



## THE IMPACT OF GEMINI AI ON STUDENTS' WRITING PERFORMANCE

**Rizki Bobi Baihaki <sup>a\*</sup>, Melinah Diana Putri <sup>b</sup>, Naf'an Tarihoran <sup>c</sup>**

<sup>a</sup> English Education Department; [231230080.rizki@uinbanten.ac.id](mailto:231230080.rizki@uinbanten.ac.id), UIN Sultan Maulana Hasanuddin Banten; Jl. Jendral Sudirman No. 30, Panancangan, Kec. Serang, Kota Serang, Banten 42118.

<sup>b</sup> English Education Department; [231230071.melinah@uinbanten.ac.id](mailto:231230071.melinah@uinbanten.ac.id), UIN Sultan Maulana Hasanuddin Banten; Jl. Jendral Sudirman No. 30, Panancangan, Kec. Serang, Kota Serang, Banten 42118.

<sup>c</sup> English Education Department; [nafan.tarihoran@uinbanten.ac.id](mailto:nafan.tarihoran@uinbanten.ac.id), UIN Sultan Maulana Hasanuddin Banten; Jl. Jendral Sudirman No. 30, Panancangan, Kec. Serang, Kota Serang, Banten 42118.

\* Penulis Korespondensi: Rizki Bobi Baihaki

### ABSTRACT

*The integration of Artificial Intelligence (AI) in education offers transformative potential, yet EFL learners still face significant hurdles in writing proficiency. This study aims to explore the effectiveness of Google Gemini, a multimodal Large Language Model (LLM), in enhancing students' writing performance and overcoming psychological barriers, such as low motivation. Using a qualitative approach grounded in the Technology Acceptance Model (TAM) and Socio-constructivism theory, this research examines how Gemini's real-time feedback functions as a "More Knowledgeable Other" (MKO). The findings demonstrate that Gemini effectively identifies deficiencies in sentence structure and grammar, acting as a vital catalyst for boosting fluency and coherence in EFL compositions. Furthermore, students perceive the tool as highly intuitive, particularly during the initial drafting and planning phases. The study concludes that while Gemini provides essential scaffolding within the Zone of Proximal Development (ZPD), structured pedagogical supervision is necessary to prevent over-dependency. These results suggest that a synergy between AI support and human guidance is fundamental for sustainable second-language mastery in the digital age.*

**Keywords:** Gemini AI; Student; Writing performance

### 1. INTRODUCTION

The Role of Technology in Education. The integration of Artificial Intelligence (AI) tools in education offers immense transformative potential, particularly in developing students' writing proficiency. The presence of AI technology has fundamentally altered the pedagogical landscape and language acquisition (Sartika, 2025). These tools provide a versatile framework for pedagogical innovation, allowing educators to address Classroom complexities with greater flexibility. Overall, technology is not merely a supplement to existing methods but creates a dynamic, data-driven environment that accelerates second-language mastery.

Specifics of Gemini Technology: Google Gemini is a next-generation Large Language Model (LLM) developed by Google AI with revolutionary multimodal capabilities. Gemini possesses the flexibility to process various data inputs, ranging from text, images, and audio to video, and is capable of generating diverse content types [6]. In an educational context, Gemini provides instant linguistic support, automated feedback, and multimodal explanations across various stages of the writing process [4]. This technology is designed to provide a framework that supports personalized learning and intelligent tutoring systems.

Challenges in Writing Skills: Developing writing proficiency remains a significant challenge for English as a Foreign Language (EFL) learners. Writing requires mastery that extends beyond grammar to include lexical choices, coherence, and stylistic conventions [16]. Common issues faced by students include constraints in vocabulary use, difficulties with content organization, and a lack of confidence in composing texts. Many students also experience difficulties in generating ideas and organizing paragraphs logically [10].

