

UNIVERSITY - LEVEL ENGLISH LANGUAGE TEACHING: AN NLP PERSPECTIVE

Dr. Challa Venkata Lakshmi

Assistant Professor
Dept of English
Bapatla Engineering College
cvltutu@gmail.com

Abstract:

Natural Language Processing (NLP) has emerged as a transformative technology in English language teaching, particularly for university-level learners. This paper focuses on the recent development in NLP applications at teaching level. Fundamentally includes chat box , automated writing, and evaluation tools for grammar and speech recognition systems for pronunciation training. Studies show that AI chatbots can serve as conversational partners, reducing learners' anxiety and boosting engagement and communication skills (Koc & Savas, 2024). Likewise, NLP-based writing tools contribute Speedy , Personalized feedback, leading to the improvement in Student's writing accuracy (Wei et al., 2023). These tools have been effective in both traditional classroom and online learning environments, offering on-demand support and personalized instruction (Fuchs, 2023). However, integrating NLP in language education also presents challenges. Over - dependence on AI tools (e.g. grammar checkers over-flagging errors), and the loss of human interaction are noted concerns (Abu Qub'a et al., 2024).

NLP technologies offer promising enhancements for English language teaching at the tertiary level, from providing conversational practice through chatbots to scaling writing feedback with AI, thereby supporting learners' language development in both classroom and online settings. The paper concludes with pedagogical recommendations for integrating NLP-driven tools effectively and ethically in university English curricula, alongside a discussion of future directions in language education.

Keywords: Natural Language Processing, Chatbots, Automated Writing Evaluation, Speech Recognition; Computer-Assisted Language Learning

Introduction

In recent years, Natural Language Processing (NLP) technologies have opened new ways to support language learning and teaching in both classroom and online settings. NLP, a part of artificial intelligence that helps computers understand and generate human language, can automate or improve many language teaching tasks. For example, AI-driven systems can help students practice conversation, fix writing mistakes, evaluate essays, or give instant feedback on pronunciation. These abilities tackle familiar challenges in language education, such as offering enough practice opportunities and timely personalized feedback (Fuchs, 2023). This paper focuses on how NLP helps teach the English language to university-level learners. We look at specific NLP tools and applications, including chatbots, grammar checkers, automated essay scoring systems, and speech recognition tools, and how they are used to improve English language teaching (ELT). We consider both classroom and online learning, reflecting the blended and digital environments common in higher education. We also discuss the benefits these technologies provide, such as increased student engagement, personalized learning, and efficiency in assessment, along with the challenges and limitations, like accuracy issues, dependency, and ethical concerns.

NLP Applications in English Language Teaching: An Overview

NLP-powered tools for English teaching can be grouped into a few broad categories based on their function. **Table 1. Key NLP Applications in University English Language Teaching** (with examples and benefits)

Application	Example Tools and Technologies	Educational Purpose	Benefits for Learners and Teachers
Chatbots and Conversational Agents	Chatbots in apps (e.g., Duolingo Bots), AI assistants (Siri, Alexa), Grammarly, and voice-enabled agents	Facilitates conversation practice; improves speaking and listening skills	Provides on-demand dialogue practice in English; increases speaking opportunities; can lower students' anxiety and boost confidence in speaking (Koç & Şiş, 2024). Offers personalized, anytime practice outside class, facilitating

			edclassroomspeaking
Grammar Checkers	Primarily, Ginger, Proton Write Check, Grammarly Editor	Instant feedback	Instantly identifies grammar and spelling errors; helps students notice and correct mistakes, leading to improved grammatical accuracy over time (Smith, 2024).
Automated Essay Scoring (AES) and AI Systems	Examples include e-rater (ETS), IntelliMetric, iWrite, Turnitin, and AI-powered systems like Carnegie Learning's iMUSE, Pearson's PowerWrite, and Blackboard's WriteAnywhere. Also includes AI writing assistants like Grammarly, Proton, and GPT-4.	Instant feedback and analysis	Provides consistent, fast scoring and qualitative feedback (organization, coherence, etc.) on writing assignments. Enables large-scale writing practice with immediate feedback (Wei et al., 2023). Supports large classes by reducing teachers' grading load, allowing more assignments and interventions.
Speech Recognition	Speech-to-text apps (e.g., Google Speech API), pronunciation tutors (e.g., Pimsleur, Speak, Duolingo), and assessment tools (e.g., Pronunciation Power, IELTS.org).	Real-time assessment of pronunciation; oral fluency practice	Provides immediate feedback on pronunciation accuracy, fluency, and rhythm. Can adapt to different accents and provide targeted exercises for problem sounds.

Table 1 provides a high-level overview of four key application areas – chatbots, grammar/writing.

feedback, automated essay scoring, and speech recognition – along with examples and their educational benefits.

