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Exploring the Role of Artificial Intelligence in Supporting Pre-Writing Skills and Academic Literacy: A Reflective Classroom Inquiry in an Islamic Educational Setting

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ABSTRACT
The integration of Artificial Intelligence (AI) into English language teaching and learning has transitioned from a mere innovation to an essential component of higher education. University students are increasingly utilizing AI-based applications to support them in various academic writing tasks, ranging from idea generation to language refinement. However, the application of AI tools during the EFL pre-writing stage remains underexplored. This descriptive qualitative research aims to investigate the types, functions, and purposes of the AI tools used during the pre-writing phase. Participants engaged in reflective writing, allowing them to articulate and assess their experiences with AI during this critical phase of academic writing. A thematic analysis was conducted, drawing from data provided by 50 undergraduate students at Antasari State Islamic University in Indonesia. The findings

revealed that the most frequently utilized tool was ChatGPT, followed by Perplexity AI and DeepL. The study indicates that students mainly utilize AI tools for generating ideas, sourcing references, constructing outlines, enhancing linguistic accuracy, translating text, and improving time management and academic compliance. While these practices demonstrate the practical advantages of AI integration, they also raise significant ethical concerns. In particular, the excessive dependence on AI may diminish cognitive involvement, potentially impeding the growth of their academic literacy. Therefore, the findings emphasize the necessity of maintaining equilibrium between AI-assisted strategies and conventional pedagogical methods in academic writing instruction.

Keywords: Academic Literacy, Academic Writing, AI Integration in Education, Artificial Intelligence, Pre-writing

INTRODUCTION

The emergence of Large Language Model (LLM) and Generative AI (GenAI) initially met with reluctance from researchers, particularly within the realm of academic writing instruction. Concerns have been raised regarding the potential negative effects these technologies may have on students' critical thinking, originality, and overall engagement in the learning process, particularly in the context of academic writing courses. It is imperative that the application of Artificial Intelligence (AI) be governed by ethical awareness and a sense of moral responsibility. It should serve as a supplementary tool rather than a substitute for human intellect and faith. Furthermore, its use should be firmly rooted in the principles of *tawhid*, the cultivation of noble character (*Al-Akhlaq Al-Karimah*), and the spiritual pursuit of knowledge as an act of devotion. Islamic scholars have issued warnings against the tendency toward "AI idolatry," which may erode academic honesty and may diminish the sacred nature of learning within Islamic educational contexts (Jusri Pohan & Nasution, 2025).

Despite the reservations expressed by some teachers, it has become increasingly evident that university students are integrating AI tools into their academic practices. University

students are increasingly incorporating Artificial Intelligence into their learning practices in various ways (Black & Tomlinson, 2025). Some AI applications support and enrich students' educational experiences, while others are primarily used as convenient shortcuts to complete assignments with minimal effort (Black & Tomlinson, 2025). These technologies have the potential to enhance students' learning experiences (Mouta et al., 2024). This development highlights the importance for educators and researchers to gain a thorough understanding of AI, including both its opportunities and associated risks, as well as how students interact with these tools. Such insights are essential for guiding students toward the responsible and meaningful use of AI technology, specifically in the realm of academic writing.

In the context of academic writing, the process-based approach is widely recognized as an effective method for teaching this productive skill. This pedagogical strategy focuses on assisting students as they progress through the various stages of writing. Murray (1972), a leading figure in the writing process approach, emphasized that students should not focus solely on the outcome during the writing process. Instead, writing teachers should guide learners through the stages of writing, integrating these stages into assignments. Murray believes that active engagement in the writing process facilitates learning. Additionally, Flower and Hayes (1981) introduced their cognitive process theory of writing, stating that the stages of writing are recursive and flexible. Initially, the writing process was identified as consisting of three stages: prewriting, writing, and rewriting (Murray, 1972). Recently, it has been categorized into six stages: planning (invention or pre-writing stage), drafting, revising, editing, reflecting, and publishing (L. Cummings, 2023). This highlights the importance of planning or pre-writing as the first step in the writing process.

From an Islamic perspective, the importance of planning, is underscored, as it is believed that success is unattainable without it (Fadli & Awaluddin, 2022). Planning is stated explicitly in the Holy Qur'an, particularly in Surah Al-Hashr verse 18, "O you who believe, fear Allah. And let every soul look to what it has put forth for

tomorrow-and fear Allah." This tenet is also applicable to the execution of writing tasks and assignments. To write good texts, it is important to have a pre-writing plan (Uludag et al., 2021). In addition, the pre-writing stage fosters both critical and reflective thinking, which aligns closely with the long-standing tradition of Islamic intellectual inquiry. Activities included in this stage, such as brainstorming, generating ideas, and examining multiple viewpoints, mirror the concept of *tadabbur* (deep contemplation) that the Qur'an frequently emphasizes. Furthermore, the pre-writing process necessitates the review of reading materials and collecting relevant information before drafting begins. This practice reflects the Islamic principle of pursuing knowledge, regarded as an act of worship. Hence, the pre-writing represents a crucial starting point in the writing process, encompassing tasks such as generating and structuring ideas prior to composition. Techniques such as brainstorming and outlining have been proven to enhance writing proficiency and improve both the organization and content of students' work (Hung & Van, 2018; Uludag et al., 2021). Consequently, planning or pre-writing is recognized as a vital phase of the writing process that significantly contributes to better writing outcomes.

This preparatory phase is essential for developing academic literacy, as it helps students structure their arguments and ideas effectively. Academic literacy refers to the knowledge, skills, and practices needed for effective academic writing. It includes critical thinking, argumentation, proper citation, synthesis, paraphrasing, and other relevant skills. It also involves cognitive engagement, comprehension, and the ability to create original knowledge and engage in academic discourse, including critical reading. Lea and Street (1998, 2006), who are leading figures in Academic Literacy, define academic literacy as students' ability to read, understand, organize, and produce academic texts effectively. Academic literacy is defined as the integration of reading, writing, and critical thinking skills necessary for university students' success (Moran Hayes & Williams, 2016). A broader interpretation characterizes academic literacy as a multifaceted concept

encompassing various skills and practices, including reading, writing, and oral discourse, which are essential for success within academic settings (Li, 2022). Over the past two decades, the conception of academic literacy has evolved beyond the traditional reading and writing skills to encompass advanced communication skills and critical thinking, as well as digital literacy and ICT literacy (Werdiningsih et al., 2025). The current research focuses on the pre-writing stage of the writing process, highlighting its significance in shaping academic literacy.

In recent years, there has been a notable increase in research concerning artificial intelligence in education, especially within the field of English Language Education (Mouta et al., 2024). A bibliometric analysis conducted by Guo et al. (2024) examined academic publications from 2013 to 2023 in reputable journals, providing an extensive overview of the development and major trends in Artificial Intelligence in Education over the past decade. One of the main findings revealed that language education emerged as the second most prominent trend, with English education being the central area of focus. This study suggests that artificial intelligence (AI) applications have been widely explored within the context of English as a Foreign Language (EFL) education, particularly in relation to writing as a fundamental skill. Nevertheless, the study did not explicitly address research concerning the use of AI during the "pre-writing" phase of the writing process. Instead, the review emphasized a more general examination on the integration of AI in EFL writing.

Despite the growing integration of artificial intelligence in EFL writing, existing research has primarily focused on its role in the overall writing process or the final written product (Alghasab, 2025; Barrett & Pack, 2023; Cummings et al., 2024; Söğüt, 2024; Syafei & Nuraeningsih, 2025; Wang & Ren, 2024). There remains a dearth of research investigating how students utilize AI tools during the planning stage of writing, especially in terms of how such tools may support or hinder their academic literacy development.

Numerous studies have been conducted regarding the use of AI or Generative AI in L2 or EFL writing, however, the majority

have primarily concentrated on the drafting, revising, and editing stages of the writing process, rather than addressing the pre-writing stage as a distinct venue for AI support. It is important to understand and interpret how AI tools are integrated into pre-writing context. Through reflective practices, students can articulate their perspectives on the utilization of AI during the pre-writing phase. Furthermore, there is a scarcity of research focusing on the specific types and functions of AI tools used, the purposes for their use during pre-writing, and how these practices contribute to the development of academic literacy. This reveals a significant gap in understanding students' practices and experiences at this stage of the writing process. To elaborate further, the relationship between AI-supported pre-writing activities and academic literacy remains insufficiently examined. Previous studies on pre-writing preparation have highlighted its vital contribution to improving writing quality (Hung & Van, 2018; Uludag et al., 2021), yet these findings have not been directly associated with AI integration. Likewise, although existing research indicates that AI tools enhance comprehension (Dinh, 2025; Hedlin et al., 2025; Moon et al., 2025; Polakova & Klimova, 2023; Risang Baskara & Mukarto, 2023; Silor & Silor, 2025; Syafei & Nuraeningsih, 2025), there remains a limited number of studies that explicitly connect these capabilities with the advancement of academic literacy during the pre-writing stage.

