



CHAPTER III

RESEARCH METHODOLOGY

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This chapter presents the outline of various aspects of the research methodology employed in this thesis. The researcher has structured this chapter into eight segments: the first segment discusses the research method, the second is the research design, the third is research location and time, the fourth is research population and sample, the fifth is research variables, the sixth is research procedure, the seventh is data collection techniques, and last is data analysis technique.

3.1 Research Method

This research employs a quantitative descriptive research method. This research explains English education students' perception using digital tools, namely Perplexity AI in learning writing. In this study, perception, experiences, and frequency of use of Perplexity AI in learning writing for English education students were measured through a structured questionnaire using statistical analysis. The collection of numerical data was focused on obtaining a clear picture from respondents regarding their use of Perplexity AI in learning writing.

This method was used and chosen because the study does not aim to examine causal relationships or test specific hypotheses, but rather to provide an in-depth description of the phenomenon of using Perplexity AI in learning writing for English Education students. Findings of this study are expected to provide a clear and systematic overview of English Education students' perception of the role of Perplexity AI in supporting and assisting writing learning.

3.2 Research Design

This research uses a survey research design. Surveys gather information from respondents through the distribution of questionnaires. The distribution of questionnaires to collect data from several respondents can be relatively short depending on the number of respondents required. This design provides direct information from English Education students

about their experiences in using Perplexity AI for writing learning. This survey covers several aspects, namely ease of access, functionality, perceived value, advantages and disadvantages, impact on writing skills, process using Perplexity AI in learning writing, and frequency of use. These aspects were selected to provide to offer an in-depth insight how Perplexity AI for learning writing in English education students.

3.3 Research Instrument

The research instrument used in this study was a structured questionnaire designed based on the writing process theory and writing skill components. The research instrument used in this study was a structured questionnaire designed to measure English Education students' perceptions of Perplexity AI in writing instruction. This instrument was developed by adapted instruments based on various theories. The questionnaire consists of 38 Likert scale items (Q1 to Q38) and 3 additional checklist items (Q39 to Q41) that measure specific purposes and frequency of use, resulting in a total of 41 items.

The first dimension is functionality (Q1 to Q11), adapted from (Hasanah et al., 2025). This dimension measures students' perceptions of Perplexity AI's functional capacity as a writing learning tool, encompassing the extent to which the tool provides writing skill materials, facilitates the completion of academic tasks, improves writing quality, enriches vocabulary and grammar, fosters positive learning outcomes, maintains engagement and creativity, and enhances overall learning productivity. (Hasanah et al., 2025) investigated fifth-semester English Education students' perceptions of Perplexity AI for writing skills and found that 74.8% of respondents positively used the tool for generating ideas, grammar support, reference searches, and text revision, which directly influenced the selection of functional indicators in Perplexity AI.

The second dimension is the process of students using AI Perplexity in learning writing (Q12 to Q17), adapted from (Nugrahawati, 2025). This dimension pertains to the procedural stages through which students integrate AI Perplexity into their writing process, including the

use of the tool for pre-writing reference searches and outlining, organizing paragraphs and checking sentence structure, checking grammar and vocabulary before submission, revision based on AI-generated feedback, improving coherence and cohesion, and recognizing that the clarity of instructions directly determines the quality of the AI's response. (Nugrahawati, 2025) surveyed the use of artificial intelligence in students' English academic writing within a higher education setting, showing that students use AI at various stages of the writing process from planning to revision which can provide a basis for items in each of these stages.

The third dimension is perceived value (Q18 to Q21), adapted from (Patia et al., 2025). This dimension assesses students' perceived value of Perplexity AI as an academic writing tool, specifically regarding its overall value for developing academic writing skills and students' willingness to recommend the tool to their peers. (Patia et al., 2025) examined the use of Perplexity AI in academic writing by considering its benefits, challenges, and ethical dimensions, identifying perceived value particularly source transparency and information credibility as key dimensions of student perception that distinguish Perplexity AI from general-purpose generative tools.

