

ENHANCING EFL STUDENTS' ACADEMIC WRITING PROGRESSION FROM PARAGRAPHS TO ESSAYS USING GEMINI AS AN AI WRITING ASSISTANT

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Abstract

This research article aims to evaluate the effectiveness of Google Gemini as an AI-driven scaffolding tool in facilitating the critical transition from paragraph writing to multi-paragraph essay construction among English as a Foreign Language (EFL) learners. In academic writing, tertiary students often encounter a “cognitive leap” when moving beyond isolated paragraphs, frequently resulting in structural fragmentation and heightened writing anxiety. Drawing upon Vygotsky’s Zone of Proximal Development (ZPD), this study positions Gemini as a “More Knowledgeable Other” (MKO) designed to provide real-time, formative feedback through a structured pedagogical framework. The study employed a convergent parallel mixed-methods design involving 60 undergraduate Business English students at Dhurakij Pundit University, selected through purposive sampling. Over an 8-week intervention in the “Reading and Writing 2” course, participants followed the Gemini Scaffolding Protocol (GSP), which guided them through AI-assisted ideation, structural transitions, and reflective editing. Data were collected using three research tools: pre-tests and post-tests, a satisfaction questionnaire based on the Technology Acceptance Model (TAM), and semi-structured interviews. Quantitative data were analyzed using mean (M), standard deviation (SD), and a dependent samples t-test, while qualitative data from semi-structured interviews conducted with a subgroup of 10 key informants selected from the participants were analyzed using thematic analysis.

Quantitative findings revealed a statistically significant improvement in writing proficiency, with mean scores increasing from 12.45 (Moderate) to 18.82 (High) out of 25. Notably, the most substantial growth was observed in Coherence and Cohesion, suggesting that Gemini effectively helped students bridge the structural gap by mastering transitional logic and thesis development. Survey results indicated a high level of satisfaction ($M = 4.39$), with Perceived Usefulness ($M = 4.52$) emerging as the strongest dimension. Qualitative analysis further demonstrated that Gemini acted as a non-judgmental “private tutor,” which significantly lowered the students’ affective filter and increased their writing confidence. Participants reported that the AI provided “safe space” to experiment with language, shifting their focus from a product-oriented mindset to a dynamic, process-oriented approach. The study concludes that when integrated with proper prompt engineering, Gemini fosters student

autonomy and critical thinking without compromising academic integrity. These results suggest that AI-assisted scaffolding is a vital pedagogical strategy for modern EFL writing instruction in the Thai higher education context.

Keywords: Academic Writing Progression, Gemini, Writing Assistant, English as a Foreign Language, AI Scaffolding

Introduction

Academic writing is a foundational pillar in higher education, serving as the primary vehicle through which tertiary students demonstrate critical thinking, synthesize complex ideas, and contribute to global scholarly discourses (Hyland, 2019). Structurally, its core components encompass not only grammatical precision and lexical variety, but more importantly, macro-level skills such as thesis development, paragraph coherence, organizational transition, and rhetorical stance. For the vast global community of English as a Foreign Language (EFL) learners which currently exceeds 1.5 billion speakers worldwide, including over 20 million students and professionals in the Thai educational system alone mastering these components is often regarded as one of the most daunting academic challenges. The transition from constructing a single, coherent paragraph to developing a structured, multi-paragraph essay represents a significant cognitive and linguistic leap. While a paragraph focuses on a single idea, an essay requires the integration of multiple perspectives, cohesive devices, and a clear thesis statement a transition where many EFL learners struggle due to limited vocabulary, grammatical constraints, and “writing anxiety” (Kurniasih et al., 2023).