This study aims to bridge the identified research gap by investigating how university students utilize AI during the planning phase of their final projects. The research employs a descriptive qualitative approach, utilizing thematic analysis based on the framework of Braun and Clarke (2006, 2021). The pre-writing phase warrants particular focus because it is the stage in which students develop ideas, locate references, and organize arguments—processes that significantly affect the overall quality of their writing. Nevertheless, as previously discussed, most prior research on AI-supported academic writing has mainly focused on the drafting and revision stages, often overlooking the critical planning stage. By centering on this phase, the present study aims to reveal how the use of AI tools during pre-writing influences

students' idea formulation and literacy practices, thereby contributing to closing the gap identified in current literature. The research analyzes students' reflective writing to identify the types of AI tools used in the pre-writing stage and to describe the functions and rationales behind their usage. Furthermore, it examines how students' use of AI relates to the development of academic literacy. Thus, this qualitative study contributes to the field by offering insights for EFL writing instructors to design AI-aware writing process pedagogies and policies that promote responsible AI integration, particularly in the pre-writing stage of the writing process.

RESEARCH METHODS

The purpose of this research was to explore the types and functions of AI tools employed during the pre-writing phase of the academic writing process and to identify the specific purposes for which students used these tools. Participants were asked to reflect on their experiences with AI tools and provide transparent explanations regarding their integration of these tools into their pre-writing activities. To achieve these objectives, the researcher employed a qualitative descriptive research design to obtain an in-depth understanding of students' practices and perceptions related to AI use in the early stage of the writing process. A hallmark of qualitative research is its focus on investigating a central phenomenon to gain an in-depth understanding of a particular issue. This approach is effective for analyzing data through descriptive and thematic exploration, utilizing text analysis, and interpreting the broader significance of the findings (Creswell, 2014). According to Creswell, the purpose of the descriptive method is to find a detailed explanation and description of the research objects systematically. In this study, the objects of investigation were the types and functions of AI tools, as well as the purposes for using these tools in the pre-writing stage of the writing process. The researcher also examined how the students' use of AI in the pre-writing stage is connected to their academic literacy.

Research Participants

The participants in this study were undergraduate students enrolled in the Academic Writing course under the English Language Education Study Program at Antasari State Islamic University, Banjarmasin, Indonesia. All participants were in their fourth semester of study. The researcher applied a purposive sampling method, which is defined as "a qualitative sampling procedure in which researchers intentionally select individuals and sites to learn or understand the central phenomenon" (Creswell, 2014, p. 621). Of the 57 students enrolled in the course, a total of 50 students submitted complete written reflections that transparently disclosed the types of AI tools they used, the functions performed by each tool, and the students' purposes for utilizing AI in the pre-writing process. This relatively limited number of participants was selected to provide an in-depth, context-specific investigation of how students in an Islamic higher education setting use artificial intelligence during the pre-writing stage of their writing.

Antasari State Islamic University Banjarmasin, located in South Kalimantan, Indonesia, and is taken as the research site, is a well-known university not only in the capital city of South Kalimantan, Banjarmasin, but also in other regions in Kalimantan and other Indonesian provinces. Although the findings may not be directly generalizable to other institutions, disciplines, or cultural settings, they may offer valuable preliminary insights that can inform future comparative studies in broader contexts.

Data Collection Technique

To obtain data, the researcher utilized students' online written reflections by providing explicit reflection prompts that required participants to specify the AI tools they employed during the pre-writing stage, along with explanations of how and why they used these tools. The reflections collected were systematically categorized and coded according to the types of AI tools used, their specific functions, and the purposes underlying their use. The written reflection questions guided participants to reflect on and disclose their use of AI tools during the pre-writing stage. The students were required to provide an open-ended response.

Reflective writing is recognized as a valuable research technique for collecting qualitative data in educational contexts, for its role in promoting introspective and critical thinking, as well as to encourage research participants to inspect their attitudes, beliefs, and experiences (Jasper, 2005). Furthermore, evidence suggests that reflective writing serves as a significant research tool in the writing research (Isabelle, Vandette, & Valiquette-Tessier, 2017). Moreover, Machost and Stains (2023) described the benefits of applying reflective practices in education for students and educators. They posited that reflective practice is legitimized as an essential core tool to be used as qualitative data in educational research through written reflection for fostering critical thinking, metacognition, and learning. Furthermore, online structured reflective essays can be used to collect rich qualitative data systematically from participants (Grigorovicius, 2025). In addition, reflective writing was selected not only as a data source but also as a methodological innovation, providing insights into how students positioned AI tools in relation to their pre-writing strategies and academic literacy development.

Data Collection Procedure

The research was conducted in the context of the Academic Writing course that the researcher taught at the English Language Education Study Program of Antasari State Islamic University, Banjarmasin. The students were instructed to produce an argumentative, library-based research paper as the final project for the course. During the pre-writing phase, they were assigned two main tasks. The first task involved selecting a topic related to English language teaching and learning, followed by the creation of a preliminary outline. The second task in the pre-writing or planning phase required students to locate and collect references relevant to the chosen topic. In addition, the students were given a reflective assignment in which they reported and described their use of AI tools during this stage. Specifically, they were asked to identify the use of AI tools by addressing three key aspects: 1) the types of AI tools utilized, 2) the functions performed by each tool, and 3) the purposes for which these tools were employed.

Students submitted their assignments and the reflections electronically via Google Classroom. After submission, the researcher reviewed the reflections to assess task completeness. A total of 57 students submitted reflections. However, only 50 provided complete information regarding the types of AI used, the functions of the AI tools, and the purposes for using these tools in the pre-writing stage of the writing process. Reflections that contained complete information were included in the analysis, while incomplete responses were excluded. Seven students' writing reflections were not analyzed due to their lack of clarity in stating which AI tools they used to assist in the pre-writing stage, often responding in general terms. Surprisingly, one of the seven students explicitly claimed that he did not use AI in the pre-writing stage for this task.

Data Analysis

In analyzing the data, the researcher applied thematic analysis developed by Braun and Clarke (2006) and their Reflexive Thematic Analysis (Braun & Clarke, 2021). The process of conducting thematic analysis is recursive rather than linear (Braun & Clarke, 2006), meaning that the writer can revisit the various stages without following a strict sequence. Reflexive thematic analysis emphasizes the researcher's active role and engagement with the data. It is focused not only on summarizing the data, but also on achieving a deeper level of understanding and interpretation to form a coherent story. Students were required to explain the AI tools used, the functions, and the purposes of AI use. Thematic analysis has six phases: 1) familiarization with the data, 2) generating initial code, 3) searching for themes, 4) reviewing the themes, 5) defining and naming themes, and 6) producing the report (Braun & Clarke, 2006).

In addition to conducting a manual thematic analysis, the researcher employed artificial intelligence (AI), specifically ChatGPT, to support the analytical process and obtain deeper insights. As suggested by Christou (2024), ChatGPT can be integrated into each stage of thematic analysis to assist researchers, though it is not intended to substitute their role. Christou (2024, p.

569) outlined the procedures, potential benefits, and limitations associated with the incorporation of ChatGPT within the phases of thematic analysis. Similarly, Naeem et al. (2025) proposed a framework for applying generative AI, particularly ChatGPT, across the six stages of systematic thematic analysis as previously established by Naeem et al. (2023). In this study, the researcher used ChatGPT 5 and adhered to the analytical approaches suggested by both Christou (2024) and Naeem et al. (2025). ChatGPT 5 was primarily utilized for generating initial codes and identifying overarching themes, in accordance with the prompt structure proposed by Naeem et al. (2025, pp. 5–11).

Despite using ChatGPT as a tool in the thematic analysis process, particularly for identifying potential codes and themes, the researcher ensured that the AI-generated data did not introduce bias or overlook subtle themes by conducting a manual thematic analysis. The researcher maintained comprehensive control of the data analysis. The researcher carefully cross-checked all AI-generated suggestions against the raw data several times to ensure alignment with the participants' original language and context. Any codes or themes generated by the AI that were deemed inaccurate or redundant were subject to refinement or exclusion. Thus, Manual thematic analysis was conducted as an important part of the process after utilizing AI at every step to compare and ensure the accuracy of the analysis, particularly when selecting codes and themes, as well as calculating word frequency. For instance, there were instances where ChatGPT failed to identify the type of AI used by the student. However, through manual thematic analysis, the researcher identified two additional types of AI tools used by the students during the pre-writing stage. In another instance, ChatGPT suggested a specific code, "AI suggesting topic," as distinct from "brainstorming." From the researcher's point of view, it would be more appropriately categorized under the code of "AI brainstorming." Therefore, the final codes and themes emerged from the researcher's interpretive judgment, with AI utilized solely as a tool for enhancing efficiency and facilitating triangulation. Figure 1 illustrates the reflexive thematic analysis process.

