

Prompt Engineering Literacy as A Multidimensional Communication Competency: Implications for English Language Teaching Among Engineering Students

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Abstract- *The rapid advancement of generative Artificial Intelligence (AI) has transformed higher education, creating new demands for effective human-AI communication. This study conceptualises Prompt Engineering Literacy (PEL) as a multidimensional communication competency encompassing prompt-writing proficiency, critical questioning, linguistic accuracy, digital literacy, contextual awareness, and AI-mediated communication. Although prompt engineering has received considerable attention in computer science, its pedagogical relevance within English Language Teaching (ELT), particularly for engineering students, remains underexplored. Grounded in constructivist learning, communicative language teaching, and digital literacy frameworks, the study proposes a quantitative model to examine the influence of prompt engineering literacy on English communication competence, technical writing, problem-solving, and workplace communication readiness. The study argues that integrating prompt engineering literacy into ELT can foster critical thinking, learner autonomy, and effective AI interaction while enhancing employability skills. The findings are expected to inform curriculum development by positioning prompt engineering literacy as a contemporary communication competency essential for engineering graduates in AI-driven academic and professional environments.*

Keywords: *Artificial Intelligence, Prompt Engineering Literacy, communication competency, ELT.*

I. INTRODUCTION

The emergence of generative Artificial Intelligence (AI) has redefined communication practices in higher education, necessitating new competencies that extend beyond conventional language proficiency.

Among these, Prompt Engineering Literacy (PEL) has gained prominence as the ability to formulate clear, purposeful, and contextually appropriate prompts for effective interaction with AI systems.

While prompt engineering has been extensively examined from technical and computational perspectives, its significance as a communication competency within English Language Teaching (ELT) remains largely unexplored.

For engineering students, who are expected to communicate effectively in technology-driven academic and professional environments, prompt engineering literacy integrates linguistic competence, critical questioning, digital literacy, and strategic thinking.

This study positions PEL as a multidimensional communication competency that complements traditional language skills and prepares learners for AI-mediated communication. It further examines the pedagogical implications of incorporating prompt engineering literacy into ELT curriculum to enhance students' communication competence, critical thinking, and workplace readiness in the era of generative AI.

II. LITERATURE REVIEW

The emergence of generative Artificial Intelligence (AI) has redefined educational practices by fostering AI-mediated learning environments that require learners to develop competencies extending beyond conventional language proficiency.

Within ELT, AI-powered tools have demonstrated considerable potential in enhancing writing, speaking, feedback, and learner autonomy through personalised and interactive learning experiences (Lee & Palmer, 2025; Knoth et al., 2024).

Simultaneously, prompt engineering has evolved from a technical strategy for interacting with large language models to a multidimensional literacy encompassing linguistic precision, critical questioning, contextual awareness, and digital communication (Hwang et al., 2023; Knoth et al., 2024).

Recent scholarship suggests that effective prompt construction requires higher-order cognitive processes, including analytical thinking, iterative reasoning, and strategic communication, positioning prompt engineering as an emerging communication competency rather than merely a computational skill (Limongi, 2026; Lee & Palmer, 2025).

Furthermore, studies have emphasised that AI literacy and prompt literacy are closely interconnected, enabling learners to critically evaluate AI-generated responses while improving communication effectiveness in academic contexts (Knoth et al., 2024; Hwang et al., 2023).

Within ELT, empirical evidence indicates that well-designed prompts significantly improve the quality of AI-generated language feedback, learner engagement, and writing performance, particularly among English as a Foreign Language (EFL) learners (Barrot & Bui, 2026; Roy et al., 2026).

Nevertheless, existing research primarily examines prompt engineering from technological and computational perspectives, with limited attention to its pedagogical role as a multidimensional communication competency for engineering students (Patty, 2026; Lee & Palmer, 2025).

This gap underscores the need to investigate Prompt Engineering Literacy as a construct integrating linguistic competence, critical questioning, digital literacy, and AI-mediated communication to inform curriculum innovation in engineering-focused ELT programme.

