Decoding Dispositions: Attitudes of Indian Engineering Students Towards AI in the ESL Classroom and its Correlation with Academic Performance

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***Abstract*—This paper investigates the complex relationship between engineering students' attitudes toward AI-integrated English language learning and their academic outcomes. As AI tools increasingly reshape educational paradigms, understanding student dispositions is crucial for effective pedagogical integration. Conducted in the Indian higher education context, the research employs a sequential mixed-methods design, beginning with a quantitative survey of 250 engineering students, followed by semi-structured interviews with 25 students and 15 English language educators. Quantitative findings reveal a significant paradox. While students report high perceived utility of AI and strongly value human instruction, a moderate negative correlation ($r=-0.42$, $p<.001$) exists between an attitude of over-reliance and academic performance. Furthermore, regression analysis shows that students' confidence in detecting AI errors is more strongly predicted by their technical discipline than their demonstrated language proficiency, indicating a critical overconfidence dilemma. The qualitative data substantiates these findings, with educators expressing alarm over skill atrophy and the uncritical acceptance of AI-generated "hallucinations", a tendency students confirmed. The study argues that for engineering students, this overconfidence, born from their technical identity, creates a significant blind spot, leading them to outsource foundational critical thinking and writing skills. While AI offers powerful tools, its unmanaged integration risks promoting intellectual passivity and undermining long-term communicative competence. The study concludes by recommending the integration of AI within structured pedagogical frameworks that balance technological support with active, teacher-led development of critical evaluation skills. For engineering educators, the findings highlight the need to embed structured AI literacy, critical evaluation of machine-generated text, and teacher-guided verification practices into ESL coursework to prevent skill atrophy and promote long-term communicative competence.**

***Keywords*—Academic performance; AI-integrated English language learning; Engineering education; ESL classroom; Pedagogical integration; Student attitudes.**

***ICTIEE* Track—Innovative Pedagogies and Active Learning.**

ICTIEE Sub-Track—Inquiry-Based Learning in Fostering Curiosity and Critical Thinking among GenZ.

I. INTRODUCTION

THE dawn of artificial intelligence (AI) has sparked a veritable revolution in higher education, fundamentally redefining how knowledge is acquired, processed, and applied, especially by engineering students who are at the technological vanguard of this transformation (Zhang et al., 2025). Across global campuses, the integration of AI tools into English as a Second Language (ESL) classrooms is accelerating at an unprecedented pace, supporting language acquisition, enhancing content creation, automating feedback, and streamlining assessment processes (Zhang et al., 2024; Jegede, 2024). These AI-driven systems promise personalized learning paths and new efficiencies, customising instruction and feedback to each student's needs, yet they simultaneously introduce complex pedagogical, cognitive, and ethical complexities that cannot be ignored from the outset (El Badaoui & Ben Lazaar, 2024).

Engineering students, due to their early and intense exposure to emerging technologies, constitute a uniquely consequential demographic for examining the impact of AI-enhanced ESL education (Javed, 2024). Their technological fluency fuels eager adoption and confidence in leveraging AI for academic gain, but this very enthusiasm creates a core tension: the risk that foundational skills—critical thinking, original writing, and fact-checking—may be inadvertently eroded in the face of persuasive AI-generated outputs.

In recent years, scholars focusing on the Indian context have explored these dynamics within Indian classrooms, shedding

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light on regionally specific trends and challenges (Subaveerapandiyan et al., 2025; Stöhr et al., 2024). Recent studies indicate that undergraduates in India demonstrate a higher-than-average inclination to integrate AI into language learning (Murshid & Peter, 2025); however, they often exhibit uneven competence in critically evaluating AI outputs, raising concerns over language accuracy and academic integrity.

