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EFL STUDENTS' PERCEPTIONS AND PRACTICES OF USING GEMINI FOR DEVELOPING ENGLISH ARGUMENTATIVE ESSAY WRITING SKILLS

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Abstract:
As artificial intelligence increasingly shapes education, its impact on language learning has become a critical area of study. This research examines English-major students' perceptions and practices using Google Gemini to support argumentative essay writing in an EFL context. Eight dimensions of writing development were investigated: vocabulary, grammar, idea generation, organization, transitions, writing style, plagiarism management, and mechanics. A 92-item questionnaire assessed students' perceptions and practices, supplemented by semi-structured interviews with 10 participants. One hundred students who completed the Reading–Writing B2.2 course took part. Findings show that students generally view Gemini as a valuable writing aid. However, perceived usefulness did not always translate into frequent use, and engagement varied across groups despite stable perceptions. The study highlights both the potential and limitations of AI-assisted writing instruction and offers practical implications for educators aiming to integrate AI responsibly and effectively to enhance academic writing skills.

Keywords: Google Gemini, argumentative writing, EFL students, perceptions, practices, artificial intelligence

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1. Introduction

1.1. Background of the Study

Recent advancements in Artificial Intelligence (AI) have strongly influenced English language learning, especially academic writing. With the emergence of large language models such as Google Gemini (hereafter *Gemini*), EFL learners now have access to immediate linguistic support, automated feedback, and multimodal explanations across different stages of the writing process. Previous studies show that AI tools can enhance learners' vocabulary, grammatical accuracy, text organization, and overall clarity (Gayed *et al.*, 2022; Guo *et al.*, 2022). As a result, generative AI has become an integral part of how students approach writing tasks.

Argumentative essay writing is a core element of university writing curricula, requiring coherent ideas, logical argumentation, cohesive structure, and appropriate academic style. However, many EFL learners still struggle with idea generation, organization, lexical precision, plagiarism management, and writing fluency (Ariyanti, 2016; Dang *et al.*, 2020; Zhu, 2001), leading to essays that often lack clarity and persuasiveness. To address these challenges, learners increasingly rely on AI writing assistants. Among these tools, Gemini has gained attention for its advanced multimodal features and detailed, context-based suggestions that support writing development (Google DeepMind, 2023; Hasanein *et al.*, 2024).

In the Writing B2.2 course at the School of Foreign Languages, Can Tho University (CTU), Vietnam, students are required to produce multiple argumentative essays that demand both linguistic competence and critical thinking. As Gemini becomes more widely used, students have incorporated it into their writing processes for various purposes. This study examines eight key aspects of writing development: vocabulary, grammar, idea generation, organization, translation, writing style, plagiarism management, and writing mechanisms—areas identified as common challenges in previous research.

Despite growing use of AI tools among Vietnamese university students, limited empirical research has explored how English majors perceive and use Gemini for argumentative essay writing. To address this gap, a 92-item questionnaire was designed to investigate students' perceptions and self-reported practices. The study involved 100 students enrolled in the Writing B2.2 course across Cohorts 47, 49, and 50. The findings aim to provide insights into how generative AI can be integrated into writing instruction and how it supports students' writing development.

1.2. Research Aims

The study aims to investigate English-major students' perceptions and practices of using Google Gemini to develop their argumentative essay writing skills. Specifically, it examines how students evaluate the usefulness of Gemini across the eight aspects of writing development and identifies the benefits and challenges they experience during their use of the tool.

1.3. Research Questions

The study was conducted to answer the following questions:

1) What are EFL students' perceptions of using Google Gemini in developing their English argumentative essay writing skills across key writing components?
2) What benefits and challenges do students experience when using Google Gemini to support their argumentative essay writing in the Writing B2.2 course?

1.4. Significance of the Study

The findings of this study are expected to deepen understanding of AI-assisted writing in the Vietnamese EFL context. Theoretically, the study contributes to existing literature by offering empirical evidence on students' perceptions and practices regarding the use of Google Gemini, an AI tool that has received less scholarly attention than platforms such as ChatGPT. Practically, the results may help students develop more effective and responsible strategies for using AI in writing. Teachers can benefit from insights into how AI may be integrated into instruction while maintaining academic integrity, and curriculum designers may incorporate AI literacy into writing courses to better prepare students for future academic and professional demands. The study also identifies potential challenges, including overreliance on AI, inaccurate suggestions, and ethical concerns.

1.5. Scope of the Study

The scope of this study is limited to English-major students at the School of Foreign Languages, Can Tho University, Vietnam. Although respondents could indicate their cohort (e.g., Cohorts 49, 50, and 47), the target sample consisted of 100 students enrolled in the Writing B2.2 course at the time of data collection. The questionnaire also asked which writing courses students had completed—Writing B1, Writing B2.1, Writing B2.2, Writing C1.1, Writing C1.2, or Writing Scientific Research—to provide background information, though these demographic items were not used for comparative analysis.