With the advent of Artificial Intelligence (AI), the landscape of language teaching has shifted towards AI-Assisted Language Learning (AILL). To support learners in overcoming these linguistic barriers, AI can be strategically deployed as a real-time scaffolding tool rather than a mere automated proofreader. Specifically, Large Language Models (LLMs) like Google Gemini have emerged as powerful tools for “scaffolding” the writing process. Unlike traditional grammar checkers, Gemini functions as a conversational assistant capable of providing formative feedback, generating outlines, and refining transitions (Su & Cheng, 2024). This technology aligns with Vygotsky’s Zone of Proximal Development (ZPD), where the AI acts as a more knowledgeable other (MKO) to bridge the gap between a student’s current ability and their potential performance.

In the Reading and Writing 2 course at the university level, students often demonstrate proficiency in writing isolated sentences or short paragraphs. However, when tasked with essay writing, they frequently encounter “structural fragmentation” an inability to maintain logical flow between paragraphs. Previous studies have explored AI in vocabulary acquisition (Khakheang & Cherngroongroj, 2025), but there is a research gap regarding how Generative AI

specifically facilitates the structural progression from paragraphs to essays in a Thai EFL context.

Furthermore, the integration of Gemini into the writing classroom signifies a pivotal shift from a traditional product-oriented approach to a more dynamic process-oriented pedagogy. In the past, feedback on student writing was often delayed and primarily provided by the instructor after the final draft was submitted. However, the real-time interaction offered by Generative AI allows for “on-the-spot” intervention, enabling students to experiment with sentence variety and structural transitions during the drafting phase (Warschauer & Matuchniak, 2010). In the Thai higher education context, where large class sizes often limit personalized instructor feedback, AI-driven scaffolding serves as a vital bridge to enhance student autonomy and digital literacy. By utilizing Gemini not merely as a generator but as a reflective partner, students are encouraged to engage in higher-order thinking, critically evaluating the AI's suggestions to ensure their voice remains central to the essay (Kritpet et al., 2024).

Ultimately, the critical research problem identified in this context is the lack of a structured pedagogical model that helps EFL students bridge the cognitive gap between localized paragraph writing and global essay organization under real-time constraints. This specific problem interested the researcher because while students can write individual paragraphs, their proficiency plummets during macro-structural transitions, and traditional classroom feedback cannot be scaled to meet this need. Investigating how Google Gemini mitigates this structural fragmentation provides a scalable solution to student writing anxiety and autonomy. Therefore, this study was conducted to empirically evaluate the effectiveness of Gemini as a scaffolding tool to enhance students' structural writing progression and to explore their satisfaction with this AI-driven approach. This overarching objective directly connects to and dictates the subsequent research methodology, data analysis, and pedagogical framework detailed in the following sections of this article.

Research Objectives

1. To evaluate the improvement of EFL students' academic writing skills in transitioning from paragraphs to essays after using Gemini.
2. To explore students' perceptions and satisfaction levels regarding the use of Gemini as an AI writing assistant.

Methodology

This methodology provides a comprehensive description of the research design, participants, instruments, pedagogical procedures, and analytical frameworks employed to investigate the effectiveness of Gemini as a scaffolding tool for transitioning EFL students from paragraph to essay writing.

1. Research Design

The study utilizes convergent parallel mixed-methods design. This approach allows for the simultaneous collection and analysis of quantitative data (test scores and survey results) and qualitative data (interviews and student writing samples). By triangulating these data sources, the researcher can gain a more nuanced understanding of how Gemini influences the writing process and how students perceive its pedagogical value (Creswell & Plano Clark, 2018).

2. Population and Sampling

The target population for this study comprised all undergraduate students enrolled in Reading and Writing 2 course within Business English Program, the Faculty of Arts at Dhurakij Pundit University during the second semester of the academic year. The participants were a sample of 60 undergraduate students majoring in Business English at the Faculty of Arts, Dhurakij Pundit University. They were enrolled in the Reading and Writing 2 course, a second-semester foundational subject.

2.1 Sampling Technique: Purposive sampling was used to select this specific cohort from the total population, as they were at the critical juncture of moving from “Basic Paragraph Writing” to “Academic Essay Composition.”

