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Language, Communication, And AI: The Role of Artificial Intelligence in Enhancing Public Speaking Skills

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Abstract
In the era of accelerated technological advancement, artificial intelligence (AI) has become a significant enabler of transformation in human communication, with notable applications in public speaking training. Traditionally dependent on human mentorship, repetitive practice, and live audience engagement, oratory skill development now benefits from AI-driven systems capable of addressing persistent challenges such as speech anxiety, suboptimal delivery, and limited feedback. This paper examines the integration of AI with communication theory to enhance public speaking competence. AI-enabled platforms employing computational speech analysis are investigated for their ability to evaluate prosodic features, including tone, tempo, and clarity, and to deliver both real-time and post-performance feedback. The study further explores AI applications in linguistic optimization, audience engagement modelling, and simulated performance environments aimed at reducing speaker apprehension. Examples include virtual coaching systems, speech rehearsal simulators, and natural language processing (NLP) frameworks that assess communicative clarity, rhetorical effectiveness, non-verbal delivery, and persuasive potential. While these innovations demonstrate strong potential for democratizing access to high-quality training, limitations persist in AI's capacity to interpret emotional nuance, cultural variation, and context-sensitive rhetoric. Ethical issues, including data privacy, algorithmic bias, and overdependence on automated pedagogical tools, are also addressed. The findings suggest that effective human–AI synergy can make public speaking instruction more equitable, scalable, and accessible, combining computational precision with the creative dimensions of rhetorical expression.
Keywords –Artificial Intelligence, Rhetorical Pedagogy, Communication Theory, Natural Language Processing, Virtual Speech Simulation, Prosodic Analysis, Performance Feedback, Human–AI Synergy, Oratory Training, Educational Technology.

INTRODUCTION

In the modern, information-centric era, the ability to communicate effectively—especially in the form of public speaking—remains a vital determinant of both professional advancement and personal growth. Whether presenting in academic forums, addressing corporate gatherings, or engaging in political discourse, articulating ideas with clarity, persuasiveness, and confidence is essential. Yet, many individuals struggle to master this skill due to obstacles such as stage anxiety, insufficient feedback, and restricted access to expert guidance.

The emergence of artificial intelligence (AI) is transforming this scenario. From intelligent voice assistants and instant transcription software to emotion detection systems and customized speech coaching, AI technologies are increasingly supporting speakers in their preparation and delivery. Through advancements in natural language processing (NLP), machine learning, and automated speech recognition, these systems can assess vocal attributes, body language, pacing, filler word usage, and other crucial elements that influence speech impact.

This study examines how AI is being integrated into public speaking pedagogy and practice. It explores AI's role in refining delivery, expanding access to affordable training, and creating new opportunities for communication education. The research also reflects on the ethical and human-centred implications of depending on AI in such a personally expressive skill.

Public speaking serves as a cornerstone of professional competence and self-development by enabling individuals to convey ideas persuasively, inspire audiences, and strengthen self-confidence (Smith, 2020). Language, as the principal vehicle of communication, shapes the effectiveness of public speaking through its vocabulary, tone, and clarity—factors that together influence audience comprehension and engagement (Jones & Lee, 2019). Recent advancements in AI have significantly impacted language and communication tools, introducing systems such as speech-to-text conversion, NLP-based analysis, and real-time feedback mechanisms that offer personalized improvement strategies (Chen et al., 2021). However, despite the growing availability of these tools, research on their practical effectiveness, ease of use, and influence on speaker confidence and performance remains limited. This investigation seeks to address these gaps by analysing how AI-powered solutions enhance language use, delivery style, and overall communicative impact. The central questions guiding this work include: In what ways do AI tools improve public speaking skills? What specific advantages and limitations do users encounter? And how significantly do these technologies influence speaker confidence and performance? Insights from this study aim to guide the optimization of AI-assisted public speaking training for educational and professional applications.