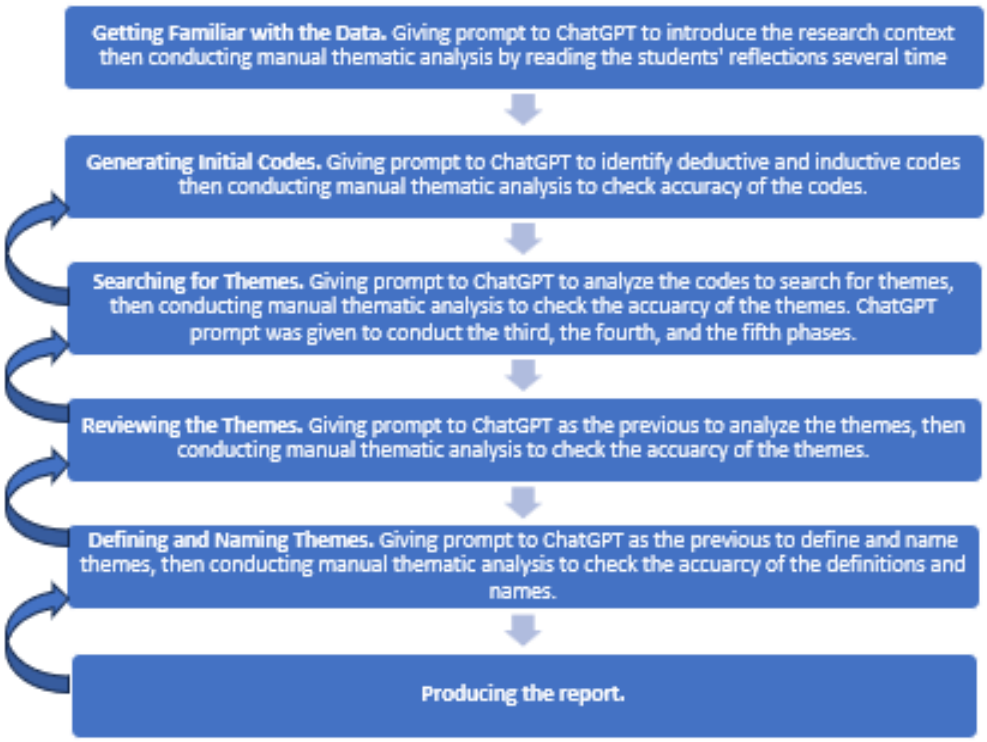

Figure 1. The Six-Phase Reflexive Thematic Analysis process

To clarify the process of integrating ChatGPT into the six stages of thematic analysis, the researcher engaged in a thorough examination of the students' written reflections, reading them multiple times while taking detailed notes about the key ideas that emerged from the data. The information gathered focused on the types of AI tools served during the pre-writing phase of academic writing and the purposes behind their use. When employing ChatGPT in this stage, it is essential to clearly present the research context. The prompt should specify the research questions, objectives, theoretical framework supporting the study, and the research method applied (Naeem et al., 2025).

In the second phase, which involves generating initial codes, the researcher highlighted specific sections of the written text and

developed the deductive and inductive codes. The deductive codes consist of structured codes that outline AI types, functions, and the purposes of using AI tools. Meanwhile, inductive codes emerged from reading the students' written reflections, addressing aspects such as whether AI assists or hinders students' academic literacy, as well as concerns related to time efficiency. When using ChatGPT, it is important to incorporate this information regarding deductive and inductive codes into the prompt. In the next phase, the researcher connected the codes and identified themes, primarily based on their frequency of occurrence. When a response appeared repeatedly, it was categorized as a theme. In other words, the researcher grouped similar codes into broader themes, such as "AI for Idea Generation" and "AI for Translation".

No	AI Type	Function	Purpose
S1	ChatGPT, Perplexity AI, DeepL	Translating (DeepL), generating an outline (ChatGPT), and searching references (Perplexity)	Understand texts, organize structure, and collect sources
S2	ChatGPT	Generating ideas, listing key points, structuring an outline, refining language, clarifying content, searching references, and checking task compliance	Brainstorm, organize content, improve clarity and readability in writing, ensure task compliance, and gather sources and deepen understanding of sources
S3	ChatGPT	Generating initial ideas	Brainstorm and gather ideas
S4	Perplexity AI, ChatGPT, Elicit AI	Searching relevant sources (Perplexity, Elicit AI), summarizing articles (ChatGPT)	Save time, find relevant sources, summarize literature
S5	ChatGPT	Suggesting topics, developing a detailed outline, organizing paragraphs, and finding references	Select an appropriate topic, organize the writing structure, and find relevant journal references
S6	Perplexity AI	Suggesting subheadings, creating an outline, synthesizing from several journals, finding references, and generating APA-style references	Brainstorm, organize structure, clarify ideas, find sources, and create APA references
S7	ChatGPT, DeepL	Suggesting ideas, refining arguments, and translating references	Brainstorm ideas, clarify foreign language sources, and develop arguments
S8	ChatGPT	Looking for references and checking the references	Access information easily and find journals

Figure 2. The Process of Manual Searching for Themes in the Third Phase

The fourth phase involves a review of the potential themes. This process includes examining the emerging themes in relation to the coded data. In the next phase, which focuses on defining and naming themes, the researcher clearly defined each theme to reflect students' practices and experiences. Given that the third, the fourth, and the fifth phases are interconnected to themes, the researcher

combined these themes into a single prompt when utilizing ChatGPT. Additionally, ChatGPT was instructed to apply the 4 Rs framework—Reciprocal, Recognizable, Responsive, and Resourceful, as proposed by Naeem et al. (2023). In the final phase, the researcher produces the report, elaborating on each theme and supporting it with quotes from students' descriptive reflections.

FINDINGS AND DISCUSSION

As previously mentioned, the researcher gathered data from undergraduate students' written reflections submitted online through Google Classroom and analyzed this data using thematic analysis supported by ChatGPT. The analysis focused on the kinds of AI tools utilized during the pre-writing phase of students' final projects, examining their respective functions and the reasons for their utilization. Table 1 below presents a summary of the findings, outlining the initial codes related to the types and functions of AI tools employed by the 50 undergraduate students, along with the purposes for which these tools were used, based on the students' descriptive reflections.

Table 1. Types, Functions, and Purposes of AI Tools

No	AI Type	Function	Purpose
S1	ChatGPT, Perplexity AI, DeepL	Translating (DeepL), generating an outline (ChatGPT), and searching references (Perplexity)	Understand texts, organize structure, and collect sources
S2	ChatGPT	Generating ideas, listing key points, structuring an outline, refining language, clarifying content, searching references, and checking task compliance	Brainstorm, organize content, improve clarity and readability in writing, ensure task compliance, and gather sources and deepen understanding of sources
S3	ChatGPT	Generating initial ideas	Brainstorm and gather ideas
S4	Perplexity AI, ChatGPT, Elicit AI	Searching relevant sources (Perplexity, Elicit AI), summarizing articles (ChatGPT)	Save time, find relevant sources, summarize literature

No	AI Type	Function	Purpose
S5	ChatGPT	Suggesting topics, developing a detailed outline, organizing paragraphs, and finding references	Select an appropriate topic, organize the writing structure, and find relevant journal references
S6	Perplexity AI	Suggesting subheadings, creating an outline, synthesizing from several journals, finding references, and generating APA-style references	Brainstorm, organize structure, clarify ideas, find sources, and create APA references
S7	ChatGPT, DeepL	Suggesting ideas, refining arguments, and translating references	Brainstorm ideas, clarify foreign language sources, and develop arguments
S8	ChatGPT	Looking for references and checking the references	Access information easily and find journals
S9	Character. AI, ChatGPT	Creating a basic outline (C.ai) and finding academic references (ChatGPT)	Understand the structure of the writing task and collect recent and reputable sources
S10	ChatGPT, Gemini, Aria AI, CoPilot	Generating topic options and searching relevant references	Brainstorm and gather topic ideas, and find relevant references
S11	ChatGPT	Suggesting points of an outline	Brainstorm the content of the outline
S12	Perplexity AI Connected Papers	Generating ideas, confirming keywords, and searching references	Help brainstorm and develop ideas, and select appropriate and relevant sources
S13	ChatGPT, Perplexity AI	Suggesting a research title, suggesting correct word choices, and finding references	Brainstorm topic, clarify wording, and gather relevant sources
S14	ChatGPT	Identifying common research titles	Select an appropriate research topic
S15	ChatGPT	Suggesting headings and subheadings for the written task, and correcting grammar	Brainstorm ideas and ensure correct grammar