1.1 Chatbots for Conversational Practice:

One of the most prominent NLP applications in language education is the use of AI chatbots as conversational partners or tutors. Research in the last few years indicates that chatbots can positively impact language learning. A systematic meta-synthesis by Koç and Savaş (2024) analyzed 57 studies on voice-based AI chatbots for English learning and found generally positive outcomes. The interactive, low-pressure environment of talking to a bot – which does not judge mistakes the way a human might – can make students more comfortable in experimenting with the language. Chatbots also appear to boost engagement and motivation; they provide a form of *edutainment* that keeps learners interested through gamified conversation and instant feedback. In reviewed studies, chatbots effectively facilitated conversational practice, helped with negotiation of meaning in dialogues, and elevated learners' communicative competence (Koç & Savaş, 2024). University students have used general-purpose voice assistants (like Siri, Alexa) for practice, but there is a push for more.

1.2 ELT-specific chatbots: trained on educational dialogues (Koç & Savaş, 2024). Personalized bots might focus on group discussions, mock interview, and day to day conversations.

In practice, teachers might introduce a chatbot as a **practice partner for homework** or as a role-play agent in class, while still guiding the activity and debriefing with students to ensure learning. Some studies are exploring giving chatbots more personality or using multimedia (avatars, etc.) to increase the sense of presence. Indeed, the latest research prototypes include **multimodal chatbots** that incorporate voice, text, and even visual cues to create a richer conversational experience.

Furthermore, the techniques of case studies chatbot usage can have an improvement in observations. Onestudyreportedhigher *willingness to communicate* and lower anxiety among EFL students after weeks of practicing with a voicechatbot(Lee&Lim,2023,ascitedinKoç&Savaş,2024).Anotherfoundincreasesinthelength and complexity of student oral responses over time when using a dialogue-based AI tutor (Belda- Medina & Calvo-Ferrer, 2022).

Another alarm is dependence on chatbots. Fuchs(2023)arguesthatwhileNLP-basedagentslikeChatGPT offeron-demandsupport,theyshouldbeusedasasupplementtohumaninstruction,notareplacement.

Teachers can ensure students still get meaningful real conversations and cultural context from human interaction. Overall,chatbotsareanexcitingNLP-driventoolbringingconversationalpracticeintolearners'hands.

Withappropriateuse,theycangreatlyincreasestudents'exposuretoEnglishininteractiveform,wh ich is crucial for developing fluency and confidence.

1.3 GRAMMARCHECKERSANDAUTOMATEDWRITINGFEEDBACK

WritinginEnglish—especiallyacademicwritingexpectedatuniversity—isachallengeformany ESL/EFLstudents. Instantly identifies grammar and spelling errors; helps students notice and correct mistakes, leading to improved grammatical accuracy over time (Vu,2024).For language learners, these tools serve as **automated tutors for writing mechanics** – catching errors that the student might notrealizeandprovidinginstantfeedback.Thisimmediacyispedagogicallyvaluable:asstudents write and immediately see highlights on mistakes, they can learn from those corrections in real time, which reinforces learning (Fu *et al.*, 2022) Several studies suggested that Grammar checkers can improve the writing accuracy.For example, a case study at a college in Vietnam by Vu (2024) showed that after a period of using Grammarly, students' grammatical error rates in essays decreased, andthestudentsreportedapositiveattitudetowardusingsuchtoolsforwritingimprovement.

Moreover,grammarcheckersprovidedetailedfeedbackonspecificissues –manywillunderlinea fragmentorhighlightavertenseerrorandexplainexamplecorrection. It also fosters learner autonomy: students can self-edit and revise their drafts with less immediate reliance on a teacher's red pen.

Alharbi (2023) in a pedagogical overview noted that AI writing assistants can *enhance*

writing instruction by handling routine error correction, thus allowing instructors to engage in more meaningful writing guidance (Alharbi, 2023). This is particularly useful in large classes where a single instructor cannot possibly give extensive individualized grammar feedback on every draft.

A systematic review by Dizon and Gayed (2024) examined the use of Grammarly in L2 writing contexts

and found that Grammarly generally outperformed other automated grammar checkers in accuracy and breadth of error detection. However, the same review and other studies also highlight limitations. One major issue is **false positives** – the checker flags something as an error when it is actually acceptable. Abu Qub'a *et al.* (2024) specifically evaluated Grammarly's performance on academic writing and concluded that it “tends to over-flag many issues, resulting in many false positives,” and it fails to account for context or optional usages in English. This can confuse learners or lead them to mistrust the tool's feedback. The study found that **Grammarly is not fully reliable as an assessment tool** for polished academic writing, although it can help highlight areas for revision (Abu Qub'a *et al.*, 2024).