Previous Research on Gemini Several studies have evaluated the effectiveness of Gemini in supporting writing skills. A study demonstrated that Gemini effectively identifies deficiencies in sentence structure, grammar, and word choice. Other research revealed that using Gemini as a catalyst can boost fluency and coherence in EFL compositions [4]. Furthermore, research on vocational students indicates positive perceptions, with Gemini considered helpful during the planning and initial drafting phases of writing [10]

Research Gap and Differences. While previous research has extensively discussed the effectiveness and perceptions of using Gemini, this study has a distinct focus. Most prior studies emphasize final test scores or general student perceptions of the tool's utility [11]. This research aims to fill this gap by exploring in greater depth the specific practices of utilizing Gemini's multimodal features to overcome psychological barriers, such as low motivation and concerns about technology dependency, which have not been comprehensively discussed in certain educational contexts. Research Questions 1). How does the use of Gemini AI impact students' writing performance in EFL contexts? 2). To what extent does Gemini AI improve students' writing skills (grammar, vocabulary, and organization)? 3). What are students' perceptions of using Gemini AI in improving their writing performance?

## 2. LITERATURE REVIEW

### 2.1. *Gemini AI in Language Learning*

Modern educational shifts are heavily influenced by the integration of artificial intelligence, which offers significant opportunities to refine students' writing expertise. Google Gemini has emerged as a cutting-edge large language model (LLM) equipped with groundbreaking multimodal features [6]. This technology possesses the remarkable versatility to interpret various data formats, text, imagery, audio, and video, enabling the production of highly diverse content.

The emergence of AI has fundamentally reshaped both the pedagogical framework and the process of language acquisition [14]. These digital tools offer an adaptable structure for educational innovation, assisting teachers in managing Classroom dynamics with greater ease [13]. Essentially, technology is no longer just a supplementary component but a vital catalyst that establishes a data-centric ecosystem to accelerate second-language mastery [7]. In academic settings, Gemini provides immediate linguistic assistance, automated feedback, and multimodal clarification throughout every phase of the writing journey [6].

### 2.2. *Students' Writing Skills*

For learners of English as a Foreign Language (EFL), achieving high-level writing proficiency remains a formidable obstacle. Writing competency demands a skill set that goes beyond basic grammar, encompassing precise word choice, logical coherence, and adherence to specific stylistic standards [5]. Many students encounter particular difficulties in generating initial ideas and structuring paragraphs in a logical flow [9].

Frequent hurdles include limited vocabulary use, struggles with organizing content, and a general lack of self-assurance when drafting texts [11]. These obstacles often manifest as psychological deterrents, such as diminished motivation, which ultimately impede academic growth. Since writing is an intricate cognitive operation, students require effective scaffolding to bridge the gap between their current performance and the sophisticated composition standards required, such as enhanced cohesion and advanced sentence structures.

In addition to internal linguistic challenges, external learning environments also play a crucial role in shaping students' writing development. The use of digital platforms has been shown to significantly enhance students' writing performance by providing opportunities for interaction and feedback. For instance, [15] found that social media platforms such as Facebook can serve as effective language support tools, enabling learners to improve their online writing performance through collaborative engagement and peer feedback. This indicates that writing skills are not only developed individually but also socially constructed through meaningful interaction and continuous practice in digital environments

### 2.3. *The use of Gemini AI in Writing Activities*

In the realm of digital-age instruction, AI models like Gemini act as a "More Knowledgeable Other" (MKO), offering a "scaffold" within the student's Zone of Proximal Development (ZPD) [3]. Evidence suggests that Gemini is highly effective at pinpointing weaknesses in sentence structure, grammatical errors, and inappropriate vocabulary [2]. Utilizing Gemini as a driving force can provide a significant boost to a student's fluency, structural unity, and overall confidence when producing English compositions [3].

Throughout the task-completion process, students view Gemini as an invaluable resource for generating creative ideas and broadening their lexical range [17]. According to the Technology Acceptance Model (TAM) framework, when students perceive a technological interface as intuitive and capable of driving productivity, their motivation to incorporate it into their writing routine grows substantially [1]. While Gemini is popular for its "ease of use" during the rough drafting phase, its "perceived usefulness" is most strongly recognized in the areas of grammatical refinement and structural organization [9]. Nevertheless, the assistance provided by AI must be balanced with structured supervision to avoid excessive dependency and to ensure that independent writing abilities continue to flourish [8].

Studies on similar technologies, such as ChatGPT, also support the effectiveness of AI in writing activities. Research by [12] demonstrates that students perceive AI tools as highly beneficial for idea generation, drafting, and revision. The study further reveals that AI can reduce writing anxiety and increase learners' confidence when dealing with academic writing tasks. This aligns with Gemini's role as an intelligent assistant that supports students throughout the writing process, making it a valuable tool in modern EFL writing instruction.

