial listening skills and to provide baseline data that could be compared with the post-test results. The test consisted of 15 multiple-choice questions that assessed several aspects of listening comprehension, including the ability to identify main ideas, locate specific information, understand details, and infer implied meanings.

b. Treatment

After the students had done the pre-test, the research continued to find out more about the use of podcast media in the experimental class. Meanwhile, the control group continued to receive listening instruction using audio materials from textbooks or conventional audio materials used in classroom instruction. In the scenario of teaching the experimental class, the focus was on building student-centered learning activities.

c. Post-test

The students in both the experimental and control classes received the post-test sheets as a follow-up to the original pre-test, which was given by the researcher in the role of instructor. It was anticipated that learning results would improve after the experimental class received treatment utilizing podcast media.

d. Interview

After the quantitative data were collected and analyzed, interviews were conducted as the qualitative phase of the explanatory sequential mixed-methods design. Interviews were conducted with six students, consisting of three students from the experimental group and three students from the control group. Participants were selected through purposive sampling, taking into account their ability to provide information about their listening learning experiences. In the experimental group, the interview questions focused on experiences using podcasts, learner autonomy, flexibility, motivation, engagement, difficulties, and students' perceptions of podcast features. In the control group, the interview questions focused on experiences using conventional audio listening materials, difficulties in understanding the audio, control over audio playback, learning environment conditions, and students' perceptions regarding the possibility of using podcasts as an alternative learning method.

3.4.2 Research Instrument

The research instruments included a pre-test, treatment, post-test, and semi-structured interviews. The tests were used to measure students' achievement of the expected learning objectives. In this study, the researchers used a multiple-choice test consisting of fifteen questions. These test questions were adapted from several audio and video podcasts taken from two YouTube channels: "5-Minutes English Practice," which features audio on the themes of Daily Activities and Fears and Failures, and "Listening Time Podcast," which features audio on the theme of Favorite Memories. The fifteen questions were designed to assess several aspects of students' listening comprehension, including: identifying main ideas, locating specific information or details, and inferring implied meanings from the audio. Before the instrument was used in the main study, a pilot test was conducted to examine the validity and reliability of the listening comprehension test. The next instrument was a semi-structured interview guide. Interview participants were selected from three students in each of the experimental and control groups, using purposive sampling to represent students with high, moderate, and low achievement levels based on their post-test scores. This approach allowed the researchers to obtain diverse perspectives on the implementation of podcast-based learning.

3.5 Quantitative Data Analysis

3.5.1 Instrument Test

Data analysis was the most decisive step in a study. This was done to test the research hypothesis and answer the problem formulation. Analysis of data used in

quantitative Educational Research, as stated by Cohen et al., (2018), included statistical significance, correlation, regression, curvilinearity, and statistical indications. The statistical tests used in the data analysis were carefully considered, as they affected the layout of the research items and the computer packages available to process the data.

Data preparation, which included gathering pre-test and post-test findings from the experimental group and control group, coding the data, and entering it into the SPSS data, was the first step in the data analysis process. Before the main data analysis was conducted, the research instrument was tested to examine its validity and reliability. The listening comprehension test consisted of 15 multiple-choice questions and was piloted with 27 participants who were not included in the main research sample. The validity of the test items was examined using the Pearson Product-Moment correlation through SPSS (Christoffersson et al. 2012). The analysis was conducted by correlating each item's score with the total test score, with a significance level of 0.05. An item was considered to meet the statistical validity criterion when its significance value was below 0.05. The reliability of the listening comprehension test was examined using Cronbach's Alpha through SPSS (Taber 2018). The results of the validity and reliability testing are presented in Chapter Four.

The second stage involved performing descriptive statistical analysis, such as calculating the mean, median, mode, standard deviation, and variance. This analysis was used to determine an overview of students' listening ability before and after treatment, and helped detect an increase in scores in the experimental

group after using the podcast. Furthermore, the third was inferential statistical analysis, which aimed to test the hypothesis of whether there was a notable distinction between the outcomes of the pre-test and post-test.

Pre-test and post-test data were grouped into seven skill categories to describe listening abilities of students before and after implementing it. The assessment criteria used are as follows (Hardiyanti & Saputra, n.d.).