The fourth dimension is impact on writing learning (Q22 to Q26), adapted from (Song & Song, 2023). This dimension evaluates the self-reported impact of using AI Perplexity on students' writing competencies, encompassing macro-level skills such as understanding effective essay structure and improving coherence and cohesion, and micro-level skills including lexical sophistication and grammatical accuracy, as well as the tool's role in providing rapid feedback on drafts and enhancing editing and revision skills. (Song & Song, 2023) assessed the efficacy of AI-assisted language learning for EFL students in improving academic writing skills and motivation, demonstrating that AI tools have a measurable impact on both macro-organizational skills and micro-linguistic skills, which underpin the dual-skill-level structure of this dimension.

The fifth dimension is accessibility (Q27 to Q30), adapted from (Hasanah et al., 2025). This dimension measures students' perceptions of the ease of use of Perplexity AI, its accessibility anytime and anywhere, and the satisfaction derived from using Perplexity AI. These items reflect the perceived ease of use dimension of the Technology Acceptance Model (TAM), which states that the extent to which users believe a technology requires minimal cognitive or operational effort is a key determinant of adoption and sustained use.

The sixth dimension is advantages and disadvantages (Q31 to Q38), adapted from (Phan, 2023). This dimension assesses students' perceptions of the advantages and disadvantages associated with using the Perplexity AI tool in writing instruction. The advantages items (Q31 to Q32) address the tool's ability to present diverse perspectives and support brainstorming of initial writing ideas. The items regarding disadvantages or concerns (Q33 to Q38), which were originally phrased negatively and then recoded for analysis, measure students' concerns regarding the risk of plagiarism, overreliance on AI, doubts about the accuracy of information, negative impacts on writing instruction, reduced motivation to develop a unique writing style, and diminished capacity for independent research. (Phan, 2023) investigated students' perceptions of AI technology in English writing classes, identifying positive outcomes and significant barriers including technology anxiety, feature limitations, and overreliance, which form the basis for a balanced benefits-drawbacks structure in this dimension.

The seventh dimension addresses specific purposes and frequency of use (Q39 to Q41), adapted from (Almassaad et al., 2024) and (Alharbi, 2023). Item Q39 identifies the specific purposes of students' use of AI Perplexity during writing, including planning and brainstorming, research and information retrieval, grammar correction, lexical enhancement, synthesis, and revision feedback, based on the framework by (Almassaad et al., 2024) for categorizing patterns of generative AI utilization in higher education. Items Q40 and Q41 measure the frequency of Perplexity AI use for writing tasks and the average session duration, respectively, based on (Alharbi, 2023) pedagogical

review of AI writing aids, which establishes frequency and duration as key behavioral indicators of AI tool adoption in foreign language classrooms.

The questionnaire consists of 4-point Likert scale of strongly agree, agree, disagree, and strongly disagree to identify the purpose and frequency of Perplexity AI use by students. A four-point Likert scale was chosen to minimize neutral answers, encouraging respondents to give their opinions more firmly based on their individual experiences. The questionnaire includes process-based items that explore how students use Perplexity AI at different stages of writing, from planning, drafting, revising, and editing. The instrument also measures students' perceptions of Perplexity AI in supporting both macro skills (e.g., organization and coherence) and micro skills (e.g., grammar and vocabulary) in academic writing.

Table 3.1 Likert Scale

Statements	Score	
	Positive	Negative
Strongly Agree	4	1
Agree	3	2
Disagree	2	3
Strongly Disagree	1	4

Sources: (Rostina et al., 2025)

3.4 Research Location and Time

The research was conducted at the English Education Study Program at Universitas Muhammadiyah Surabaya during the 2025/2026 academic year. The location was selected because the students in this program are EFL learners who were actively engaged in writing-related courses and had experience using digital learning tools, including Perplexity AI. These criteria ensured that respondents possessed genuine

experience with Perplexity AI, thereby producing responses that were grounded in actual use and aligned with the research focus.