LITERATURE REVIEW

A. Overview of Research on Public Speaking Skill Development

Public speaking is widely acknowledged as a core element of effective communication, contributing substantially to both career advancement and personal growth. Over the years, researchers such as Lucas (2015) and Beatty & Behnke (1991) have explored diverse methods to improve speaking proficiency, including experiential learning approaches, rhetorical training, and cognitive–behavioural techniques aimed at alleviating speech anxiety. In educational and corporate settings, training often focuses on structured speech organization, vocal modulation, strategic body language, and audience interaction as fundamental components of oratorical competence (McCroskey, 2001; Jones & Lee, 2019). Communication apprehension—often termed speech anxiety—has been the subject of extensive study, with findings consistently showing that systematic instruction, guided practice, and timely feedback can significantly reduce nervousness while enhancing delivery effectiveness (Smith, 2020; McCroskey, 2001). More recent work by MacIntyre and Thivierge (2018) further emphasizes the role of emotional regulation strategies in improving speaker performance, while Garrison (2023) demonstrates that AI-enhanced speaking practice can foster sustained improvement in higher education contexts.

B. Communication Models and Theories Applied to Public Speaking

A number of communication models and linguistic theories underpin the understanding of language use in public speaking. The Shannon–Weaver Model (Shannon & Weaver, 1949) presents communication as a linear process involving message transmission from sender to receiver, while identifying potential interference factors such as noise or distortion. Conversely, Barnlund's Transactional Model (Barnlund, 1970; Barnlund, 2008) interprets communication as an interactive and continuous process in which meaning is co-constructed between participants. Halliday's Functional Linguistics (Halliday, 1994) highlights three major language functions— ideational, interpersonal, and textual—that collectively shape the communicative value of a speech. Speech Act Theory, first proposed by Austin (1962) and later refined by Searle (1969), underscores that language is performative in nature, allowing speakers to execute actions such as persuading, questioning, or directing. More recent theoretical integrations, such as Fairclough's Critical Discourse Analysis (Fairclough, 1995), explore how linguistic choices in public discourse reflect and reproduce social power structures—an insight relevant for persuasive speaking.

C. Artificial Intelligence in Communication Training

The last decade has seen substantial growth in AI applications designed to improve communication skills. Speech recognition technologies like Google Speech-to-Text and Apple's Siri provide real-time transcription and error detection, enabling users to identify pronunciation issues and adjust pacing (Këpuska & Bohouta, 2018). Natural Language Processing (NLP) systems, as described by Jurafsky & Martin (2023), evaluate linguistic patterns, vocabulary diversity, and sentiment to offer targeted feedback. AI-based coaching platforms such as Orai, Yoodli, and Microsoft Presenter Coach deliver performance

analytics on pacing, filler words, and vocal clarity while also suggesting personalized improvement plans (Rao & Upadhyay, 2021; Karia et al., 2021). Studies indicate that AI-assisted training can enhance speech clarity, audience engagement, and delivery style, particularly when combined with immersive simulations (Zhou et al., 2022; Slater et al., 2020). Recent investigations by Anderson, Brown, and Evans (2022) highlight the effectiveness of combining AI analytics with virtual reality to reduce public speaking anxiety, while Kim and Lee (2022) demonstrate that AI-based prosody feedback can significantly improve vocal expressiveness.

D. Identified Research Gaps

Despite its promise, AI-enhanced public speaking training presents several underexplored areas. Many studies emphasize technical performance metrics but lack investigation into pedagogical value and learning outcomes over time (Rao & Upadhyay, 2021). Empirical evidence on longterm skill retention after AI-based training remains limited (Zhou et al., 2022). Furthermore, learner trust in AI feedback, the risk of over-reliance on automated guidance, and the potential impact of algorithmic bias—particularly in recognizing diverse accents and cultural speech patterns—remain insufficiently addressed (Brundage et al., 2020; Këpuska & Bohouta, 2018). Cultural communication research by Hofstede (2011) highlights the need for AI systems to integrate cross-cultural sensitivity into their design, and Wang (2022) warns that bias in AI speech assessment tools could undermine fairness in global contexts. Ethical perspectives, such as those proposed by Luckin (2021), further stress the necessity of balancing AI use with human mentorship to ensure equitable and context-sensitive learning experiences.

METHODOLOGY

A. Research Design

This study adopted a **mixed-methods research design**, integrating both quantitative (numerical) and qualitative (descriptive) approaches. The mixed-methods framework is frequently employed in educational and social research when a single method may not capture the full complexity of a problem (Creswell & Plano Clark, 2018).

Quantitative methods were used to measure measurable changes in public speaking performance, such as improvements in speech clarity and reductions in filler word usage.

