

ADAPTIVE SPEECH TECHNOLOGIES AND LEARNER AUTONOMY: REIMAGINING ENGLISH PRONUNCIATION THROUGH ARTIFICIAL INTELLIGENCE

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Abstract

Artificial Intelligence (AI) is rapidly reshaping language education, with adaptive speech technologies standing out as a pivotal innovation for pronunciation training. Using automated speech recognition (ASR) and deep learning, these tools deliver instant, individualized feedback that strengthens learners' accuracy, fluency, and confidence. This paper synthesizes evidence from global empirical studies alongside emerging African applications to identify consistent pedagogical gains, including improved pronunciation accuracy, increased learner autonomy, and higher engagement in self-regulated learning. Building on this synthesis, the paper demonstrates how tools such as ELSA Speak, Google Read Along, and Speech Ace can be pedagogically integrated into English pronunciation teaching in Tanzania. The analysis shows that these technologies align strongly with the communicative ambitions of the Competence-Based Curriculum (CBC) and offer practical solutions for overcrowded, resource-limited classrooms. The paper further identifies the institutional actors responsible for effective alignment, namely the Ministry of Education, Science and Technology (MoEST), the Tanzania Institute of Education (TIE), and teacher-training institutions, each tasked with policy guidance, curriculum adaptation, and teacher capacity-building. It concludes that when these stakeholders coordinate ethical data governance and localized content development, adaptive speech technologies can serve as a realistic pathway for strengthening English proficiency, enhancing learner autonomy, and widening equitable access to quality pronunciation instruction across Tanzania.

Keywords: Adaptive Speech, Technologies, Autonomy, Reimagining, Artificial Intelligence

INTRODUCTION

Pronunciation has long been one of the most persistent challenges in second language acquisition. Unlike vocabulary or grammar, pronunciation mastery requires precise control of articulatory gestures, stress, and intonation patterns, skills that develop only through sustained feedback and iterative practice. In traditional English language classrooms,

especially in contexts where English functions as a foreign or second language, opportunities for such individualized attention are scarce. Teachers often manage large classes, limited instructional time, and scarce technological resources, making it difficult to provide real-time corrective feedback on speech production (Derwing and Munro, 2015).

In Tanzania, these challenges are amplified by systemic factors within the education system.

English is taught as a compulsory subject in primary and secondary schools and serves as the language of instruction in higher education, yet the majority of learners acquire it as a second or third language after Kiswahili and local vernaculars (UNICEF, 2017). The gap between policy expectations and classroom realities remains wide: although curricula emphasize communicative competence, instruction often prioritizes reading and writing due to exam pressures, leaving pronunciation under-taught and under-assessed (Mgaya, 2024; Komba and Shukia, 2023). Learners consequently develop limited oral confidence, fossilized pronunciation errors, and difficulties in intelligibility that persist into tertiary and professional domains.

Recent advances in Artificial Intelligence (AI) present a timely opportunity to bridge these instructional and systemic gaps. Adaptive speech technologies driven by automatic speech recognition (ASR), text-to-speech (TTS), and natural language processing (NLP) can now recognize, analyze, and respond to learners' spoken input with high precision. These systems provide immediate, individualized feedback on pronunciation, rhythm, and fluency, allowing learners to engage in repetitive, self-paced oral practice. Global platforms such as ELSA Speak, Speechace, and Duolingo's AI Tutor have demonstrated measurable gains in learners' pronunciation accuracy, confidence, and oral fluency (Neri, Cucchiari, and Strik, 2019; Li and Ni, 2021).

Within the Tanzanian education landscape, such innovation aligns strongly with national pedagogical reform. The Competence-Based Curriculum (CBC), introduced to promote active, reflective, and learner-centered education, calls for instructional practices that prioritize communication, creativity, and problem-solving over rote memorization (Tanzania Institute of Education [TIE], 2023).

AI-powered pronunciation tools embody these principles by transforming learners from passive recipients of correction into active participants who monitor and refine their own oral production. This approach resonates with the CBC's commitment to formative assessment and lifelong learning.

Moreover, the national policy environment increasingly supports digital transformation in education. The *National Digital Education Strategy (2024/25)* and the *Digital Tanzania Initiative* are expanding ICT infrastructure, promoting teacher digital literacy, and improving access to learning technologies across both urban and rural schools (Ministry of Education, Science and Technology [MoEST], 2025; World Bank, 2023). These programs could create enabling conditions for AI-enhanced pronunciation tools to be integrated into language instruction, particularly through tablets distributed to teachers in 2022 if they are still available and functional, and expanding broadband connectivity. If strategically aligned, such technologies could address both the pedagogical and infrastructural limitations that have constrained oral English proficiency for decades.