The study examines students' perceptions and practices in using Google Gemini to support argumentative essay writing across eight aspects: vocabulary, grammar, idea generation, organization, translation, writing style, plagiarism management, and writing mechanisms. It does not assess the quality of students' written products or compare Gemini with other AI tools; rather, the analysis relies solely on self-reported data from a 92-item questionnaire.

2. Literature Review

2.1. Theoretical Framework of English Argumentative Essay Writing

2.1.1. Essence and Purpose of an Essay

Essay writing is a central practice in academic contexts, serving both communicative and evaluative purposes. Essays allow students to present ideas, demonstrate critical thinking, and engage in structured argumentation (Ariyanti, 2016; Campbell & Filimon,

2018). In EFL contexts, learners must translate L1 knowledge into English while maintaining clarity and coherence, which demands cognitive and linguistic skills (Dang *et al.*, 2020; Zhu, 2001). Essays not only reflect intellectual growth but also develop essential academic writing skills, including idea organization, evidence evaluation, and rhetorical awareness. By writing essays, students learn to structure arguments logically, express perspectives persuasively, and engage critically with source materials. Consequently, essay writing functions as both a learning process and an assessment tool, fostering autonomy, analytical thinking, and the ability to communicate complex ideas in English. These purposes highlight its role as a foundational skill in higher education.

2.1.1.1. The Communicative Purpose of Essay Writing

The communicative function of essays emphasizes expressing ideas clearly, engaging readers, and presenting coherent arguments (Campbell & Filimon, 2018). In argumentative writing, learners must articulate claims, justify reasoning, and integrate evidence persuasively, all while adhering to academic English conventions (Ariyanti, 2016). For EFL learners, the challenge lies in converting L1 ideas into grammatically correct and stylistically appropriate English, which requires lexical precision and rhetorical understanding. Essays also function as a dialogue with readers and evaluators, allowing writers to negotiate meaning and convey perspective effectively. Beyond conveying content, communicative proficiency in essays fosters critical thinking, argument evaluation, and audience awareness, which are essential for academic success. By mastering this purpose, learners develop skills not only for assessment but also for broader academic and professional communication, making essays a multidimensional tool for language and cognitive development.

2.1.1.2. The Cognitive Demands of Essay Writing

Essay writing is a cognitively demanding activity, requiring simultaneous engagement of linguistic, cognitive, and metacognitive skills (Zhu, 2001; Ferretti *et al.*, 2009). Writers plan ideas, organize evidence, draft, revise, and edit, all while ensuring clarity and logical flow. Argumentative essays, in particular, demand critical thinking, the ability to evaluate counterarguments, and coherent reasoning to support claims (Dang *et al.*, 2020). For EFL learners, limited vocabulary, grammatical accuracy, and experience with critical reasoning often present barriers. Metacognitive skills, such as self-monitoring and reflection, are crucial for producing high-quality essays. Instructional scaffolding and guided practice can help learners internalize these processes. Thus, essay writing not only develops linguistic ability but also enhances cognitive capacities for analysis, synthesis, and evaluation, emphasizing its dual role as both language practice and intellectual development.

2.1.1.3. Essay Writing as an Academic Assessment and Skill Development Tool

Essays serve as both a measure of academic competence and a vehicle for skill development (Campbell & Filimon, 2018). Through essays, instructors can evaluate

comprehension, critical thinking, argument construction, and writing proficiency. Regular writing practice strengthens vocabulary, grammatical accuracy, and paragraph organization (Ariyanti, 2016). Argumentative essays specifically enhance the ability to construct evidence-based claims, consider alternative perspectives, and synthesize information from multiple sources (Dang *et al.*, 2020). In EFL contexts, essays also provide a means to internalize academic English norms and rhetorical conventions. By combining assessment with formative skill-building, essays enable learners to identify weaknesses, monitor progress, and refine strategies for effective communication. This dual function underscores the importance of integrating writing practice systematically into curricula, especially for students aiming to develop critical thinking and persuasive writing skills essential for academic and professional contexts.

2.1.2. Fundamentals of Essay Writing

Mastering essay writing requires understanding core principles such as coherence, cohesion, linguistic accuracy, recursive writing processes, and paragraph development (Ariyanti & Fitriana, 2017; Zhu, 2001). Coherence ensures logical argument flow, while cohesion links ideas using appropriate linguistic markers. Accuracy in grammar, vocabulary, and sentence construction enhances clarity, while paragraph structure maintains focus on central ideas. Recursive processes, including planning, drafting, revising, and editing, enable refinement and improvement. Many EFL learners struggle with these fundamentals due to differences between L1 and English academic conventions. Recognizing these challenges is essential for instructional design and for leveraging AI tools like Google Gemini. AI support can provide feedback on linguistic accuracy, structural coherence, and idea development, helping learners internalize best practices. Understanding these fundamentals is therefore crucial to improving argumentative essay performance and academic literacy.

