

CHAPTER III

RESEARCH METHODOLOGY

A. Research Design

This research employed a quantitative approach with a correlational design to examine the relationship between two variables by collecting numerical data from a sample and analyzing it through statistical procedures rather than through word or images. Quantitative research is an approach for testing objective theories by examining the relationship among variables or a comparison among groups (Creswell, 2023). Correlational research measures the degree or association (or relationship) between two or more variables or sets of scores (Creswell, 2012). The strength of the relationship will be measured using Pearson's correlation coefficient.

The quantitative approach is selected because this study requires numerical data that can be statistically analyzed to determine the existence and strength of the correlation between the two variables. The correlational design allows the researcher to describe the nature of the relationship between students' attitudes (measured through a Likert-scale questionnaire) and theory based on Zimmerman (1998) and their academic writing achievement (measured through essay writing final test scores).

B. Population

The population of this study comprises all active undergraduate students from the English Tadris Department, Faculty of Tarbiyah and Teacher Training, UIN Imam Bonjol Padang, who are enrolled in the

academic year 2025/2026. This population is selected because they are actively engaged in essay writing tasks as part of their curriculum and are likely to use language learning applications in their learning process. The total population is estimated to reach thousands of students, but this study limits its focus to students involved in specific programs to ensure the relevance of data related to writing skills.

C. Sample and Sampling

The sample of this study consists of 47 fourth-semester students from UIN Imam Bonjol Padang. This sample size is considered adequate for correlational research, as it meets the minimum sample size requirements for Pearson or Spearman correlation analysis. According to Brooks et al., researchers need to account for the level of unreliability in measurement instruments by appropriately determining sample size. The purposive sampling technique will be used to select participants who meet these criteria.

The sample size was determined using the Slovin formula with a 5% margin of error, resulting in a sample of 48 students. This technique was chosen to ensure that the sample represents a population with specific experience in academic writing, making the research results more valid and generalizable to similar contexts. This approach is supported by Sugiyono (2019), who explains that purposive sampling is effective for research requiring samples with specific characteristics.

D. Instrument

1. Instrument for Variable X (Students' Attitude on Using AI Writing Tools)

The instrument used to measure students' attitudes toward using AI writing tools (Variable X) is a structured questionnaire based on Zimmerman's (1998) Self-Regulated Learning theory. Zimmerman's framework was chosen because it comprehensively captures the cognitive, motivational, and behavioral aspects of learners' engagement with learning tools. The questionnaire consists of four indicators with a total of items measured on a 5-point Likert scale:

Table 3. 1
Questionnaire Indicators Based on Zimmerman's (1998) Theory

No	Indicator	Description
1.	Motivational Beliefs & Task Value	Students' beliefs about their capability to use AI writing tools and the perceived value of these tools for their writing tasks.
2.	Strategic Task Execution & Self-Monitoring	Students' ability to strategically employ AI writing tools and monitor their effectiveness during writing.
3.	Self-Judgment on AI Integration	Students' evaluation of their own performance when integrating AI tools in writing.
4.	Self-Reaction & Continued Engagement	Students' emotional and behavioral responses to using AI tools and their willingness to continue using them.

The Likert scale used ranges from:

- 1 = Strongly Disagree
- 2 = Disagree
- 3 = Neutral

- 4 = Agree
- 5 = Strongly Agree

Table 3. 2
Kisi-Kisi Instrument
Students' Attitudes Toward the Use of AI Writing Tools

(Grounded in SRL Theory — Zimmerman, 1989/2000; Schunk, 2001)

SRL Phase / Dimension	Indicator	No. Item	Jumlah
A. Forethought Phase (Motivational Beliefs & Task Value)	1. Perceived task efficiency 2. Time management 3. Perceived writing quality improvement 4. Task value of feedback/suggestions 5. Creativity development 6. Critical thinking development	1, 2, 3, 4, 5, 6	6
B. Performance Phase (Strategic Task Execution & Self-Monitoring)	7. Strategic/iterative task execution 8. Self-control through prompt refinement 9. Monitoring perceived accuracy 10. Monitoring perceived reliability 11. Perceived usefulness of output 12. Self-checking/review before submission	7, 8, 9, 10, 11, 12	6
C. Self-Reflection Phase (Self-Judgment on AI Integration)	13. Judgment on change in writing process 14. Rational acceptance judgment 15. Judgment on future role/value 16. Awareness of responsible use	13, 14, 15, 16	4
D. Self-Reflection Phase (Self-Reaction & Continued Engagement)	17. Enjoyment (affective self-reaction) 18. Positive attitude (self-reaction) 19. Interest (self-reaction) 20. Intention for continued engagement	17, 18, 19, 20	4
Total			20