Despite proliferating research into AI's educational promise, the literature reveals a clear gap: there is limited understanding of how engineering students' attitudes toward AI in the ESL classroom relate to their actual academic performance, and little is known about the benefits and drawbacks perceived by both students and educators. This study addresses that gap by providing evidence crucial for educators, curriculum designers, and policymakers who seek to harness AI's advantages while safeguarding the integrity of language education and critical reasoning. The following research questions guide this inquiry:

1. What are engineering students' attitudes toward AI-integrated English language learning?
2. Is there a measurable correlation between these attitudes and academic performance in language proficiency assessments?
3. What benefits and challenges do both students and educators perceive in the integration of AI into ESL pedagogy?

By addressing these questions, the study aims to inform curriculum design, instructional practices, and educational policy, ensuring AI serves as a tool that complements, rather than replaces, human mentorship and critical engagement in language education.

II. LITERATURE REVIEW

The integration of artificial intelligence (AI) into higher education has catalysed a profound shift in pedagogical paradigms, particularly within English as a Second Language (ESL) learning (Bauer et al., 2025; Jegede, 2024). A growing body of empirical research highlights the dual nature of AI's impact, presenting it as a veritable double-edged sword. While research from China (Bai & Wang, 2025; Fan et al., 2025) demonstrates the tangible benefits of generative AI in enhancing students' creative self-efficacy and learning outcomes, it's crucial to consider that these benefits often depend on the quality of interaction and student agency (Khan & Sarkar, 2025). Indeed, this positive impact stands in tension with warnings that uncritical reliance on AI may promote superficial learning and lead to the atrophy of essential critical thinking skills (Zhai, Wibowo, & Li, 2024). Similarly, a mixed-methods study in Bangladesh found that AI-assisted language assessment reduced student anxiety and led to improved writing performance (Biju et al., 2024). However, the generalizability of such findings to all contexts, particularly those with differing educational infrastructures or student digital literacies, warrants further examination, especially when considering the potential for over-reliance. This tension highlights the urgent need for pedagogical frameworks that teach students not just how to *use* AI, but how to *critically engage* with it, a sentiment reflected in calls for balanced guidelines promoting AI literacy (Cacho, 2024; Woo et al., 2024).

This complex dynamic is especially pertinent for engineering students, a demographic positioned at the vanguard of technological adoption. Their inherent technical fluency often translates into a high degree of confidence and enthusiasm for utilizing AI tools in their academic work (Javed, 2024). However, this very confidence can mask a critical vulnerability. Specifically, this technical self-assurance may lead engineering students to apply an uncritical trust to AI outputs in domains where their foundational knowledge, such as language nuances or rhetorical structures, might be less developed. Within the Indian context, this trend is particularly pronounced. Research indicates that while Indian undergraduates exhibit a higher-than-average propensity to adopt AI for language learning (Murshid & Peter, 2025), they often lack the sophisticated skills needed to critically evaluate AI-generated content for accuracy and integrity (Subaveerapandiyan et al., 2025). This suggests a disconnect where technical competence might mistakenly translate into perceived linguistic competence or critical evaluation skill when interacting with AI. This aligns with findings from other contexts, which show that favourable attitudes toward AI do not necessarily correlate with preparedness for its ethical implications (Acosta-Enriquez et al., 2024). This particular context highlights a critical gap in the literature: despite the proliferation of research on AI in education, a systematic investigation connecting the attitudes of Indian engineering students toward AI in the ESL classroom with their measurable academic performance remains largely unexplored. The enthusiasm for AI adoption among this cohort, especially in India, presents a unique challenge: a high propensity for use coupled with a potential lack of critical evaluation skills. This gap is not merely theoretical; it has significant implications for academic integrity and the development of genuine language proficiency. When students uncritically accept AI-generated text, they may bypass the cognitive processes essential for deep learning, such as syntactic construction, vocabulary acquisition, and the nuances of rhetorical expression (Kosmyna et al., 2025; Elsayed, 2024). This reliance, while seemingly efficient in the