### 3. METHODS

This study employed a qualitative research design with a survey approach to explore students' perceptions of using Gemini AI in improving their writing performance. A qualitative approach was chosen to gain an in-depth understanding of students' experiences, opinions, and responses toward the use of AI in writing activities.

#### 3.1. Sample / Participants

The participants of this study were 103 students from the English Education Department at UIN Sultan Maulana Hasanuddin Banten. The sample was selected through purposive sampling, focusing on students with experience using Gemini AI in their writing. The participants were undergraduate students with varying levels of writing proficiency, categorized as English as a Foreign Language (EFL) learners. They regularly engage in writing tasks and are familiar with digital tools, including Gemini AI. The relatively large number of participants yielded comprehensive data on students' perceptions of Gemini AI's impact on their writing performance.

#### 3.2. Instrument(s)

The instrument used in this study was a questionnaire comprising open- and closed-ended questions. The questionnaire was designed to explore students' perceptions based on aspects of the Technology Acceptance Model (TAM), including perceived usefulness and perceived ease of use, as well as their writing performance.

The questionnaire included several questions related to: 1) Students' experiences using Gemini AI, 2) The benefits of Gemini AI in writing, 3) The challenges faced when using the tool, and 4) The impact on writing skills such as grammar, vocabulary, and idea development.

According to Creswell (2014), questionnaires can be used in qualitative research to collect participants' perspectives and experiences in a structured manner. Additionally, Likert-scale and open responses help researchers interpret participants' attitudes and perceptions in depth.

**Data Collection Procedures.** The data were collected through an online questionnaire distributed using Google Forms. Participants were asked to answer the questions based on their personal experiences using Gemini AI in writing. The responses were collected within a specific time frame and documented for analysis.

#### 3.3. Data Analysis

The data were analyzed using qualitative descriptive analysis. The researchers categorized the responses into several themes, such as usefulness, ease of use, and writing improvement. The data were then analyzed to identify patterns and common responses among participants.

This approach follows Miles, Huberman, and Saldaña (2014), who suggest that qualitative data analysis involves data reduction, data display, and conclusion drawing. The findings were then presented in narrative form to explain the impact of Gemini AI on students' writing performance.

#### 4. RESULTS AND DISCUSSION

##### 4.1. Research Findings: Students' Responses Toward Writing Questionnaire

The questionnaire results were analyzed using descriptive statistics, including mean, median, mode, and standard deviation, to describe students' responses. The results are presented in the table below.

Table 1. Result of Questioner

No.	Statement	Scale					Score
		SD: 1	D: 2	N:3	A:4	SA: 5	
1.	Gemini AI is an interesting tool for helping students improve their writing skills.	5	8	38	40	12	103
2.	Using Gemini AI helps me generate ideas when writing in English.	3	11	30	46	13	103
3.	Gemini AI helps me improve my writing grammar.	4	11	39	37	12	103
4.	Gemini AI helps me learn new vocabulary.	4	8	32	47	12	103
5.	Gemini AI helps me organize my ideas into clear sentences and paragraphs.	2	8	36	41	16	103
6.	Using Gemini AI makes writing tasks easier to complete.	5	7	38	36	17	103
7.	Using Gemini AI increases my confidence in writing English.	3	7	48	36	9	103
8.	Gemini AI helps me write more effectively and clearly.	3	8	41	36	15	103
9.	Using Gemini AI has a positive impact on my writing performance.	2	5	46	34	16	103

The questionnaire served as the primary instrument for collecting research data, comprising 9 items on the use of Gemini AI to improve students' writing skills. This instrument was designed to measure the impact of Gemini AI on students' writing performance, including their perceptions and motivation in using this technology as a learning tool.

The data were collected from 103 students who used Gemini AI to support their writing activities. Furthermore, a validity test was conducted by comparing the r-calculated (r-count) with the r-table to determine the validity of each questionnaire item. The collected data were then analyzed using descriptive statistics, including mean, median, mode, and standard deviation, to provide a comprehensive understanding of the research findings.