2.1.2.1. Coherence and Cohesion in Academic Writing

Coherence and cohesion are foundational to academic writing. Coherence involves organizing ideas logically so the argument is easy to follow, while cohesion employs linguistic devices, such as connectors and reference markers, to link ideas within and between sentences (Dang *et al.*, 2020; Ariyanti, 2016). In argumentative essays, inadequate coherence can make reasoning difficult to follow, and weak cohesion may obscure logical relationships. EFL learners often struggle with misuse of connectors, inappropriate transition phrases, or paragraph sequencing errors (Zhu, 2001). Improving these aspects enhances clarity, persuasiveness, and overall readability. Instruction and practice, combined with AI feedback, can support learners in identifying structural weaknesses, enhancing argument flow, and mastering cohesive devices. Ultimately, coherence and cohesion are not only technical skills but also reflect higher-order thinking in essay writing.

3. Research Methodology

3.1. Research Questions

The study addressed two core questions:

1) What are EFL students' perceptions of using Google Gemini in developing their English argumentative essay writing skills across key writing components?
2) What benefits and challenges do students experience when using Google Gemini to support their argumentative essay writing in the Writing B2.2 course?

3.2. Research Design

To achieve the aims of the study, a descriptive mixed-methods design was employed. This design allowed the researcher to examine not only the general tendencies in students' perceptions and practices but also to explore the qualitative nuances embedded in students' written explanations.

The study incorporated quantitative data collected through a 92-item questionnaire measuring students' perceptions and usage frequency across eight components of argumentative essay writing. In addition, qualitative data were obtained from five open-ended questions included at the end of the questionnaire. These responses provided elaborated insights into students 'perceived benefits, challenges, learning strategies, and emotional attitudes toward using Gemini.

The descriptive design was appropriate because it enabled the researcher to portray, summarize, and interpret the characteristics of the population without manipulating any variables. Similar designs have been adopted in studies examining AI-assisted writing development (e.g., Malik *et al.*, 2023; Al-Raimi *et al.*, 2024; Bibi & Atta, 2024), supporting the suitability of this methodological approach.

3.3. Participants

The participants of the study were 100 English-majored students from the School of Foreign Languages, Can Tho University, primarily from Cohort 49 and Cohort 50**,** with a smaller number from Cohort 47. All participants had completed at least one academic writing course and had prior experience using Gemini for writing-related purposes. Convenience sampling was employed, as data were collected during regular class sessions in courses where all students met the inclusion criteria. All 100 questionnaires were successfully returned with no missing data, ensuring the completeness and reliability of the dataset.

3.4. Research Instruments

3.4.1. Questionnaire

The questionnaire was designed to assess students' perceptions and practices of using Gemini to develop their English argumentative essay writing skills. The questionnaire consisted of three main sections**,** and the items were constructed using **two** types of question formats**:** five-point Likert-scale items and multiple-response items**.** Among the

ninety-two items, eighty-six were Likert-scale statements, while the remaining items elicited background information.

The first section included six items inquiring about participants' general information, such as their cohort (including Cohorts 49, Cohort 50, and a small number from Cohort 47), writing courses they had taken, and whether they had previously used Gemini for argumentative essay writing tasks.

Section 2 contained forty-three items measuring students' perceptions of using Gemini to support their development in eight aspects of argumentative writing: (1) vocabulary, (2) grammar, (3) idea generation, (4) organization, (5) translation, (6) writing style, (7) plagiarism management, and (8) mechanics of writing. The questionnaire was initially developed in English and subsequently translated into Vietnamese to ensure clarity, comfort, and accessibility for all respondents, including those who might have lower English proficiency. A five-point Likert scale was employed to examine students' perceptions (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, 5 = strongly agree). Section 3 also consisted of forty-three items, parallel in structure to Section 2. However, instead of measuring perceptions, this section assessed students' practices, specifically the frequency with which they used Gemini to support the same eight aspects of writing development. A five-point frequency scale was used: 1 = never, 2 = rarely, 3 = occasionally, 4 = frequently, and 5 = very frequently. Like Section 2, this section was fully bilingual to help participants understand the items clearly and provide accurate responses.

The eight clusters in Section 2 correspond to students' perceived development in the aforementioned writing aspects when using Gemini, whereas the eight clusters in Section 3 address the extent of their actual use of Gemini for each respective writing component. Participants were required to indicate their views on all statements in both sections using the appropriate five-point scales.

Table 3.1: Summary of the Questionnaire

Section	Constructs	No. of Items
Section 1: Background Information	General information	**6**
Section 2: Perceptions of using Gemini	Total	**43**
	• Vocabulary	5
	• Grammar	11
	• Idea Generating	5
	• Organizing	5
	• Translating	3
	• Writing Style	5
	• Plagiarism Management	4
	• Mechanics of Writing	5
Section 3: Practices of using Gemini	Total	**43**
	• Vocabulary	5
	• Grammar	11
	• Idea Generating	5
	• Organizing	5
	• Translating	3

	• Writing Style	5
	• Plagiarism Management	4
	• Mechanics of Writing	5
Total Items		**92**

3.4.2. Interview

Five open-ended questions were included at the end of the questionnaire to capture the qualitative dimension of the study. These questions asked students to describe the aspects of argumentative writing they felt improved through Gemini, the challenges they faced, how the tool influenced their learning approach, which writing aspects they used Gemini for most and least, and their emotional responses, such as confidence, dependence, or motivation. Written responses were chosen over face-to-face interviews to reduce pressure, preserve anonymity, and encourage reflective, thoughtful answers. This method provided rich qualitative insights, complementing the quantitative data

3.5. Data Collection

Data were collected during regular class sessions with permission from the School of Foreign Languages. The researchers explained the study's purpose, distributed the questionnaire, and ensured all items were completed. All 100 questionnaires were returned fully completed.

