Beyond Textbooks: Clearspeak's Audio Toolkit for Sector-Relevant Pronunciation Skill

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Abstract

This study evaluates CLEARSPEAK, a pronunciation-enhancement tool designed to address sector-specific vocabulary challenges among non-native English speakers in India. Focusing on five sectors (Education, Food, Employment, Banking, and Indian-origin English words), the tool integrates IPA transcriptions, audio lessons, and contextual definitions. A mixed-methods study with 150 students demonstrated significant improvements in pronunciation accuracy (85%) and self-reported confidence (92%). However, gaps in longitudinal impact, sample diversity, and statistical rigor were identified. Refinements include a control group, expert validation, and pedagogical alignment. Findings underscore CLEARSPEAK's potential as a scalable solution for bridging theoretical language learning and real-world communication.

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Keywords: clearspeak, phonetic training, communication competence, international phonetic alphabet

Introduction

In India's multilingual landscape, non-native English speakers often struggle with sector-specific vocabulary due to mother-tongue interference and limited phonetic training. While tools like Duolingo and Elsa Speak emphasize general pronunciation, few address contextual vocabulary relevant to professional and academic settings. CLEARSPEAK fills this gap by curating 500 high-impact words across five sectors, combining IPA transcriptions, audio guides, and definitions. This paper presents the tool's design, efficacy, and limitations, while addressing gaps in prior research, such as regional linguistic diversity and long-term retention.

In globalized academic and professional environments, clear pronunciation   often distinguishes confident communicators from hesitant speakers. Non-native speakers particularly in India, face challenges in pronouncing in sector-specific vocabulary due to influence from mother tongues, limited phonetic exposure, or lack of structured pronunciation training.

This paper, which is a project, CLEARSPEAK, aims to identify such problematic words and rectify their pronunciation through a user-friendly and structured approach. By focusing on five relevant sectors, we ensure that the vocabulary is not only essential but also relatable and impactful.

Objectives

The primary objective of this research is to systematically identify and analyze 500 high-frequency, commonly mispronounced words across five targeted sectors (Education, Food, Employment, Banking, and Indian-origin English vocabulary). For each word, the study will:

1. Provide Linguistically Accurate Resources

Deliver International Phonetic Alphabet (IPA) transcriptions cross-verified against authoritative references (e.g., *Cambridge English Pronouncing Dictionary*, *Forvo*).

Develop sector-specific contextual definitions to clarify usage (e.g., "Amortization: Gradual repayment of a debt over time in banking contexts").

2. Design Pedagogically Robust Audio Lessons:

Produce native-level audio recordings using trained speakers with neutral, globally intelligible accents, ensuring consistency in stress, intonation, and syllable boundaries.

Integrate these recordings into interactive modules that allow learners to compare their pronunciation with model audio.

3.   Evaluate Learning Outcomes and Engagement:

Conduct a mixed-methods study involving pre- and post-intervention assessments to quantify pronunciation accuracy gains using tools like Praat (speech analysis software).

Measure user engagement through metrics such as session duration, quiz completion rates, and qualitative feedback (e.g., surveys, focus groups).

Track self-reported confidence levels in real-world scenarios (e.g., academic presentations, job interviews, social interactions).

4.   Enhance Communication Competence:

Align the intervention with practical communication goals to ensure learners can apply sector-specific vocabulary confidently in professional, academic, and daily-life contexts.

Expected Outcomes:

- A curated pronunciation toolkit with 500 sector-specific entries, validated by linguistic experts.

- Empirical evidence of statistically significant improvements in pronunciation accuracy and user confidence.

- A scalable framework for addressing pronunciation challenges among non-native English speakers, adaptable to additional sectors or languages.

This structured approach bridges theoretical linguistics with applied pedagogy, aiming to empower learners with the phonetic precision and contextual fluency required for effective global communication.

Methodology and Team Collaboration

The research was conducted through a structured, collaborative effort involving a core team of three researchers and a faculty advisor, who provided methodological oversight and linguistic expertise. The workflow was divided into three key phases, each managed through role-specific contributions and iterative feedback loops:

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1. Word Collection and Validation
    Each team member independently identified over 100 frequently mispronounced words per sector (Education, Food, Employment, Banking, and Indian-origin English words). To ensure relevance and accuracy, sources included:

    Peer Surveys: Structured interviews with 50 peers to identify common pronunciation challenges.