No	AI Type	Function	Purpose
S16	ChatGPT, DeepL	Clarifying task instruction related to writing outlines, formatting APA referencing, and translating	Clarify the writing task instruction, format references, and translate texts
S17	ChatGPT	Searching references and assisting with vocabulary	Find supporting references and learn vocabulary
S18	ChatGPT	Translating texts, organizing an outline, and reviewing the outline's relevance	Translate, ensure consistency between the outline and the topic, and ensure content relevance
S19	ChatGPT	Suggesting the right keywords, finding sources, and summarizing articles	Help do research faster and more organized, gather relevant references, select suitable keywords, improve readability, and ensure clarity.
S20	ChatGPT	Suggesting topics and refining academic vocabulary	Brainstorm to choose a topic and improve academic language
S21	ChatGPT	Translating sources	Translate content between languages
S22	ChatGPT, DeepL	Suggesting research titles, refining the outline, translating, and searching references	Brainstorm research title, select a topic, translate texts, and find and check relevant references
S23	ChatGPT	Correcting word and sentence structure, clarifying the writing	Improve writing accuracy and clarity
S24	ChatGPT	Suggesting topics and correcting grammar	Brainstorm and fix the grammar
S25	ChatGPT, Connected Papers, and Semantic Scholar	Organizing content, creating an outline, finding relevant sources, and summarizing research methodologies	Organize the structure of the written task and find relevant sources
S26	ChatGPT	Refining topics, selecting key points, searching journals,	Clarify a topic and organize arguments

No	AI Type	Function	Purpose
		and checking the structure of the writing task	
S27	ChatGPT	Suggesting a title, making a basic outline, and selecting relevant journal sections	Brainstorm, generate a topic, structure writing, and select relevant parts
S28	Perplexity AI, Zendy AI, ChatGPT	Searching for journals and articles, and improving sentence structure	Find literature and clarify and improve writing
S29	ChatGPT	Suggesting and refining headings and subheadings, paraphrasing, and correcting grammar	Structure headings and subheadings, and clarify language
S30	ChatGPT	Searching and gathering references	Gather sources efficiently
S31	ChatGPT, Grammarly	Suggesting a topic, correcting grammar, suggesting keywords, and analyzing references	Brainstorm a topic, find sources, and correct grammar
S32	ChatGPT	Creating an outline and points from journals	Organize structure and check content relevance
S33	ChatGPT	Advising title and checking outline	Choose a topic and organize the writing structure
S34	ChatGPT	Suggesting synonyms and searching references	Refine keywords and gather sources
S35	ChatGPT, DeepL	Providing references, translating texts, and creating a bibliography	Assist in finding sources, clarify language, and format references
S36	ChatGPT	Suggesting ideas and topics, creating an outline, and structuring the writing project	Brainstorm ideas, select a topic, and organize the writing task
S37	Gemini, DeepL	Developing ideas and translating texts	Expand ideas and clarify language
S38	ChatGPT	Advising on topic suitability	Choose an appropriate topic
S39	ChatGPT, DeepL, Perplexity AI	Translating, clarifying the meaning of words and sentences, searching, and	Clarify language, find sources, improve the

No	AI Type	Function	Purpose
		compiling sources, and improving references	format of references, and shorten the time.
S40	ChatGPT, Blackbox AI	Generating ideas, searching references	Support idea generation and collect sources
S41	Gemini, ChatGPT	Suggesting ideas and searching references	Brainstorm, develop ideas, and gather sources
S42	ChatGPT	Advising on topics, creating an outline, explaining writing structures, and explaining references	Select a relevant topic, organize writing, understand the writing structure and outline, and understand references
S43	ChatGPT	Brainstorming, checking relevant content, and creating an outline	Generate ideas, select support points, and organize writing
S44	Perplexity AI, ChatGPT	Structuring the content, summarizing, and translating sources	Organize the content, summarize sources, clarify language, improve the selection of credible sources, and increase research efficiency
S45	ChatGPT, Gemini, Connected Papers	Searching references, clarifying sources, and explaining complex content	Simplify sources and clarify understanding
S46	ChatGPT, Perplexity AI, Claude AI DeepL	Brainstorming, summarizing, and explaining difficult content, searching sources, and translating	Generate ideas, summarize, save time, clarify understanding, find sources, and translate
S47	ChatGPT, DeepL	Searching references, creating an outline, expanding ideas, and translating texts	Collect sources, organize content, translate, and improve language
S48	Gemini, ChatGPT	Brainstorming and searching references	Develop ideas and gather academic sources
S49	Perplexity AI	Searching sources	Collect relevant sources

No	AI Type	Function	Purpose
S50	ChatGPT	Brainstorming topics, outlining key points, verifying, and formatting APA references	Select a research topic, organize writing, and validate sources

Based on Table 1, it is evident that students utilized a variety of AI tools during the pre-writing process. The most frequently used tool was ChatGPT, which was mentioned 46 times, followed by Perplexity AI, referenced 10 times. DeepL was frequently used for text translations, noted 9 times. Gemini AI was occasionally used by the students, with 5 mentioned mainly for brainstorming and developing ideas. Several other AI tools, such as Claude AI, Blackbox AI, Elicit AI, Zendy AI, and Character AI, were used by a few students and were mentioned once. Other AI platform, such as Connected Papers, was mentioned three times, while Semantic Scholars and Grammarly were mentioned once each. Table 2 below illustrates the frequency of AI tool usage during the pre-writing stage of the final project.

Table 2. AI Tools and the Frequency of Use

AI Tool	Frequency of Use
ChatGPT	Most dominant
Perplexity AI	Frequently used
DeepL	Frequently used for translation
Gemini AI	Used occasionally
Others	Used by a few students

The functions of AI tools refer to the specific activities or tasks these tools perform to support students during the pre-writing stage of their writing process. In summary, the AI tools employed by the students served various purposes, ranked from the most to the least frequently utilized: 1) generating and brainstorming ideas, 2) searching for references, 3) developing and organizing outlines or structure, 4) checking grammar, correcting errors, and refining language, 5) translating texts and references, 6) formatting citations according to APA style, 7) clarifying complex materials and explaining task instructions, and 8) summarizing

information and extracting key points. Table 3 provides an overview of the main functions of AI tools utilized by university students during the pre-writing stage, as revealed through thematic analysis.

Table 3. Functions of AI Use during Pre-writing

Function	Description
Brainstorming and Generating Ideas	AI tools were used to generate research topics and brainstorm ideas for students' argumentative research paper final project
Searching References	AI tools and platforms were used to locate academic journals, articles, and appropriate sources
Outlining and Structuring	AI tools were employed to help structure outlines, organize paragraphs, and generate headings and subheadings
Grammar Checking and Language Refinement	AI tools and platforms were employed to improve academic language, vocabulary, sentence structure, and grammar, as well rewrite content for coherence
Translation	AI tools like DeepL were utilized to translate English and non-English sources and clarify language
APA Referencing	AI tools were used to format references according to APA style
Explaining Complex Content/ Clarifying Tasks	AI tools were used to simplify sources and clarify task instructions
Summarizing Sources and Extracting Information	AI tools were employed to summarize long articles and extract relevant sections from the articles

The purpose of employing AI tools reflects the students' intentions or motivations for using AI during the pre-writing stage of their writing process. In summary, the reasons for utilizing AI tools at this stage, arranged from the most to the least frequent, are as follows: 1) to support idea generation and development, 2) to locate and collect references, 3) to plan and organize the structure of writing, 4) to refine and clarify language, 5) to enhance comprehension and understanding of references, 6) to manage time efficiently, 7) to improve academic vocabulary and overall language quality, and 8) to ensure the relevance and completeness of the task. Table 4 presents the various purposes for which the students

employed AI tools during the pre-writing stage as revealed by the thematic analysis.

Table 4. The Purposes of AI Use during Pre-writing

Purpose	Description
To Facilitate Idea Generation	AI assisted students in overcoming difficulties in starting the writing process
To Gather References	AI helped students easily find and use academic sources
To Organize Writing	AI supported logical organization of arguments, headings, and subheadings, and outlines
To Clarify and Refine Language	AI assisted students in improving clarity, correcting grammar, and paraphrasing for readability
To Enhance Comprehension and Understanding of References	AI helped students to clarify difficult materials, simplify complex content, and assist with translation
To Save Time	Many students used AI for the purpose of efficiency in summarizing and formatting
To Improve Academic Vocabulary and Language Quality	AI helped refine vocabulary and improve academic writing style
To Ensure Task Compliance and Relevance	AI helps students check if all task requirements are met and the content is on topic

The following table, Table 5, provides a summary of the functions and purposes of frequently used AI tools, with a special focus on ChatGPT, which is recognized as the most widely used tool in this category. As indicated in Table 5, the findings revealed that ChatGPT performed the widest range of functions and served multiple purposes, followed by Perplexity AI, DeepL, and Gemini. Grammarly was specifically noted for its role in grammar checking to enhance writing accuracy. Additionally, other AI tools and platforms, including Elicit AI, Connected Papers, Semantic Scholar, and Zendy AI, were reported to share a common function—assisting students in locating relevant academic sources and journal articles essential for their literature review. Moreover, several AI tools, including Claude AI, Aria AI, CoPilot, Blackbox AI, and Character AI,

were mentioned only once and served as supplementary tools that complemented the main AI applications. The subsequent sections will analyze and discuss the emerging themes. The thematic analysis of students' reflective writings uncovered eight major themes illustrating how AI tools were incorporated into the pre-writing stage of the final project in the academic writing course.