Table 3. 2 Classification of Student's Score

Classification	Score
Excellent	91-100
Very Good	81-90
Good	71-80
Fairly Good	61-70
Fairly	51-60
Fairly Poor	31-50
Poor	0-35

3.5.2 Statistical Assumptions Test

After testing the research instrument, the researchers then process the data. In detail, the design of data analysis or data processing was described as follows:

a. Normality Test

The purpose of this test was to assess the normality of the pre-test and post-test data. The researchers employed SPSS version 26 with a significance threshold of 5% for the normalcy test. The following criteria were used to make decisions: the data was considered normally distributed if the Sig. (p) value was greater than

0.05. The data was not normally distributed if the Sig. (p) value was less than 0.05.

b. Homogeneous Test

The purpose of this test was to ascertain the homogeneity of the research data. The researchers employed SPSS version 26 with a significance threshold of 5% in the computation. The following criteria were used to make decisions: the variation between groups was homogenous if Sig. (p) > 0.05. On the other hand, the variance between the groups was not homogeneous if Sig. (p) < 0.05.

3.5.3 T-Test

To find out if students' listening skills were significantly impacted by podcast use, a hypothesis test was carried out. The Independent Samples t-Test approach was utilized in this study to compute the t-test using the SPSS 26 software. A significance threshold of 5% served as the basis for decision-making. H_0 was rejected if the significance value was less than 0.05, but it was accepted (failed to reject) if it was larger than 0.05. On the other hand, the Mann-Whitney test was performed at the 5% level if the data were not normally distributed or lack of sample. There was no discernible difference between the two groups if the significance value was more than 0.05.

1. Null Hypothesis (H_0): There was no significant difference in listening skills between students who were taught using podcasts and those who were taught without podcasts.

2. Alternative Hypothesis (H1): There was a significant difference in listening skills between students who were taught using podcasts and those who were taught without podcasts.

3.5.4 N-Gain Test

The degree of improvement in students' learning outcomes following an instructional intervention was assessed using the N-Gain test. The N-Gain tests were used in this study to assess how much students' listening abilities improved from the pre-test to the post-test following the introduction of podcast-based learning. The N-Gain formula developed by Hake was cited by Purba et al., (2022) as follows:

$$N - gain(g) = \frac{(Score\ Posttest - Score\ Pretest)}{(Score\ Ideal - Score\ Pretest)}$$

Table 3. 3 The Criteria Indeks Gain

Percentage (%)	Interpretation
<40	Ineffective
40-55	Less effective
56-75	Effective enough
>76	Effective

3.5.5 The Effect Size

After the T-test and N gain test, the analysis also comes with an effect size. According to Creswell & Creswell, (2023) that effect size is "identified as the strength of the conclusions about group differences or the relationships among

variables in quantitative studies." The study used the Cohen D formula to determine some of the major effects of behavior change (treatment effects).

The following are the effect size level criteria:

Table 3. 4 The Criteria Indeks Effect Size

Percentage (%)	Interpretation
0.00 – 0.20	weak effect
0.21 – 0.50	modest effect
0.51 – 1.00	moderate effect
> 1.00	strong effect

3.6 Qualitative Data Analysis

The interview data were analyzed using thematic analysis. The analysis was conducted in stages. First, the interview recordings or responses were transcribed and written out as text. Next, the researcher read the data repeatedly to understand the full content of the interviews. Third, they assigned codes to the portions of the data relevant to the research objectives. Fourth, these codes were grouped into categories and then into themes. Finally, the themes were reviewed and interpreted based on the research questions and quantitative results. The initial themes used in this study included:

1. Learner Control and Flexibility;
2. Listening Difficulties and Learning Barriers;
3. Topic Relevance and Engagement; and
4. Perceived Benefits and Limitations of Podcast-Based Learning.

The interview data from the experimental group were used to understand the students' actual experiences with podcasts. Meanwhile, the interview data from the control group were used to understand the students' experiences with conventional audio-based learning and to compare their perceptions of those learning conditions.

3.7 Ethical Consideration

Ethical principles were strictly observed throughout the research process. Participants were informed about the purpose of the study and participated voluntarily. Their identities were kept confidential, and the collected data were used solely for academic research purposes. Ethical considerations in educational research are essential to protect participants' rights and ensure research integrity (Cohen et al., 2000).

3.8 Concluding Remarks

This chapter has outlined the methodological framework adopted for the study, covering the participants, research setting, instruments, procedures for gathering and analyzing the data, as well as ethical aspects. To investigate the effectiveness of podcast-assisted instruction compared with conventional listening activities, the study applied a quasi-experimental approach using a nonequivalent control group design. These methodological procedures provide the basis for interpreting the findings, which are presented and discussed in the next chapter.