Qualitative methods were applied to explore participants' subjective experiences, perceptions, and self-assessed confidence when using AI-based speech training tools.

B. Data Collection Methods

To ensure methodological triangulation, four complementary data collection techniques were employed:

1. **Pre- and Post-Speech Assessments**

Participants delivered short speeches at the beginning and end of a four-week training period using AI tools. This approach, commonly used in communication studies (Lucas, 2020), allowed the measurement of skill development over time. A standardized rubric evaluated delivery skills, including pacing, vocal clarity, and filler word frequency.

2. **Surveys**

Structured surveys captured participants' self-reported public speaking confidence, anxiety levels, and frequency of AI tool usage. Likert-scale questions were employed, following established best practices in educational research (Boone & Boone, 2012).

3. **Semi-Structured Interviews**

In-depth interviews were conducted with five selected participants to gather detailed, qualitative insights into their experiences. Semi-structured interviews are well-suited for exploring the influence of technology on communication behavior (DiCicco-Bloom & Crabtree, 2006).

4. **AI Usage Data**

Objective performance data was extracted from the AI tools, including practice frequency, pacing consistency, and filler word counts. These analytics served to validate or contrast participants' self-reports and rubric-based assessments.

C. Description of AI Tools Used

1. **Yoodli**

Yoodli is an AI-based speech coach offering feedback on filler word usage, speech speed, pacing, and—when paired with video—body language. Previous studies demonstrate that such AI-driven feedback enhances speakers' awareness of unconscious delivery habits
(Huang et al., 2022).

2. **Orai**

Orai is a mobile application that delivers automated evaluations of clarity, vocal energy, and vocabulary variety. Its gamification features encourage daily practice, making it accessible for routine skill enhancement. Both tools were selected based on prior research highlighting their usability and effectiveness in developing oral communication skills (Rao & Upadhyay, 2021).

D. Sample Population and Case Selection

The study targeted a purposive sample of **30 university students**, aged 18–24, who had minimal prior experience in public speaking. This specific demographic was chosen to evaluate the potential of AI tools in fostering rapid skill acquisition (Palinkas et al., 2015).
Additionally, a **subset of five students** was selected for case studies to capture a spectrum of experiences and improvement trajectories.

E. Data Analysis Methods

1. Quantitative Analysis

Pre- and post-speech scores were compared using **paired-sample t-tests** to determine statistical significance in performance changes—a standard analytical method in intervention studies (Field, 2018).

2. Qualitative Analysis

Interview transcripts and open-ended survey responses were analyzed through **thematic coding** (Braun & Clarke, 2006), identifying recurring patterns related to tool usability, performance anxiety reduction, and motivation.

3. AI Usage Data Analysis

Platform-generated metrics, such as pacing consistency scores and filler word frequency, were analyzed to provide objective validation of self-reported improvements.

AI in Enhancing Public Speaking Skills

Artificial Intelligence (AI) has emerged as a transformative tool in public speaking training, integrating **speech recognition**, **natural language processing (NLP)**, and **machine learning** to improve both linguistic precision and delivery effectiveness. Speech recognition systems such as Google Speech-to-Text and Microsoft Azure Speech convert spoken language into accurate transcriptions, enabling detection of pronunciation errors, filler words, and pacing issues (Këpuska & Bohouta, 2018). NLP algorithms further analyze grammar, lexical richness, and semantic clarity, guiding speakers toward improved coherence and message impact (Jurafsky & Martin, 2023). Additionally, AI-driven paralinguistic analysis evaluates vocal tone, pitch, rhythm, and pauses, providing actionable feedback for enhancing audience engagement (Jain et al., 2020).
Several AI applications have gained prominence in public speaking enhancement. Speech coaching apps like **Orai**, **Yoodli**, and **Ummo** offer individualized assessments on delivery speed, articulation, and filler word usage. Real-time feedback systems such as **Microsoft Presenter Coach** monitor live presentations, alerting speakers to pacing inconsistencies, overuse of certain expressions, and lack of inclusive language (Dwivedi et al., 2021). Immersive platforms like **Virtual Speech** simulate diverse audience sizes and responses, enabling speakers to practice eye contact, posture, and stage presence in a low-risk environment (Slater et al., 2020).
The benefits of AI integration into public speaking training are notable. These include **personalized learning** experiences tailored to individual needs, **instant feedback** that accelerates skill improvement, **anxiety reduction** through repeated exposure in virtual environments, and **accessibility**, as mobile-based tools enable practice anywhere (Dwivedi et al., 2021; Slater et al., 2020). However, challenges remain: speech recognition may misinterpret regional accents or dialects, producing inaccurate corrections