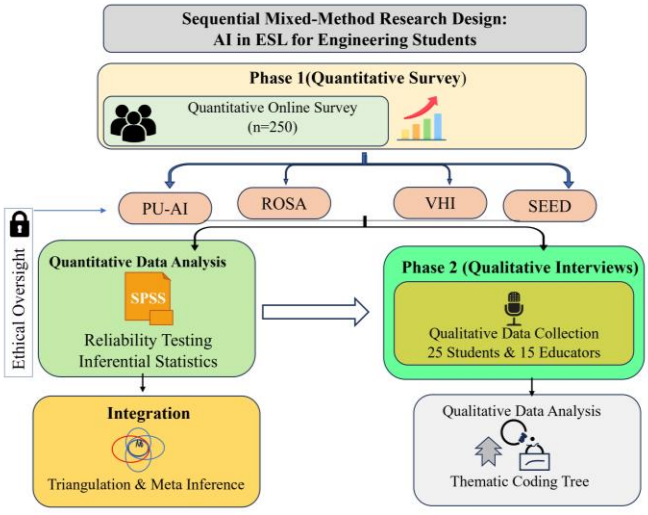

Fig. 1. Research Design of the study

TABLE I
PROFILE OF STUDY PARTICIPANTS ACROSS QUANTITATIVE AND QUALITATIVE PHASES

Participant Group	n (%)	Branch / Role	Gender (n, %)	Mean Age (SD)	Year of Study / Teaching Exp.	Sampling Method
Engineering Students (Survey)	250 (100%)	CSE: 50 (20%), DS: 50 (20%), AIML: 50 (20%), CSIT: 50 (20%), ESE: 50 (20%)	Male: 128 (51.2%), Female: 122 (48.8%)	20.8 (±1.2)	2nd–4th year	Stratified random sampling (branch-wise, gender-balanced)
Engineering Students (Interviews)	25 (10% of survey cohort)	Representation from all five branches	Male: 13 (52%), Female: 12 (48%)	21.0 (±1.0)	2nd–4th year	Purposive sampling (based on survey attitude spectrum)
English Language Educators (Interviews)	15	N/A	Male: 7 (46.7%), Female: 8 (53.3%)	37.5 (±6.2)	5–15 years teaching experience	Purposive sampling (across departments)

short term, can ultimately hinder their ability to produce original, high-quality work and to communicate effectively in professional settings.

Much of the existing research focuses on other disciplines or regions and often relies on self-reported perceptions without correlating them to performance-based outcomes (de la Peña Álvarez et al., 2024; Khan & Sarkar, 2025). This study directly addresses this gap by providing a triangulated analysis of Indian engineering students' dispositions toward AI, its perceived benefits and challenges, and its tangible correlation with their language proficiency.

III. METHODOLOGY

A. Research Design

This study employed a sequential mixed-methods design to investigate engineering students' attitudes towards AI-integrated English language learning and its correlation with academic performance. The research was conducted in two main phases: a quantitative survey and a qualitative interview phase.

B. Participants

A total of 250 engineering students participated in the quantitative survey phase. The sample was drawn from four engineering colleges and represented five branches: Computer Science Engineering (CSE), Data Science (DS), Artificial Intelligence & Machine Learning (AIML), Computer Science & Information Technology (CSIT), and Electronics & Software Engineering (ESE). The sample was designed to be gender-inclusive, with an approximately equal representation of male and female students across branches. For the qualitative phase, 25 students (selected purposefully to cover the range of attitudes identified in the survey) and 15 English language educators participated in semi-structured interviews.

C. Data Analysis

Quantitative data were analyzed using descriptive and inferential statistics to measure attitudes and explore correlations with academic performance (e.g., Pearson's r for attitude and proficiency scores). Qualitative data (interview transcripts) underwent thematic coding to identify recurring patterns, teacher and student concerns, and nuanced perspectives on AI's role in English language education.