2.2 Key Informants for Qualitative Strand: To further explain the quantitative findings, a sub-group of 10 key informants were selected from the 60 participants using purposive sampling based on their post-test scores (representing high, medium, and low writing progression) to participate in follow-up semi-structured interviews.

2.3 Proficiency Level: Participants had an English proficiency range of A2 to B1 (CEFR), established by their grades in the previous “Reading and Writing 1” course.

2.4 AI Familiarity: A preliminary survey indicated that while students were aware of Generative AI, none had previously used Gemini for structured academic writing purposes.

3. Research Instruments

No.1 Writing Assessments (Pre-test and Post-test):

- **The Pre-test:** Students were required to write a single 150-word paragraph on “The Advantages of Online Learning.”
- **The Post-test:** After the intervention, students wrote a 500-word four-paragraph essay on “The Impact of Artificial Intelligence on Modern Education.”
- **Scoring Rubric:** Both tasks were assessed using a modified version of the IELTS Writing Task 2 Rubric, focusing on four criteria: 1 Task Response, 2. Coherence and Cohesion, 3. Lexical Resource, and 4. Grammatical Range and Accuracy (Hyland, 2019). To ensure grading reliability, two independent inter-raters scored the papers.

No.2 Gemini Scaffolding Protocol (GSP): The core intervention was the Gemini Scaffolding Protocol, which provided students with a structured framework for interacting with AI. The protocol was divided into three stages:

1. Ideation & Outlining: Students used prompts like “Help me brainstorm three main arguments for.....” and “Create a five-paragraph essay outline based on these points.”

2. Structural Transitions: Students asked, “How can I link my first body paragraph about [Point A] to my second body paragraph about [Point B] using a transition word?”

3. Refining and Editing: Instead of asking Gemini to “write,” students were taught to ask, “Review my thesis statement for clarity and suggest two ways to improve it.”

No.3 Satisfaction Questionnaire: A 20-item questionnaire was developed, based on the Technology Acceptance Model (TAM) (Davis, 1989). It measured four dimensions on a 5-point Likert scale: Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Attitude Toward Usage (ATU), and Facilitating Conditions (FC).

4. Instructional Procedures

The 8-week intervention was structured as follows to rigorously balance the quantitative treatment and the qualitative data generation:

- **Weeks 7-8 (Baseline):** Pre-test administration (Quantitative baseline data collection) and review of paragraph structure.

- **Week 9 (AI Literacy):** Introduction to Gemini. Students were taught Prompt Engineering—specifically the “Act-as, Task, Constraint” framework (e.g., “Act as an English tutor, help me outline this essay, use formal academic tone”).

- **Weeks 10-12 (The Scaffolding Phase):** Students drafted the essay. During this phase, the instructor acted as a facilitator, ensuring students used Gemini for feedback rather than substitution. Students maintained weekly writing logs documenting their AI prompts and revised drafts, which served as qualitative artifacts.

- **Week 13 (Final Polish):** Peer review session where students used Gemini to explain the grammatical errors found in their peers' work.

- **Week 14 (Evaluation):** Post-test and questionnaire administration (Quantitative outcome data collection), followed by face-to-face semi-structured interviews with the 10 key informants to gather descriptive insights into their lived experiences and cognitive shifts during the AI-scaffolded writing process (Qualitative data collection).

5. Ethical Considerations

To ensure ethical standards, all participants provided informed consent. They were informed that their participation was voluntary and that their data would be anonymized. Furthermore, the “Human-in-the-loop” principle was emphasized to ensure students maintained academic integrity while using AI tools (Kritpet et al., 2024).

