CHAPTER 1

INTRODUCTION

This chapter presents the research background, research questions, research purposes, research significance, research scope, conceptual framework, hypotheses, and previous research. These components are presented to provide a clear rationale for this research and to establish the theoretical and empirical foundations for this study.

A.   Background

Academic writing is a crucial skill for students, especially English as a Foreign Language (EFL) learners. Students are required to express their ideas logically, coherently, and accurately using appropriate academic conventions. However, many EFL students experience difficulties in academic writing, including issues related to grammatical accuracy, vocabulary usage, sentence structure, organization of ideas, and writing confidence. Previous studies have shown that these challenges often result in decreased writing performance and academic achievement (Qamariah et al., 2020; Handayani et al., 2018).

The digital revolution, marked by the emergence of Industry 4.0, has shifted the paradigm of global development. Industry 4.0 brings technologies such as the Internet of Things, artificial intelligence, big data, and integrated cyber-physical systems to various sectors, including education. This change is not simply technological innovation, but a major leap in the way humans work, learn, and interact. In this context, the concept of Society 5.0 has emerged, a vision of a technology-based society that places humans at the center of digital transformation (Kashfabi et al., 2021).

The impact on education is significant. Learning systems are shifting from conventional models to digital and adaptive ones. Technology enables flexible learning through online platforms, personalized teaching materials, and AI integration for student competency mapping. Educational institutions are also encouraged to strategically transform to face the era of Society 5.0 (Hijazi, 2025). Educators are not only required to master technology but also to be able to shape critical, collaborative, and character-driven students to face the challenges of the 21st century.

In line with the paradigm shift brought about by the Industrial Revolution 4.0 and Society 5.0, the world of education is also required to adapt quickly and comprehensively. Digital transformation is no longer an option, but rather an imperative, a fundamental necessity in the teaching and learning process in the 21st century. Technology has become a major driver of change in the education system, not only in methods but also in the structure and objectives of learning itself (Suryanto, 2024).

One form of information technology that continues to develop and transform rapidly is progress in the field of artificial intelligence, also known as artificial intelligence (AI). AI is no longer just a technological ghost tool, but a core element in creating an adaptive, efficient, and student-centered education system. The use of AI enables learning to be personalized, predictive, and responsive to individual learning needs (Harras, 2025). Academically, AI is defined as a field of computer science that focuses on developing systems that can perform tasks that usually require human intelligence, such as learning, pattern recognition, and decision-making (AI in academic terms).

Artificial Intelligence (AI) has made a significant contribution to accelerating the transformation of learning. AI not only supports learning effectiveness but also provides solutions for personalized comments, automated grading, and improving the quality of interactions between lecturers and students. A survey conducted by Antoni of lecturers and students from several universities in Indonesia found that 80% of students and 65% of lecturers have used AI, primarily to assist with course preparation, lecture materials, grammar checking, and answering questions or assignments (Antoni et al., 2024).

In recent years, the rapid development of Information and Communication Technology (ICT) has significantly impacted the field of education. One of the most prominent innovations is the use of Artificial Intelligence (AI) in language learning. AI-based tools are increasingly being integrated into higher education to support students' learning, particularly in writing. These tools are designed to provide instant

feedback, aid idea generation, improve grammatical accuracy, and support the development of overall writing skills.

Perplexity AI is an AI-based tool that has gained attention as a writing assistant. It offers real-time feedback, grammar checking, vocabulary suggestions, and structured responses supported by credible sources. These features enable students to improve their writing efficiency and accuracy while developing greater confidence in academic writing assignments. Gayed et al. (2022) reported that AI-based writing tools can help students reduce grammatical errors and improve the quality of their academic writing.

Despite the increasing use of AI tools in higher education, empirical research examining the relationship between Perplexity AI use and students' academic writing achievement remains limited, particularly in the Indonesian EFL context. Most existing studies focus on students' frequency of use of AI tools or investigate AI-assisted writing in general without specifically examining Perplexity AI or its summary with measured academic writing outcomes.

This situation leads to a research problem: although Perplexity AI is increasingly used by students as a writing support tool, it is not yet empirically known whether students who use Perplexity AI more frequently tend to achieve higher academic writing scores. The absence of clear statistical evidence creates uncertainty regarding the role of the frequency of AI use in academic writing achievement.

This research gap suggests the need for further investigation into how the use of Perplexity AI relates to students' academic writing achievement. Understanding this relationship is crucial to evaluating whether AI tools can meaningfully support writing development and academic performance. Therefore, this study aims to investigate the relationship between the use of Perplexity AI and the academic writing achievement of fourth-semester, class A, class of 2023, English Language Education Department students, UIN Sunan Gunung Djati Bandung.