Table 5. The Functions and Purposes of AI Tools

AI Tool	Main Functions	Main Purposes
ChatGPT	Brainstorming and generating Ideas, Outlining and Structuring, Reference Searching and Gathering, Summarizing Content, Grammar Checking and Language Refinement, Translating, Formatting and Referencing, Clarifying Task Instructions, Ensuring Task Compliance, and Explaining Complex Content	To organize and structure writing, support idea generation and content development, facilitate in finding references and using academic sources, improve academic language and readability, aid in translating, ensure task fulfillment and relevance, and save time
Perplexity AI	Searching References and literature, Brainstorming and Generating Ideas, Generating APA references	To collect sources faster and help refine the research focus
DeepL	Translating Texts and References, Clarifying Foreign Language Content	To overcome language barriers and comprehend multilingual sources
Gemini	Brainstorming and Developing Ideas, Searching and Summarizing Academic Papers	To support the literature review
Connected Papers	Searching academic papers	To assist in the searching for references and literature review

Major Theme 1: Predominance of ChatGPT

One of the research objectives is to identify the AI tools used by students during the planning stage of their writing. The findings revealed that the students used a variety of AI tools, including Digital platforms such as ChatGPT, Grammarly, Perplexity, DeepL, and Gemini, to assist with various pre-writing activities. Notably,

ChatGPT emerged as the most dominant and frequently used AI tool. One student (S10) explicitly reported:

> *I used various AI, such as ChatGPT, Gemini, Aria, and CoPilot. But mostly I am using ChatGPT because the other AI does not help that much for the topic reference that I was looking for*." He further said: "*If I need more precise result, I use AI like ChatGPT. (S10)*

S10 highlighted that he mostly used ChatGPT for brainstorming and idea generation in the pre-writing phase, citing its convenience and precision.

This finding, which shows ChatGPT's status as the most frequently used AI tool compared to other, aligns with previous studies conducted by Stöhr et al. (2024), Baek et al. (2024), Morell-Manguel et al. (2025), and Waziana et al. (2024).

For instance, Stöhr et al. (2024) conducted a survey that involved 5894 students from Swedish universities. The first section of the survey assessed students' familiarity and usage frequency of ten AI chatbots, including ChatGPT, for educational purposes. Among those surveyed, ChatGPT was reported as the most frequently used AI, with 35.4% of students stating that they were familiar with it and used it regularly. However, the study does not explicitly confirm that ChatGPT is the most frequently used AI for pre-writing; rather, it highlights its general utility in generating text and assisting with language.

In another study, Baek et al. (2024) investigated the perceptions and utilization of ChatGPT among 1001 U.S college students through a mixed-methods approach. Most students reported using ChatGPT for general purposes, with approximately one-third (33.1%) indicating its use for writing on monthly basis. This suggests that students regard ChatGPT as a valuable resource for general tasks and writing activities. Moreover, non-native English speakers frequently leveraged ChatGPT for writing tasks to improve grammar and coherence. However, it is noteworthy that the study did not specifically state that ChatGPT was the most frequently used AI tool by students in the pre-writing stage.

Morell-Mengual et al. (2025) identified ChatGPT as the most frequently used tool among students, with a usage rate of 93.8%. Its application extended beyond writing and idea generation to encompass information retrieval (79.3%), information verification (30.3%), and assignment completion (11.4%). Specifically, 14% of its usage was allocated for essay writing, 34.5% to summarizing content, and 61.6% to generating ideas. This survey sought to ascertain whether students utilized AI chatbots for their academic studies and to identify the most frequently employed tool. However, it is important to note that the findings were based solely on survey responses rather than actual usage data.

Additionally, Waziana et al. (2024) conducted a study exploring the various types of Artificial Intelligence (AI) chatbots employed by students and analyzed their perceptions regarding the influence of these tools on vocabulary and grammar in EFL writing. Using a mixed-methods design, their research involved 100 undergraduate EFL students from five universities in Indonesia. The results indicated that ChatGPT was the most frequently used tool, utilized by 78 participants, followed by Gemini with 31 users, and Perplexity with 17 users.

In conclusion, the findings from this study, alongside previous research, indicate that ChatGPT is applied throughout all phases of the writing process.

Major Theme 2: AI as a Brainstorming Partner

The data obtained show that students used AI for brainstorming topic ideas and generating points to include in their outlines. Brainstorming is a valuable pre-writing activity in writing courses (Shirvani & Porkar, 2021). Han et al. (2024) asserted that ChatGPT provides information that is more concise and targeted than that obtained through any other search engines; therefore, it serves as a valuable brainstorming partner. In this era of artificial intelligence, EFL students are utilizing ChatGPT for brainstorming ideas (Han et al., 2023). One student (S2) reported, "*In completing this task, AI [ChatGPT] was used as a brainstorming partner to generate ideas and structure the outline. ChatGPT helped in listing*

key points related to the role of AI in enhancing speaking skills (the students' topic of final project)." Another student (S20) pointed out:

> *I use the AI tool which is ChatGPT to help me brainstorm about topic that I want to choose [for Final Project]. I type keywords like speaking, language acquisition, and education because I'm interested in those things. Then it offers many topics related, then I choose one that suits my needs*. (S20)

Another participant (S25) stated his use of ChatGPT. "*I use ChatGPT to help me sort the points,*" while a different student (S22) conveyed, "*I used AI ChatGPT to help me determine the title. I used the listing of what I wanted to research in this study*." These findings validate previous studies conducted by Han et al. (2023), Nugroho et al. (2023), and Abdul Sanny et al. (2025).

The research by Nugroho et al. (2023) which included 18 language students from two public universities in Indonesia, highlighted that ChatGPT can significantly enhance students' writing skills by generating ideas and outlines, as well as by correcting grammatical and syntactical errors. The findings of my research are also in line with the research conducted by Abdul Sanny et al. (2025), revealed that students primarily use ChatGPT to generate ideas and gather information. This research examined ChatGPT's perceived usefulness and ease of use by the students using a questionnaire, followed by a semi-structured interview. Among the findings, one aspect pertains to the utilization of ChatGPT in the pre-writing phase. Five themes emerged from the interviews with five participants: the search for information related to the research study topic or variable, the search for information related to the writing format, the summarization or simplification of information from various articles, the solicitation of suggestions from ChatGPT, and the confirmation or verification of ideas and responses. All five participants reported that they primarily used ChatGPT to search for information related to the topic and to gain new insights.

Another participant used another type of AI application to assist with brainstorming. S12 mentioned:

> *I use an application called Perplexity to help me develop ideas for my tasks. However, before using it, I usually brainstorm raw ideas in my mind. I use Perplexity similarly to how I would use Google. I simply type a few things into the search bar about topics I am unfamiliar with*. (S12)

This use of Perplexity AI in the pre-writing stage contributes to the broader discourse on the integration of Perplexity in teaching and learning EFL writing, as evidenced by the study conducted by Fitria (2024)

Major Theme 3: AI as a Research Assistant and Source Manager

Another finding shows that the function and purpose of using AI in the pre-writing stage is to assist in searching for relevant references. Several students (S6, S13, S16, S24, S26, S35, and S41) conveyed this function in their reflection as follows:

S6: *I also use it [perplexity AI] to find some references that I need for my topic, even though most of them I search on Google Scholar and other websites, and this AI helps me in formatting references using APA style*.

S13: *I used AI to help me with this assignment. I used AI to find references for what I was looking for. I also used it to create words that I had difficulty expressing, so I told it how I wanted the concept to be and then AI gave some title or theme suggestions*.

S16: *DeepL helped me with translation, and I used ChatGPT to find the correct way to write references according to APA 7th edition*.

S24: *ChatGPT assisted in verifying whether the articles found were relevant to my research title. It also helped in structuring the bibliographical references according to APA 7th edition*.

S26: *I also used ChatGPT to help me find specific journal articles related to different points in my topic outline. By providing the outline, I was able to get recommendations for relevant sources that matched each section of my research. Additionally, ChatGPT helped me structure and articulate the reasons why each source was relevant to my topic, ensuring that the connections were clear and well-explained*.

S35: *I used AI (ChatGPT) to assist in providing references, examples, and explanations.*

S41: In this assignment, I used ChatGPT to help me find references that are relevant to my topic. I asked ChatGPT to find me some journal references based on my topic and title. First, I validate all the sources that were given to me. The references I got were from Springer, Elsevier, Taylor and Francis, ERIC, and JSTOR. If I couldn't find the journal, I searched manually on Google by writing the title and the writer.

The students' reflections emphasize the function of AI as a research assistant that supports them in locating references during the early stage of writing. This finding aligns with the study conducted by Kim et al. (2024), which examined the various functions of AI, identifying its key roles as a "search engine" that assists students in locating relevant literature and compiling supporting sources and evidence.