Note:

SD	: Strongly Disagree	MN	: Mean
D	: Disagree	MDN	: Median
N	: Neutral	MO	: Modus
A	: Agree	SD	: Standard Deviation
SA	: Strongly Agree		

Table 2. Descriptive Of Questioner

No.	MN	MDN	MO	SD	r-hitung	r-tabel	validity
1.	3,45	4	4	0,96	0,792	0,195	Valid
2.	3,53	4	4	0,89	0,865	0,195	Valid
3.	3,41	3	3	0,94	0,787	0,195	Valid
4.	3,53	4	4	0,90	0,749	0,195	Valid
5.	3,59	4	4	0,88	0,762	0,195	Valid
6.	3,51	4	3	1,01	0,804	0,195	Valid
7.	3,40	3	3	0,86	0,759	0,195	Valid
8.	3,50	4	3	0,94	0,838	0,195	Valid
9.	3,54	4	3	0,89	0,841	0,195	Valid

Based on Table 2, the mean scores for the 9 questions range from 3.40 to 3.59, indicating that respondents generally agreed with the statements. The highest mean is found in item 5 ( $M = 3.59$ ), while the lowest mean is in item 7 ( $M = 3.40$ ).

Regarding the median, most items show a value of 4, indicating that the majority of respondents selected "agree." However, items 3 and 7 have a median of 3, suggesting a tendency toward neutral responses.

Regarding the mode, most items have a value of 4, meaning that "agree" is the most frequently chosen response. Nevertheless, items 3, 6, 7, 8, and 9 have a mode of 3, indicating that "neutral" responses are also common in those items.

Furthermore, the standard deviation ranges from 0.86 to 1.01, showing that the variation in responses is relatively low and the data are fairly consistent across respondents.

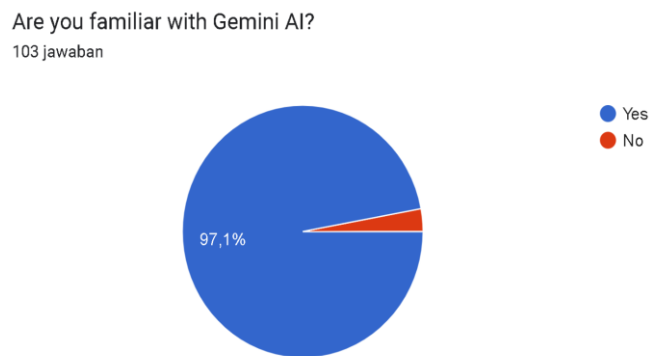


Figure 1. Result of Analysis Item 1

A total of 97.1% of students answered "Yes," while only a small percentage selected "No." Based on these results, it can be concluded that the vast majority of students are familiar with Gemini AI.

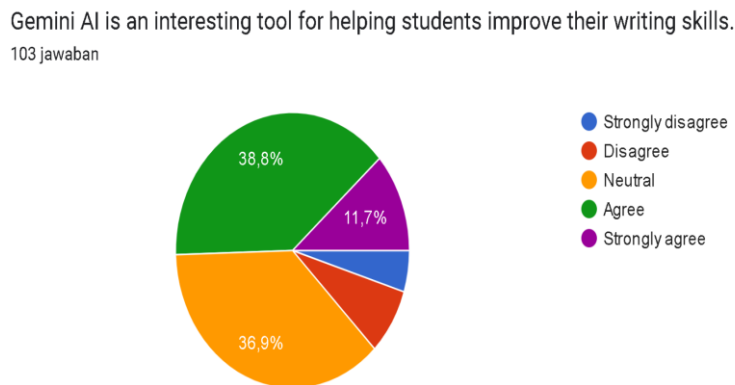


Figure 2. Result Of Analysis Item 2

A total of 4.9% of students selected strongly disagree, 7.7% chose disagree, and 36.9% selected neutral. Furthermore, 38.8% of students chose agree, and 11.7% selected strongly agree. Based on these results, it can be concluded that most students tend to agree that Gemini AI is an interesting tool for improving writing skills.

Using Gemini AI helps me generate ideas when writing in English.

