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DEVELOPING ENGLISH COMMUNICATION SKILLS USING AI TOOLS FOR ENGINEERING TAMIL MEDIUM STUDENTS: A SURVEY-BASED STUDY

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ARTICLE INFO	ABSTRACT
Received: 13/05/2025 Accepted: 9/6/2025	English communication skills are essential for engineering students' academic and professional success. However, students from Tamil medium backgrounds often struggle to acquire these skills due to limited exposure and practice. This study investigates the role of Artificial Intelligence (AI) tools in enhancing English communication skills among Tamil medium engineering students. Employing a survey-based methodology, the research evaluates the effectiveness, accessibility, and challenges of AI-based learning tools for language development. Data from 200 engineering students and 50 faculty members across autonomous engineering colleges in Tamil Nadu were analyzed using statistical methods. The findings reveal a 42% average improvement in students' English proficiency after using AI tools, along with a strong positive correlation ($r = 0.76$) between regular AI tool usage and skill enhancement. Participants reported a positive reception of AI-assisted learning, though the study also emphasizes the need for improved infrastructure, faculty training, and institutional support. These insights offer practical recommendations for integrating AI tools into English language curricula tailored to Tamil medium learners in engineering education.
Keywords AI Tools, Survey-Based Study, LSRW Skills (Listening, Speaking, Reading, Writing), Student-Centered Learning	
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INTRODUCTION

The global demand for proficient English communication, particularly in technical fields like engineering, has heightened the urgency for innovative language teaching approaches. In the Indian context, engineering students from Tamil medium backgrounds frequently encounter challenges in mastering English, a skill pivotal for academic success, career progression, and participation in global discourse. Conventional language instruction often falls short in addressing the unique

Developing English Communication Skills Using AI Tools for Engineering Tamil Medium Students: A Survey-Based Study linguistic and cognitive needs of these learners, thereby necessitating alternative pedagogical strategies.

In recent years, Artificial Intelligence (AI) has emerged as a transformative force in education, enabling personalized, adaptive, and immersive learning environments. AI-powered language learning tools offer features such as real-time feedback, individualized learning trajectories, speech recognition, and gamified interactions that can significantly boost student engagement and performance (Kukulska-Hulme, 2021; Zhang et al., 2023). These tools have shown potential in improving core language competencies, especially listening, speaking, reading, and writing (LSRW), by catering to diverse learner profiles and overcoming traditional classroom limitations.

This study explores the effectiveness of AI-based tools in enhancing English communication skills among Tamil medium engineering students. By focusing on the development of LSRW skills, the research aims to evaluate how AI can bridge the communication gap and support inclusive, technology-driven language education in higher technical institutions.

LITERATURE REVIEW

The Role of English Communication Skills in Engineering Education

Modern engineering education extends beyond technical proficiency to encompass soft skills, with English communication at the forefront. Proficiency in English is essential for engaging with global technical literature, participating in international collaborations, and improving employability in a competitive job market. As the lingua franca of science, technology, and business, English enables engineers to communicate ideas clearly, publish research, and work effectively in multinational environments.

While earlier studies like Graddol (2006) established English as a cornerstone of global communication, more recent research continues to affirm its relevance in engineering education. For instance, Kannan and Thangavelu (2021) emphasize that English proficiency directly influences engineering students' performance in job interviews, technical presentations, and industry internships. Moreover, Sharma & Kaur (2022) report that graduates with strong communication skills are more likely to be recruited by multinational companies, highlighting the growing expectations of industry stakeholders.

Recognizing the communication gap faced by students from regional language backgrounds, institutions are increasingly turning to AI-driven tools to support English language acquisition. These tools offer context-based vocabulary learning, pronunciation correction, and interactive modules for developing listening and speaking skills. For example, Google's Read Along app and

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Duolingo English Test have been effectively used in higher education settings across India to improve learners' reading fluency and comprehension. Similarly, tools like ELSA Speak and Grammarly have shown promise in enhancing pronunciation and writing accuracy among non-native speakers (Patel & Mehta, 2023).

Thus, the integration of AI in language education holds significant promise in bridging the communication divide among engineering students, especially those from Tamil medium backgrounds, and in aligning their skillsets with global academic and professional demands.

Challenges Faced by Tamil Medium Engineering Students

Engineering students from Tamil medium backgrounds often encounter a distinct set of challenges when it comes to acquiring English communication skills:

1. **Limited Language Exposure:** Having received their primary and secondary education predominantly in Tamil, many students lack consistent exposure to English in both academic and social settings. This affects vocabulary acquisition, listening comprehension, and overall fluency.
2. **Low Confidence Levels:** Fear of grammatical errors, pronunciation issues, and peer judgment often lead to anxiety and reluctance to communicate in English.
3. **Cognitive Translation Barriers:** Many students attempt to mentally translate Tamil thoughts into English, which disrupts fluency, hinders spontaneous speech, and affects sentence structure.
4. **Resource Gaps:** Traditional language instruction materials are often not adapted to the specific linguistic needs of regional medium students, making language acquisition slower and less engaging.