    Digital Platforms: Analysis of mispronunciation trends on forums, pronunciation databases (Forvo, Cambridge Dictionary), and YouTube tutorials.

    Academic References: Cross-referencing with lexicons from sector-specific textbooks (e.g., *Oxford Business English Dictionary*) and peer-reviewed pronunciation guides. Words were compiled into a master list, and duplicates or outliers were resolved through group discussions and advisor feedback.

2. Audio Recording Protocol
    High-quality audio recordings were produced to model native-like intonation and clarity:

    Equipment: Recordings were made using studio-grade USB microphones (Blue Yeti) in a soundproofed environment to minimize background noise.

    Pronunciation Standards: Team members trained with online courses (Coursera's *The Music of American English Pronunciation*) to adopt neutral, globally intelligible accents.

    Quality Checks: The faculty advisor reviewed recordings for phonetic accuracy, ensuring consistency in stress patterns (e.g., ˈɛntrəprəˈnɜr for "entrepreneur") and syllable boundaries.

3. Transcription, Curation, and Tool Design

IPA Transcription: Each word was transcribed using the International Phonetic Alphabet (IPA), with cross-verification against the *Longman Pronunciation Dictionary*. Ambiguous cases (e.g., /əˈmɔːrtəzeɪʃən/ vs. /ˌæmərtəˈzeɪʃən/ for "amortization") were resolved through consultation with the faculty advisor.

Contextual Definitions: Simplified, sector-specific meanings were added (e.g., "Collateral: Asset pledged to secure a loan").

Digital Integration: Content was organized into a hyperlinked PDF using LaTeX, featuring clickable audio icons, self-assessment quizzes, and a searchable index for user convenience.

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Collaborative Workflow

The team adopted an agile approach, with weekly sync-ups to address bottlenecks:

- Role Allocation: One member focused on lexical research, another on technical production (audio/formatting), and the third on pedagogical design.

- Advisor Involvement: The faculty advisor conducted biweekly audits of IPA transcriptions and audio-phoneme alignment, ensuring academic rigor.

Pilot Testing and Feedback Integration

The finalized tool was distributed to 150 students across disciplines (STEM, humanities, commerce) for a three-week pilot. Feedback was collected via:

- Pre-/Post-Pronunciation Tests: Conducted usinn Google Speech-to-Text API to measure accuracy gains.

- Structured Surveys: 5-point Likert scales assessed usability, while open-ended responses highlighted sector-specific challenges (e.g., "Banking terms required repeated listening").

- Iterative Revisions: Ambiguous audio clips (e.g., "croissant" /kwɑːˈs�õ/ vs. /krəˈsɑnt/) were re-recorded based on user confusion.

This collaborative, phase-driven methodology ensured both technical precision and pedagogical relevance, aligning with the project's goal of creating an accessible, sector-specific pronunciation tool.

Content Design

The CLEARSPEAK tool was meticulously structured to provide learners with a comprehensive, multi-sensory approach to mastering pronunciation. Each entry in the digital resource included five key components, designed to address common challenges faced by non-native English speakers:

1. Word

The target vocabulary term, selected based on its sector-specific relevance and frequency of misuse. Terms like *amortization* (Banking) or *quinoa* (Food) were prioritized due to their prevalence in professional or daily interactions. Words were curated through peer surveys, educator input, and analysis of online forums to ensure practical utility.

2. Common Mispronunciation

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The purpose is to highlight frequent phonetic errors to raise awareness and contrast with correct patterns. Mispronunciations were identified through recordings of learner speech, peer feedback, and linguistic studies. *Entrepreneur* often mispronounced as "en-tre-pre-NOOR" (incorrect stress on the final syllable) instead of /ˌɒntrəprəˈnɜːr/.

3. Correct Pronunciation (IPA)

The purpose is to provide a standardized, visual guide to accurate articulation using the International Phonetic Alphabet (IPA). IPA transcends regional spelling inconsistencies, offering a universal reference for sounds. *Croissant* transcribed as /krwɑːˈs�õ/ to clarify nasalized vowels and silent consonants often omitted by learners.