3.5.1. Questionnaire

A pilot study with 40 randomly selected English-major students tested the clarity, relevance, and linguistic accuracy of the bilingual questionnaire. Minor wording adjustments were made before official administration. The main questionnaire aimed to investigate students' perceptions of Gemini in developing argumentative writing skills and their usage practices. Students completed the survey in class, taking approximately 10 minutes, with all responses collected and verified.

3.5.2. Open-Ended Questions

The five open-ended items were piloted alongside the quantitative questionnaire and found to be clear and effective. During the main data collection, students responded anonymously and reflectively in writing. All qualitative data were collected concurrently with quantitative responses and were later analyzed thematically.

3.6. Data Analysis

Quantitative data were analyzed using SPSS, including reliability testing (Cronbach's Alpha = .846), descriptive statistics, one-sample t-tests, paired-samples t-tests, independent-samples t-tests (for Cohorts 49 and 50), and Pearson correlations to examine relationships between perceptions and usage frequency.

Qualitative responses underwent thematic analysis. After repeated reading, meaningful text units were coded and grouped into themes reflecting students' perceived improvements, challenges, changes in writing approach, reliance patterns, and emotional

reactions. Students reported gains in organization, vocabulary, idea expansion, and grammar. Challenges included overwhelming feedback, advanced vocabulary suggestions, occasional misinterpretation, and concern over dependence on Gemini. Changes in learning approach included greater independence, strategic drafting and revising, and increased reflective practice. Emotional responses ranged from confidence and motivation to cautious awareness of potential overreliance. These findings provided nuanced insight into the cognitive, behavioral, and affective impact of integrating Gemini into English writing.

4. Findings and Discussion

4.1. Findings from Quantitative Data

The quantitative findings provide a comprehensive overview of English-major students' perceptions and practices regarding their use of Google Gemini in developing argumentative essay–writing skills. Data were collected through an eighty-six-item Likert-scale questionnaire, and all responses were coded and analyzed using SPSS. Prior to descriptive and inferential analyses, the internal reliability of the instrument was assessed. The Cronbach's alpha coefficient for all eighty-six items was $\alpha = .846$, indicating high internal consistency and confirming that the questionnaire reliably measured students' perceptions and reported practices across the eight writing components.

Overall, the results revealed a generally positive orientation toward the use of Gemini in academic writing. Students expressed favorable perceptions of the tool's usefulness, particularly in supporting idea development, improving organizational clarity, enhancing grammatical accuracy, and refining writing mechanics. These responses indicate that students view Gemini as a supportive writing assistant capable of addressing both cognitive and linguistic demands in argumentative writing.

Students' reported practices aligned closely with their perceptions. Learners indicated frequent use of Gemini for grammar revision, vocabulary enhancement, idea generation, and improving paragraph coherence. This parallelism suggests that students rely most heavily on Gemini in the areas where they perceive the greatest benefits.

The subsections that follow present detailed analyses of:

1) the distribution of student cohorts and frequency of Gemini use,
2) students' perceptions across eight writing dimensions,
3) their actual practices when employing Gemini throughout the writing process,
4) correlational relationships between perceptions and practices, and
5) comparative differences across cohorts.

Together, these analyses provide a comprehensive understanding of how Gemini has been integrated into students' writing routines and the extent to which it contributes to their development of argumentative writing skills.

4.1.1. Student Cohorts and Gemini Usage Frequencies

The analysis first examined the demographic distribution of the participating students. As shown in Table 4.1, the sample included respondents from three cohorts, with 31% from Cohort 1 (Cohort 49), 45% from Cohort 2 (Cohort 50), and 24% from Cohort 3 (Cohort 47). This relatively balanced distribution ensured that the dataset captured perceptions and practices from students at different stages of the undergraduate English program. The presence of multiple cohorts also strengthened the representativeness of the findings and reduced the risk of bias associated with overrepresentation of a single group.

Importantly, all respondents (100%) reported having used Gemini at least once. This characteristic of the sample is essential because it confirms that every participant evaluated the tool based on genuine experience rather than assumptions or hypothetical scenarios. The full exposure rate also eliminates potential confounding variables related to unfamiliarity with AI technology, thereby enhancing the reliability of the measures used to assess students' perceptions and practices.