103 jawaban

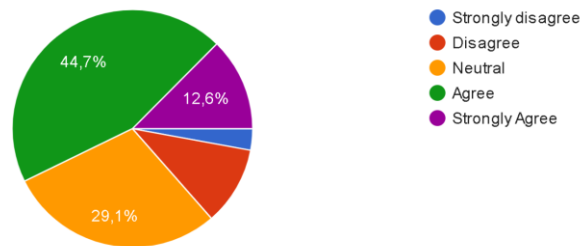


Figure 3. Result of Analysis Item 3

A total of 3.9% of students selected strongly disagree, 9.7% chose disagree, and 29.1% selected neutral. Furthermore, 44.7% of students chose agree, and 12.6% selected strongly agree. Based on these results, it can be concluded that the majority of students agree that Gemini AI helps them generate ideas when writing in English.

Gemini AI helps me improve my grammar in writing.

103 jawaban

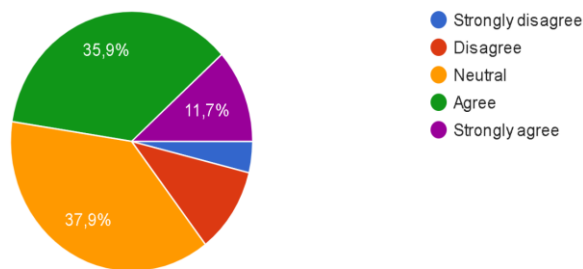


Figure 4. Result of Analysis Item 4

A total of 4.5% of students selected strongly disagree, 10% chose disagree, and 37.9% selected neutral. Furthermore, 35.9% of students chose agree, and 11.7% selected strongly agree. Based on these results, it can be concluded that most students tend to agree that Gemini AI helps improve their grammar in writing.

Gemini AI helps me learn new vocabulary for writing.

103 jawaban

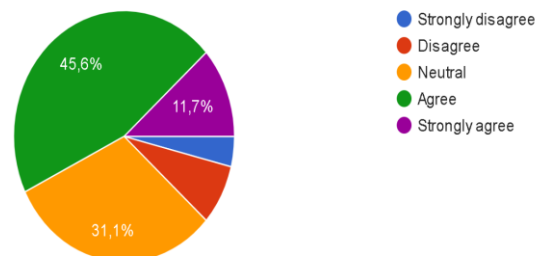


Figure 5. Result of Analysis Item 5

A total of 4.6% of students selected strongly disagree, 7% chose disagree, and 31.1% selected neutral. Furthermore, 45.6% of students chose agree, and 11.7% selected strongly agree. Based on these results, it can be concluded that the majority of students agree that Gemini AI helps them learn new vocabulary.

Gemini AI helps me organize my ideas into clear sentences and paragraphs.

103 jawaban

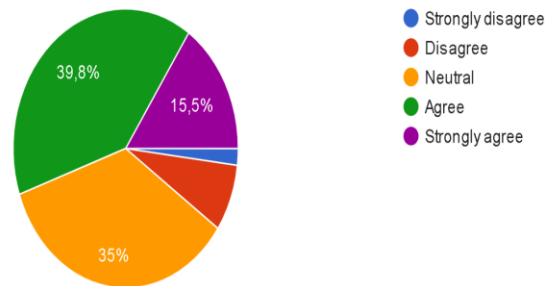


Figure 6. Result of Analysis Item 6

A total of 3.9% of students selected strongly disagree, 5.8% chose disagree, and 35% selected neutral. Furthermore, 39.8% of students chose agree, and 15.5% selected strongly agree. Based on these results, it can be concluded that most students agree that Gemini AI helps organize ideas into clear sentences and paragraphs.

Using Gemini AI makes writing tasks easier to complete.

103 jawaban

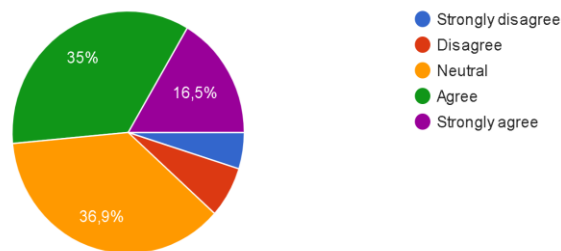


Figure 7. Result of Analysis Item 7

A total of 4.6% of students selected strongly disagree, 7% chose disagree, and 36.9% selected neutral. Furthermore, 35% of students chose agree, and 16.5% selected strongly agree. Based on these results, it can be concluded that the majority of students agree that using Gemini AI makes writing tasks easier.