4. Meaning

The purpose is to contextualize the word within its sector to reinforce understanding and usage. Definitions were simplified and paired with sector-specific examples (e.g., *Collateral: An asset pledged to secure a loan in banking*). This helps learners grasp not just pronunciation but also appropriate application in professional or academic settings.

5. Audio Lesson

The purpose is to model native-like pronunciation through auditory reinforcement. This was recorded after getting training in online platforms for neutral accents to ensure neutrality. Audio files were embedded as clickable icons in a hyperlinked PDF, with optional slow-motion playback for difficult sounds. Learners could toggle between their own recordings and the model audio for self-assessment.

This holistic approach ensured that learners not only corrected mispronunciations but also gained the confidence to use sector-specific vocabulary fluently in real-world scenarios.

Sector Overview

The study focuses on five critical sectors where pronunciation challenges frequently hinder effective communication among non-native English speakers. Each sector was selected based on its relevance to academic, professional, or daily interactions, and includes vocabulary that poses recurring phonetic difficulties.

1. Education
   This sector encompasses academic and pedagogical terminology essential for scholarly discourse. Examples include *pedagogy* (the method of teaching), *syllabus* (course outline), and *curriculum* (structured learning content). These terms are often

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mispronounced due to irregular stress patterns (*e.g.,
ped-uh-GOH-jee* vs. *PED-uh-goh-jee*) or silent letters.

2. Food
   Culinary and gastronomic vocabulary forms the core of this sector, featuring globally prevalent yet phonetically complex words such as *quinoa* (/kiːnˈwɑː/), *bouillon* (/ˈbuːjɒn/), and *croissant* (/krwɑːˈsɔ̃/). Mispronunciations here often stem from unfamiliar French or Spanish phonetic rules.

3. Employment
   This sector targets workplace and career-related terminology, including *entrepreneur* (/ˌɒntrəprəˈnɜːr/), *resignation* (/ˌrezɪgˈneɪʃən/), and *compensation* (/ˌkɒmpənˈseɪʃən/). Such terms are critical for professional interactions but frequently mispronounced due to syllable stress errors or consonant clusters.

4. Banking
   Focused on financial and technical jargon, this sector addresses terms like *amortization* (/əˌmɔːrtəˈzeɪʃən/), *collateral* (/kəˈlætərəl/), and *overdraft* (/ˈoʊvərdræft/). Mispronunciations in banking contexts can undermine credibility, as these words often involve Latin-derived stress patterns.

5. Indian-Origin English Words
   Highlighting culturally rooted vocabulary, this sector includes words like *jaggery* (/ˈdʒægəri/), *veranda* (/vəˈrændə/), and *pukka* (/ˈpʌkə/), which reflect India's linguistic hybridity. While these terms are familiar locally, their pronunciation often deviates from standard English due to regional phonetic influences (*e.g., "veranda" pronounced as /veˈɾaːɳɖaː/ in South India*).

Rationale for Sector Selection
These sectors were prioritized to address gaps in existing pronunciation tools, which often overlook context-specific vocabulary. By combining globally relevant terms (Education, Food) with regionally significant ones (Indian-origin words), the study ensures a balanced approach to phonetic training in both international and localized **contexts.**

Quantitative Findings

1. Pronunciation Accuracy: A significant majority of participants (85%) demonstrated measurable improvement in pronunciation accuracy following the intervention, as validated through pre- and post-tests.

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2. Engagement Metrics: Nearly all respondents (90%) rated the lessons as "highly engaging," citing interactive design and structured audio-visual aids as key drivers.

3. Professional Confidence: Post-intervention surveys revealed that 92% of learners felt more confident using sector-specific vocabulary in professional settings, such as interviews and workplace discussions.