6. Data Analysis

To fulfill the convergent parallel mixed-methods design, quantitative and qualitative data were analyzed separately and then integrated during the interpretation phase:

Quantitative Data Analysis: Descriptive statistics, including mean (M) and standard deviation (SD), were calculated to analyze the TAM satisfaction questionnaire results. Inferential statistics, specifically a dependent samples t-test, were computed to compare the mean scores of the pre-test and post-test to determine statistically significant improvements in student writing proficiency ($p < .05$). Qualitative Data Analysis: The qualitative data obtained from the semi-structured interview transcriptions and student writing logs were analyzed using inductive thematic analysis (Braun & Clarke, 2006). This involved data familiarization, initial code generation, searching for overarching themes, and reviewing named themes to extract deep pedagogical patterns regarding how Gemini facilitated the students' macro-structural writing progression.

Results

This part reports the findings of the study, structured according to the two main research objectives. The results combine quantitative data from assessments and surveys with qualitative insights from student interviews and writing samples to provide a comprehensive view of how Gemini facilitated the transition from paragraph to essay writing.

Objective 1: Evaluation of Academic Writing Skill Improvement

The first objective was to evaluate whether students' writing skills improved as they moved from simple paragraph writing to academic essays using Gemini as a scaffolding tool.

Comparison of Pre-test and Post-test Writing Performance

The primary data source for writing improvement was the comparison between the baseline Pre-test (a 150-word paragraph) and the Post-test (a 500-word four-paragraph essay).

Table 1: Quantitative Comparison of Writing Scores (N=60)

Assessment	Mean (M)	Std. Deviation (SD)	Interpretation
Pre-test (Paragraph)	12.45	2.15	Moderate
Post-test (Essay)	18.82	2.48	High

The data in Table 1 shows a notable increase in the average writing scores, which rose from 12.45 to 18.82 out of 25. From a descriptive perspective, this indicates that the students' writing ability moved from a "moderate" level to a "high" level of proficiency. What makes this finding particularly significant is the difference in task difficulty. In the pre-test, students only had to focus on a single topic sentence and a few supporting details. However, in the post-test, they were required to maintain a clear argument across four paragraphs, including an introduction with a thesis statement and a formal conclusion. The fact that their scores increased despite the post-test being significantly more demanding suggests that Gemini effectively acted as a "bridge," helping students handle the increased complexity of essay writing.

Improvement in Specific Writing Criteria

When looking closely at the scoring criteria, the narrative of improvement becomes even clearer. Students showed growth across all four areas of the rubric:

- **Coherence and Cohesion:** This area saw the most dramatic improvement. In the pre-test, students often struggled to link sentences logically. After the Gemini intervention, students were able to use transitional phrases (e.g., “Furthermore,” “In contrast,” “Consequently”) more effectively to connect ideas between different paragraphs.

- **Task Response:** Students demonstrated a better understanding of how to develop an academic argument. With the help of Gemini’s outlining scaffolding, their essays were more organized and stayed on topic, whereas pre-test paragraphs often wandered into irrelevant details.

- **Lexical Resource and Grammar:** While students still made some minor errors, the post-test essays showed a wider range of academic vocabulary and more complex sentence structures. Gemini’s feedback helped students replace simple words with more formal academic alternatives suitable for a university-level essay.

Objective 2: Student Perceptions and Satisfaction

The second objective was to explore the students' attitudes toward using Gemini. The results are based on a 5-point Likert scale questionnaire (1 = Strongly Disagree to 5 = Strongly Agree).

Quantitative Survey Results (TAM Model)

The survey measured four dimensions of technology acceptance. The results indicate that the 60 Business English students had a very positive experience with the tool.

Table 2: Student Satisfaction with Gemini AI Scaffolding (N=60)

Dimension	Mean (M)	SD	Level of Satisfaction
1. Perceived Usefulness	4.52	0.54	Strongly Agree
2. Perceived Ease of Use	4.38	0.62	Agree
3. Attitude Toward Usage	4.45	0.58	Agree
4. Facilitating Conditions	4.20	0.71	Agree
Overall Average	4.39	0.61	High Satisfaction

The high score in Perceived Usefulness (4.52) is the most important takeaway. It shows that students didn't just find Gemini "fun" to use, but they genuinely felt it made them better writers. They perceived the AI as a valuable assistant that helped them organize their thoughts and refine their language.