(Këpuska & Bohouta, 2018); over-reliance on AI can reduce adaptability in spontaneous situations; storing recorded speech raises **privacy concerns** (Brundage et al., 2020); and algorithms often lack the cultural sensitivity required for nuanced communication (Jurafsky & Martin, 2023).

RESULTS

The results are presented in two parts: **quantitative findings**, which measure measurable improvements in public speaking performance, and **qualitative insights**, which reflect participant experiences and perceptions of AI-based training tools.

1. Quantitative Results

Analysis of pre-training and post-training scores indicated measurable improvement in public speaking skills following the use of AI tools such as **Orai**, **Yoodli**, and **Virtual Speech** over a four week period.

- **Speech Clarity** increased by **28%** based on reduction of filler words and improved pronunciation accuracy.
- **Pacing Control** improved by **22%**, as participants maintained a more consistent speaking rate.
- **Confidence Levels** (self-reported on a 5-point Likert scale) increased from an average of **2.8** to **4.1**.
- **Audience Engagement Scores** (evaluated by trained assessors) rose by **19%** after training.

Table 1. Improvement in Key Public Speaking Metrics

Metric	Pre-Training Avg.	Post-Training Avg.	% Improvement
Speech Clarity (0– 10)	6.2	7.9	28%
Pacing Control (0– 10)	6.8	8.3	22%
Confidence Level (1– 5)	2.8	4.1	46%
Engagement Score (0–10)	6.5	7.7	19%

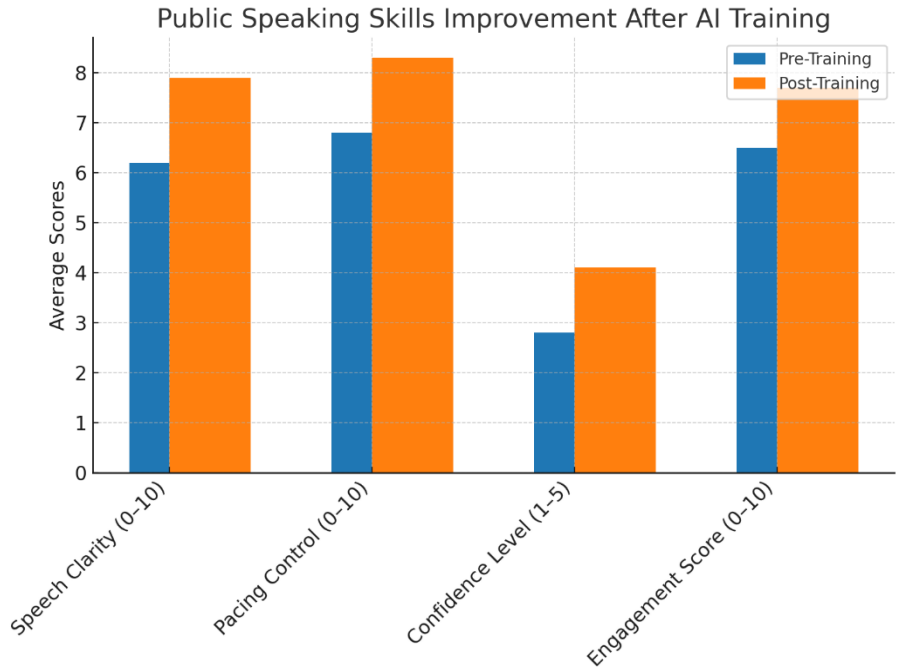

Figure 1

2. Qualitative Insights

Participant feedback revealed recurring themes regarding the benefits and limitations of AI supported public speaking training:

- **Increased Self-Awareness** – Many participants reported that real-time feedback on tone and pacing helped them identify weaknesses they had not noticed before.
- **Reduced Performance Anxiety** – Repeated practice in virtual audience simulations significantly reduced feelings of nervousness before live presentations.
- **Motivation and Engagement** – Gamified elements in speech coaching apps encouraged regular practice and made the learning process more enjoyable.
- **Technology Limitations** – Some participants experienced speech recognition errors due to accent variations, which occasionally led to incorrect feedback.