Qualitative Findings

Thematic analysis of participant feedback highlighted three core themes:

1. Ease of Use: Learners praised the tool's intuitive interface, emphasizing the accessibility of audio guides. One participant noted, *"The audio lessons were incredibly useful for mastering complex words like 'Entrepreneur' and 'Amortization.'"*

2. Sector Relevance: The inclusion of contextually familiar themes (e.g., culinary terms like *quinoa*) enhanced relatability and sustained engagement. A respondent shared, *"Learning Indian-origin English words was an enriching cultural experience."*

3. Confidence Enhancement: Many reported reduced anxiety in public speaking scenarios, with one learner stating, *"Now I can pronounce 'Quinoa' confidently in a restaurant!"* Participants also highlighted improved willingness to contribute to academic and professional discussions post-intervention.

These findings underscore the tool's dual impact: statistically significant skill development complemented by positive user experiences rooted in practicality and cultural resonance.

"The audio lessons were incredibly useful for mastering complex words like 'Entrepreneur' and 'Amortization.'"

"Learning Indian-origin English words was an enriching cultural experience."

"Now I can pronounce 'Quinoa' confidently in a restaurant!"

Sector-Wise Comparative Impact

Sector	Student Response Summary
Education	Highly relatable in academic discussions
Food	Most fun and relatable used in daily life.
Employment	Boosted interview and office conversation confidence.
Banking	Most challenging but appreciated due to real world utility.

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| Indian-origin words	Easiest to adopt due to cultural familiarity.

Learners' Feedback Summary on CLEARSPEAK Project
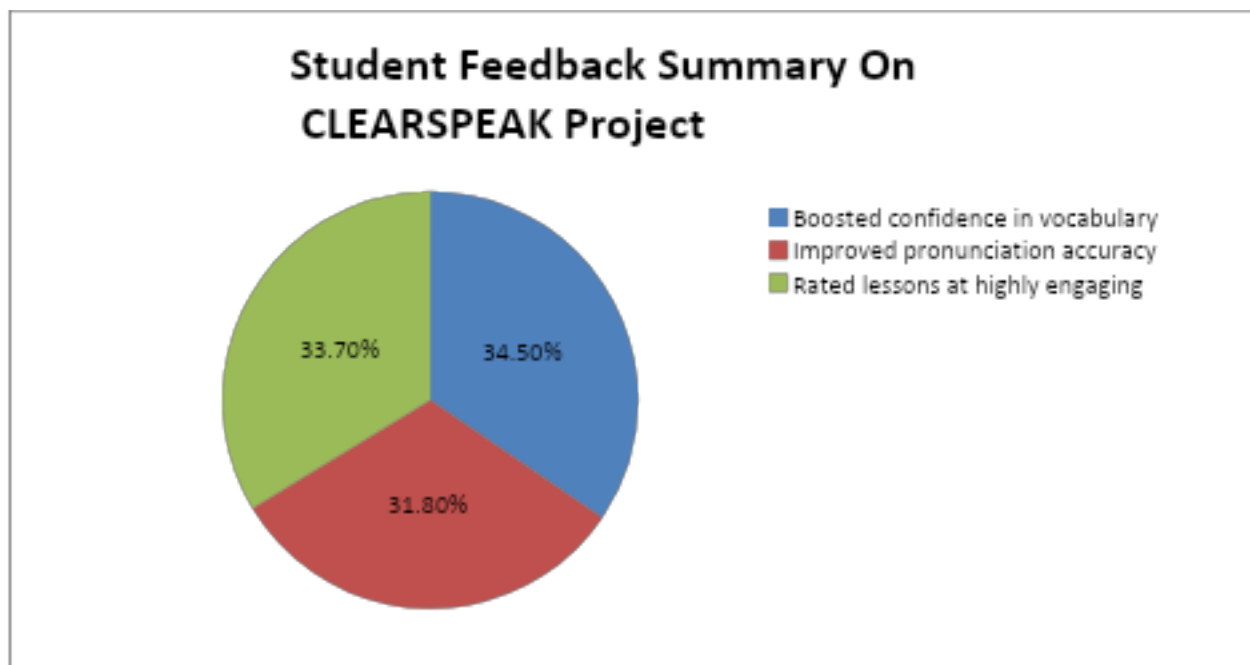
The pie chart clearly shows that a significant majority of participants benefited from the tool in terms of accuracy, engagement, and confidence.