D. Ethical Considerations

All participants provided informed consent. Data confidentiality and participant anonymity were maintained throughout the research process. Interviews were audio-recorded with permission, and all quantitative data were stored securely.

IV. ANALYSIS

A. Quantitative Analysis

This section presents the quantitative findings from the survey administered to 250 engineering students. Data analysis was conducted using SPSS v28. The analysis began with an assessment of measurement reliability for the attitudinal scales, followed by descriptive statistics, and concluded with inferential statistical tests to explore the relationships between student attitudes and academic performance. Academic performance was measured on a 100-point scale derived from standardized language proficiency assessments.

1) Reliability and Descriptive Statistics

The internal consistency of the multi-item scales was examined using Cronbach's alpha to ensure their reliability. Students' attitudes were then examined across four domains: Perceived Utility of AI (PU-AI), Risk of Over-Reliance & Skill Atrophy (ROSA), Value of Human Instruction (VHI), and Self-Efficacy in Error Detection (SEED). Descriptive statistics for these attitudinal items and their composite scores are summarized in Table II.

Prior to hypothesis testing, the internal consistency of the multi-item scales was examined using Cronbach's α. Assumptions for inferential statistics—normality, homogeneity of variance, and independence—were met. As shown in Table 2, all constructs demonstrated acceptable to excellent reliability ($\alpha \geq 0.77$).

TABLE-II
RELIABILITY OF ATTITUDINAL SCALES (N = 250)

Construct	Items	Cronbach's α
Perceived Utility of AI (PU-AI)	2	0.82
Risk of Over-reliance & Skill Atrophy (ROSA)	3	0.77
Value of Human Instruction (VHI)	4	0.89

2) Student Dispositions: Factor Analysis

Students' attitudes were examined across the four domains using descriptive statistics summarized in Table 2.

TABLE III
DESCRIPTIVE STATISTICS AND COMPOSITE RELIABILITY (CRONBACH'S A) FOR STUDENT ATTITUDE CONSTRUCTS TOWARD AI-INTEGRATED ENGLISH LEARNING

Construct	Item	Statement	M	SD
Perceived Utility (PU-AI)	1	AI enhances my English communication skills.	4.25	0.88
	2	AI helps me produce better quality assignments.	4.45	0.75
Composite PU-AI Score	—	—	4.35	0.79
Risk of Over-reliance (ROSA)	3	Less need for traditional ESL activities.	3.15	1.10
	4	Traditional ESL curriculum could be reduced.	3.40	1.05
	5 (R)	Concerned about skill loss from AI reliance.	3.85	0.95
Composite	—	—	3.27	0.85
Value of Human Instruction (VHI)	6	Teacher skills are essential for my career.	4.55	0.70
	7	I need teacher guidance to evaluate AI content.	4.10	0.90
	8	Teacher instruction is crucial for a strong foundation.	4.40	0.82
	9	Language nuances are best learned from humans.	4.35	0.85
Composite VHI Score	—	—	4.35	0.68
Self-Efficacy (SEED)	10	I am confident in correcting AI-generated errors.	3.95	1.05

(Scale: 1 = Strongly Disagree, 5 = Strongly Agree; N = 250) (R) = Reverse-coded item.

3) Perceived Utility of AI (PU-AI): High Enthusiasm with Discipline Effects

The PU-AI construct yielded a high composite mean (M = 4.35), indicating strong endorsement of AI's educational value. A one-way ANOVA examined differences across engineering disciplines, revealing a statistically significant effect: $F(4, 245) = 4.88$, $p < .001$, $\eta^2 = .07$.

Post-hoc analyses indicated that AIML (M = 4.65) and CSE (M = 4.58) students reported significantly higher perceived utility compared to ESE students (M = 4.01). This suggests that proximity to AI-related specializations is associated with stronger confidence in AI as a learning tool.