2. Instrument for Variable Y (Academic Writing Performance)

The instrument used to measure students' academic writing performance (Variable Y) is the final test essay writing scores. Students are required to produce an academic essay following standard academic writing conventions. The essays are evaluated based on established academic writing criteria, including:

- a. Content and organization
- b. Coherence and cohesion
- c. Grammar and Vocabulary
- d. Mechanics (spelling, punctuation, formatting)

E. Technique Collecting Data

The data collection technique used was an online questionnaire for variable X distributed via Google Forms platform; Google Forms facilitates access for English Department students. The researcher prepared the questionnaire instrument based on Zimmerman's (1998) Self-Regulated Learning theory. The questionnaire is reviewed and validated by experts to ensure content validity.

The questionnaire is distributed to the 48 selected fourth-semester students. The researcher explains the purpose of the research and provides clear instructions for completing the questionnaire. Students are given adequate time to respond to all items honestly. Completed questionnaires are collected and checked for completeness. Incomplete questionnaires are returned to respondents for completion.

The researcher collects students' final test essay writing scores from the academic writing course instructor. These scores represent the students' academic writing performance (Variable Y). Then, the questionnaire data (Variable X) and essay writing scores (Variable Y) are compiled into a single dataset for statistical analysis. This online data collection approach is supported by Evans and Mathur (2018), who state that digital platforms such as Google Forms are effective for quantitative surveys with high response rates and time efficiency.

F. Data Analysis

The data analysis in this research is conducted using a correlation analysis technique using SPSS version 31. The analysis follows these steps:

1. Data Screening and Prerequisite Tests

Before conducting the correlation analysis, the researcher performs prerequisite tests:

- a. Normality test: The normality test is conducted to determine whether the data are normally distributed. This test is necessary because it influences the selection of the appropriate correlation coefficient (Pearson or Spearman). The Shapiro-Wilk test is used for this purpose. If the data are normally distributed ($p > 0.05$), Pearson correlation is used; if not, Spearman rank correlation is employed.
- b. Linearity tests: This test examines whether the relationship between the two variables is linear. The test is conducted using the ANOVA approach in SPSS.

2. Hypothesis Tests

Hypothesis testing is conducted using correlation analysis. Based on the results of the prerequisite tests, either the Pearson Product-Moment Correlation or Spearman Rank Correlation coefficient is calculated.

a. Pearson Product-Moment Correlation

If the data meet the normality assumption, the Pearson Product-Moment Correlation coefficient (r) is calculated using the following formula:

$$r_{xy} = \frac{n \sum XY - (\sum X)(\sum Y)}{\sqrt{[n \sum X^2 - (\sum X)^2][n \sum Y^2 - (\sum Y)^2]}}$$

Where:

- r = correlation coefficient between variable X and variable Y
- n = number of respondents (48)
- $\sum X$ = sum of scores for variable X (students' attitudes)
- $\sum Y$ = sum of scores for variable Y (academic writing performance)
- $\sum XY$ = sum of the product of paired scores
- $\sum X^2$ = sum of squared X scores
- $\sum Y^2$ = sum of squared Y scores

The Pearson correlation coefficient is suitable when data are normally distributed and the relationship between variables is linear (de Winter & Gosling, 2016).

b. Spearman Rank Correlation

If the data are not normally distributed, the Spearman Rank Correlation coefficient (ρ or r_s) is calculated using the following formula:

$$r_s = 1 - \frac{6 \sum d_i^2}{n(n^2 - 1)}$$

Where:

- r_s = Spearman rank correlation coefficient
- d_i = difference between the ranks of each paired observation
- n = number of respondents (48)

De winter Gosling explained that Spearman correlation is more suitable when variables feature heavy-tailed distributions or when outliers are present, as is often the case in behavioral and psychological research.

3. Interpretation of Correlation Coefficient

The correlation coefficient (r or r_s) ranges from -1 to +1 and is interpreted as follows:

Table 3. 3
Interpretation of Correlation Coefficient

Correlation Coefficient (r)	Interpretation
0.00 – 0.19	Very weak correlation
0.20 – 0.39	Weak correlation
0.40 – 0.59	Moderate correlation
0.60 – 0.79	Strong correlation
0.80 – 1.00	Very strong correlation

4. Data Analysis Software

All statistical analyses in this research are conducted using the Statistical Package for Social Sciences (SPSS) version 31.0 for Windows. This software is chosen for its reliability and comprehensive statistical analysis capabilities, including correlation analysis and prerequisite tests.

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