Based on these reasons, this study is entitled "The Relationship Between the Use of AI Perplexity and Students' Academic Writing Achievement."

B.   Research Questions

Based on the background of the study, this research is designed to examine both the descriptive and relational aspects of students' use of Perplexity AI in academic writing. First, it is necessary to identify the extent to which students utilize Perplexity AI as a writing support tool in order to understand their level of engagement with AI-assisted writing. Second, assessing students' academic writing achievement is essential to provide an objective picture of their writing performance as measured through academic evaluation. Finally, by examining the relationship between these two variables, this study seeks to determine whether the use of Perplexity AI is significantly associated with students' academic writing achievement. Therefore, the research questions are formulated as follows:

1.   What is the level of students' use of Perplexity AI in academic writing?

2.   What is the level of students' academic writing achievement?

3.   How is the relationship between the use of Perplexity AI and students' academic writing achievement?

C.   Research Purposes

In accordance with the research questions, the purposes of this study are:

1.   To determine the level of students' use and integration of Perplexity AI in academic writing.

2.   To identify the level of students' academic writing achievement.

3.   To examine how is the relationship between the use of Perplexity AI and students' academic writing achievement.

D.   Research Significances

The significance of this study lies in its potential to shed light on the role of Perplexity AI in relation to academic writing achievement among students. By investigating the correlation betisween Perplexity AI usage and students' academic writing, this study aims to provide empirical evidence of how technology can positively influence educational outcomes. Understanding this relationship is crucial for

educators and institutions, as it can inform the integration of AI tools into the academic curriculum, which can ultimately promote better writing competencies among students.

Furthermore, by focusing on the frequency of AI use and its perceived effectiveness, this research will provide insights into how consistent engagement with these tools can lead to measurable improvements in academic achievement. This knowledge can pave the way for more effective teaching strategies that leverage technology to support student learning in higher education settings, particularly at UIN SGD Bandung.

E.   Research Scope

This study focuses on fourth-semester students of the English Language Education Department at UIN Sunan Gunung Djati Bandung who are taking an academic writing course. The scope of this study is limited to examining the relationship between the use of Perplexity AI and students' academic writing achievement in the context of higher education.

The independent variable in this study was the use of Perplexity AI, which was measured by the frequency of use and integration of Perplexity AI's effectiveness as a writing aid. Data related to this variable were collected using a Likert-scale questionnaire consisting of 30 statements designed to capture students' engagement and attitudes toward using Perplexity AI in academic writing activities.

The dependent variable in this study was students' academic writing achievement, which was measured using their final academic writing exam scores. These scores were assessed using an IELTS-based writing rubric that encompasses task achievement, coherence and cohesion, lexical resources, and grammatical range and accuracy. This measurement was used to provide an objective evaluation of students' writing performance.

This study is limited to quantitative correlational analysis and does not examine causal relationships between variables. It does not include students from other semesters or departments, nor does it investigate the use of AI tools other than

Perplexity AI. Furthermore, it does not explore the long-term effects of AI use outside the academic writing context studied during the data collection period.

By limiting its scope in this way, this study aims to provide a focused and systematic analysis of the relationship between Perplexity AI use and academic writing achievement among fourth-semester EFL students at UIN Sunan Gunung Djati Bandung.

F.   Conceptual Framework

The conceptual framework of this study describes the relationship between the use of Perplexity AI and improved academic writing achievement among students at UIN SGD Bandung. This conceptual framework states that the independent variable, namely the use of Perplexity AI, directly affects the dependent variable, namely academic writing achievement. This relationship is further colored by two key dimensions: frequency of use and perceived effectiveness.

Frequency of Use: Increased frequency of use of Perplexity AI is expected to positively correlate with higher academic writing scores. Students who use the tool more frequently can develop better writing skills due to consistent practice and access to suggestions generated by AI. Perceived Effectiveness: Students' integration of how effective Perplexity AI is in helping their writing process can also affect their academic performance. If students believe that this tool significantly improves their writing, they will probably be more motivated to use it regularly, leading to further improvement in their writing skills.

Research shows that technology, particularly AI tools such as Perplexity, can significantly improve educational outcomes by providing resources and support tailored to students' writing needs. For example, one study highlighted that the use of AI in an academic setting helps students navigate complex writing processes more efficiently, ultimately leading to improved writing ability (Fitria, 2025). By examining this relationship through a quantitative correlational approach, this study aims to provide empirical evidence on how Perplexity AI can be a valuable tool in improving students' writing ability.