Using Gemini AI increases my confidence in writing English.

103 jawaban

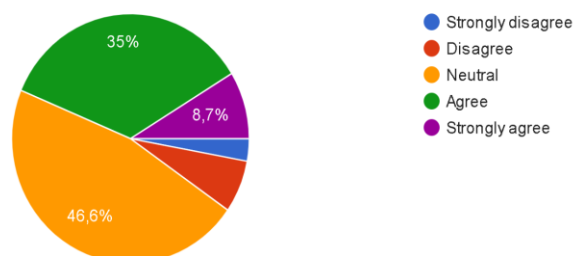


Figure 8. Result of Analysis Item 8

A total of 4.9% selected strongly disagree, 4.9% selected disagree, and 46.6% selected neutral. Furthermore, 35% of students chose agree, and 8.7% selected strongly agree. Based on these results, it can be concluded that students tend to have a neutral to positive perception regarding increased confidence in writing.

Gemini AI helps me write more effectively and clearly.

103 jawaban

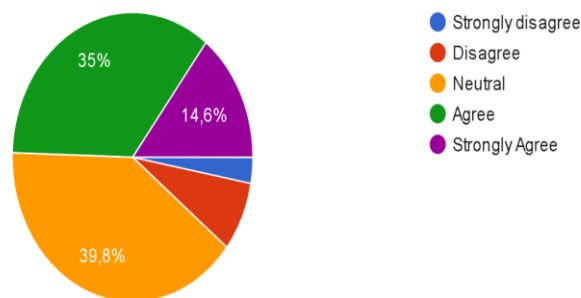


Figure 9. Result of Analysis Item 9

A total of 3.9% of students selected strongly disagree, 6.8% chose disagree, and 39.8% selected neutral. Furthermore, 35% of students chose agree, and 14.6% selected strongly agree. Based on these results, it can be concluded that most students agree that Gemini AI helps them write more effectively and clearly.

The use of Gemini AI has a positive impact on my writing performance.

103 jawaban

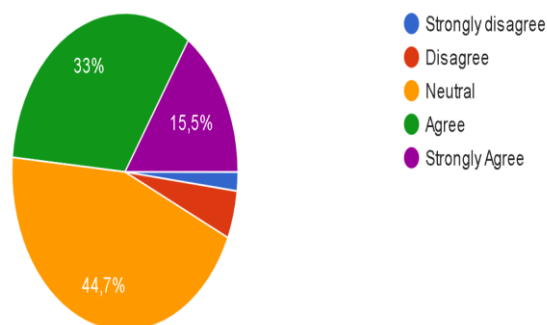


Figure 10. Result of Analysis Item 10

A total of 3.9% selected strongly disagree, 3.9% selected disagree, and 44.7% selected neutral. Furthermore, 33% of students chose agree, and 15.5% selected strongly agree. Based on these results, it can be concluded that students generally have a positive perception of the impact of Gemini AI on their writing performance.

#### 4.2. Discussion

The findings show that students generally have a positive perception of Gemini AI's use in improving their writing skills, as indicated by mean scores ranging from 3.40 to 3.59. Most students agree that Gemini AI helps generate ideas, improve vocabulary and grammar, and organize ideas into clear sentences and paragraphs. The highest mean score is for organizing ideas, indicating that this is the most perceived benefit of the tool.

In addition, students also agree that Gemini AI makes writing tasks easier and helps them write more effectively. However, responses related to confidence in writing show a slightly lower mean and more neutral responses, suggesting that confidence is influenced not only by AI but also by other factors, such as practice and feedback.

Overall, the results indicate that Gemini AI has a positive impact on students' writing, particularly in supporting idea development and writing organization. Nevertheless, the presence of neutral responses suggests that AI still requires proper guidance to maximize its benefits in the learning process.

## 5. CONCLUSION

This study concludes that integrating Gemini AI into the EFL writing process serves as a transformative catalyst that enhances students' writing performance. By functioning as a "More Knowledgeable Other" (MKO), Gemini provides essential scaffolding within the students' Zone of Proximal Development (ZPD), enabling them to achieve higher levels of coherence and master complex sentence structures that they might struggle to reach independently.

