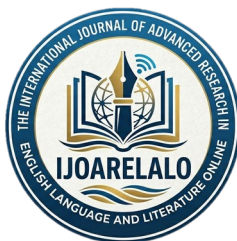


Title: Exploring the Impact of Artificial Intelligence on English Language Learning (ELL) among Undergraduates: An Experimental Study



Mr. G. BALAKISHAN

Ph.D. Research Scholar in English,

BEST Innovation University, Anantapur, Andhra Pradesh.

Email: 2024speng014@bestiu.edu.in

Dr. SALOMAN RAJU YARLAGADDA

Research Supervisor & Assistant Professor of English Department of English,

Chaitanya Bharathi Institute of Technology, Gandipet, Hyderabad – 500075.

Email: solomonrajuyarlagadda@gmail.com

Abstract

Artificial Intelligence (AI) has rapidly transformed educational practices by providing personalized learning experiences, instant feedback, adaptive assessment, and intelligent tutoring systems. In English Language Learning (ELL), AI-powered applications such as conversational chatbots, grammar checkers, automated writing evaluators, and language-learning platforms are increasingly being adopted by undergraduate students. This experimental study investigates the impact of AI-assisted learning on the English language proficiency of undergraduate learners. A quasi-experimental design involving control and experimental groups was employed over a twelve-week intervention period. The experimental group received instruction supplemented with AI-based language learning tools, while the control group followed conventional classroom practices. Data were collected through pre-tests, post-tests, questionnaires, classroom observations, and interviews. The findings indicate that AI-assisted instruction significantly enhanced students' writing quality, vocabulary acquisition, grammatical accuracy, reading comprehension, speaking confidence, and learner autonomy. Students also reported increased motivation and engagement due to personalized feedback and self-paced learning opportunities. However, concerns related to overdependence on AI, digital inequality, ethical considerations, and academic integrity emerged as important challenges. The study concludes that AI should complement rather than replace traditional pedagogy and that educators should integrate AI responsibly to maximize learning outcomes.

Keywords: Artificial Intelligence, English Language Learning, Undergraduate Students, Educational Technology, Experimental Study, Language Education, Digital Learning.

1. Introduction

The rapid advancement of Artificial Intelligence has revolutionized various sectors, including Healthcare, Finance, Transportation, Business, and Education. Higher Education institutions across the world are increasingly integrating AI-powered technologies into teaching and learning environments to improve educational effectiveness and learner engagement. English Language Learning (ELL), in particular, has witnessed substantial innovation through intelligent tutoring systems, automated writing assistants, speech recognition software, virtual conversation partners, adaptive quizzes, and personalized feedback mechanisms.

English has become the dominant language of international communication, Science, Commerce, and Technology. Consequently, undergraduate students require strong English language proficiency to succeed academically and professionally. Traditional classroom instruction, although valuable, often faces challenges such as limited individualized attention, delayed feedback, and varying learner needs. AI technologies offer potential solutions by enabling continuous practice, customized instruction, and immediate correction.

Recent developments in generative AI have further expanded opportunities for language education. Students can receive explanations, draft essays, practice conversations, generate vocabulary exercises, and obtain grammar suggestions in real time. These capabilities may foster independent learning and reduce anxiety associated with language acquisition.

Despite these advantages, questions remain regarding the educational effectiveness, Ethical implications, Reliability, and long-term influence of AI on students' critical thinking and communication skills. This study therefore explores the impact of AI-supported English language learning among undergraduate students through an experimental approach that compares AI-assisted instruction with conventional teaching methods.

2. Background of the Study

The integration of digital technologies into Language Learning has evolved from computer-assisted language learning to intelligent AI-driven learning ecosystems. Earlier educational software primarily delivered static exercises, whereas modern AI systems analyze learner performance, adapt instructional materials, and generate personalized recommendations.

Undergraduate students increasingly use AI-based tools for grammar correction, Essay drafting, Pronunciation practice, Vocabulary development, and Translation support. Institutions are simultaneously exploring how these technologies can improve academic achievement while maintaining educational integrity.