Qualitative Insights: Student Experience

Through interviews and observations, several descriptive themes emerged regarding how students felt about the process:

- **Reduced “Writing Anxiety”:** Many students at DPU reported that writing a long essay usually felt overwhelming. However, using Gemini to help with the initial brainstorming and outlining made the task feel manageable. Students felt they had a “starting point” which gave them the confidence to begin writing.
- **The “Private Tutor” Effect:** Students appreciated having a tool that could give them instant feedback at any time of day. They mentioned that they felt comfortable “asking silly questions” or “checking simple grammar” with the AI before showing their work to the teacher. This private interaction helped them learn from their mistakes without fear of being judged.
- **Focus on Process, Not Just Result:** During the intervention, it was observed that students became more curious about *why* certain words were better than others. Because Gemini could explain the reasoning behind its suggestions, students felt they were actually “learning” how to write better, rather than just getting a corrected paper.

Discussion

This final part synthesizes the findings of the study, providing an in-depth discussion on the role of Gemini in facilitating the transition from paragraph to essay writing. It also outlines the pedagogical implications, limitations, and recommendations for future research.

Discussion

The results of this study offer a rich narrative on how Generative AI, specifically Gemini, can be integrated into the EFL classroom as a transformative scaffolding tool. By aligning the quantitative metrics with the qualitative insights, the discussion demonstrates empirical consistency across all dimensions of writing proficiency, technology acceptance, and affective shifts.

Bridging the Structural Gap through AI Scaffolding

The most striking finding was the students' ability to successfully transition from 150-word paragraphs to 500-word academic essays. In the past, this “structural jump” has been a major source of cognitive overload for EFL learners (Hyland, 2019). However, the significant improvement in Coherence and Cohesion scores observed in the post-test suggests that Gemini served as a critical “bridge.” By providing logical outlines and suggesting transitional phrases, Gemini acted as the More Knowledgeable Other (MKO) within the students' Zone of Proximal Development (Vygotsky, 1978). Instead of being lost in the complexity of a multi-paragraph structure, students were able to focus on the logical flow of their arguments. This confirms that AI scaffolding is not about “dumbing down” the task, but about providing the structural support necessary for students to reach higher levels of discourse competence. This

structural leap aligns closely with the findings of Su and Cheng (2024), who reported that structured LLM scaffolding directly enhances the rhetorical organization of Chinese EFL writers, and mirrors the localized progression patterns observed by Khlakheang and Cherngroongroj (2025) in Thai higher education settings.

The “Private Tutor” and the Affective Filter

The high levels of student satisfaction ($M = 4.39$) and the overwhelming agreement in the Perceived Usefulness dimension ($M = 4.52$) are directly corroborated by the qualitative interview data. Unlike traditional teacher feedback, which can sometimes be intimidating or delayed, Gemini provided immediate, non-judgmental, and private feedback. This environment significantly lowered the students' “Affective Filter,” allowing them to experiment with language and structure without the fear of immediate academic penalty (Krashen, 1982). The qualitative data revealed that students viewed Gemini as a “safe space” to practice. This finding suggests that the value of AI in language learning is not just cognitive but also emotional, fostering a sense of confidence and autonomy that is essential for long-term writing development. These affective benefits validate previous TAM-based language studies, such as Kurniasih et al. (2023), which emphasized that reducing writing anxiety through immediate AI interventions leads to higher perceived ease of use and long-term user satisfaction.