The insights gained from this study will not only contribute to the academic discourse surrounding technology in education but also inform practical strategies for effectively integrating AI tools into the writing curriculum. In summary, this conceptual framework provides a structured approach to understanding how the use of Perplexity AI affects students' academic writing achievement. By focusing on frequency of use and perceived effectiveness, this study aims to uncover valuable insights into how technology can improve educational outcomes in writing. This framework will guide data collection and analysis, helping to clarify the relationships between key variables throughout the research process.

So the table below shows the framework that the researcher made. This concept is the steps of this research that will be conducted, from the figure 1.1 conceptual framework.
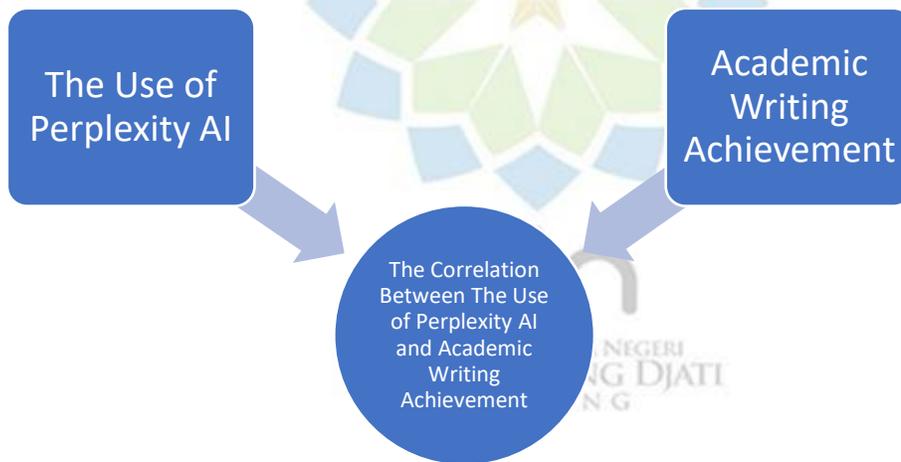
The Use of Perplexity AI

Academic Writing Achievement

The Correlation Between The Use of Perplexity AI and Academic Writing Achievement

Figure 1. 1. . Conceptual Framework

G.   Hypothesis

A hypothesis is a testable, provisional statement that predicts a relationship between two or more variables and serves as a bridge between theory and empirical investigation. In quantitative research, hypotheses provide clear direction for data collection and analysis by determining expected results, such as correlations, differences, or causal effects, thereby guiding researchers to solve research problems

(Creswell & Creswell, 2018). After that, the researcher formulates the hypotheses based on the scores.

The statistical hypotheses for this study are outlined as follows: First, the alternative hypothesis (Ha) states that there is a positive and significant relationship between the use of Perplexity Al (X) and the improvement of academic writing achievements (Y). Second, the null hypothesis (H0) states that there is no significant relationship between the use of Perplexity AI (X) and the improvement of academic writing achievements (Y). In order to evaluate these hypotheses, the researcher used the correlation coefficient from the calculation (rxy), which was then compared to the correlation coefficient in the Pearson Product-Moment table (r table).

To determine the r-table value, the degree of freedom (df) is calculated, which is then used to identify the r-table value at a 5% level of significance. After calculating the degree of freedom, the r-table value can be determined for the 5% significance level can be established. The following criteria to test hypotheses are: First, if r'xy > rtable, Ha is accepted, and HO is rejected, which means there is a significant correlation between the two variables. Second If r'xy < rtable, HO is accepted and Ha is rejected, which means there is no significant correlation between the two variables.

H.   Previous studies

Previous studies have highlighted the significant role of AI tools, including Perplexity AI, in enhancing students' writing skills. Lubis & Rahman (2024) investigated the perceptions of eighth-semester EFL students regarding Perplexity AI's impact on writing efficiency. Their findings revealed that students positively viewed Perplexity AI for its ease of use, ability to optimize time, and support in improving writing quality, suggesting its potential for broader integration in English language education. Similarly, Syahnaz & Fithriani (2023) emphasized the effectiveness of AI-based tools, like Perplexity AI, in providing real-time feedback on grammar, vocabulary, and idea development. These tools were found to empower students by offering personalized learning experiences and fostering creativity in writing projects.

Additionally, Kurniati & Fithriani (2022) explored the use of AI writing tools (AIWTs), including Perplexity AI, among EFL students. They reported that these tools significantly improved the quality of writing, sped up the writing process, and enhanced idea generation, making them important in the modern educational context. These studies collectively underscore the transformative impact of Perplexity AI on students' academic writing skills.

This study also shows that the use of Perplexity AI has a significant impact on improving the academic writing achievements of students in the Department of English Education at Bandung State University, especially in terms of grammar, sentence structure, and idea organization. Therefore, this research aims to explore further how Perplexity AI can be optimized to support students' learning and academic writing achievements. Several previous studies have shown results that align with these findings.