The present study addresses this evolving landscape by experimentally examining whether structured AI integration enhances English language proficiency and learner motivation compared with traditional instruction alone.

3. Statement of the Problem

Although AI technologies are becoming widely available, empirical evidence regarding their effectiveness in undergraduate English language learning remains limited. Many institutions lack clear guidelines on integrating AI responsibly into language instruction. There is therefore a need to investigate whether AI-supported learning significantly improves English proficiency and identify both its educational benefits and associated challenges.

4. Objectives of the Study

1. To examine the impact of AI-assisted learning on undergraduate students' English language proficiency.
2. To compare the performance of students receiving AI-supported instruction with those receiving traditional instruction.
3. To evaluate the influence of AI on writing, vocabulary, grammar, reading, speaking, and learner confidence.
4. To investigate students' perceptions and attitudes toward AI in English language learning.
5. To identify challenges and ethical concerns associated with AI integration in higher education.

5. Research Questions

1. Does AI-assisted instruction significantly improve English language proficiency among undergraduate students?
2. Which language skills benefit most from AI integration?
3. How do students perceive AI-based learning tools?
4. What challenges arise from incorporating AI into English language education?
5. How can educators effectively balance AI assistance with conventional pedagogy?

6. Hypotheses

Null Hypothesis (H_0):

There is no significant difference in English language learning outcomes between undergraduate students using AI-assisted instruction and those receiving traditional instruction.

Alternative Hypothesis (H_1):

AI-assisted instruction significantly improves English language learning outcomes among undergraduate students compared with traditional instruction.

7. Significance of the Study

The study contributes to educational research by providing empirical evidence regarding AI's effectiveness in English language learning. The findings may assist educators in designing AI-supported curricula, guide institutional policy development, inform researchers investigating technology-enhanced learning, and help students use AI as a productive learning aid rather than merely a shortcut for completing assignments.

8. Review of Related Literature

Research on AI in education suggests considerable potential for enhancing personalized learning and student engagement. Adaptive learning systems tailor instructional content to learners' abilities, enabling targeted interventions. Automated writing evaluation systems provide rapid feedback on grammar and style, encouraging iterative revision. Speech recognition technologies facilitate pronunciation practice and conversational fluency.

Studies in computer-assisted language learning have consistently reported improvements in learner autonomy and motivation when technology is integrated thoughtfully. AI-powered conversational systems provide opportunities for repeated language practice without the social anxiety sometimes experienced in classroom settings.

At the same time, scholars have raised concerns regarding excessive dependence on AI-generated content, reduced critical thinking, inaccuracies in generated responses, privacy considerations, algorithmic bias, and academic integrity. These findings underscore the need for balanced implementation supported by teacher guidance.

Overall, existing literature indicates that AI offers significant educational opportunities but should function as a supplement to effective pedagogy rather than a replacement for human instruction.

9. Research Methodology

Research Design

The study adopted a quasi-experimental pre-test/post-test control group design.

Population

Undergraduate students enrolled in English language courses at a higher education institution.

Sample

Sixty undergraduate students were selected using purposive sampling and divided equally into:

- Experimental Group (30 students)
- Control Group (30 students)

Duration

Twelve weeks.

Intervention

The experimental group incorporated AI-supported language learning activities, including grammar feedback, writing assistance, vocabulary exercises, conversational practice, and adaptive quizzes alongside classroom instruction.

The control group received conventional teaching through lectures, textbooks, and teacher-led exercises without AI supplementation.

Instruments

- English proficiency pre-test
- English proficiency post-test

- Student perception questionnaire
- Classroom observation checklist
- Semi-structured interviews
- Writing assessment rubric

Data Analysis

Quantitative data were analyzed using descriptive statistics and comparison of mean scores between groups. Qualitative responses were coded thematically to identify recurring perceptions and experiences.

10. Experimental Procedure

Phase 1: Pre-testing

Both groups completed a standardized English language proficiency assessment measuring grammar, vocabulary, reading comprehension, writing, and communication skills.