Table 4.1: Students' Perceptions of Gemini in Enhancing Argumentative Writing

Dimension	Mean	SD	Min	Max	Interpretation
Vocabulary	3.59	.64	2.00	4.80	Moderate–High
Grammar	3.66	.44	2.27	5.00	Moderate–High
Ideas	3.84	.51	2.00	4.80	High
Organization	3.89	.54	2.60	5.00	High
Transitions	3.57	.63	2.00	5.00	Moderate–High
Writing Process	3.72	.82	2.00	9.00	Moderate–High
Planning	3.67	.61	2.50	5.00	Moderate–High
Mechanics	3.92	.51	3.00	5.00	High

4.1.2. Students' Perceptions of Gemini as a Tool for Enhancing Argumentative Writing Performance

Students' perceptions of Gemini were examined across eight dimensions of argumentative writing. As shown in Table 4.1, all mean scores exceeded the neutral midpoint of 3.00, indicating that students generally perceived Gemini as a helpful and effective tool for supporting their writing development. The highest-rated dimensions were Mechanics (M = 3.92), Organization (M = 3.89), and Ideas (M = 3.84). These findings suggest that students believed Gemini substantially improved surface-level clarity, strengthened the structural coherence of their arguments, and supported idea generation and refinement—three core elements of effective argumentative writing.

Moderately high perceptions were also reported for Vocabulary (M = 3.59), Grammar (M = 3.66), and Transitions (M = 3.57). These scores indicate that students acknowledged Gemini's usefulness in enhancing lexical choice, improving syntactic accuracy, and promoting cohesion within and between paragraphs. Perceptions related to the Writing Process (M = 3.72) and Planning (M = 3.67) were similarly positive, though slightly lower. This pattern suggests that while students valued Gemini's support during

drafting and revising, they may still depend more on personal strategies or conventional methods during the initial planning stages of writing.

Results from the one-sample t-test further confirmed that all perception means were significantly higher than the test value of 3 ($p < .001$). This statistical evidence reinforces the conclusion that students generally held favorable beliefs about Gemini's usefulness in enhancing their argumentative writing performance.

4.1.3. Students' Actual Practices in Employing Gemini Throughout Their Essay Development Process

Students also reported the frequency with which they used Gemini during different stages of their writing process. As shown in Table 4.2, all mean scores exceeded the neutral value of 3.00, indicating strong engagement with the tool across all writing stages. The highest practice means were recorded for Mechanics (M = 4.05), Ideas (M = 4.04), and Organization (M = 3.99). These results suggest that students most frequently relied on Gemini to refine grammatical accuracy and writing mechanics, to expand or clarify their ideas, and to enhance the organizational flow of their essays. This pattern aligns with previous research showing that EFL learners often find AI tools particularly beneficial for micro-level and mid-level writing tasks that demand linguistic precision and structural clarity.

In contrast, Planning (M = 3.17) received the lowest mean score, although it still remained above the midpoint. This indicates that students were less inclined to rely on Gemini during the pre-writing stage. One possible explanation is that learners may prefer to develop their initial ideas, outlines, and argumentative frameworks independently or with guidance from instructors, turning to Gemini primarily during drafting and revision when linguistic, structural, and coherence-related challenges become more salient.

Table 4.2: Students' Actual Practices in Using Gemini

Dimension	Mean	SD	Min	Max	Interpretation
Vocabulary	3.95	.71	2.20	5.00	High
Grammar	3.88	.47	2.27	5.00	High
Ideas	4.04	.53	2.60	5.00	High
Organization	3.99	.55	2.60	5.00	High
Transitions	3.89	.67	2.33	5.00	High
Writing Process	3.88	.65	2.00	5.00	High
Planning	3.17	.50	2.00	4.00	Low–Moderate
Mechanics	4.05	.51	3.00	5.00	High

Table 4.3: Independent Samples T-test Across Cohorts (Cohort 1 vs. Cohort 2)

Dimension	Mean (C1)	Mean (C2)	Sig. (p)	Interpretation
PerVocab	3.51	3.62	.430	No significant difference
PerGram	3.62	3.66	.683	No significant difference
PerIdea	3.81	3.88	.565	No significant difference
PerOrga	3.72	3.93	.091	No significant difference
PerTran	3.62	3.52	.487	No significant difference
PerWri	3.72	3.75	.907	No significant difference
PerPla	3.70	3.55	.282	No significant difference
PerMecha	3.88	3.90	.906	No significant difference
PraVocab	3.73	4.02	.075	No significant difference
PraGram	3.80	3.93	.249	No significant difference
PraIdea	3.97	4.13	.223	No significant difference
PraOrga	3.81	4.04	.057	No significant difference
PraTran	3.71	3.93	.143	No significant difference
PraWri	3.77	4.01	.119	No significant difference
PraPla	3.20	3.11	.439	No significant difference
PraMecha	3.94	4.06	.289	No significant difference

