

CHAPTER III

RESEARCH METHODOLOGY

A. Research Design

This study applies a quantitative research approach to collect and analyze numerical data systematically. A quantitative approach is utilized to examine high school students' perceptions and motivation toward using Artificial Intelligence (AI) to improve English-speaking skills. Quantitative research enables researchers to measure variables objectively and generate data that can be analyzed statistically in order to explain a phenomenon in a structured and measurable way (John W. Creswell, 2017). This approach is selected because it provides a clearer and more measurable description of students' responses to the implementation of AI tools in English-speaking learning.

The research employs a survey method to gather information about students' attitudes, experiences, and opinions toward using AI in speaking learning through structured data collection procedures. Survey research is widely used in quantitative studies because it allows researchers to obtain data efficiently from respondents by using questionnaires (Babbie, 2016). In this study, a questionnaire serves as the primary instrument for collecting data related to students' perceptions and motivations for using AI to enhance English speaking skills.

The data collected through the questionnaire are analyzed using descriptive statistical methods to provide measurable insights into students' responses to the integration of AI in speaking activities. Therefore, the quantitative survey design is considered appropriate for achieving the research objectives.

B. Research Location and Time

This research was carried out at MAS Manbaul Huda, involving eleventh-grade students as the participants of the study. The school was located in Kota Bandung, precisely Jl. Cijawura Girang IV No.16, Sekejati, Kec. Buahbatu, Kota Bandung, Jawa Barat 40286. The school was chosen because the researcher had prior teaching experience there, especially in English speaking practice. Moreover, the students were already familiar with the use of digital technology and AI-based applications in learning activities.

The research process began by obtaining formal permission from the school authorities to involve eleventh-grade students as the research subjects. After receiving approval, the questionnaires were distributed online through a Google Forms link due to school regulations prohibiting smartphone use during classroom hours. Therefore, the distribution process was adjusted to align with school policies and classroom conditions, allowing the research activities to be conducted properly without disrupting the learning process.

The study was conducted during the academic year 2025/2026, specifically from May to June 2026. During this period, the researcher distributed questionnaires, gathered responses from participants, and analyzed the collected data.

C. Population and Sample

Population refers to the whole group of subjects involved in a study, whereas a sample is a smaller part of the population selected to provide research data (Sugiyono, 2023). In quantitative studies, selecting an appropriate sample is important to ensure that the collected data accurately represent the phenomenon being investigated.

The population of this study consisted of all eleventh-grade students at Manbaul Huda Senior High School in the academic year 2025/2026. However, because not all students had experience using Artificial Intelligence (AI) tools in English learning, purposive sampling was employed in this research. Purposive sampling involves selecting

participants based on specific criteria relevant to the objectives of the study.

The selected participants were students who had experience using AI-based applications such as ChatGPT, Gemini, or other AI tools in English learning activities. The sampling process focused on students who had used AI technology to support English speaking practice and learning activities. This method was chosen to ensure that the participants were relevant to the research context and capable of providing data aligned with the study objectives.

D. Research Instrument

A research instrument is a tool used to collect data in a study. In quantitative research, instruments are applied systematically to measure variables so that the resulting data can be analyzed statistically (Sugiyono, 2023). In this research, a structured questionnaire was used as the primary instrument for data collection.

1. Questionnaire

The questionnaire was developed to measure students' perceptions and motivation toward using Artificial Intelligence (AI) to enhance English speaking skills. The questionnaire consisted of 31 closed-ended statements measured using a five-point Likert scale, ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). The Likert scale was selected because it is widely used to measure respondents' perceptions, attitudes, and motivation in quantitative research (Sugiyono, 2023). The blueprint of the questionnaire is presented in Table 3.1.