Promoting Process-Oriented Writing and Critical Thinking

One of the most important aspects of the discussion is the “Human-in-the-loop” principle. The study found that when students followed the Gemini Scaffolding Protocol (GSP), they did not become passive recipients of AI-generated content. Instead, they became active editors. Students were forced to engage in “noticing” (Schmidt, 1990)—comparing their original drafts with Gemini’s suggestions and deciding which changes to implement. This interaction transformed writing from a one-time “product” into a dynamic “process.” This dynamic process accounts for the statistically significant proficiency gain (from 12.45 to 18.82) yielded by the quantitative analysis. It demonstrates that if taught correctly through prompt engineering, AI tools can enhance critical thinking and language awareness rather than encouraging academic dishonesty. This crucial outcome reinforces the pedagogical model proposed by Kritpet et al. (2024), which demonstrates that when AI is utilized as a reflective partner rather than a text generator, students maintain academic integrity and strengthen their higher-order cognitive skills.

Body of Knowledge

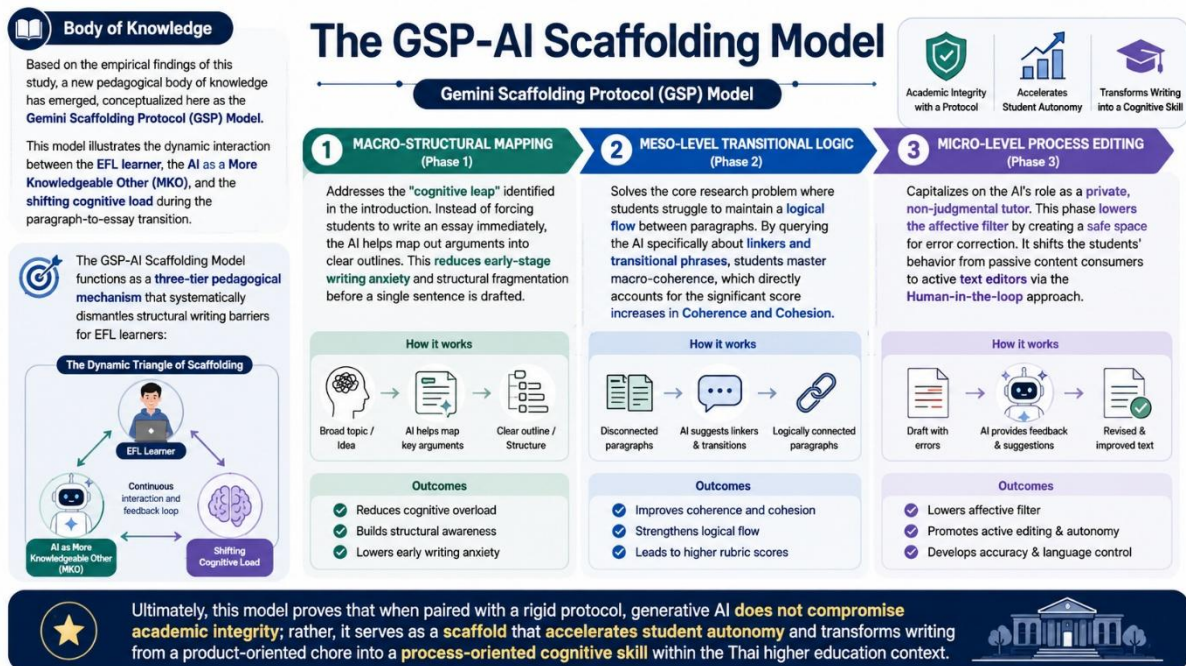


Figure 1: The GSP-AI Scaffolding Model

Based on the empirical findings of this study, a new pedagogical body of knowledge has emerged, conceptualized here as the Gemini Scaffolding Protocol (GSP) Model. This model illustrates the dynamic interaction between the EFL learner, the AI as a More Knowledgeable Other (MKO), and the shifting cognitive load during the paragraph-to-essay transition. The GSP-AI Scaffolding Model functions as a three-tier pedagogical mechanism that systematically dismantles structural writing barriers for EFL learners:

1. Macro-Structural Mapping (Phase 1): Addresses the "cognitive leap" identified in the introduction. Instead of forcing students to write an essay immediately, the AI helps map out arguments into clear outlines. This reduces early-stage writing anxiety and structural fragmentation before a single sentence is drafted.