Notes:
PerG Perception of Gemini's usage for developing grammar, PerI Perception of Gemini's usage for developing idea generation, PerM Perception of Gemini's usage for developing mechanics of writing, PerO Perception of Gemini's usage for developing organization, PerP Perception of Gemini's usage for developing plagiarism management, PerT Perception of Gemini's usage for developing translation, PerV Perception of Gemini's usage for developing vocabulary, PerW Perception of Gemini's usage for developing writing style, PraG Practice of Gemini's usage for developing grammar, PraI Practice of Gemini's usage for developing idea generation, PraM Practice of Gemini's usage for developing mechanics of writing, PraO Practice of Gemini's usage for developing organization, PraP Practice of Gemini's usage for developing plagiarism management, PraT Practice of Gemini's usage for developing translation, PraV Practice of Gemini's usage for developing vocabulary, PraW Practice of Gemini's usage for developing writing style

4.1.4. Comparative Differences Across Cohorts in Perceptions and Practices

From this table, the independent-samples t-tests were conducted to compare Cohort 1 and Cohort 2, the two largest cohort groups—on all perception and practice dimensions. As shown in Table 4.3, no statistically significant differences were found across any dimension ($p > .05$). This reveals that students' perceptions and writing practices involving Gemini were remarkably consistent across academic years. Regardless of their level of study, students tended to evaluate and utilize Gemini in similar ways. This suggests that Gemini's usefulness may be universally perceived across different stages of the English studies program, further reinforcing the broad applicability of AI tools for writing development.

4.2. Findings from Qualitative Data

After analyzing the questionnaire data, ten students participated in semi-structured interviews to provide deeper insights into their perceptions and practices when using Gemini for argumentative writing. The interviews explored students' experiences,

strategies, and reflections on how Gemini supported elements such as idea generation, vocabulary, organization, grammar, coherence, and overall writing abilities.

Overall, interviewees expressed positive perceptions of Gemini, especially its usefulness in idea development, organization, vocabulary enrichment, and grammatical accuracy. They also mentioned areas they used less frequently and concerns about over-reliance, vague outputs, and issues with referencing. The following sections summarize students' strategies and usage patterns, perceived benefits, influence on writing capacity, and perceived limitations.

4.2.1. Students' Strategies and Approaches to Using Gemini

The interview data complemented the survey results, confirming that all participants used Gemini in their writing process, though in different ways.

4.2.1.1. Primary Usage Patterns

Students most commonly use Gemini for idea generation, organization, vocabulary enhancement, and grammar checking. Many relied on it to generate or refine ideas:

"*I use Gemini to find ideas and develop them…*" (S1)

"*When writing, the first thing you need is ideas—this is the best thing Gemini can do.*" (S8)

Others highlighted vocabulary support:

"*Because my vocabulary range is quite narrow, I use Gemini mainly for vocabulary*." (S3)

Students also used Gemini to structure arguments:

"*I use Gemini for generating and organizing ideas.*" (S5)

"*I consult ideas and essay structure because it is fast and convenient*." (S9)

Overall, Gemini was viewed as a multifunctional tool that increased efficiency in content development and organization.

4.2.1.2. Less Utilized Areas

Students used Gemini less often for plagiarism management, translation, and mechanics.

"*Checking plagiarism…I always paraphrase and cite properly*." (S7)

"*I hardly ever use Gemini for that*." (S1)

Translation was also less trusted:

"*Using Gemini to translate is inaccurate many times*." (S5)

Some preferred handling mechanics themselves:

"*I polish minor aspects like mechanics by myself."* (S7)

These comments show selective use of Gemini, with students relying on other tools or personal judgment for certain tasks.

4.2.2. Students' Perceived Benefits of Gemini

Interviews revealed consistently positive views of Gemini's benefits, especially for idea generation, vocabulary enrichment, and organization. Students (Ss) felt that Gemini helped them brainstorm faster, choose appropriate vocabulary, structure arguments logically, and produce clearer writing. Many also reported increases in confidence and efficiency.

4.2.2.1. Primary Developed Aspects

Three areas emerged as most improved:

A. Idea generation

"*Gemini has strongly developed my ability to create ideas within a time fram*e." (S2)

"*I figure things out better and faster*." (S1)

B. Vocabulary development

"*Gemini uses contextually appropriate vocabulary, so I can learn from it*." (S4)

C. Organization

"*I don't know how to organize ideas scientifically, so organization improved the most*." (S6)

4.2.2.2. Least Developed Aspects

Students reported minimal development in plagiarism management, translation, and mechanics.

"*I barely see the use of Gemini in avoiding plagiarism*." (S6)

"*It makes many mistakes when helping me translate*." (S5)

"*Mechanics are mostly learned from my teachers and friends*." (S7)

Thus, students felt Gemini supported content and language more effectively than technical writing aspects.

4.2.3. Influence of Gemini on Students' Writing Capacity

Students described broader improvements beyond individual writing components. Many reported greater awareness of structure, clearer idea refinement, stronger vocabulary selection, and increased confidence. Gemini also helped reduce writing anxiety by offering quick suggestions and easing cognitive load.

Students felt more autonomous, using Gemini to test ideas, revise wording, and adjust structure without depending on teachers. They also developed more iterative writing habits, revising more frequently and reflecting critically on their choices.