4) Student Attitudes and Academic Performance

a. Correlation Analysis: Risk of Over-reliance & Skill Atrophy

A Pearson correlation analysis was performed to determine the linear relationship between the composite score for Risk of Over-reliance & Skill Atrophy (ROSA) and academic performance. The analysis revealed a significant negative correlation, indicating that as students' attitudes of over-reliance on AI for language tasks increased, their academic performance tended to decrease.

- Correlation Coefficient**:** r=−0.42
- p-value: p<.001

This result is statistically significant, suggesting the relationship is not due to random chance. The moderate negative value of the correlation coefficient indicates a meaningful inverse relationship: students who were more receptive to reducing traditional learning methods in favour of AI use performed less well on the language proficiency tests. This finding highlights a potential trade-off between perceived efficiency from AI and the actual development of foundational skills.

b. Value of Human Instruction (VHI): The Irreplaceable Teacher

The VHI score (M = 4.35) reflects strong consensus on the importance of human-led instruction. An independent samples t-test showed that female students (M = 4.48) rated VHI significantly higher than male students (M = 4.22), $t(248) = 3.21$, $p = .002$, $d = 0.41$.

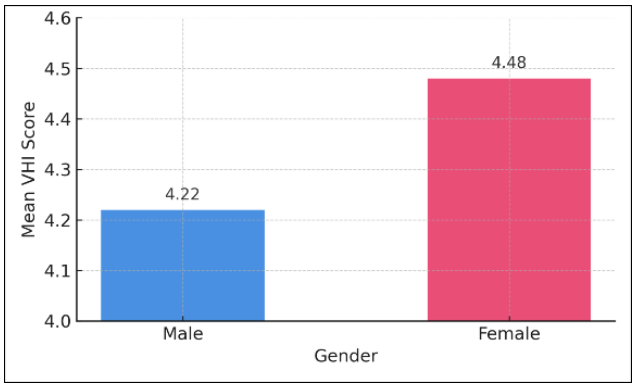

Fig. 2. Illustrates mean VHI scores by gender.

5) Regression Analysis: The Overconfidence Dilemma

A multiple linear regression was conducted to predict students' Self-Efficacy in Error Detection (SEED) scores, which reflects their confidence in correcting AI-generated mistakes. The model included academic performance and engineering branch as predictors.

As shown in the table below, the model was statistically significant ($F(5,244)=16.21$, $p<.001$), with an adjusted R^2 of .135, meaning approximately 13.5% of the variance in SEED scores could be explained by the included variables.

TABLE IV
MULTIPLE REGRESSION PREDICTING SEED

Predictor	B	SE(B)	β	t
(Constant)	2.85	0.24	—	11.88
Academic Performance	0.012	0.005	.148	2.51
AIML (vs. ESE)	0.64	0.15	.310	4.27
CSE (vs. ESE)	0.55	0.15	.265	3.65
DS (vs. ESE)	0.38	0.15	.183	2.52
CSIT (vs. ESE)	0.31	0.15	.150	2.06

Dependent Variable: SEED Score; Adjusted R^2 = .135.

self-efficacy than their actual language proficiency. The standardized beta coefficients (β) show that being in the AIML (β=.310) or CSE (β=.265) branches had a more substantial positive effect on confidence in error detection than a student's academic performance (β=.148). This suggests that technical

expertise and proximity to AI-related fields can create a false sense of confidence, leading students to potentially overlook mistakes and accept AI output uncritically.

B. Qualitative Analysis

To add depth and context to the statistical findings, semi-structured interviews were conducted with 25 engineering students (selected purposefully from the survey cohort) and 15 English language educators. Thematic analysis of the interview transcripts was performed to identify the underlying attitudes, motivations, and challenges associated with AI integration in the ESL classroom. Three primary themes emerged: the student view of AI as a "double-edged sword," the educator's alarm over skill erosion, and a shared, evolving vision for redefining roles in the AI-integrated classroom.