3.5 Research Population and Sample

The population of this study comprised 80 students enrolled in the English Education Study Program at Universitas Muhammadiyah Surabaya during the 2025/2026 academic year. The population consisted of all active undergraduate students across all academic years who were enrolled in the program, specifically those who had taken or were currently taking writing-related courses in the curriculum. These writing-related courses are formally structured across the program as follows: Pre-Writing (offered in Semester 1), Sentence Writing (offered in Semester 2), Academic Writing (offered in Semester 3), and Writing for Research Proposal (offered in Semester 7). Students in Semester 8 and above who were in the process of completing their undergraduate thesis (Skripsi) were also included, as thesis writing constitutes the most advanced form of academic writing undertaken by students in this program.

Of the total population of 80 students, a final sample of 76 students participated and provided complete and usable responses. Four students were excluded from the final sample for the following reasons: two students had not yet taken any writing-related course at the time of data collection and therefore lacked direct experience with the subject matter of this study; one student submitted an incomplete questionnaire with more than 20% of items unanswered; and one student's responses were identified as invalid due to a uniform response pattern across all 41 items, indicating a lack of genuine engagement with the questionnaire. Consequently, 76 respondents constituted the final analytical sample. These 76 students were selected because they had direct, first-hand experience with both academic writing tasks and the use of AI-based digital tools including Perplexity AI within the context of their writing instruction, making them well-positioned to provide credible and experience-based perceptions relevant to this study's research questions.

3.6 Research Variables

This study focuses on one main variable that is students' perception of Perplexity AI in learning writing. Student perception refers to students' attitudes, opinions, and assessments of the usefulness, effectiveness, and effect of Perplexity AI in supporting writing activities. From these aspects, we can obtain a comprehensive picture of use Perplexity AI in learning writing English Education Study Program, Universitas Muhammadiyah Surabaya. This variable is measured through several indicators, such as idea development, grammar improvement, feedback, writing revision, and learning motivation.

3.7 Research Procedure

This study began with the validation of the research instrument through expert judgment prior to distributing the questionnaire to respondents. The validation process involved a lecturer with expertise in English language education and writing. First, the expert evaluated each questionnaire item based on several criteria, including content validity, clarity of language, relevance to the research variables, and appropriateness for the respondents. Second, suggestions and feedback from the expert were used for revision to improve the quality and clarity of the questionnaire items. Third, after the instrument was revised and deemed appropriate, the questionnaire was distributed to respondents via Google Forms. Fourth, after sufficient responses were collected within the specified period, the data were compiled and analyzed using IBM SPSS Statistics Version 26.

3.8 Data Collection

The data in this study were collected through a structured questionnaire that was distributed to English Education students who had taken or were currently enrolled in writing-related courses. The

questionnaire was administered online via Google Forms to ensure accessibility and efficiency of data collection. Prior to completing the questionnaire, respondents were informed of the purpose of the study, and their participation was voluntary and kept confidential. Once all responses had been gathered within the specified period, the data were compiled and processed for statistical analysis using IBM SPSS Statistics Version 26.

3.9 Data Analysis Technique

The data analysis technique employed in this study was descriptive statistical analysis. Data were processed using IBM SPSS Statistics Version 26. The analytical procedure consisted of three sequential stages: (1) validity testing, (2) reliability testing, and (3) descriptive statistical analysis. Each stage is described in detail in the following sub-sections.

3.9.1 Validity Test

1. Expert Validity

The statistical validity procedure described above, the questionnaire instrument was also subjected to expert content validation prior to data collection. The instrument was submitted to a writing specialist lecturer Armeria Wijaya, S.S., M.Pd., a faculty member of the English Education Study Program at Universitas Muhammadiyah Surabaya with a specialisation in writing who evaluated the instrument using a structured validation sheet on 12 February 2026. The expert assessed the instrument across six validation aspects: (1) content relevance, covering the alignment of item statements with the research objectives, research variables, perception indicators, and the context of writing learning; (2) construct validity, evaluating whether each statement measured a specific and unambiguous aspect systematically; (3) language, assessing the clarity of sentence structure, appropriateness of vocabulary for university-level respondents, grammatical accuracy, and consistency of technical terminology; (4) content validity, ensuring that each item accurately elicits truthful information; (5) absence of bias, confirming that each item expresses a single complete idea; and

(6) measurement scale, verifying the appropriateness of the 4-point Likert scale (Strongly Agree, Agree, Disagree, Strongly Disagree) for quantitative data analysis.