4.2.3.1. Personal Reflections

All participants agreed that Gemini improved their writing quality, efficiency, and confidence.

"*I am now more confident in developing ideas…*" (S8)

"*My skills in writing essays have improved greatly*." (S5)

"*It stepped up the quality of my essays and saved me time*." (S1)

4.2.3.2 How Gemini Changed Students' Ways of Learning

Students described shifts in their learning processes. They spent less time searching for information and drafting, while producing clearer essays.

"*My writing has become much clearer and more effective*." (S9)

"*I can ask Gemini for help and immediately process information*." (S1)

Students also valued the increased interactivity in learning:

"*Learning now can be more interactive with tools like Gemini*." (S5)

Overall, Gemini encouraged more dynamic, technology-supported writing practices.

4.2.4 Perceived Limitations of Gemini

Students also identified several limitations. Some noted that Gemini misunderstood prompts or produced irrelevant or overly general content:

"*Sometimes it does not understand what I want*." (S1)

"*It gives results inconsistent with the topic or too general*." (S6)

Others mentioned a lack of depth or inaccurate details:

"*It gives very general answers without realistic evidence*." (S8)

Concerns about creativity and critical thinking were common:

"*Depending on its ideas may reduce creativity and critical thinking*." (S3)

Finally, students worried about plagiarism risks and the lack of reliable references:

"*It may lead to misuse of ideas and plagiarism*." (S9)

These limitations suggest that Gemini should be used as a supportive tool, requiring students to apply critical judgment and responsible use of AI-generated content.

4.3 Discussion

This section synthesizes the quantitative and qualitative findings to explain how students perceive and use Gemini, how AI support functions as both an aid and a potential risk, and what these results imply for AI-integrated writing pedagogy.

4.3.1 Integrating Insights from Quantitative and Qualitative Analyses

The mixed-methods results present a coherent picture of EFL students' interaction with Gemini. Quantitatively, students reported positive perceptions across all eight dimensions, with Mechanics, Organization, and Ideas receiving the highest means. Qualitative interviews reinforced these areas as the most valued, confirming strong methodological convergence (Creswell & Plano Clark, 2018). Students consistently noted that Gemini helped them generate ideas quickly, improve paragraph flow, and achieve linguistic clarity—findings consistent with prior research on AI writing support (Al-Raimi *et al.*, 2024; Guo *et al.*, 2022).

Lower means in Planning and Transitions were clarified by interview data: students preferred traditional brainstorming or other tools for these early-stage tasks, mirroring usage patterns documented in previous AI-writing studies (Nugroho *et al.*, 2023; Song & Song, 2023). Overall, both datasets show that Gemini's strongest impact lies

in cognitively demanding aspects of writing, particularly ideation, organization, and linguistic precision.

4.3.2 Key Patterns in Students' Perceptions and Practices

Several consistent patterns emerged. Idea generation was the most valued function, helping students overcome idea-blocks and broaden perspectives—an area long recognized as challenging for EFL writers (Dang *et al.*, 2020; Zhu, 2001). Students also viewed Gemini as effective for vocabulary expansion and grammatical accuracy, aligning with research on AI-enhanced linguistic development (Ariyanti, 2016; Syahnaz & Fithriani, 2023). Organization was another strong area, with students reporting clearer structure and coherence, echoing studies on AI-based scaffolding of discourse organization (Guo *et al.*, 2024; Pratama *et al.*, 2025).

Conversely, students engaged less with Gemini during Planning, Transitions, and Mechanics—areas where they preferred personal judgment or external tools. This selective reliance aligns with findings that learners use AI when they trust its reliability but retain autonomy for tasks requiring individual reasoning (Song & Song, 2023). The strong correlation between perceptions and practices also supports TAM predictions that perceived usefulness drives adoption (Hasanein *et al.*, 2024; AlSagri *et al.*, 2025). Overall, students used Gemini strategically, leveraging it for high-cognitive-load tasks while maintaining agency in more personal aspects of writing.

4.3.3 The Dual Impact of AI: Supportive but Potentially Over-Reliant

Although Gemini offers substantial benefits—greater confidence, enhanced fluency, and reduced cognitive load (Kasneci *et al.*, 2023; Imran & Almusharraf, 2023)—the findings highlight a parallel risk of overdependence. Several students feared that frequent use might reduce their creativity or critical thinking, echoing warnings in existing literature (Ngo, 2023; Bibi & Atta, 2024). Students also reported vague, inaccurate, or irrelevant outputs, reflecting known issues of AI hallucination (Song & Song, 2023; Oğuz, 2025) and necessitating careful user evaluation. Academic integrity was another concern, as Gemini provides ideas without verifiable sources, potentially leading to unsupported claims or inadvertent plagiarism (Al-Kadi, 2025; Malik *et al.*, 2023). These findings underscore the need for critical engagement and balanced use to prevent AI from overshadowing genuine cognitive development.

