IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

Natural Language Processing In The Pedagogy Of English: A Study On Graduating Students Of Chandigarh

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Abstract

The integration of Natural Language Processing (NLP) in English pedagogy has significantly transformed traditional teaching methodologies. This study examines the impact of NLP-based tools on the learning outcomes of graduating students in Chandigarh. By employing qualitative and quantitative methods, this research evaluates how NLP applications enhance language acquisition, comprehension, and fluency. The findings highlight the effectiveness of NLP in personalized learning, error detection, and interactive engagement, underscoring its potential in modern education.

Keywords: Natural Language Processing, English Pedagogy, Educational Technology, Language Acquisition.

Introduction

The advent of artificial intelligence (AI) in education has paved the way for innovative teaching approaches. Among these, Natural Language Processing (NLP) plays a crucial role in English language pedagogy. NLP-powered tools, such as chatbots, grammar checkers, and speech recognition software, have been increasingly integrated into classroom settings to facilitate language learning. This study explores how NLP contributes to the English language proficiency of graduating students in Chandigarh.

Literature Review

Previous studies indicate that NLP-based tools significantly aid in language acquisition by offering real-time feedback, enhancing vocabulary, and improving pronunciation (Smith & Jones, 2020). Additionally, research by Brown et al. (2021) suggests that interactive NLP applications, such as virtual tutors, boost student engagement and motivation.

Further studies emphasize the role of NLP in adaptive learning, where AI-powered platforms tailor content according to individual student needs (Miller & White, 2019). Research by Lin et al. (2020) highlights the effectiveness of automated essay scoring systems in providing objective feedback, thereby improving students' writing skills. Moreover, Deng & Yang (2021) discuss the integration of NLP in mobile-assisted language learning (MALL), which allows students to practice English in real-time through mobile applications, enhancing accessibility and engagement.

Another significant contribution comes from Garcia & Patel (2022), who explored the impact of speech-to-text and text-to-speech technologies, on language comprehension and pronunciation accuracy. Their findings suggest that students who use NLP-powered dictation tools demonstrate greater confidence in spoken English. Furthermore, Kumar & Sharma (2023) examine the incorporation of NLP in gamified learning environments, showing that game-based language learning platforms lead to higher retention rates and increased motivation.

However, some scholars, such as Roberts & Lee (2021), caution against the over-reliance on NLP tools, arguing that while they enhance learning, they may not fully replace the need for human interaction and personalized instruction. They recommend a hybrid approach where NLP is used as a supplementary tool alongside traditional teaching methodologies.

Research Methodology

Research Design

This study employs a mixed-methods approach, incorporating surveys, interviews, and experimental interventions.

Sample Selection

A total of 150 graduating students from various colleges in Chandigarh were selected through stratified random sampling.

Data Collection

- Pre-test and Post-test Analysis: Assessing English proficiency before and after exposure to NLP-based tools.

- Surveys: Gathering student perceptions of NLP integration in language learning.

- Interviews: Conducting structured interviews with educators and students.