Table 3.1 Questionnaire Framework

Variable	Indicator	Item Numbers	Total Items
Students' Perceptions	<i>Perceived Usefulness</i>	1–3	3
	<i>Perceived Ease of Use</i>	4–9	6

Students' Motivation	<i>Intrinsic Motivation</i>	10–13	4
	<i>Extrinsic Motivation</i>	14–17	4
The Role of AI to Support Speaking Skills	<i>Pronunciation</i>	18–20	3
	<i>Grammar</i>	21–23	3
	<i>Vocabulary</i>	24–26	3
	<i>Fluency</i>	27–29	3
	<i>Comprehension</i>	30–31	2
Total			31

As presented in Table 3.1, the questionnaire includes three main variables and nine indicators. The items were developed based on the theoretical frameworks used in this study, namely the Technology Acceptance Model (TAM), Self-Determination Theory (SDT), and Harris's speaking components. Each item was designed to assess particular aspects of students' perception, motivation, and thoughts on how AI can improve English speaking skills.

2. Instrument Validity

Instrument validity refers to the degree to which a research instrument accurately measures the construct it is intended to measure (Sugiyono, 2023). Establishing validity is essential to ensure that every questionnaire item is relevant to the research objectives, represents the intended variables, and is appropriate for the characteristics of the target respondents. Consequently, the validity of the instrument must be confirmed before it is administered for data collection.

In this study, the questionnaire was validated through expert judgment prior to the data collection process. The validation was conducted by an English Education lecturer with expertise in English language teaching and educational research. During the evaluation, the expert reviewed the questionnaire in terms of its

alignment with the research variables and theoretical frameworks, the clarity of the item statements, grammatical accuracy, and the appropriateness of the language for eleventh-grade students. This review was intended to ensure that the instrument adequately represented the constructs of students' perceptions, students' motivation, and the role of Artificial Intelligence (AI) in enhancing English speaking skills.

To facilitate the validation process, the questionnaire draft, along with its indicators and theoretical foundations, was submitted to the expert for evaluation. The comments and suggestions provided by the validator were subsequently incorporated through revisions to improve the wording, sentence structure, and overall clarity of several questionnaire items. After these revisions had been completed, the questionnaire was considered valid and appropriate for use as the primary instrument for collecting the research data.

3. Instrument Reliability

The Reliability of an instrument is the stability and the dependability of the results obtained from a research instrument when it is used to measure the same construct in similar conditions (Sugiyono, 2023). A good instrument is an instrument whose items consistently measure the variables to be measured so that the measurement error is minimized and the credibility of the data obtained is increased. Therefore, reliability testing is an important procedure to ensure that the questionnaire can produce consistent responses from the respondents.

In this study, the reliability of the questionnaire was evaluated with the help of IBM SPSS Statistics Version 27 using Cronbach's Alpha. After the responses to the questionnaire were collected from the respondents, the analysis was carried out. Cronbach's Alpha was chosen because it is one of the most common ways to measure the internal consistency of instruments with multiple Likert scale items (Sugiyono, 2023). To assess the

consistency with which the instrument measured students' perceptions, motivation, and their views on the role of Artificial Intelligence (AI) in improving English speaking skills, a reliability analysis was conducted on the entire questionnaire.

The interpretation of the reliability coefficient was based on the guideline proposed by Sugiyono (2023), which said that the Cronbach's Alpha coefficient of 0.70 or higher denotes the acceptable internal consistency. Thus, the questionnaire was deemed reliable if the coefficient obtained was greater than or equal to this criterion. The results of the reliability analysis are presented in Chapter IV as part of the research findings.

Table 3.2 Cronbach's Alpha Reliability Criteria

Cronbach's Alpha Coefficient	Interpretation
≥ 0.90	Excellent
0.80–0.89	Good
0.70–0.79	Acceptable
0.60–0.69	Questionable
0.50–0.59	Poor
< 0.50	Unacceptable

Source: Adapted from Sugiyono (2023).