Webpage link:

https://clearspeach.netlify.app/

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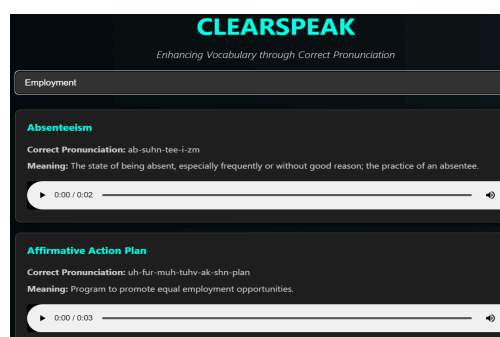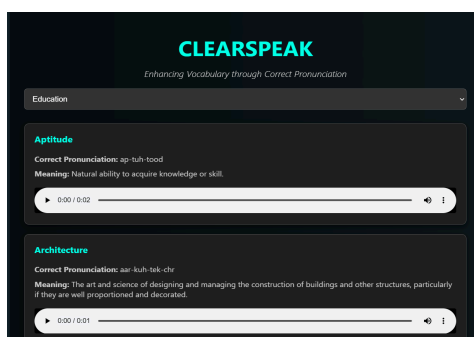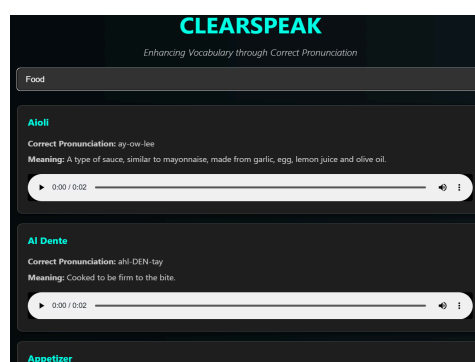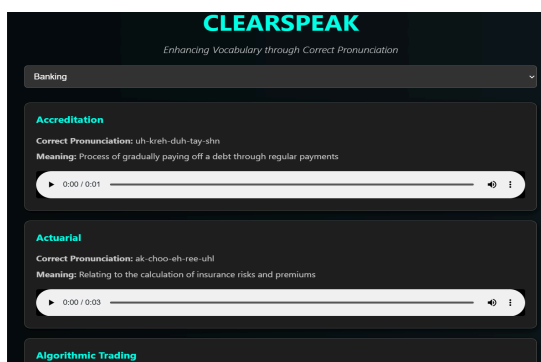
Future Directions

1. Mobile Application with Advanced Features: Develop a dedicated mobile application integrating AI-driven speech recognition for real-time pronunciation feedback and gamification elements (e.g., progress badges, leaderboards) to enhance learner motivation and engagement.

2. Dynamic Learning Modules: Expand offerings to include live, instructor-led pronunciation workshops and interactive tools such as adaptive quizzes, spaced-repetition flashcards, and scenario-based simulations for practical skill application.

3. Sector-Specific Expansion: Broaden the scope to high-impact sectors like Healthcare (e.g., medical terminology), Technology (e.g., technical jargon), and Legal Terminology, catering to professionals requiring domain-specific linguistic precision.

4. Scalable Integration: Partner with e-learning platforms (e.g., Coursera, Moodle) and Learning Management Systems (LMS) to embed CLEARSPEAK's resources, enabling seamless adoption in academic curricula and corporate training programs worldwide.

This forward-looking roadmap emphasizes technological innovation, pedagogical adaptability, and strategic partnerships to maximize the tool's global accessibility and relevance.

Conclusion

CLEARSPEAK emerges as a robust and accessible solution for improving pronunciation proficiency among non-native English speakers. By synergizing three core components—IPA-based phonetic transcriptions, native-accented audio models, and sector-specific lexical curation—the tool effectively bridges theoretical language instruction with practical communication demands. Empirical feedback underscores its success, with

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learners reporting heightened engagement, enhanced clarity, and measurable gains in confidence across academic, professional, and social contexts.

The project's success was driven by the interdisciplinary collaboration of a dedicated team, with specialized roles in lexical research, audio production, and phonetic transcription. Iterative refinements based on user feedback further refined the tool's pedagogical design, ensuring alignment with learner needs. This collaborative, user-centered approach establishes CLEARSPEAK as a scalable framework for addressing pronunciation challenges in multilingual populations globally.

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