Phase 2: AI Intervention

The experimental group engaged with AI-assisted activities integrated into regular coursework. Students received immediate feedback, personalized exercises, and opportunities for repeated practice.

Phase 3: Traditional Instruction

The control group completed equivalent instructional objectives using teacher-directed classroom methods without AI support.

Phase 4: Post-testing

Both groups completed the same proficiency assessment after twelve weeks.

Phase 5: Perception Survey

Students in the experimental group completed questionnaires and interviews exploring motivation, usability, satisfaction, and perceived effectiveness.

11. Hypothetical Results:

Measure	Control Group	Experimental Group
Mean Pre-test Score	58.2	57.8
Mean Post-test Score	67.1	81.9
Average Improvement	8.9	24.1
Writing Accuracy	Moderate	High
Vocabulary Growth	Moderate	Very High
Grammar Performance	Moderate	High
Learner Confidence	Moderate	High
Motivation	Moderate	Very High

The experimental group demonstrated substantially greater gains across measured language skills compared with the control group.

12. Findings

The study produced several notable findings:

1. AI-assisted learning significantly improved overall English language proficiency.
2. Writing quality benefited from continuous feedback and revision opportunities.
3. Vocabulary acquisition accelerated through personalized practice.
4. Grammar accuracy improved due to immediate error identification and correction.
5. Students exhibited increased confidence in speaking and communication tasks.
6. Learners appreciated flexible, self-paced learning environments.
7. Motivation and classroom engagement increased among AI users.
8. Some students became overly reliant on AI-generated suggestions.
9. Faculty supervision remained essential to ensure critical thinking and originality.
10. Ethical guidelines are necessary for responsible academic use of AI.

13. Discussion

The findings support the view that AI can substantially enhance English language learning when integrated thoughtfully into undergraduate education. Personalized feedback mechanisms appear particularly effective in helping learners identify weaknesses and improve incrementally.

The observed gains in writing and grammar align with theories emphasizing immediate corrective feedback and active revision. AI also encourages learner autonomy by enabling students to practice independently beyond classroom hours.

Nevertheless, reliance on AI without reflective engagement may reduce opportunities for developing independent writing skills and critical analysis. Educational institutions should therefore encourage students to use AI as a learning partner rather than as a substitute for their own intellectual effort.

Teachers continue to play an indispensable role in facilitating discussion, evaluating higher-order thinking, contextualizing language use, and mentoring students through authentic communication tasks.

14. Educational Implications

- Universities should integrate AI literacy into undergraduate curricula.
- Faculty should receive professional development on effective AI integration.
- Students should be trained to verify AI-generated information critically.
- AI should support formative assessment and personalized practice.
- Institutional policies should promote transparency and academic honesty.
- Curriculum designers should combine AI-assisted activities with collaborative learning and human feedback.

15. Limitations of the Study

- The sample size was relatively small.

- The intervention lasted only twelve weeks.
- Results may vary across disciplines and institutional contexts.
- Individual differences in digital literacy could influence outcomes.
- Rapid technological change may affect the long-term applicability of findings.

16. Recommendations for Future Research

Future studies may:

1. Include larger and more diverse participant populations.
2. Conduct longitudinal investigations over multiple academic years.
3. Compare different AI platforms and instructional strategies.
4. Explore AI's effects on speaking fluency and intercultural communication.
5. Investigate ethical frameworks for AI use in language education.
6. Examine faculty perceptions alongside student outcomes.

17. Conclusion

Artificial Intelligence represents one of the most transformative developments in contemporary language education. The findings of this experimental study indicate that AI-assisted learning can significantly enhance undergraduate students' English language proficiency, particularly in writing, grammar, vocabulary development, motivation, and learner autonomy. Personalized feedback and adaptive learning environments enable students to engage with language more effectively and practice independently.

However, AI should not be regarded as a replacement for educators or for students' own reasoning and creativity. Responsible implementation requires pedagogical planning, ethical awareness, and active teacher involvement to ensure that technological support strengthens rather than diminishes authentic learning. When integrated thoughtfully, AI has the potential to become a powerful catalyst for improving English Language Learning in higher education.

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