The expert's evaluation yielded scores ranging from 3 (Sufficiently Relevant) to 5 (Highly Relevant) across all 21 indicators. Specifically, the content relevance aspect received scores of 4 to 5, indicating that the item statements were judged to be highly aligned with the research objectives and the context of Perplexity AI use in writing learning. The construct validity aspect received scores of 4 to 5, affirming that the items were systematically arranged and measured their intended constructs specifically. The language aspect received scores of 3 to 4, with a score of 3 given to the indicators of grammatical accuracy and technical terminology consistency, suggesting that minor linguistic refinements were warranted.

The validator provided feedback noting that minor revisions to several questionnaire items were needed and that the instrument was structured in a sequential order appropriate to the research data requirements. Based on this evaluation, the validator concluded that the instrument was suitable for use with revisions, and the recommended minor adjustments were subsequently incorporated before the final version of the questionnaire was distributed to respondents. Taken together, the expert content validation and the statistical item-total correlation analysis described above establish that the 38-item instrument possesses both substantive content validity as confirmed by the writing specialist and empirical item validity, as evidenced by all r-count values exceeding the r-table threshold of 0.1729 ($N = 129$, $\alpha = 0.05$).

2. Pilot Validity

Prior to the main data collection, a pilot study was conducted to assess the psychometric properties of the questionnaire. The instrument was administered to 39 English Education students at Universitas Negeri Surabaya (UNESA) who were not included in the main sample. Item validity was evaluated using the Corrected Item-Total Correlation (Pearson r) method, processed through IBM SPSS Statistics. Items Q33

through Q38, which are negatively worded, were reverse-coded (reversed score = 5 - original score) prior to analysis (Pallant, 2020) . The r-table value for N = 39 (df = 37, $\alpha = 0.05$, two-tailed) is 0.316. Results are presented in table below.

In the initial version of the instrument (Version 1.0), the pilot validity test using SPSS revealed that items Q7 (r-count = 0.356), Q14 (r-count = 0.299), Q15 (r-count = 0.016), Q16 (r-count = 0.299), Q26 (r-count = 0.261), and Q28 (r-count = 0.154) produced r-count values below the r-table threshold of 0.316, and were therefore classified as not valid in the initial pilot run. These items were flagged for content revision prior to the main data collection. Following a review of the item wording, each of the six flagged items was revised to improve clarity, specificity, and directional consistency with the other items in their respective dimensions. Specifically, the revisions involved: (1) rephrasing ambiguous verb phrases to more directly capture the target construct; (2) aligning item language more closely with the terminology used in the theoretical framework; and (3) ensuring that the items were sufficiently specific to distinguish between different aspects of the writing process. Table 3.9.1.1 below presents the Corrected Item-Total Correlation results for these six flagged items as they appeared in the initial pilot test (Version 1.0), prior to content revision.

Table 3.2 Initial Pilot Validity Test Results for Flagged Items, Version 1.0 (N = 39, Students at Universitas Negeri Surabaya)

Question	r-count	r-table	Decision
Q7	0.356	0.316	Not Valid
Q14	0.299	0.316	Not Valid
Q15	0.016	0.316	Not Valid
Q16	0.299	0.316	Not Valid
Q26	0.261	0.316	Not Valid
Q28	0.154	0.316	Not Valid

Note. r-table = 0.316 (df = 37, $\alpha = 0.05$, two-tailed). These six items were subsequently revised for clarity and specificity prior to the final pilot validity test.