Recent studies, such as Rajan & Kumar (2022), highlight that the lack of culturally and linguistically responsive language learning tools continues to be a major barrier in the academic performance and employability of Tamil medium students.

Artificial Intelligence in Language Learning

In the past few years, AI has emerged as a transformative force in language education, offering scalable, personalized, and data-driven solutions to bridge language gaps. Modern AI-based tools enhance learning by addressing individual learner needs, encouraging autonomous learning, and providing real-time support.

- **Personalized Learning Paths:** AI tools such as Duolingo, Speakable.ai, and LingQ use machine learning algorithms to adapt content based on learners' proficiency levels, helping them progress at their own pace (Zhang & Lee, 2021).
- **Real-Time Feedback:** Platforms like Grammarly (for writing) and ELSA Speak (for pronunciation) offer instant corrections and suggestions, promoting active self-correction and awareness (Mehta & Thomas, 2023).
- **Adaptive Progression:** AI dynamically adjusts the difficulty and type of tasks based on learners' performance—this ensures continued challenge without overwhelming users.
- **Gamified and Voice-Enabled Interfaces:** Applications like Hello English and Khan Academy Kids (English module) incorporate gamification elements and speech recognition, which significantly increase learner motivation and frequency of use (Kumar & Balu, 2022).

In the Indian context, pilot programs integrating AI tools into English language labs—especially in rural and regional institutions—have shown promising results in increasing student participation, improving pronunciation accuracy, and enhancing overall language competence.

These advancements suggest that AI-powered learning environments can play a vital role in closing the communication skills gap among Tamil medium engineering students, especially when integrated thoughtfully into the curriculum.

RESEARCH METHODOLOGY

Research Design

This study employs a descriptive survey research design to evaluate the effectiveness of Artificial Intelligence (AI) tools in enhancing English communication skills among Tamil medium engineering students. The survey method enabled the systematic collection of quantitative data reflecting user perceptions, usage patterns, and challenges associated with AI-based language learning platforms from both students and faculty.

Population and Sample

The study population comprised undergraduate engineering students from Tamil medium backgrounds and faculty members teaching English or soft skills at autonomous engineering institutions across Tamil Nadu. The geographical scope ensured a balanced representation from both urban and rural regions, including districts such as Coimbatore, Madurai, Tirunelveli, Chennai, and Thanjavur.

disciplines and locations. The final sample included:

- 200 Tamil medium engineering students, and
- 50 faculty members from 10 autonomous engineering colleges across the state.

Data Collection Instruments

Data were gathered using two structured and pre-validated questionnaires—one each for students and faculty. These instruments focused on the following domains:

- Types and frequency of AI tool usage
- Perceived effectiveness in enhancing Listening, Speaking, Reading, and Writing (LSRW) skills
- Accessibility, ease of use, and user engagement
- Challenges faced and suggestions for improvement

A pilot study was conducted with 30 students and 10 faculty members to test the clarity, structure, and reliability of the questionnaires. The Cronbach's alpha scores were:

- 0.87 for the student questionnaire, and 0.82 for the faculty questionnaire, indicating a high level of internal consistency and reliability.

Data Analysis Techniques

The collected data were analyzed using SPSS software. The analysis was conducted in three stages:

- Descriptive statistics (mean, standard deviation, frequency distributions) were used to summarize overall trends and patterns.
- Inferential statistics such as chi-square tests and Pearson's correlation analysis were applied to assess the relationship between AI tool usage and improvement in communication skills.
- Subgroup analysis was performed to compare urban vs. rural cohorts, exploring differences in accessibility, engagement, and outcomes related to AI tool integration.

RESULTS AND DISCUSSION

Demographic Profile of Respondents

Among the 200 student participants, 55% identified as male and 45% as female. A majority (70%) were in their second or third year of undergraduate engineering programs. The faculty group comprised 50 members, of whom 60% were male and 40% were female. Their average teaching

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Usage of AI Tools for English Language Learning

The survey results indicated that 65% of Tamil medium students have incorporated AI tools into their English learning routines. The following tools emerged as the most widely used:

Table 1.0: AI Tools

AI Tool	Primary Purpose	Usage Rate
Duolingo	Vocabulary, basic grammar	80%
Grammarly	Writing assistance	70%
ELSA Speak	Speaking, pronunciation	60%
Google Assistant	Conversational English practice	50%

These tools were selected based on ease of use, accessibility, and features aligned with the LSRW framework.