1.4 Tools – Speech & Pronunciation : Speech recognition and pronunciation tools, empowered by NLP, provide a powerful means for students to improve their spoken English in a targeted way. By affording endless practice and immediate feedback, they help learners make incremental improvements that accumulate into significantly better pronunciation and fluency.

Modern language learning applications increasingly incorporate pronunciation exercises where learners speak a word or sentence and the app analyzes their speech. NLP algorithms – often using techniques like Hidden Markov Models or deep neural networks trained on speech data – compare the learner's pronunciation to native-speaker benchmarks. The system can then **pinpoint errors** (e.g., mispronounced phonemes, misplaced stress) and sometimes even offer corrective suggestions (like showing the phonetic pronunciation or having the learner repeat troublesome words). For example, the app ELSA Speak uses an AI model to score how closely the learner's pronunciation matches a standard and give targeted feedback.

In traditional settings, a student might speak in class and only occasionally get corrections due to time constraints or fear of interrupting. With an AI listener, every attempt can yield feedback. An advanced system that integrates NLP and speech recognition for “interactive and real-

time feedback, enhancing oral English proficiency “Their system provided personalized and adaptive learning: it could adjust for a user’s accent and focus on the individual’s pronunciation challenges. This adaptivity makes practice more efficient – learners spend time on their specific weaknesses rather than generic drills Dubey et al (2025)

More recently, an experiment by Mroz (2022) reported that students using a mobile pronunciation app with automatic feedback improved their intelligibility over a semester more.

than those who only got traditional teacher feedback sparingly. The technology is especially helpful for problematic sounds that do not exist in the learner’s first language – the immediate corrective feedback and ability to see visual waveforms or charts (some apps show pitch contours or intensity, etc.) reinforce the correct articulation.

Additionally, these tools can increase speaking *volume* (quantity of speaking practice). University learners can practice speaking with an app for hours if they want, without needing a partner or feeling shy. This extra practice can lead to greater fluency.

Some NLP-driven systems serve a dual purpose of training listening comprehension alongside speaking. For instance, a chatbot with voice capability requires the student to *understand* what the bot said (listening) and then respond (speaking), and the speech recognizer transcribes the student’s response. If the recognizer cannot parse it, it often means pronunciation issues. Voice-based chatbots (like some used in Koç & Savaş’s review) essentially create a loop where the student’s listening and speaking are continuously engaged. In the process, learners get used to real-time conversational exchanges in English. Dubey (2025) collected a diverse dataset of 882 English teachers’ speech across various accents to improve their system’s robustness. Their resulting model achieved up to 97.5% recognition accuracy and outperformed baseline models (including an LSTM-based model and even GPT-3.5 in transcription tasks). This is a promising sign that NLP can handle non-standard input better with specialized models.

Another innovation in their system was using multimodal feedback – combining audio analysis with *visual input* (lip movement detection via computer vision) to enhance

accuracy. This multimodal approach can catch pronunciation issues that purely audio-based systems might miss (for example, if a learner's lip movement doesn't match the expected phoneme, the system knows the sound was likely wrong even if audio was a bit unclear). While such sophisticated systems are still in research or early product stages, they represent the direction NLP-based language tech is heading.

1.5 In the Classroom and Online: Teachers have started using speech tech in many ways. In class, some use language lab software where students speak into microphones and the software logs errors or scores their pronunciation, which the teacher can later review. This allows for pronunciation drills without the teacher having to monitor each student individually at the same time. Online, teachers might assign specific pronunciation apps as homework. For example, an assignment might be: "Practice the pronunciation of these 20 academic vocabulary words using the app and record your score or progress." Many apps give a score of 100 or a percentage match to native pronunciation; students can try repeatedly to improve these scores, which turns practice into a kind of game.

There are also assessment applications. Tests like IELTS or TOEFL have speaking components traditionally evaluated by human examiners, but there's interest in automated speaking assessment. Duolingo English Test, an online proficiency test, uses an AI (NLP+speech) to rate test-takers' speaking; this significantly reduces cost and scheduling friction. Studies on automated speaking assessment show reasonably good reliability, though ensuring fairness across accents remains crucial.

2. Challenges and Consideration

Although there are many benefits to using NLP applications in English instruction, it is crucial to address the difficulties and factors involved. These range from technical limitations to pedagogical and ethical issues.

Accuracy and Reliability: No NLP tool is 100% accurate. If a student encounters too many mistakes from the tool, they could become frustrated or learn incorrect information. For example, if a chatbot consistently responds incorrectly, a student might get confused about language usage. To tackle this, it's advisable to use well-vetted tools (with high accuracy rates) and always have a feedback loop where students can ask the teacher if they suspect an error in the AI's feedback. As the tech improves (e.g.,

specialized models for non-native input), accuracy is increasing, but cautious oversight remains wise.