In response to the research questions regarding the effectiveness and specific practices of using this tool, the findings indicate that: 1) *Overcoming Psychological Barriers*: Gemini effectively addresses psychological barriers, such as low motivation and a lack of self-assurance, by providing instant linguistic support and automated feedback. 2) *Technical Proficiency*: Students perceive the tool as highly useful for grammar correction, vocabulary enhancement, and triggering creative ideas during the initial drafting phases. 3) *TAM Implementation*: The adoption of Gemini is driven by its "Perceived Ease of Use" in drafting and its "Perceived Usefulness" in refining structural organization.

However, this research emphasizes that the synergy between AI support and human supervision is vital. While Gemini is an invaluable resource for accelerating second-language mastery, structured pedagogical guidance is required to prevent over-dependency and ensure the genuine development of independent writing skills.

## REFERENCES

- [1] K. Azmi and R. Fithriani, "Students' Perceptions of Gemini AI Effectiveness," *IDEAS: Journal on English Language Teaching and Learning, Linguistics and Literature*, 2025.
- [2] B. Bagash and M. Ahmed, "Technology in Language Teaching & Learning: The Effectiveness of AI-Generated Feedback in Enhancing Students' Writing Proficiency: A Study of Google Gemini," 2026.
- [3] E. Hasanah, S. N. Azizah, and F. Febtwenesty, "Gemini AI as a Writing Catalyst: Boosting Fluency, Coherence, and Confidence in EFL Composition," vol. 3, no. 2, pp. 64–77, 2025.
- [4] E. Hasanah and S. N. Azizah, *Gemini AI as a Writing Catalyst: Boosting Fluency, Coherence, and Confidence in EFL Composition*. CV. Doki Course and Training, 2025.
- [5] K. Hyland, *Second Language Writing*. Cambridge: Cambridge University Press, 2019.
- [6] M. Imran and N. Almusharraf, "Google Gemini as a next-generation AI educational tool: A review of emerging educational technology," *Smart Learning Environments*, 2024, doi: 10.1186/s40561-024-00310-z.
- [7] M. Levy and G. Stockwell, *CALL Dimensions: Options and Issues in Computer-Assisted Language Learning*. Mahwah, NJ: Lawrence Erlbaum Associates, 2006.
- [8] N. D. Luat, "Using Gemini for Formative Assessment in English Academic Writing: Critical Insights into the AI Tool's Efficacy," 2025.
- [9] A. D. Nugraha, "Perceptions and Attitudes of Vocational Students in Using Google Gemini as a Writing Tool," 2025.
- [10] A. D. Nugraha, "Perceptions and Attitudes of Vocational Students in Using Google Gemini as a Writing Tool," vol. 13, no. 02, 2025.
- [11] H. E. Putra, R. Antony, M. Dei, J. High, and S. Tangerang, "Journal of Educational Learning and Innovation," vol. 5, no. 2, pp. 48–62, 2025, doi: 10.46229/elia.V5i2.
- [12] A. Rahayu, N. A. Tarihoran, E. Rahmawati, and E. Muslihah, "Navigating the Digital Writing Landscape: EFL Students' Perspectives on ChatGPT Utilization," *International Journal of Learning, Teaching and Educational Research*, vol. 24, pp. 727–752, 2025, doi: 10.26803/ijlter.24.5.37.
- [13] J. C. Richards, *Key Issues in Language Teaching*. Cambridge: Cambridge University Press, 2015.
- [14] I. A. Sartika, "Exploring Students' Perceptions of Using Gemini AI in Writing Skills," vol. 1, no. 1, pp. 15–23, 2025.
- [15] N. Tarihoran, A. Q. Alhourani, Y. Ocaña-Fernandez, J. Alanya-Beltran, and R. M. Hernández, "CALLing the process of writing: Facebook as a language support learning tool in enhancing the EFL learners' online writing performance," *Journal of Language and Linguistic Studies*, vol. 18, 2022.

- [16] N. T. N. Trinh and T. C. Dan, "EFL Students' Perceptions and Practices of Using Gemini for Developing English," *European Journal of Alternative Education Studies*, pp. 167–189, 2025, doi: 10.46827/ejae.v10i3.6428.
- [17] T. T. Hang, B. T. Ly, K. Q. Nga, and N. H. Phuong, "Impacts of Artificial Intelligence Student Guide on Academic Writing among Third-Year Students," 2025.