Major Theme 4: AI as a Writing Organizer and Academic Style Checker

Another function of AI in the pre-writing stage was related to outlining and organizing the points of discussion in the writing. S36 explained, "*AI (ChatGPT) helps develop a clear and structured outline for my project. AI offers suggestion on how to organize the sections, ensuring each part of my project has a logical flow*." S42 further pointed out, "*I use ChatGPT to create an outline for my paper and I also look for explanations for my source pdf to make it easier for me to understand the material with the help of GPT chat."*

S29 further asserted the role of AI as the outline checker. She said:

> *I use ChatGPT AI to help me check whether the subheadings I created truly match the titles of each heading. The way I use it is, first, I come with my own subheadings based on keywords I have chosen. Then, I ask AI to paraphrase them into more complete subheadings*. (S29)

This finding was in line with Nugroho et al. (2023) and Xu & Jumaat (2024), which indicates that AI, particularly ChatGPT, enhances students' writing skills, especially in generating outlines.

Major Theme 5: AI as a Language Refiner

Another function and purpose of using AI in the pre-writing stage involves grammar checking and language refinement. This shows that students are very careful in their writing, even at the pre-writing stage. They use AI to check grammatical errors in their outlines. A number of students pointed out the use of ChatGPT: "*I also use ChatGPT to help make proper sentences with academic vocabulary*". (S20) Another participant remarked, "*I asked ChatGPT to correct the structure of my words and sentences to make it better and clearer*" (S23), "*I used ChatGPT to help me structure sentences to explain what I meant and to correct my grammar*". A different student (S32) mentioned the use of Grammarly. "*I also use Grammarly to correct my grammar mistakes and enhance my writing*."

The result is consistent with the studies conducted by Han et al. (2023), Nugroho et al. (2023), and Baek et al. (2024). According to Han et al., (2023) ChatGPT was employed to improve grammatical accuracy. Nugroho's research further demonstrated that ChatGPT significantly improved students' writing performance by identifying and correcting grammatical and syntactic errors. Participants reported using ChatGPT to address grammar issues and to propose alternative expressions. Similarly, Baek et al. (2024) found that non-native English learners frequently relied on ChatGPT for writing assignments to enhance grammatical precision and overall coherence.

Major Theme 6: AI as a Reading Comprehension and Critical Understanding Supporter

The findings show that another important function of AI was assisting students in translating and comprehending reference materials. The undergraduate students reported using ChatGPT, Gemini, and DeepL to help with translation, enabling them to understand the references they had gathered more easily. S2

pointed out, *"…I also use ChatGPT to help me understand some of the references it provides*". S35 explained, "*first I wrote my title in google scholar search. Then, choosing interesting one for my topic. After I got them, I downloaded and entered them to ChatGPT to be translated so that I could read and understand them well. "*

Other students, S7, S16, and S45, made the following remarks:

> *DeepL helped in understanding and translating some foreign language references to ensure the correctness of the translation, but of course, I still carefully double-checked each piece of information obtained.* (S7)

> *I used AI to help me with this assignment. I used AI to clarify and ask what I did not understand in this assignment, I also asked how to write a paper outline, while I also looked at the material in the PPT at the second meeting yesterday. I used AI only to help me understand something that I did not fully know, by looking at various references on how to write a paper outline.* (S16)

> *I used AI assistance, namely ChatGPT and Gemini AI, to understand difficult-to-understand contexts in articles I found on Google Scholar and Connected Papers...I also used ChatGPT and Gemini AI to explain the overall meaning in an easier-to-understand way*. (S45)

This finding—that students used AI to translate and comprehend references that they reviewed during their pre-writing stage—is consistent with prior research showing that students utilize AI and generative AI to improve reading outcomes and readability (Dinh, 2025; Hedlin et al., 2025; Moon et al., 2025; Polakova & Klimova, 2023; Risang Baskara & Mukarto, 2023; Silor & Silor, 2025; Syafei & Nuraeningsih, 2025). In their experimental research, Silor & Silor (2025), explored the effectiveness of AI tools in enhancing reading comprehension and found that they can effectively support comprehension development. They emphasize that reading comprehension involves understanding, interpreting,

and evaluating texts and that the use of AI tools can improve these skills.

When composing essays or research papers, students need to engage in both reading and critical thinking (Syafei & Nuraeningsih, 2025), especially in the pre-writing phase of the writing process. Research by Hedlin et al. (2025), Moon et al. (2025), and Risang Baskara and Mukarto (2023) examined the use of ChatGPT and its effectiveness in enhancing learners' reading comprehension abilities. Furthermore, previous studies have demonstrated that ChatGPT and DeepL are effective tools for improving translation quality (Dinh, 2025; Polakova & Klimova, 2023). Collectively, these findings indicate that AI tools serve as valuable supports for comprehension and critical interpretation, particularly when students encounter unfamiliar vocabulary or complex reading materials.

Major Theme 7: AI and Time Efficiency and Academic Compliance

Current research findings indicate that one notable purposes of using AI in the pre-writing stage is to enhance time efficiency. Participant S19 asserted that "*Using AI made my research faster and more organized*." Participant S44 asserted, "*AI helped speed up the research process by summarizing long texts, highlighting key findings, and ensuring that the selected references aligned with my topic. This allowed me to quickly determine which sources were the most relevant to my research*".

Participant S39 also claimed that he used AI mainly for that purpose. He noted that:

> *For AI, I really tried not to use it. The things I did with AI were mostly to translate and search for words or sentences that I did not understand when reading the articles above (references), and I used AI in compiling the "sources" format above to shorten the time.* (39)

This function was in line with research conducted by Ozfidan et al. (2024) which explored Saudi undergraduate students'

perceptions of using artificial intelligence tools in academic writing, highlighting "time-saving" as one of the AI's benefits.

Major Theme 8: AI and Academic Literacy

Academic literacy involves the integration of reading, writing, and critical thinking skills (Moran Hayes & Williams, 2016). It can also be perceived as a multifaceted concept, encompassing advanced communication skills and critical thinking, digital literacy, and information and communication technology (ICT) literacy (Werdiningsih et al., 2025).

An illustration of academic literacy is provided by participant S5, who indicated that prior to utilizing AI, she independently generated initial ideas and did not directly utilize AI. She explained:

> *I used AI in the process of choosing a topic for my final project. At first, I thought of some ideas on my own, then I discussed them with some of my classmates to get feedback. After that, I shared my ideas with ChatGPT and asked for suggestions. From the discussion with the AI, I received a recommendation for the topic" Exploring TikTok Challenges as a Tool for Enhancing Pronunciation Skills in English Learning"; which I then choose. To create the outline, I first studied the example outline in the PPT from the second meeting. I used it as a reference and inspiration for my final project's outline. Then, I used ChatGPT to help develop my ideas in a more detailed and structured way.* (S5)

S5 further used ChatGPT in the process of searching for references, and after she received some recommendations, she reviewed them. She stated:

> "*In this assignment, I used ChatGPT to help find journal references relevant to my topic about TikTok challenges for enhancing English pronunciation skills. After receiving the recommendations, I reviewed them to ensure they met the assignment criteria."*

Another student, S7, pointed out that after using AI for translation, she checks the accuracy of the translated content. S7 said, "*DeepL helped in understanding and translating some foreign language references to ensure the correctness of the translation, but of course, I still carefully double-checked each piece of information obtained*." S44 further described, "*Perplexity AI provided suggestions for many ideas and refining key points. However, the final selection of points was based on my own understanding and preferences*."

S12 has a similar attitude when utilizing AI. S2 explained:

> *In doing this task, first, I didn't immediately ask for help from AI, but I tried to do it by myself, with the first step using "Connected Papers" and "Google Scholar" in searching for my reference journal. This allowed me to identify the most relevant journals and ensured that I could effectively utilize the references for high-quality writing, previously, I searched and considered keywords that match my title and my outline in searching for the reference journal on Google Scholar. After I felt it was enough, then I came back to confirm the keywords by asking AI called Perplexity, and again, looking for the related reference journal. I believe that using AI is not a problem, especially when we actively engage our own thoughts alongside. AI serves as a valuable tool that can significantly simplify our work, if we use it wisely, not excessively, and according to the capacity*. (S12)

Critical thinking was demonstrated by S29, who articulated the following process:

> *After receiving the AI-generated results, I carefully review them to see if they align with my original ideas. If I find any parts that don't match my keywords or the focus of my research, I adjust them accordingly. After that, I manually paraphrase them again to ensure they fit my writing style and preferences. I did not use AI to brainstorm my research topic. The topic I chose came entirely from my own thoughts because I genuinely enjoy listening to podcasts. However, I used AI as a*

> *tool to improve and refine my subheadings, making sure they are clear and relevant.* (S29)

Additional excerpts that reflect academic literacy among students include the following:

> *I utilize ChatGPT to analyze all the references and request specific pages that are relevant to my writing. Only after this, do I read the references manually. If I find that the sources do not meet my expectations for my writing, I will redo the first step. I recognize that I rely on AI assistance quite heavily, and I am actively working to reduce my dependence on it.* (S31)

> *I use AI, namely ChatGPT, to consult about the title of the material, I told ChatGPT about my research and it gave some suggestions for titles that match my research. I also consulted about the outline, but it was not very helpful, so I made my own points and refined the words with the help of AI*. (S33)

> *I used ChatGPT to find relevant research topics, outline key points, and structure my arguments. However, I carefully reviewed its suggestions, adjusted them to fit my research goals, and ensured they aligned with existing studies. This research is not just the result of AI assistance but also my own critical thinking, analysis, and understanding of the topic.* (S24)

Based on this explanation, it is evident that scholars and educators should not preclude the inclusion of AI in academic writing classes. Rather, it is essential to introduce AI literacy to pre-service teachers so they can use AI wisely (Arifah Drajati et al., 2023)

The data revealed important emergent insights regarding the potential benefits and limitations of AI use in academic literacy development. This is evident from the students' descriptions of the functions and purposes of AI during the pre-writing stage. Some students reflected on how AI facilitated or hindered their academic literacy development. Several students reported that AI tools

enhanced their comprehension of content, organized their ideas, and improved language accuracy. These findings contribute to a more comprehensive understanding of the role of AI in the pre-writing process. Many students expressed that AI tools supported their academic literacy by helping with idea generation, organization, and comprehension. However, concerns were also raised regarding overreliance, reduced personal engagement, and a superficial understanding of texts.