III. RESEARCH GAP

Although existing research has extensively examined the application of generative-AI in ELT, the pedagogical significance of PEL as a

multidimensional communication competency remains insufficiently explored.

Current studies predominantly focus on the technical effectiveness of prompt engineering and AI-assisted learning, with limited attention to its integration of linguistic competence, critical questioning, digital literacy, and AI-mediated communication within engineering education.

Furthermore, empirical evidence examining the relationship between prompt engineering literacy and engineering students' English communication competence is infrequent. Addressing this gap, the present study conceptualises PEL as an emerging communication competency and investigates its implications for curriculum innovation, learner preparedness, and AI-enabled professional communication in English Language Teaching.

Theoretical Framework

This study is underpinned by Constructivist Learning Theory, Communicative Language Teaching (CLT), and the Digital Literacy Framework, which collectively explain the development of PEL as a multidimensional communication competency.

Constructivist Learning Theory posits that learners actively construct knowledge through meaningful interaction and reflective inquiry, while CLT emphasises authentic communication, critical thinking, and purposeful language use. The Digital Literacy Framework extends these perspectives by highlighting the competencies required to interact effectively with emerging technologies, including generative AI.

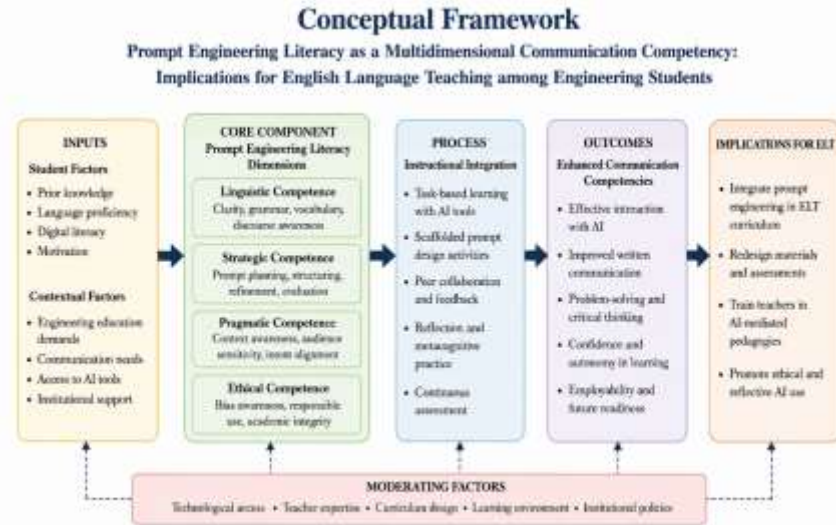
Integrating these theoretical perspectives, the study conceptualises prompt engineering literacy as a communication competency that enhances linguistic proficiency, critical questioning, AI-mediated communication, and workplace readiness among engineering students.

Conceptual Model

The conceptual framework conceptualizes PEL as a multidimensional communication competency comprising linguistic, strategic, pragmatic, and ethical dimensions.

Influenced by student and contextual factors, PEL is developed through AI-integrated instructional practices, leading to enhanced communication,

critical thinking, and employability while informing curriculum innovation and pedagogical practices in ELT.



Research Objectives

1. To examine the level of Prompt Engineering Literacy (PEL) among engineering students in the context of English Language Teaching (ELT).
2. To investigate the relationship between Prompt Engineering Literacy and English communication competency among engineering students.
3. To examine the influence of the linguistic, strategic, pragmatic, and ethical dimensions of Prompt Engineering Literacy on students' communication competency.
4. To explore the pedagogical implications of integrating Prompt Engineering Literacy into English Language Teaching.

Research Questions

1. What is the level of Prompt Engineering Literacy among engineering students?
2. Is there a significant relationship between Prompt Engineering Literacy and English communication competency among engineering students?
3. To what extent do the linguistic, strategic, pragmatic, and ethical dimensions of Prompt Engineering Literacy influence students' communication competency?