1) The "Double-Edged Sword" — Student Perspectives on Utility and Peril

The qualitative data from students powerfully explains the high Perceived Utility (PU-AI) scores seen in the quantitative analysis. Students almost universally described AI as an indispensable tool for efficiency and overcoming initial hurdles in the writing process (Zhang et al., 2024; Jegede, 2024).

> *"It's like having a 24/7 tutor. I can get a first draft done in ten minutes instead of two hours. It helps me overcome writer's block and gives me a professional structure to start with, which is the hardest part."* — Student, Computer Science Engineering (CSE), 3rd Year

However, probing deeper revealed a near-unanimous admission of uncritical acceptance, corroborating the "overconfidence" hypothesis suggested by the regression analysis. Students acknowledged a significant gap between their confidence in spotting errors and their actual practice of doing so, especially under time pressure. The perceived authority of AI's cleanly generated text often overrode their critical judgment.

> *"Honestly? If the sentence sounds good and looks professional, I just use it. I don't have time to fact-check every single thing it generates, especially if it's for a smaller assignment or just to get my points across in an email. It feels correct, so you just trust it."* — Student, Data Science (DS), 2nd Year

This sentiment explains the paradox of high self-efficacy (SEED) coexisting with a negative correlation between over-reliance (ROSA) and academic performance. Students are confident in an ability they rarely exercise, leading to a reliance that demonstrably impacts their scores.

2) The Educator's Alarm — Fears of Skill Atrophy and Intellectual Passivity

The educators provided a stark and urgent counter-narrative. Their perspective was dominated by a significant concern that unmonitored AI use was actively eroding foundational cognitive and linguistic skills (Zhai, Wibowo, & Li, 2024). The most frequently cited issue was AI's tendency to produce "hallucinated" or factually incorrect information, which students were ill-equipped to identify.

> *"My biggest fear is the 'plausible nonsense' it produces. A student submitted a report citing a non-existent study from 'Zhang et al., 2025'. The AI just made it up, but the citation format was perfect and the sentence was flawless. The student had absolutely no idea it was fake. He just saw a credible-looking source."* — English Language Educator, 12 years of experience

Beyond factual errors, educators expressed a deeper concern about the atrophy of critical thinking and writing structures. They described students who could generate sophisticated text but were unable to articulate the logic or reasoning behind it. This directly supports the quantitative finding that attitudes favoring the replacement of traditional skills are linked to lower proficiency.

> *"We are seeing a decline in the ability to structure an argument. They can prompt the AI to write a five-paragraph essay, but they can't explain the logic connecting paragraph two to paragraph three. The thinking process itself is being outsourced. They bring us a finished product with no understanding of the intellectual labor required to create it."* — English Language Educator, 8 years of experience

3) Redefining Roles in the AI-Integrated Classroom

Despite the tensions, neither students nor educators advocated for banning AI. Instead, a powerful consensus emerged around the need to redefine roles. This theme strongly validates the high Value of Human Instruction (VHI) scores found in the quantitative survey. Students, even those most enthusiastic about AI, clearly articulated the irreplaceable role of their teachers.

> *"The AI gives me the 'what'—the words, the grammar, the basic structure. But my professor helps me with the 'why' and the 'how.' She points out when the tone is wrong for the audience, or when the argument is logically weak, things the AI just can't see. She guides my thinking."* — Student, Artificial Intelligence & Machine Learning (AIML), 4th Year

Educators reflected this sentiment, framing their future role as less of a "sage on the stage" and more of a "guide on the side." They saw their primary responsibility shifting from teaching the mechanics of language to promote the critical faculties required to manage technology effectively (Chan & Tsi, 2024).

> *"My job is changing. It's no longer about being the primary source of information. It's about being the curator of critical thinking. I'm not here to teach them how to write a grammatically correct sentence anymore; AI can do that. I'm here to teach them how to question the sentences the AI writes for them. My role is to be the human check on the machine."* — English Language Educator, 15 years of experience

The qualitative data paints a picture of a critical juncture. While students' positive dispositions towards AI can be a powerful motivator, the interviews reveal that without a structured pedagogical framework and the active guidance of a human teacher, this enthusiasm risks promoting intellectual passivity and degrading the very communication skills that engineering students need for long-term success.