Several ethical concerns arise, including overdependence on AI, the potential risk of plagiarism, diminished cognitive engagement, and issues pertaining to fairness in maintaining academic integrity. Although not explicitly questioned, many students indirectly discussed how AI either supported or limited their academic literacy growth. Some students expressed that AI assisted them in comprehending material, structuring their ideas, and enhancing linguistic accuracy. However, a few voiced concerns about excessive reliance on AI leading to superficial understanding. Others indicated that they felt more confident when utilizing AI as a learning aid rather than as a writing generator.

Despite the advantages of using AI in academic writing, there are also potential drawbacks associated with these tools. These include the risk of overreliance, reduced critical thinking and cognitive engagement, ethical concerns, violations of academic integrity, and challenges related to originality. Aljuaid (2024) in her systematic literature review, which examined whether AI tools are replacing university academic courses, she concluded that AI tools are best viewed as supplementary aids rather than replacements for academic writing courses. According to Aljuaid, while these AI tools can support basic tasks such as grammar checking and summarization, they cannot foster the higher-order skills —critical thinking and argumentation — that academic writing develops. She advocates for a balanced integration of AI with traditional pedagogical approaches as the most effective means to enhance students' higher-order skills.

CONCLUSION

This research examines how undergraduate students use artificial intelligence (AI) tools during the pre-writing stage of academic writing. Data were collected through students' reflective writing on their use of AI. The findings reveal that students employed various AI tools, mostly ChatGPT, for multiple functions, including brainstorming, outlining, searching for references, summarizing sources, translating content, and checking language accuracy. AI was found to aid in idea generation, organizing writing, enhancing comprehension, improving language accuracy, and saving time on assignments. The study also discusses the connection between AI use and academic literacy.

Although AI is beneficial during the pre-writing phase, users need to apply it responsibly to avoid overreliance, which could hinder their academic literacy. Educators should incorporate AI literacy into writing instruction, emphasizing critical thinking and ethical academic principles. A balance between AI-assisted learning and conventional writing approaches is essential for nurturing students' academic literacy.

Based on the findings, writing instructors should consider the following steps to balance AI integration with traditional writing instruction during the pre-writing process. First, encourage students to use AI tools for brainstorming, research outlining, grammar checking, and translating and comprehending texts, while still requiring independent revision, reflection, and critical thinking. Second, incorporate AI literacy training into writing courses to guide students on ethical use and disclosure of AI assistance. Third, design tasks require students to compare AI-generated outputs with their own writing. Finally, maintain traditional writing activities, such as brainstorming exercises, manual outlining, and close and annotated reading of sources, to ensure students develop their literacy and reasoning skills alongside AI tools.

This study has limitations, including a small sample size from a single institutional setting. Future research should encompass diverse educational contexts and explore the impact of AI on academic literacy throughout the writing process.

Additionally, there may be underreporting of AI usage due to reliance on self-reported data. Despite this limitation, the research provides valuable insights for enhancing academic writing instruction in the era of AI.

This study also highlights the ethical challenges of integrating AI into academic writing instruction. While AI tools can support various aspects of writing, overreliance may limit students' opportunities to develop critical thinking and deeper literacy skills. To address this issue, the study emphasizes the importance of responsible AI use, where students are guided to treat AI as a supportive aid rather than a substitute for human reasoning and creativity. Writing instructors can foster AI literacy by teaching students to critically evaluate AI outputs and maintain traditional writing practices, thereby enhancing the development of students' critical thinking and academic literacy.

REFERENCES

Alghasab, M. B. (2025). English as a foreign language (EFL) secondary school students' use of artificial intelligence (AI) tools for developing writing skills: Unveiling practices and perceptions. *Cogent Education*, *12*(1). https://doi.org/10.1080/2331186X.2025.2505304

Aljuaid, H. (2024). The impact of artificial intelligence tools on academic writing instruction in higher education: A systematic review. *Arab World English Journal*, *1*(1), 26–55. https://doi.org/10.24093/awej/chatgpt.

Baek, C., Tate, T., & Warschauer, M. (2024). "ChatGPT seems too good to be true": College students' use and perceptions of generative AI. *Computers and Education: Artificial Intelligence*, *7*. https://doi.org/10.1016/j.caeai.2024.100294

Barrett, A., & Pack, A. (2023). Not quite eye to A.I.: student and teacher perspectives on the use of generative artificial intelligence in the writing process. *International Journal of Educational Technology in Higher Education*, *20*(1). https://doi.org/10.1186/s41239-023-00427-0

Baskara, R., & Mukarto, M. (2023). Exploring the implications of ChatGPT for language learning in higher education. *Indonesian Journal of English Language Teaching and Applied Linguistics*, *7*(2), 343–358. https://ijeltal.org/index.php/ijeltal/article/view/1387

Black, R. W., & Tomlinson, B. (2025). University students describe how they adopt AI for writing and research in a general education course. *Scientific Reports*, *15*(1). https://doi.org/10.1038/s41598-025-92937-2

Boutet, I., Marie-Pier, V., & Valiquette-Tessier, S.-C. (2017). Evaluating the implementation and effectiveness of reflection writing. *The Canadian Journal for the Scholarship of Teaching and Learning*, *8(1)*. http://ir.lib.uwo.ca/cjsotl_rcaceahttp://ir.lib.uwo.ca/cjsotl_rcacea/vol8/iss1/8

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, *3*(2), 77–101. https://doi.org/10.1191/1478088706qp063oa

Braun, V., & Clarke, V. (2021). One size fits all? What counts as quality practice in (reflexive) thematic analysis? *Qualitative Research in Psychology*, *18*(3), 328–352. https://doi.org/10.1080/14780887.2020.1769238

Christou, P. A. (2024). Thematic analysis through artificial intelligence (AI). *Qualitative Report*, *29*(2), 560–576. https://doi.org/10.46743/2160-3715/2024.7046

Creswell, J. W. (2014). *Educational Research: Planning, Conducting, And Evaluating Quantitative and Qualitative Research*. Pearson.

Cummings, L. (2023). Writing processes in the digital age: A networked interpretation. In O. Kruse *et.al*. (Eds). *Digital Writing Technologies in Higher Education: Theory, Research, and Practice* (pp. 485–497). Springer International Publishing. https://doi.org/10.1007/978-3-031-36033-6_30

Cummings, R. E., Monroe, S. M., & Watkins, M. (2024). Generative AI in first-year writing: An early analysis of affordances, limitations, and a framework for the future. *Computers and*

Composition, *71*. https://doi.org/10.1016/j.compcom.2024.102827

Dinh, C. T. (2025). EFL students' perspectives on ChatGPT in translation: Exploring AI assistance, motivation, and learning outcomes. *Electronic Journal of E-Learning*, *23*(2), 99–116. https://doi.org/10.34190/ejel.23.2.4006

Drajati, N. A., Rochsantiningsih, D., & Wijaya, S. A. (2023). Intertextuality in pre-service teachers' argumentative essay in raising AI: Practices and beliefs. *REGISTER JOURNAL*, *16*(2), 186–206. https://doi.org/10.18326/register.v16i2.186-206

Fadli, A., & Awaluddin, A. (2022). Planning in the perspective of Islamic education management (Study of the Qur'an surah Al-Hasyr [59] verse 18). *AL QUDS: Jurnal Studi Alquran Dan Hadis*, *6*(3). https://doi.org/10.29240/alquds.v6i3.4133

Fitria, T. N. (2024). Using chatbot-based artificial intelligence (AI) for writing an English essay: The ability of ChatGPT, perplexity AI, and chatsonic. *Journal of Language Intelligence and Culture*, *6*(2), 103–128. https://doi.org/10.35719/jlic.v6i2.139