2.1 Preconception of NLP models : In language education context, this might manifest as the chatbot having a bias towards certain cultural contexts or the AI favoring a certain essay structure. An infamous example is if an essay scoring AI was trained mostly on U.S. English academic essays, it might undervalue a different but legitimate rhetorical style common in another culture. To ensure fairness, developers and educators must be aware of such biases.

If a bias is suspected (e.g., students from a certain background consistently getting lower scores not aligned with teacher assessments), teachers should double-check and possibly adjust the use of the tool.

2.2 Over Dependence – AI assistance : To prevent this, educators should encourage *mindful use* of tools. For instance, one strategy is “AI then verify”: students use the tool, but then manually reflect or check key points without the tool. Another approach is periodic “off- AI” assignments where students must write or speak without any AI aid, to ensure they can perform independently (for example, in an exam setting where AI is not allowed). Essentially, balancing tool- assisted tasks with traditional tasks can maintain skill development.

2.3 Academic Integrity and Plagiarism:

With advanced NLP (particularly generative models like ChatGPT), students might misuse AI to generate essays or answers, raising plagiarism issues. For instance, a student could have ChatGPT write a rough draft and then polish it themselves; or use translation tools to do assignments meant to practice writing. This blurs the lines of authorship. Academic institutions are currently debating how to implement rules pertaining to content produced by artificial intelligence. One

approach is to integrate AI literacy: discuss openly what is acceptable use of AI in coursework (e.g., getting grammar help is okay, but having AI compose whole paragraphs is not). Some instructors design assignments that require steps (like outlines, drafts, reflections) that make AI generation thinking less straightforward to use undetected one

more difficulty is verifying that teachers are at ease and proficient with NLP tools. Professional development and evidence of effectiveness can help bring teachers on board. On the other side, a teacher who does not trust the tool might not implement it well, which can lead to poor results (like not intervening when the tool errs, or not aligning it with curriculum).

2.4 Cost and Access: Some advanced NLP tools (especially enterprise-level AWE systems or premium versions of apps) can be costly. If an institution licenses a tool, that helps equalize access, but if not, teachers should be mindful to recommend tools that are free or low-cost so as not to disadvantage certain students. Additionally, in global contexts, not all students have high-speed internet or modern devices to run these tools, which could widen gaps. Offline or low-bandwidth versions (if available) or alternative exercises might be needed in such cases.

2.5 Ethical Use of AI Feedback: A subtle pedagogical consideration is *how much to intervene* when AI gives feedback. Teacher should be ready to facilitate the doubts every time. Similarly, if an AWE tells a student their essay's structure is weak, the teachers should be ready to provide guidance on improving structure – the AI highlights the issue, but the remedy often needs human coaching or additional resources/tutorials.

2.6 Continuous Evaluation of Effectiveness: The field is evolving fast. Collecting feedback from students is one method (e.g., surveys about whether they found the chatbot helpful for practicing speaking, or if the AWE feedback made sense to them). Also, measuring outcomes – did writing scores improve over a semester of using an AWE tool compared to previous semesters without it? Did students who practiced with the pronunciation app show better pronunciation gains than those who didn't? These assessments assure that technology adoption is supported by outcomes.

Conclusion

The evidence from recent studies is largely encouraging. Chatbot can be unstoppable partners which can improve language skills. Grammar and writing tools catch errors and coach students toward greater accuracy, thus enhancing writing quality (especially when combined with teacher input). Automated evaluation systems allow for more writing and

speaking practice with timely insights, accelerating skill development in those domains.

Speech

recognition tool target pronunciation, giving students concrete guidance to refine their spoken English.

However, the integration of NLP in teaching is not a panacea; it comes with caveats that educators and institutions must mindfully manage. Need to avoid and be cautious with tool accuracy, dependence and maintaining academic integrity. The recurring theme is that human guidance remains indispensable. When learners engage with an AI tutor or evaluator, the teacher's role shifts to facilitator, explainer, and motivator – helping students interpret AI feedback, curating appropriate tasks, and providing the empathy and contextual understanding that AI lacks.

Another future direction is increased multimodality: integrating text, speech, and even visual context in language learning tools. In the international and multicultural context of university education, NLP tools have the potential to be tailored to specific needs – whether it's an EFL learner in Asia focusing on academic English, or an ESL immigrant student in a Western university needing support in everyday conversational skills.

The global nature of recent research (with studies reviewed from Asia, the Middle East, Europe, etc.) suggests that NLP in language teaching is a worldwide trend, with tools being adapted to various languages and English dialects.

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