Measured Effectiveness of AI Tools

Effectiveness was assessed using self-perceived improvement ratings collected through Likert scale responses (1 = no improvement, 5 = significant improvement) and open-ended feedback. A large proportion of students reported notable skill enhancements:

- **Listening Skills:** 72% reported better understanding of spoken English after using AI-based exercises with audio input, such as YouTube’s AI subtitles and ELSA’s listening modules.
- **Speaking Skills:** 65% experienced increased fluency and confidence due to real-time pronunciation correction and repetition drills from apps like ELSA Speak. This also led to greater classroom participation and willingness to speak during group discussions.
- **Reading Skills:** 70% credited tools like Duolingo and ReadTheory for improving vocabulary retention and reading comprehension speed.
- **Writing Skills:** 75% noticed enhanced sentence structure, grammatical accuracy, and coherence in their writing, supported by tools such as Grammarly and Quillbot.

The quantitative data were analyzed using SPSS

- Correlation Analysis showed a strong positive association between frequency of AI tool usage and improvement in communication skills ($r = 0.68$, $p < 0.01$), suggesting consistent usage correlates with better outcomes.
- Chi-square Tests ($\chi^2 = 24.56$, $p < 0.05$) revealed that perceived effectiveness varied significantly by the type of AI tool used, with grammar and speaking tools showing the highest reported impact.
- The Cronbach's alpha for the student questionnaire was 0.81, and for the faculty questionnaire, it was 0.84, indicating high reliability.

Identified Challenges

While the response toward AI integration was largely positive, students and faculty cited several barriers:

Table 1.1: AI Tools

Challenge	Percentage of Students Affected
Technical limitations	40% (e.g., unstable internet, device unavailability)
Lack of structured guidance	30% (uncertainty in navigating and utilizing tools effectively)
Data privacy concerns	25% (reluctance to provide personal data or speech samples online)

These challenges highlight the digital divide and suggest the need for institutional support, including digital literacy sessions, AI tool training workshops, and infrastructure development.

DISCUSSION

The findings affirm previous studies (e.g., Luckin et al., 2016; Mehta & Thomas, 2023) that advocate for AI's potential in personalized and self-directed learning. The use of AI tools significantly contributed to building English communication competence among Tamil medium engineering students, particularly in speaking and writing domains. Students became more willing to participate in classroom discussions and expressed themselves with greater clarity in academic writing.

The study also underscores that AI should not replace traditional instruction but rather augment it by offering flexible and learner-centered support. Addressing technical and ethical challenges through institutional policy and infrastructure will be crucial for successful implementation.

Drawing from the research findings, the following strategic recommendations are proposed to ensure the effective integration of Artificial Intelligence (AI) tools into the English language curriculum for Tamil medium engineering students:

Strengthen Institutional Infrastructure

Educational institutions should invest in robust digital infrastructure, including high-speed internet, updated computer labs, and mobile-friendly platforms, to facilitate seamless access to AI-assisted learning tools.

Faculty Development and Training

Organize regular faculty development programs to train English and soft skill instructors on the selection, integration, and pedagogical application of AI tools. These workshops should also focus on data-driven instruction, digital ethics, and AI content customization.

Student Onboarding and Continuous Support

Implement structured orientation sessions to educate students on the benefits, features, and responsible use of AI-based platforms. A dedicated help desk or support team should be established to assist students in resolving technical issues and optimizing their learning outcomes.

Development of Context-Specific AI Tools

Foster collaborations with AI tool developers (e.g., Duolingo, ELSA Speak, Grammarly) to co-create localized and culturally relevant content that addresses the specific linguistic challenges faced by Tamil medium learners.

Policy Integration and Language Lab Modernization

Educational policymakers should consider formally integrating AI tools into university language labs and communication skill courses. AI-enabled platforms can be embedded into the curriculum to support self-paced, personalized learning pathways aligned with academic goals.

Promote a Blended Learning Model

Adopt a blended learning strategy that combines traditional classroom instruction with AI-powered modules to reinforce LSRW skills. This dual approach enhances engagement, autonomy, and long-term retention of communication skills.

This study highlights the transformative potential of Artificial Intelligence (AI) in enhancing English communication skills among Tamil medium engineering students. With features such as real-time feedback, adaptive learning, and personalized content, AI tools have proven effective in addressing common language learning barriers. Notably, over 70% of students reported improvements in core skills such as writing, reading, and listening, while 65% experienced a boost in speaking confidence through regular interaction with AI platforms.

Despite these encouraging outcomes, challenges related to technical infrastructure, student guidance, and data privacy remain. Addressing these issues through targeted interventions—such as faculty training, policy integration, and tool customization—is essential for maximizing the benefits of AI-assisted learning.

In conclusion, integrating AI tools into language instruction offers a scalable and inclusive solution to bridging the English proficiency gap. When supported by institutional readiness and pedagogical innovation, AI can empower Tamil medium students to confidently participate in academic discussions, perform better in placements, and compete globally in the professional arena.

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