Flower, L., & Hayes, J. R. (1981). A cognitive process theory of writing. *College Composition & Communication*, *32*(4), 365–387. https://api.semanticscholar.org/CorpusID:18484126

Grigorovicius, M. (2025). Online reflective essays: A guide for qualitative researchers. *International Journal of Qualitative Methods*, *24*. https://doi.org/10.1177/16094069251321256

Guo, S., Zheng, Y., & Zhai, X. (2024). Artificial intelligence in education research during 2013–2023: A review based on bibliometric analysis. *Education and Information Technologies*, *29*(13), 16387–16409. https://doi.org/10.1007/s10639-024-12491-8

Han, J., Qiu, W., & Lichtfouse, E. (2024). ChatGPT In Scientific Research and Writing: A Beginner's Guide. Springer Nature Switzerland. https://doi.org/10.1007/978-3-031-66940-8_1

Han, J., Yoo, H., Kim, Y., Myung, J., Kim, M., Lim, H., Kim, J., Lee, T. Y., Hong, H., Ahn, S. Y., & Oh, A. (2023). RECIPE: How to integrate ChatGPT into EFL writing education. *L@S 2023 - Proceedings of*

the 10th ACM Conference on Learning @ Scale, Denmark, 416–420. https://doi.org/10.1145/3573051.3596200

Hedlin, E., Estling, L., Wong, J., Epp, C. D., & Viberg, O. (2025). Got it! prompting readability Using ChatGPT to enhance academic texts for diverse Learning Needs. *LAK '25: Proceedings of the 15th International Learning Analytics and Knowledge Conference on*, Ireland, 115–125. https://doi.org/10.1145/3706468.3706483

Hung, B. P., & Van, L. T. (2018). Depicting and outlining as pre-writing strategies: Experimental results and learners' opinions. *International Journal of Instruction*, *11*(2), 451–464. https://doi.org/10.12973/iji.2018.11231a

Jasper, M. A. (2005). Using reflective writing within research. *Journal of Research in Nursing*, *10*(3), 247–260. https://doi.org/10.1177/174498710501000303

Jusri Pohan, A., & Nasution, S. (2025). Artificial intelligence is not God: Between academic ethics and the worship of AI in academic publications at Islamic universities. *Al-Hikmah: Jurnal Agama Dan Ilmu Pengetahuan*, *22*(2), 333–348. https://doi.org/10.25299/ajaip.2025.vol22(2).21415

Kim, J., Yu, S., Detrick, R., & Li, N. (2024). Exploring students' perspectives on Generative AI-assisted academic writing. In *Education and Information Technologies*. https://doi.org/10.1007/s10639-024-12878-7

Lea, M. R., & Street, B. V. (1998). Student writing in higher education: An academic literacies approach. *Studies in Higher Education*, *23*(2), 157–172. https://doi.org/10.1080/03075079812331380364

Lea, M. R., & Street, B. V. (2006). The "academic literacies" model: Theory and applications. *Theory into Practice. 45*(4), 368–377. https://doi.org/10.1207/s15430421tip4504_11

Li, D. (2022). A review of academic literacy research development: from 2002 to 2019. *Asian-Pacific Journal of Second and Foreign Language Education*, *7*(1). https://doi.org/10.1186/s40862-022-00130-z

Machost, H., & Stains, M. (2023). Reflective practices in education: A primer for practitioners. *CBE Life Sciences Education*, *22*(2). https://doi.org/10.1187/cbe.22-07-0148

Moon, H., Chung, Y., & Randolph, A. W. (2025). Teaching and learning languages with ChatGPT: Challenges and opportunities in multilingual classrooms in higher education. *Indonesian Journal of English Language Teaching and Applied Linguistics*, *10*(1), 207–223. http://dx.doi.org/10.210

Moran Hayes, S., & Williams, J. L. (2016). ACLT 052: Academic literacy—An integrated, accelerated model for developmental reading and writing. *Nade Digest*, *9*(1), 13–22. https://files.eric.ed.gov/fulltext/EJ1097459.pdf

Morell-Mengual, V., Fernández-García, O., Berenguer, C., Ortega-Barón, J., Gil-Llario, M. D., & Estruch-García, V. (2025). Characteristics, motivations, and attitudes of students using ChatGPT and other language model-based chatbots in higher education. *Education and Information Technologies*. https://doi.org/10.1007/s10639-025-13650-1

Mouta, A., Pinto-Llorente, A. M., & Torrecilla-Sánchez, E. M. (2024). Uncovering blind spots in education ethics: Insights from a systematic literature review on artificial intelligence in education. *International Journal of Artificial Intelligence in Education*, *34*(3), 1166–1205. https://doi.org/10.1007/s40593-023-00384-9

Murray, D. M. (2003). Teach writing as a process not product. In V. Villanueva (Ed.). *Cross-Talk in Comp Theory*, 3-6. https://people.wou.edu/~waitej/crosstalk.pdf

Naeem, M., Ozuem, W., Howell, K., & Ranfagni, S. (2023). A step-by-step process of thematic analysis to develop a conceptual model in qualitative research. *International Journal of Qualitative Methods*, *22*. https://doi.org/10.1177/16094069231205789

Naeem, M., Smith, T., & Thomas, L. (2025). Thematic analysis and artificial intelligence: A step-by-step process for using ChatGPT

in thematic analysis. *International Journal of Qualitative Methods*, *24*. https://doi.org/10.1177/16094069251333886

Nugroho, A., Pancoro, H., Putro, S., & Syamsi, K. (2023). The potentials of ChatGPT for language learning: Unpacking its benefits and limitations. *REGISTER JOURNAL*, *16*(02), 224–247. https://doi.org/10.18326/rgt.v16i2.224-247

Ozfidan, B., El-Dakhs, D. A. S., & Alsalim, L. A. (2024). The use of AI tools in English academic writing by Saudi undergraduates. *Contemporary Educational Technology*, *16*(4). https://doi.org/10.30935/cedtech/15013

Polakova, P., & Klimova, B. (2023). Using DeepL translator in learning English as an applied foreign language – An empirical pilot study. *Heliyon*, *9*(8). https://doi.org/10.1016/j.heliyon.2023.e18595

Sanny, R. A., Na, K.S., & Kew, S. (2025). TESL pre-service teachers' perceptions on the use of ChatGPT in final year project writing. *Arab World English Journal (AWEJ) Special Issue on CALL (11*), 327-341. https://dx.doi.org/10.24093/awej/call11.20

Shirvani, M., & Porkar, R. (2021). How do EFL students perceive brainstorming in L2 writing classes? *Theory and Practice in Language Studies*, *11*(12), 1602–1609. https://doi.org/10.17507/tpls.1112.12

Silor, A. C., & Silor, F. S. C. (2025). Boosting reading comprehension through AI-based learning tools. *International Journal of Learning, Teaching and Educational Research*, *24*(9), 61–79. https://doi.org/10.26803/ijlter.24.9.4

Söğüt, S. (2024). Generative artificial intelligence in EFL writing: A pedagogical stance of pre-service teachers and teacher trainers. *Focus on ELT Journal*, 58–73. https://doi.org/10.14744/felt.6.1.5

Stöhr, C., Ou, A. W., & Malmström, H. (2024). Perceptions and usage of AI chatbots among students in higher education across genders, academic levels, and fields of study. *Computers and Education: Artificial Intelligence*, *7*. https://doi.org/10.1016/j.caeai.2024.100259

Syafei, M., & Nuraeningsih. (2025). Leveraging artificial intelligence in writing: ELT students' perspectives and experiences. *International Journal of Learning, Teaching and Educational Research*, *24*(5), 416–430. https://doi.org/10.26803/ijlter.24.5.22

Uludag, P., Mcdonough, K., & Payant, C. (2021). *Does prewriting planning positively impact English L2 students' integrated writing performance?* https://doi.org/https://doi.org/10.37213/cjal.2021.31313

Wang, L., & Ren, B. (2024). Enhancing academic writing in a linguistics course with generative AI: An empirical study in a higher education institution in Hong Kong. *Education Sciences*, *14*(12). https://doi.org/10.3390/educsci14121329

Waziana, W., Andewi, W., Hastomo, T., & Hasbi, M. (2024). Students' perceptions of the impact of AI chatbots on vocabulary and grammar in EFL writing. *REGISTER JOURNAL*, *17*(02), 352–382. https://doi.org/10.18326/rgt.v17i2.352-382

Werdiningsih, I., Nurhadi, K., Widiati, U., & Muniroh, S. (2025). Integrating academic literacy into contemporary learning: What we learned from an Indonesian EFL classroom. *Issues in Educational Research*, *35*(1), 380–394. https://doi.org/10.3316/informit.T20250508000042901789 78228

Xu, T., & Jumaat, N. F. (2024). ChatGPT-empowered writing strategies in EFL students' academic writing: Calibre, challenges, and chances. *International Journal of Interactive Mobile Technologies*, *18*(15), 95–114. https://doi.org/10.3991/ijim.v18i15.49219