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Research Paper

"Impact of Artificial Intelligence-Based Learning Tools on English Language Skills among Undergraduate Students: A Study of Speaking, Writing, and Vocabulary Development"

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Abstract
Artificial Intelligence (AI) is influencing English Language Teaching by offering personalised practice, immediate feedback, conversational interaction, and independent learning opportunities. This proposed study examines how AI-based tools may support speaking, writing, and vocabulary development among undergraduate students. Tools such as ChatGPT, Grammarly, Duolingo, and AI-enabled conversational platforms can supplement classroom learning, but their effectiveness and limitations require systematic assessment. A mixed-methods design is proposed, combining language assessments, a structured questionnaire, and semi-structured interviews. Quantitative data would be analysed through descriptive statistics and appropriate pre-test/post-test comparisons; interview responses would be analysed thematically. Existing literature indicates potential benefits in writing feedback, conversational practice, and learner autonomy. However, concerns include inaccurate feedback, overdependence, academic integrity, privacy, and unequal access to digital resources. The study therefore proposes a balanced evaluation of both language outcomes and student experiences in multilingual Indian higher education. Since data have not yet been collected, the article presents a research framework and anticipated outcomes rather than claiming empirical findings.

Keywords: Artificial Intelligence, English Language Teaching, Speaking Skills, Writing Skills, Vocabulary Development.

I. Introduction

English proficiency is important for higher education, professional communication, employability, and participation in the global knowledge economy. Undergraduate students need more than grammatical knowledge: they must speak with confidence, write coherently, and use vocabulary appropriately. Students enter college with different language backgrounds and levels of prior exposure to English. Limited opportunities for conversation, insufficient individual feedback, and anxiety about making mistakes may slow their progress.

Classroom teaching remains essential, but lesson time and teacher availability can limit individual practice. Technology-assisted language learning can extend practice beyond the classroom. AI-based applications can generate dialogues, explain grammar, suggest vocabulary, identify writing errors, and offer rapid feedback. ChatGPT-like tools can simulate conversations and support drafting; writing assistants can identify errors and improve clarity; language-learning apps can provide structured exercises and repeated practice.

AI may support three connected language skills. For speaking, conversational tools allow students to practise interviews, presentations, and everyday exchanges in a lower-pressure setting. For writing, AI feedback may help learners notice grammatical problems, sentence-level weaknesses, and issues of organisation. For vocabulary, AI can offer definitions, synonyms, contextual examples, and quizzes. However, students need to apply new language independently; accepting generated responses without reflection may limit genuine learning.

The Indian undergraduate context is especially relevant because students differ in mother tongue, English proficiency, digital literacy, and access to reliable devices or internet connections. The National Education Policy 2020 supports the use of technology and the development of essential competencies, but technology must be integrated with clear educational aims. AI should supplement rather than replace teachers, peer interaction, and independent work. Its responses may be inaccurate or unsuitable, and careless use can raise privacy and academic-integrity concerns.

This proposed study examines the contribution of AI-based tools to speaking, writing, and vocabulary development among undergraduate students. It considers students' use and perceptions alongside possible changes in assessed language performance. The intention is to identify responsible ways to integrate AI into English language teaching.

II. Review of Literature

Early research on computer-assisted language learning established that technology can create additional opportunities for language practice. Warschauer and Healey surveyed the development of computer-assisted language learning, while Chapelle provided a framework for evaluating technology-mediated second-language learning through interaction, feedback, and learning opportunities. Kukulska-Hulme and Shield showed how mobile technologies can extend language learning beyond the classroom and support interaction. Stockwell's work on mobile vocabulary activities highlighted the importance of platform usability and task design. Godwin-Jones also discussed the role of digital technologies in language development and cultural understanding.

Recent scholarship has examined the possibilities of generative AI. Kohnke, Moorhouse, and Zou discuss how ChatGPT can assist language teachers and learners through content generation, language support, and independent practice. Kasneci and colleagues identify opportunities associated with large language models, including personalised support, alongside risks such as unreliable responses and the need for responsible use. These works suggest that AI is best understood as a learning aid whose value depends on how it is used.