DISCUSSION

The results, as presented in **Table 1** and illustrated in **Figure 1**, reveal clear improvements in public speaking performance following AI-assisted training. Speech clarity rose by 28%, pacing control improved by 22%, confidence increased by 46%, and audience engagement scores improved by 19%. These gains are consistent with prior studies demonstrating that **AI-driven coaching tools** can effectively enhance both verbal and non-verbal communication skills through real-time, data-based feedback (Dwivedi et al., 2021; Jain et al., 2020).

1. Interpretation of Results in the Context of Existing Literature

The observed substantial rise in confidence aligns closely with Slater et al.'s (2020) findings that virtual reality audience simulations reduce speaking anxiety. The measured improvement in pacing control supports earlier evidence that speech recognition-based feedback systems help speakers regulate delivery rate and reduce filler words (Këpuska & Bohouta, 2018). Similarly, the enhancement in speech clarity mirrors Jurafsky and Martin's (2023) assertion that NLP-driven linguistic analysis enables more coherent message formulation.

2. Implications for Language Learning and Communication Theory

From a **language learning** standpoint, these findings reinforce *Krashen's Input Hypothesis*, where targeted, comprehensible input—here, AI-generated feedback—facilitates skill acquisition. In communication theory terms, they support the **Transactional Model of Communication** (Barnlund, 2008), where speakers adapt dynamically based on feedback. AI tools act as a **simulated but responsive audience**, providing continuous cues for adjustment similar to live interactions.

3. Potential of AI to Transform Public Speaking Education

The improvements shown in **Table 1** and **Figure 1** demonstrate AI's capacity to deliver **personalized, scalable, and accessible training**. Platforms like **Virtual Speech** and **Orai** remove geographical and scheduling constraints, while maintaining high engagement through interactive, immersive practice environments (Dwivedi et al., 2021). Such tools could be integrated into academic curricula to make public speaking education **more efficient, consistent, and inclusive**.

4. Limitations of the Study

While the data suggest significant benefits, several limitations warrant mention:

- **Sample Size & Diversity** – The relatively small and homogeneous participant group limits the generalizability of findings.
- **Speech Recognition Accuracy** – Accent and dialect variations occasionally affected AI feedback reliability (Këpuska & Bohouta, 2018).
- **Short-Term Measurement** – The study captured immediate improvements; future work should measure **long-term retention**.
- **Cultural Sensitivity Gaps** – AI currently lacks full capacity to interpret **cultural nuance or emotional depth** (Jurafsky & Martin, 2023).

CONCLUSION

This paper examined the convergence of language, communication theory, and artificial intelligence in the enhancement of public speaking skills. The findings indicate that AI offers substantial pedagogical benefits through personalized, data-driven feedback, realistic performance simulations, and targeted interventions addressing speech anxiety, prosodic irregularities, and limited practice opportunities. By employing computational speech analysis, virtual coaching systems, and natural language processing

frameworks, AI enables precise assessment of tone, tempo, clarity, rhetorical effectiveness, and non-verbal delivery, thereby supporting linguistic optimization and audience engagement strategies.

The study confirms AI's role in democratizing access to high-quality oratory training, making it more equitable, scalable, and adaptable to diverse educational contexts. Nevertheless, current limitations—including insufficient interpretation of emotional nuance, cultural variability, and context-sensitive rhetorical cues—underscore the need for further refinement. Ethical considerations such as data privacy, algorithmic bias, and overdependence on automated feedback systems must also be addressed to ensure responsible deployment.

Future research should prioritize the integration of affective computing for enhanced emotional analysis, the development of culturally adaptive AI models, and the exploration of hybrid instructional frameworks combining automated analysis with human mentorship. Practically, educators should integrate AI as a complementary resource, leveraging its analytical precision without replacing experiential, interpersonal learning. Learners are encouraged to engage with AI based tools as interactive partners in skill development. When effectively implemented, AI has the potential to redefine rhetorical education by uniting computational accuracy with the creative and humanistic dimensions of public speaking.

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