V. DISCUSSION

The findings of this study present a critical and complex portrait of AI's role in the English language education of engineering students. This discussion argues that while students' positive disposition towards AI offers a powerful entry point for engagement, it simultaneously masks a significant pedagogical crisis: the emergence of an overconfident, under-critical learner who risks long-term skill atrophy for short-term efficiency. The data compel a move beyond a simple "AI is good or bad" debate, demanding instead a critical re-evaluation of what it means to teach language and thinking in the age of intelligent machines.

The quantitative data reveals a striking disconnect: students' self-efficacy in detecting AI errors (SEED M=3.95) is more strongly predicted by their disciplinary identity (e.g., being an AIML or CSE student, $\beta = .310$) than by their actual academic performance ($\beta = .148$). This statistical finding is given a powerful, and concerning, voice by the qualitative data. Students readily admit to uncritically accepting AI outputs if they "feel correct," a sentiment that directly corroborates the educators' alarm over the uncritical acceptance of "plausible nonsense." For engineering students, whose identity is often interconnected with technical prowess, this suggests a unique vulnerability. Their confidence in managing technological systems appears to create a significant blind spot, leading them to trust the output of AI in a domain—language and argumentation—where they may lack the foundational expertise to effectively supervise the tool.

This study challenges the simplistic notion that a positive attitude towards educational technology directly translates to better learning outcomes. While a positive disposition is a necessary starting point, the moderate negative correlation ($r = -0.42$) between the Risk of Over-reliance (ROSA) and academic performance is the most damning piece of evidence. It suggests a clear divergence: "using AI" as a tool is different from "relying on AI" as a crutch. The qualitative findings explain this divergence perfectly. The student who uses AI to "get a first draft done in ten minutes" and the educator's observation that students can no longer "explain the logic connecting paragraph two to paragraph three" are two sides of the same coin. The cognitive process of structuring an argument, synthesizing evidence, and crafting prose—the very heart of communicative competence—is being outsourced (Kosmyna et al., 2025). This is particularly dangerous in engineering, a field where precision of language in reports, documentation, and proposals is paramount. The short-term gain in speed is masking a long-term erosion of essential professional skills.

In the face of this technological tide, the study unequivocally vindicates the role of the human educator. The exceptionally high value students placed on human instruction (VHI M=4.35), which was consistent across all branches, is not an expression of nostalgia. It is a pragmatic recognition of AI's limits. As one student eloquently stated, the teacher provides the "why" and "how" that AI cannot. This finding serves as a powerful mandate. The pedagogical imperative is not to ban AI, but to teach students how to manage it critically. English language instruction for engineers must now explicitly include AI literacy, focusing on verification, fact-checking, and the critical evaluation of machine-generated text. The teacher's role must evolve from a "sage on the stage" to a "curator of critical thinking," as one educator aptly put it. Instruction should model a "human-in-the-loop" approach, where AI is used for brainstorming or grammatical polishing, but the core tasks of argumentation and synthesis remain fundamentally human endeavours.

This study argues that the uncritical integration of AI into ESL classrooms risks creating a generation of engineering students who are pedagogically useless without the technology. While AI offers transformative potential, its true value can only be unlocked within a pedagogical framework that prioritizes human critical thinking, reinforces foundational skills, and champions the irreplaceable role of the teacher in guiding the learner's mind.

Despite its contributions, this study has several limitations that delimit the scope of its conclusions. First, the sample was restricted to five engineering branches across four institutions in a single national context, which may limit the generalisability of the findings to other regions, disciplines, or institutional types. Second, the attitudinal data relied on self-report measures, and academic performance was operationalised through a single standardized language proficiency assessment. Future research could expand the sample to include a wider range of engineering and non-engineering programs, incorporate longitudinal designs, and triangulate performance with additional indicators such as classroom participation, writing portfolios, or workplace communication tasks.