Systematic reviews provide a broader picture. Lo and colleagues reviewed empirical studies on ChatGPT in ESL/EFL education and identified potential benefits as well as research limitations. Li and colleagues examined early publications on ChatGPT and language education, noting applications for learners and teachers and the need for stronger evaluation. A review of AI-powered chatbots for English speaking practice points to opportunities for conversational practice and confidence-building, while indicating the need for further evidence about speaking outcomes. Reviews of generative AI in language education similarly emphasise personalised learning while raising questions about reliability, ethics, and the quality of existing evidence.

Intervention research has begun to examine measurable outcomes. Mahapatra investigated ChatGPT as a formative feedback tool for undergraduate ESL writing, offering a basis for considering how AI feedback can be incorporated into instruction. Al-khresheh reviewed potential advantages and disadvantages of ChatGPT in English language teaching. Slamet explored teachers' and students' perceptions of ChatGPT as a digital language-learning assistant. These studies indicate that AI may help with feedback and engagement, but perceived usefulness should not be treated as proof of lasting language improvement.

Indian research is important because English learning takes place in multilingual settings and students have unequal access to digital resources. Roy and Swargiary's preprint considers ChatGPT and Indian undergraduates, while Khan and colleagues explore Indian EFL learners' accounts of using ChatGPT for academic writing. Such work raises both positive possibilities—such as writing support and confidence—and concerns about overdependence and academic integrity. The National Education Policy 2020 provides a wider policy context for technology integration and competency development.

Overall, the literature indicates that AI can extend opportunities for language practice and feedback. However, writing has received considerable attention, and evidence combining speaking, writing, and vocabulary outcomes among undergraduate students in multilingual Indian settings remains limited. The proposed study responds to this need by combining proficiency assessment with students' reported experiences.

III. Research Gap

Four gaps motivate the proposed study. First, much recent research on generative AI focuses on writing assistance, grammar correction, and user perceptions, with less attention to assessing speaking, writing, and vocabulary together. Second, studies based mainly on self-reported satisfaction cannot establish whether language proficiency has improved. Direct pre-test and post-test assessments are needed alongside students' views. Third, evidence from other countries or specialised groups may not fully represent the linguistic diversity and differences in digital access found among Indian undergraduates. Fourth, AI tools have different functions: conversational tools support speaking, writing assistants provide revision suggestions, and vocabulary apps support word learning. Their contributions should be examined separately. The study therefore proposes a mixed-methods design combining language assessments, questionnaires, and interviews, while also considering ethical and practical challenges.

IV. Objectives of the Study

The main objective is to examine the contribution of AI-based learning tools to English language skill development among undergraduate students. The specific objectives are:

1. To identify how frequently and for what purposes students use AI tools for English learning.
2. To assess changes in speaking performance after guided AI-assisted practice.
3. To examine changes in writing accuracy, coherence, organisation, and clarity.
4. To investigate vocabulary acquisition, contextual use, and retention.
5. To analyse students' perceptions of usefulness, accessibility, and limitations.
6. To identify concerns relating to inaccurate feedback, overdependence, privacy, and academic integrity.

V. Research Methodology

Research design: A mixed-methods approach is proposed, using a quasi-experimental pre-test/post-test design supplemented by a questionnaire and semi-structured interviews.

Population and sample: The population will comprise undergraduate students in Indian colleges or universities. Approximately 120 students from two or three institutions may be recruited, subject to access and approval. Where feasible, participants will be placed in an AI-assisted group and a comparison group receiving conventional instruction. Groups should be comparable at baseline; a power analysis should guide the final sample size.

Sampling and instruments: Stratified or purposive sampling may help represent different academic years, disciplines, and proficiency levels. Speaking will be assessed through recorded responses rated for fluency, pronunciation, intelligibility, and coherence. Writing tasks will be assessed for grammar, vocabulary, organisation, and clarity. Vocabulary tests will measure meaning, contextual use, and retention. A questionnaire will collect information about tool use, perceived usefulness, confidence, access, and ethical concerns. Interviews will explore experiences in greater depth.