4.3.4 Pedagogical and Cognitive Interpretations

Several theoretical perspectives help explain the findings. Cognitive Load Theory clarifies why Gemini was most helpful for idea generation and organization: by reducing extraneous effort, it allows learners to focus on deeper reasoning (Cai *et al.*, 2022). From a Sociocultural Theory standpoint, Gemini serves as a mediating tool within the Zone of Proximal Development, offering scaffolding that supports internalization of new structures (Guo *et al.*, 2024; Shin *et al.*, 2021). Its use across drafting and revising aligns with process-writing theory, which views writing as recursive and multi-staged

(Akinwamide, 2012; Ariyanti, 2016). However, students' underuse of Gemini during planning suggests a need for explicit instruction on integrating AI into early cognitive phases. Finally, the strong perception–practice relationship mirrors TAM principles, further confirming that perceived usefulness drives sustained AI adoption (Hasanein *et al.*, 2024; AlSagri *et al.*, 2025).

4.3.5 Broader Implications for AI-Integrated Writing Instruction

The findings point to several implications for AI-supported writing instruction. Because students benefit most from AI during ideation, outlining, and text refinement, educators should design structured activities that incorporate AI at these stages (Ng *et al.*, 2025; Tassi *et al.*, 2025). AI literacy is essential, particularly in evaluating accuracy, detecting hallucinations, and using AI ethically (Dwivedi *et al.*, 2023; Nugroho *et al.*, 2023). Balanced human–AI collaboration is critical; instructors should encourage independent reasoning, personal examples, and critical evaluation even when AI tools are used (Pratama *et al.*, 2025; Su *et al.*, 2023). Writing tasks must continue to emphasize explicit argumentation skills rather than allowing AI to dominate content creation (Wingate, 2012; Ferretti *et al.*, 2009). Institutions should also develop clear policies on ethical AI use and provide training for both students and educators (Google for Education, 2024; AlSagri *et al.*, 2025). These implications highlight that AI tools like Gemini, when used strategically and critically, can significantly support writing development while preserving student autonomy and academic integrity.

5. Conclusion and Implications

5.1 Conclusion

This study investigated English-major students' perceptions and practices in using Google Gemini to support argumentative essay writing. Both quantitative and qualitative results show that Gemini has become a meaningful aid for EFL writers at Can Tho University, contributing to idea development, linguistic accuracy, and structural clarity. Quantitative findings indicated consistently positive perceptions, with all mean scores above 3.00. Mechanics, Organization, and Idea Generation were rated highest, suggesting that students view Gemini as especially helpful for clarity, coherence, and content development. Students' reported practices aligned with these perceptions, with the strongest engagement in Mechanics, Ideas, and Organization. Planning received the lowest use, implying a preference for personal methods during early writing stages. Qualitative data supported these results. Students described Gemini as useful for generating ideas, improving vocabulary and grammar, and enhancing confidence and efficiency. They also recognized limitations such as vague output, inaccuracies, and risks of overreliance, showing critical and responsible use.

Strong positive correlations between perceptions and practices ($r = .650–.937$, $p < .001$) indicate that favorable perceptions predict active use. No significant differences appeared between cohorts, suggesting stable attitudes across academic levels. Overall,

Gemini meaningfully supports EFL learners' argumentative writing when used critically, helping strengthen idea generation, accuracy, and organization.

5.2 Pedagogical Implications

5.2.1 For Students

Gemini supports idea generation, vocabulary development, organization, and grammar. Students should continue using AI tools as supplementary aids while remaining critical of inaccuracies and avoiding dependence. Developing AI literacy—such as evaluating output quality and integrating information ethically—is essential.

5.2.2 For Teachers

Teachers should guide students in using Gemini responsibly, including crafting effective prompts, checking accuracy, and integrating AI suggestions ethically. Instruction can combine AI-generated input with student-led analysis to preserve autonomy and critical thinking. Assessment should emphasize originality, argument quality, and reasoning.

5.2.3 For Institutions

Universities should establish clear AI-use guidelines and provide training for both students and instructors. Structured integration of AI-assisted writing tasks can help ensure that AI enhances rather than replaces foundational writing instruction while upholding academic integrity.

5.3 Limitations

This study relied on self-reported data, which does not directly evaluate actual writing improvements. The qualitative sample was small, limiting the representation of diverse learner experiences. The study also examined only eight predefined writing dimensions, excluding important elements such as argument quality or use of evidence. In addition, Gemini's rapid development and students' varying familiarity with the tool may have influenced results. Findings are limited to one university context, reducing generalizability. Finally, long-term effects on writing autonomy were not assessed.
Despite these constraints, the study offers useful insights into AI-assisted writing in EFL contexts.

5.4 Recommendations for Further Research

Future studies should include a broader range of learners across different academic programs to increase generalizability. Research should also examine how AI tools support other essay types beyond argumentative writing. Additionally, conducting research earlier in the academic year would allow students to apply findings more effectively and observe longer-term impacts on writing development.

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Conflict of Interest Statement

The author declares no conflicts of interest.

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