CONCLUSION

Our findings reveal a significant paradox: while students demonstrate high enthusiasm for AI's utility and deeply value human mentorship, their engagement is marked by a critical overconfidence that correlates with a tangible decline in performance for those most reliant on the technology. The qualitative data confirmed this, with students admitting to uncritical acceptance and educators expressing alarm over the erosion of foundational reasoning skills. The central conclusion of this research is that for engineering students, AI-driven language tools can function as a Trojan horse. Left unmanaged, they promote a superficial efficiency that masks the outsourcing of essential cognitive skills like argumentation, synthesis, and critical evaluation. This creates a dangerous scenario where confidence is derived from a student's technical identity rather than their demonstrated linguistic competence, leaving them vulnerable to misinformation and ill-prepared for the nuanced communication demands of their future careers. Therefore, this study does not advocate for the rejection of AI but for its thoughtful and structured pedagogical integration. The path forward requires a deliberate shift in ESL pedagogy, away from simply allowing tools and towards actively teaching critical AI literacy. Educators and curriculum designers must create frameworks that use AI to augment, not replace, human intellect. The ultimate goal must be to cultivate a generation of engineers who are not merely proficient users of AI, but critical, discerning thinkers capable of commanding technology without

surrendering their own intellectual authority.

APPENDIX

APPENDIX-I: STUDENT SURVEY ON AI IN ENGINEERING ENGLISH COMMUNICATION

Question Number		Statement	Response Scale
1	Perceived Utility of AI	I believe AI tools effectively enhance my overall English communication skills (LSRW).	Strongly Disagree / Disagree / Neutral / Agree / Strongly Agree
2		I feel that using AI tools allows me to produce better quality English assignments (e.g., reports, essays, presentations) than relying solely on own writing ability.	Strongly Disagree / Disagree / Neutral / Agree / Strongly Agree
3	Risk of Over-reliance and Skill Atrophy	I find it less necessary to actively participate in traditional ESL classroom activities (e.g., discussions, presentations, writing exercises) because AI tools can help me achieve similar learning outcomes.	Strongly Disagree / Disagree / Neutral / Agree / Strongly Agree
4		Given the capabilities of AI, I think certain parts of the traditional ESL curriculum that focus on foundational English communication skills (LSRW) could be reduced or removed.	Strongly Disagree / Disagree / Neutral / Agree / Strongly Agree
5		I am concerned that relying too much on AI for my English assignments might prevent me from developing my own critical thinking and problem-solving skills in communication.	Strongly Disagree / Disagree / Neutral / Agree / Strongly Agree
6	Value of Human Instruction	I think the English communication skills (LSRW) I learn directly from my teachers are essential for my long-term academic success and future professional career, beyond what AI can provide.	Strongly Disagree / Disagree / Neutral / Agree / Strongly Agree
7		I often need guidance from my ESL teacher to properly evaluate, adapt, and integrate AI-generated content into my own work to ensure accuracy and originality.	Strongly Disagree / Disagree / Neutral / Agree / Strongly Agree
8		Despite the availability of AI tools, I believe direct instruction from my ESL teacher is still crucial for developing a strong foundation in English communication and critical thinking skills.	Strongly Disagree / Disagree / Neutral / Agree / Strongly Agree
9		I believe that understanding the nuances of language and context, which are crucial for effective communication, is something best learned from human teachers rather than solely from AI tools.	Strongly Disagree / Disagree / Neutral / Agree / Strongly Agree
10	Self-Efficacy in Error Detection	I am confident in my ability to identify and correct potentially incorrect or "hallucinated" information generated by AI when using it for my English communication tasks.	Strongly Disagree / Disagree / Neutral / Agree / Strongly Agree

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