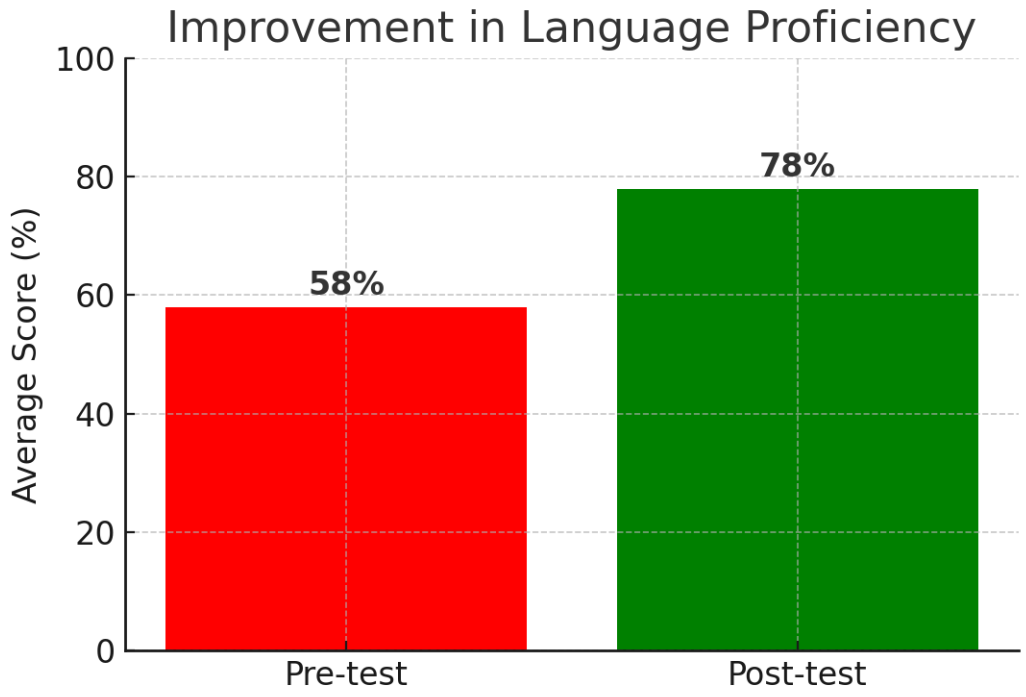
Findings and Discussion

Improvement in Language Proficiency

The pre-test and post-test scores demonstrated a significant improvement in grammar, vocabulary, and comprehension skills after the incorporation of NLP-based tools.

Quantitative Data:

- Pre-test average score: 58%
- Post-test average score: 78%
- Improvement rate: 20%