2. Meso-Level Transitional Logic (Phase 2): Solves the core research problem where students struggle to maintain a logical flow between paragraphs. By querying the AI specifically about linkers and transitional phrases, students master macro-coherence, which directly accounts for the significant score increases in Coherence and Cohesion.

3. Micro-Level Process Editing (Phase 3): Capitalizes on the AI's role as a private, non-judgmental tutor. This phase lowers the affective filter by creating a safe space for error correction. It shifts the students' behavior from passive content consumers to active text editors via the Human-in-the-loop approach.

Ultimately, this model proves that when paired with a rigid protocol, generative AI does not compromise academic integrity; rather, it serves as a scaffold that accelerates student autonomy and transforms writing from a product-oriented chore into a process-oriented cognitive skill within the Thai higher education context.

Conclusion and Recommendations

In conclusion, this study demonstrates that Google Gemini is an effective and well-received scaffolding tool for university-level EFL writers. It successfully helped 60 Business English students at Dhurakij Pundit University navigate the difficult transition from paragraph writing to essay writing. The intervention led to significant improvements in writing quality, particularly in structural organization and coherence. Furthermore, the positive perceptions of the students highlight a shift in how learners view AI from a simple search engine to a sophisticated, collaborative writing partner.

Pedagogical Implications

1. Redefining the Teacher's Role: Teachers should shift from being the sole providers of feedback to being facilitators of AI-human interaction. The focus should be on teaching students how to “talk” to the AI (Prompt Engineering) to get the most beneficial scaffolding.

2. Integration into the Curriculum: AI-assisted writing should be formally integrated into foundational writing courses. By using tools like Gemini during the drafting phase, instructors can help students overcome writing anxiety and build structural foundations early in their academic careers.

Limitations and Recommendations for Future Research

While the results of this study are promising, several limitations must be acknowledged, which in turn present valuable avenues for application and future investigation. To maximize the pedagogical and scholarly utility of these findings, the following recommendations are proposed:

Pedagogical Recommendations for Educational Practice

1. Structured AI Literacy and Prompt Engineering Integration: Educational institutions should not merely grant students access to GenAI tools, but should explicitly integrate systematic prompt engineering frameworks—such as the “Act-as, Task, Constraint” model utilized in the GSP—into the core curriculum. This ensures that AI functions as an intellectual scaffold rather than an automated text generator.

2. Professional Development for Faculty Facilitators: In Thai higher education contexts characterized by large class sizes, instructors should be trained to transition from traditional direct evaluators to proactive learning facilitators. Training should focus on monitoring the “Human-in-the-loop” approach, ensuring that students critically evaluate AI feedback and maintain absolute academic integrity.

Recommendations for Future Research

1. Longitudinal Tracking of Skill Retention: Future studies should investigate the long-term retention of macro-structural writing skills among EFL learners. Longitudinal research designs are needed to assess whether students sustain high levels of coherence and cohesion in their essay construction after the AI scaffolding is completely faded or removed.

2. Comparative Analysis of Diverse Large Language Models (LLMs): Empirical replication studies should expand beyond a single platform to compare the pedagogical efficacy of Google Gemini with other advanced LLMs, such as ChatGPT or Claude. This will help identify which underlying algorithmic architecture provides the most linguistically precise and “pedagogically sound” feedback for foreign language learners.

3. Sample Diversification and Cross-Institutional Validation: To enhance the external validity and generalizability of the GSP model, future research should scale up the sample size beyond the 60 Business English students at Dhurakij Pundit University. Cross-institutional studies involving diverse student demographics, varying baseline proficiency levels, and public-private university comparisons are highly recommended.

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