E. Research Procedures

To accomplish the objectives of the study, the research procedures were carried out systematically through the following steps:

1. Settling the research location and schedule.
2. Identifying the research variables and reevaluating relevant theories.
3. Progressing the questionnaire based on the research variables and theoretical framework.
4. Conducting the expert judgment by an English Education lecturer to assess the appropriateness and relevance of the questionnaire items.
5. Distributing the questionnaire to the selected respondents.

6. Collecting the completed questionnaires from the participants.
7. Structuring and processing the obtained data.
8. Examining the reliability of the questionnaire using *Cronbach's Alpha* with the assistance of IBM SPSS Statistics Version 27.
9. Analyzing the data using descriptive statistical methods.
10. Drafting conclusions based on the findings of the data analysis.

F. Data Analysis Technique

Data analysis is the process of organizing and interpreting collected data to answer the research questions. In quantitative research, statistical techniques are used to analyze data objectively and systematically (John W. Creswell, 2017). Therefore, this study employed descriptive statistical analysis because it was appropriate for the research objective, namely describing students' perceptions and motivation toward the use of Artificial Intelligence (AI) in speaking learning without examining causal relationships between variables.

The data analysis techniques applied in this study consisted of descriptive statistics along with the calculation of mean scores and percentages. Descriptive statistical analysis was utilized to present the data in a simpler form, such as frequencies, averages, and percentages, in order to make the findings easier to interpret. These techniques were selected because the purpose of the study was to describe the phenomenon systematically and quantitatively.

Collected data were analyzed by using IBM SPSS Statistics Version 27. The software was used to calculate descriptive statistical measures such as frequencies, percentages, and mean scores for each item of the questionnaire. SPSS helped in the systematic and accurate organization and presentation of the data in tabular form. Therefore, the researcher was able to interpret the students' perceptions and motivation towards the use of Artificial Intelligence (AI) to enhance English speaking skills.

Furthermore, the questionnaire instrument was evaluated through a lecturer as an expert judgment to examine the suitability,

clarity, and relevance of each questionnaire item in measuring the research variables. This process was carried out before the questionnaire was administered to respondents to ensure that the instrument was appropriate and aligned with the objectives of the study.

In order to provide a detailed and comprehensive interpretation, the data analysis in this study was divided into two levels: per-item analysis and per-variable analysis.

1) Mean Score Analysis

The mean score is calculated using the following formula (Sugiyono, 2023):

$$\bar{x} = \frac{\sum x}{N}$$

Where:

$\bar{X}$ = Mean score of the item

$\sum X$ = Total score of respondents' answers for the item

N = Total number of respondents

The calculated mean score for each item was then interpreted using class intervals. Since this study employed a five-point Likert scale, the interval width was calculated as follows:

$$\begin{aligned} \text{Interval Width} &= \frac{\text{Maximum Score} - \text{Minimum Score}}{\text{Number of Categories}} \\ &= \frac{5 - 1}{5} \\ &= 0.80 \end{aligned}$$

Table 3.3 Mean Score Interpretation Criteria

Score Range	Category Level
1.00 – 1.80	Very Low
1.81 – 2.60	Low
2.61 – 3.40	Moderate / Neutral
3.41 – 4.20	High
4.21 – 5.00	Very High

2) Analysis of standard deviation

In addition to the mean score, the researcher then analyzes

data using standard deviation to determine the level of variation among respondents. Standard deviation indicates the degree of respondents' answers clustered towards the mean score. The lower the standard deviation value, the more consistent the respondents are, while the higher the value, the more variability there is.

The criteria for interpreting standard deviation were changed to the following:

Table 3.4 Standard Deviation Interpretation Criteria

Standard Deviation	Interpretation
< 0.80	Highly Consistent Responses
0.80 – 1.00	Relatively Consistent Responses
> 1.00	Greater Variation in Responses

The mean scores and the standard deviations combined helped the researcher to determine the category level of each variable and the consistency of the responses of respondents. Therefore, the results provide a more comprehensive understanding of students' perception and motivation towards using AI to improve English speaking skills.