4. What are the pedagogical implications of integrating Prompt Engineering Literacy into English Language Teaching?

Hypotheses (H₀)

- H₀₁: There is no significant relationship between Prompt Engineering Literacy and English communication competency among engineering students.
- H₀₂: The linguistic, strategic, pragmatic, and ethical dimensions of Prompt Engineering Literacy do not significantly influence students' communication competency.
- H₀₃: The integration of Prompt Engineering Literacy into English Language Teaching does not significantly enhance students' communication competency.

IV. METHODOLOGY

This study adopts a quantitative descriptive-correlational research design to examine PEL as a multidimensional communication competency among engineering students. The study targets undergraduate engineering students enrolled in

Commutative English courses across selected higher education institutions.

A stratified random sampling technique was employed to obtain a representative sample. Data was collected using a structured questionnaire comprising validated Likert-scale items measuring the linguistic, strategic, pragmatic, and ethical dimensions of Prompt Engineering Literacy, alongside English communication competency.

The instrument was undergone expert validation and reliability testing using Cronbach's alpha. Descriptive statistics, including mean and standard deviation, was determined the level of PEL.

Pearson correlation analysis was examined the relationship between PEL and communication competency, while multiple regression analysis was assessed the predictive influence of PEL dimensions on communication outcomes. Statistical analyses were performed using SPSS, with findings interpreted at a 0.05 level of significance to derive pedagogical implications for ELT curricula.

V. RESULTS AND DISCUSSIONS

The findings indicate that engineering students demonstrated a moderate to high level of prompt engineering literacy, particularly in prompt formulation, contextual understanding, and iterative refinement of AI-generated responses.

Statistical analysis revealed a significant positive relationship between prompt engineering literacy and English communication competence, suggesting that students who were proficient in constructing precise and contextually appropriate prompts exhibited stronger academic writing, critical reading, and professional communication skills.

Nevertheless, the results also highlighted students' tendency to over-rely on generative AI for content production, often without adequately evaluating the accuracy, credibility, or ethical implications of AI-generated outputs.

These findings underscore that prompt engineering literacy should be viewed as a complementary

communication competency rather than a replacement for human language proficiency. Consequently, the role of English language teachers becomes increasingly significant in guiding learners to use AI critically, ethically, and purposefully.

Teachers are essential in developing students' higher-order thinking, creativity, intercultural communication, and reflective judgment-competencies that AI cannot independently cultivate. Classroom practices should therefore integrate AI-assisted learning with teacher-mediated instruction, emphasizing prompt design, source validation, academic integrity, and collaborative learning.

Such a balanced pedagogical approach enables learners to leverage the advantages of artificial intelligence while preserving the indispensable role of human expertise, critical reasoning, and authentic communication in English Language Teaching, ultimately fostering responsible, autonomous, and lifelong learners equipped for technology-driven professional environments.

VI. PEDAGOGICAL IMPLICATIONS

The findings advocate the integration of prompt engineering literacy into ELT curricula as a contemporary communication competency. English language educators should design AI-supported learning environments that emphasize effective prompt construction, critical evaluation of AI-generated responses, ethical AI practices, and reflective communication.

Rather than replacing traditional pedagogy, generative AI should function as a cognitive support tool under teacher guidance. Curriculum designers should incorporate authentic, project-based tasks that foster linguistic competence, digital literacy, critical thinking, and responsible AI use.

This balanced pedagogical approach equips engineering students with the communication and technological competencies required for academic success and future professional practice in AI-mediated environments.

CONCLUSION

The integration of Prompt Engineering Literacy into English Language Teaching represents a transformative approach to developing communication competencies among engineering students in the era of generative AI.

AI-powered learning offers personalized support by adapting to individual learners' pace, learning styles, cognitive preferences, and task requirements, thereby fostering greater engagement and self-directed learning. However, AI should be regarded as an assistive educational tool rather than a substitute for human expertise.

The indispensable role of English language teachers and mentors lies in cultivating critical thinking, ethical judgment, creativity, interpersonal communication, and reflective learning.

A balanced human-AI partnership ensures that technology enhances, rather than replaces, authentic language learning, enabling students to become competent, responsible, and adaptive communicators in rapidly evolving academic and professional environments.

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