Intervention: Over six to eight weeks, the AI-assisted group will complete guided conversational practice, writing and revision tasks, and vocabulary activities using approved tools. The comparison group will undertake similar activities without generative AI. Both groups should receive comparable teaching time and learning objectives. Independent tasks completed without AI should be included to assess whether learning transfers beyond the tool.

Data analysis: Frequencies, percentages, means, and standard deviations will summarise usage and test scores. Appropriate pre-test/post-test comparisons, effect sizes, and confidence intervals will be reported. Correlation may examine associations between AI use and learning gains, without assuming causation. Interview responses will be coded thematically and compared with quantitative results.

Ethics: Participation must be voluntary and based on informed consent. Student information and recordings should be kept confidential, and identifiable personal information should not be entered into AI tools. Participants should understand the study purpose, the limitations of AI feedback, and the institution's academic-integrity requirements.

VI. Data Analysis and Interpretation Framework

Because data have not yet been collected, this section describes how results should be analysed; it does not report actual findings. First, usage data will show how often students use AI and whether they use it for speaking, writing, vocabulary, grammar, or general academic support. Frequencies and percentages may be compared across academic years and baseline proficiency. High usage alone indicates adoption, not effectiveness.

Speaking outcomes will be assessed by comparing pre-test and post-test recordings using a common rubric. Two trained assessors, ideally unaware of group allocation, can reduce rating bias. Changes in fluency, coherence, pronunciation, and intelligibility should be reported separately. Self-reported confidence should not be confused with assessed speaking performance. If scores change little, possible explanations may include limited practice, low engagement, or insufficient teacher guidance.

Writing samples should be completed under comparable conditions and assessed for grammar, vocabulary range, coherence, sentence construction, and organisation. Results from AI-revised

drafts may show immediate assistance, but a separate writing task completed without AI is important for testing independent learning. Report the size and precision of group differences, not only whether a statistical test is significant.

Vocabulary tests should assess word meaning, contextual selection, appropriate use, and, where possible, delayed retention. Students may recognise definitions without being able to use words naturally; therefore, independent sentence production or short writing tasks can provide useful evidence. A delayed test can help establish whether learning is sustained.

Correlation analysis may explore whether frequency of AI use is associated with improvement in language scores. Pearson's correlation may be suitable for appropriate continuous data meeting its assumptions; Spearman's rank correlation may be preferable for ordinal or non-normally distributed data. Any association should be interpreted cautiously because motivation, prior proficiency, teacher support, and digital literacy may also affect results.

Interview analysis can identify themes such as immediate feedback, confidence, personalised practice, accessibility, inaccurate suggestions, dependence on AI, and academic honesty. Comparing interview themes with assessment results can reveal important differences. For example, students may feel more confident even when their assessed performance changes only slightly. The final interpretation should consider the combined evidence rather than relying on one measure.

VII. Anticipated Findings and Suggestions

The following are anticipated outcomes, not established findings. Guided AI conversation may give students more opportunities to practise and may reduce anxiety for some learners. Writing assistants may help students notice grammatical errors and improve revision, but independent writing tests are needed to establish transferable learning. AI-generated examples and quizzes may support vocabulary acquisition, although retention and contextual use must be measured. Students may value flexible practice and quick feedback, while benefits may differ according to proficiency, motivation, and digital access.

Several challenges may also arise: AI can produce inaccurate or unsuitable responses; students may accept suggestions without evaluating them; unequal access can disadvantage some learners; and submitting generated work as one's own may breach academic-integrity rules. Privacy and data protection should also be considered.

Suggestions: Teachers should integrate AI into planned activities and ask students to explain, verify, and evaluate its suggestions. Students should use AI for practice and feedback rather than copying generated answers. Colleges should provide AI-literacy guidance, establish clear acceptable-use policies, and ensure equitable access to devices and connectivity. Assessment should include independent speaking, writing, and vocabulary tasks. Future studies should use larger samples, longer interventions, comparison groups, and delayed assessments, and examine differences by discipline, language background, proficiency, and tool type.

In conclusion, AI-based tools offer promising ways to supplement English language teaching, but their effectiveness should be established through systematic assessment. A balanced approach combining teacher guidance, AI-supported practice, independent performance, and ethical awareness is more appropriate than treating AI as a substitute for teaching.

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