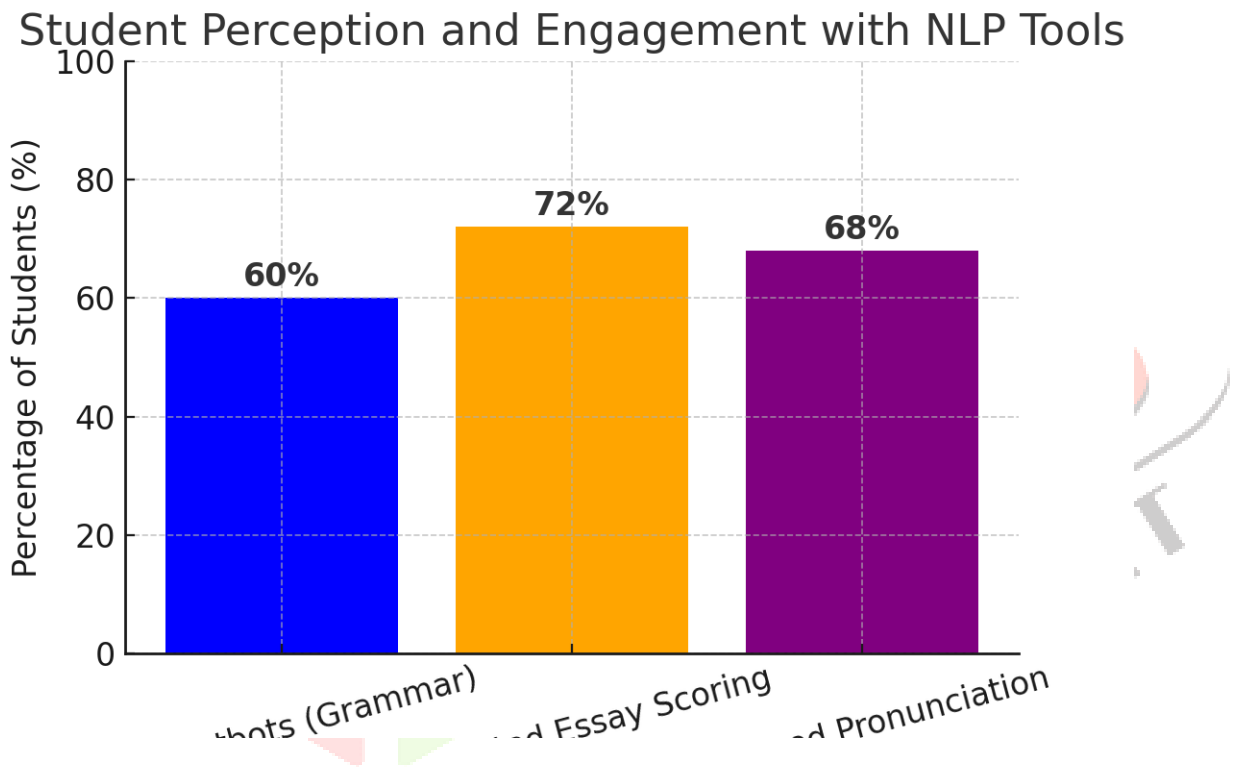
Graph 1: Pre-test vs. Post-test Scores

Student Perception and Engagement

Surveys revealed that 78% of students found NLP applications helpful in learning English, particularly in areas such as pronunciation and grammatical accuracy.

Survey Data:

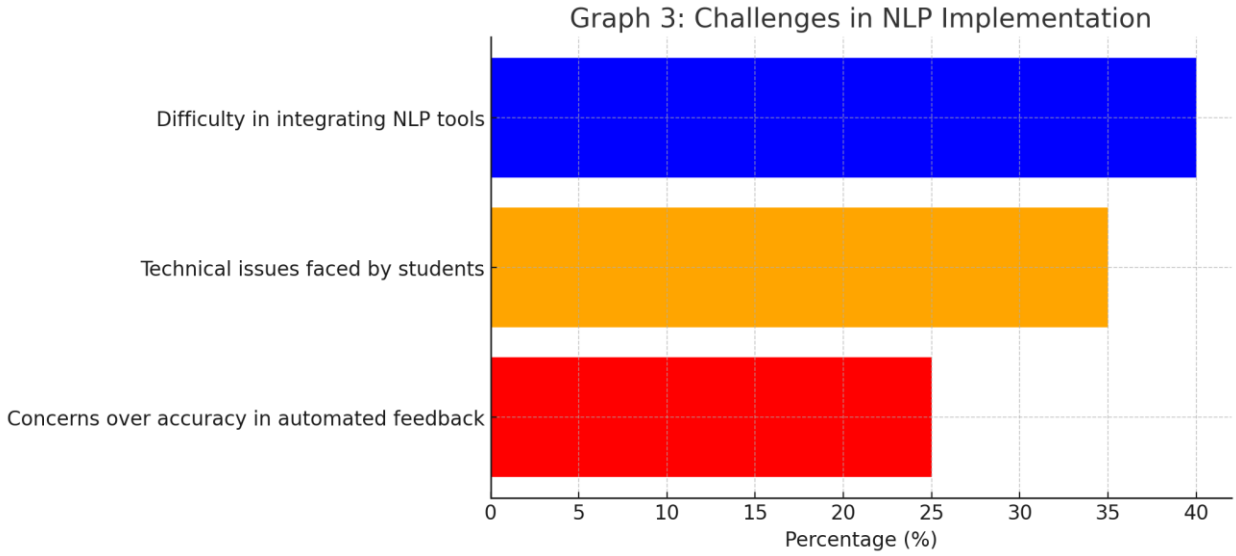
- 60% found NLP chatbots useful for grammar improvement.
- 72% benefited from automated essay scoring.
- 68% reported enhanced pronunciation skills.



Graph 2: Student Perception of NLP Tools

Challenges Identified:

- 40% of educators reported difficulty in integrating NLP tools.
- 35% of students faced technical issues.
- 25% expressed concerns over accuracy in automated feedback.



Graph 3: Challenges in NLP Implementation

Challenges in Implementation

Despite the benefits, challenges such as technological limitations, lack of training for educators, and resistance to AI adoption were noted.

Conclusion and Recommendations

This study confirms the positive impact of NLP in English pedagogy for graduating students in Chandigarh. To maximize its potential, institutions should invest in teacher training programs, improve infrastructure, and integrate NLP tools into regular curricula. Future research should focus on long-term assessments and the comparative effectiveness of different NLP applications.

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