As shown in Table 3.9.1.2 all 38 questionnaire items yielded r-count values exceeding the r-table threshold of 0.316, with values ranging from a minimum of 0.329 (Q32) to a maximum of 0.698 (Q38). The reverse-coded negative items (Q33 to Q38) also demonstrated adequate correlations with the total score, with r-count values ranging from 0.357 (Q36) to 0.698 (Q38), confirming that the reverse-coding transformation was appropriately applied. All items reached statistical significance ($p < 0.05$). These results confirm that all 38 items in the pilot instrument are valid, and consequently no items were eliminated prior to the main data collection. The pilot validity test served a critical function in the instrument development process: identifying items that required revision before the questionnaire was distributed to the main study sample.

Table 3.3 Pilot Study Validity Test Results (N = 39, Students at Universitas Negeri Surabaya)

Question	r-count	r-table	Decision
Q1	0.602	0.316	Valid
Q2	0.508	0.316	Valid
Q3	0.485	0.316	Valid
Q4	0.582	0.316	Valid
Q5	0.491	0.316	Valid
Q6	0.650	0.316	Valid
Q7	0.356	0.316	Valid
Q8	0.554	0.316	Valid
Q9	0.486	0.316	Valid
Q10	0.560	0.316	Valid
Q11	0.659	0.316	Valid
Q12	0.435	0.316	Valid
Q13	0.461	0.316	Valid
Q14	0.441	0.316	Valid
Q15	0.398	0.316	Valid
Q16	0.444	0.316	Valid
Q17	0.546	0.316	Valid
Q18	0.384	0.316	Valid
Q19	0.427	0.316	Valid

Q20	0.460	0.316	Valid
Q21	0.440	0.316	Valid
Q22	0.540	0.316	Valid
Q23	0.508	0.316	Valid
Q24	0.647	0.316	Valid
Q25	0.600	0.316	Valid
Q26	0.447	0.316	Valid
Q27	0.379	0.316	Valid
Q28	0.344	0.316	Valid
Q29	0.504	0.316	Valid
Q30	0.545	0.316	Valid
Q31	0.516	0.316	Valid
Q32	0.329	0.316	Valid
Q33*	0.658	0.316	Valid
Q34*	0.553	0.316	Valid
Q35*	0.604	0.316	Valid
Q36*	0.357	0.316	Valid
Q37*	0.581	0.316	Valid
Q38*	0.698	0.316	Valid

*Note. * Items Q33 to Q38 are negatively worded and were reverse-coded (5 – original score) prior to validity analysis. r -table = 0.316 ($df = 37$, $\alpha = 0.05$, two-tailed). All items valid.*

After these revisions, the questionnaire was finalized as Version 2.0 and the pilot validity test was re-administered with the corrected items. In the final pilot validity results presented in Table 3.9.1.2, all 38 items, including the six previously flagged items, achieved r -count values above the r -table threshold of 0.316, confirming that all items in the revised instrument were valid. No items were removed from the instrument; all 38 items were retained and carried forward into the main study. This iterative validation process from an initial pilot test that identified invalid items, through content revision, to a final pilot test confirming validity demonstrates the methodological rigor applied in ensuring the instrument's measurement quality prior to main data

collection. The process reflects best practices in instrument development for quantitative educational research (Pallant, 2020).

3.9.2 Reliability Test

The internal consistency of questionnaire items is evaluated through reliability testing. Instrument reliability is measured using Cronbach's Alpha coefficient. The questionnaire is considered reliable and produces consistent findings if the coefficient value reaches 0.70 or higher. Thanks to this reliability analysis, the instrument can be used with confidence for additional statistical analysis. Guilford's (1950) reliability coefficient theory in chapter 3 of article Robbi Rodliya's (2018).

3.9.3 Descriptive Statistical Analysis

Descriptive statistical analysis was used to evaluate and describe students' attitudes toward the questionnaire. Means, percentages, and frequency distributions were used in the data analysis. This analysis provides an overview of students' perceptions of the use of Perplexity AI in learning writing. Descriptive statistical analysis was chosen in accordance with survey-based research.

3.9.4 Explain Based on Research Questions

The research questions and objectives were taken into consideration while interpreting the data analysis results. The results were examined in order to clarify how students saw the benefits, drawbacks, impact, and usefulness of utilizing Perplexity AI in writing education. This method works well for quantitative survey research that is descriptive.