This paper examines how adaptive speech technologies can be leveraged to improve English pronunciation and promote self-paced, autonomous learning among Tanzanian learners. It situates the discussion within global developments in AI-assisted language learning (AIALL) while grounding the analysis in Tanzania's policy framework, classroom realities, and linguistic context. The paper argues that AI's role in pronunciation learning extends beyond technological novelty; it represents a pedagogical shift toward learner agency, personalized feedback, and equitable access to communicative competence in the digital age.

LITERATURE REVIEW

Recent research on Artificial Intelligence-Assisted Language Learning (AIALL) has expanded significantly, marking a shift from experimental computer-based programs to sophisticated adaptive systems capable of delivering personalized linguistic feedback. Early explorations of technology-mediated pronunciation training established that Computer-Assisted Pronunciation Training (CAPT) systems improve learners' phonological accuracy by providing immediate visual and auditory cues (Neri, Cucchiaroni, & Strik, 2019; Li & Ni, 2021). These early systems relied on structured phoneme models and waveform visualization, allowing learners to compare their pronunciation against a native model. However, the emergence of deep learning architectures and advanced speech analytics has pushed these systems far beyond static correction, making it possible for AI to assess pronunciation, stress, rhythm, and intonation at near-human accuracy (Chung, 2020; Li, 2023).

Globally, adaptive speech technologies have been linked to notable improvements in learner motivation, pronunciation retention, and communicative confidence. Zawacki-Richter, Marin, Bond, and Gouverneur (2019) noted that intelligent tutoring systems enhance language learning outcomes by combining adaptive feedback with game-like interaction, which sustains engagement even in autonomous learning settings. Tools such as ELSA Speak employ convolutional neural networks to detect errors at the phoneme level, offering corrective drills tailored to the learner's profile. Similarly, Duolingo's AI tutor integrates Automatic Speech Recognition (ASR) to simulate realistic dialogues, encouraging repeated oral practice and facilitating self-paced fluency development (Baker & Smith, 2019). Such systems do not merely automate correction—they restructure learning dynamics by placing agency back into

the learner's hands, aligning closely with the principles of learner autonomy emphasized in contemporary pedagogy (Benson, 2013).

The impact of adaptive AI tools extends beyond high-resource environments. In Sub-Saharan Africa, emerging studies suggest that low-bandwidth and mobile-based AI applications can substantially mitigate the traditional limitations of language instruction. Kaviri and Okoth (2022) found that AI-enabled speech recognition and phonics-based mobile apps improved oral reading fluency among Kenyan primary school learners by providing repetitive, individualized pronunciation exercises outside the classroom. Similar findings have emerged from Rwanda and South Africa, where speech-based learning tools helped learners gain confidence and improve phonological awareness in multilingual classrooms (UNESCO, 2023). These interventions demonstrate AI's potential to democratize quality learning opportunities in contexts with teacher shortages and overcrowded classrooms.

UNESCO (2023) underscores that adaptive learning systems foster linguistic inclusivity by catering to diverse learner needs and enabling differentiated instruction—key dimensions of Tanzania's Competence-Based Curriculum (CBC). The CBC framework emphasizes mastery through performance and continuous assessment rather than rote memorization, making AI tools ideal complements to its learner-centered philosophy (Tanzania Institute of Education [TIE], 2023). Yet, adoption challenges persist. Sustainable implementation requires contextual adaptation: localized datasets, multilingual interfaces, and equitable infrastructure distribution (World Bank, 2023).

Tanzania faces a clear mismatch between rising digital infrastructure and teachers' ability to use advanced technologies for instruction. Although the government's 2022 distribution of digital tablets improved basic digital literacy

among educators, most teachers still struggle to apply technology meaningfully in the classroom (Ministry of Education, Science and Technology [MoEST], 2025; Mgya, 2024). Rather than using digital tools to support interactive teaching or personalized learning, many rely on them mainly for administrative tasks such as storing lesson notes, managing assessment records, and facilitating communication. Research reinforces this gap: Komba and Shukia (2023) report that while teachers embrace the learner-centred philosophy of the Competence-Based Curriculum (CBC), they often lack structured training on how to integrate digital or AI-enhanced practices into everyday instruction. This tension, which is strong pedagogical reform combined with limited technological readiness, creates both urgency and opportunity. Adaptive speech technologies offer a practical solution for the persistent pronunciation difficulties that traditional classrooms rarely address, provided they are grounded in national policy, curriculum aims, and teacher professional development initiatives. When embedded in these structures, AI shifts from being a peripheral tool to becoming a strategic driver of Tanzania's educational transformation, effectively closing the gap between policy ambition and classroom practice.

THEORETICAL PERSPECTIVE: LEARNER AUTONOMY AND SELF- PACED LEARNING

The theory of learner autonomy remains one of the most influential frameworks in modern language education. Holec (1981) first defined autonomy as “the ability to take charge of one’s own learning,” a view later refined by Little (2007), who emphasized that autonomy is not independence from teachers but interdependence within a learning system that enables self-direction. At its core, learner autonomy positions students as active agents—individuals who make informed choices about what, how, and when they learn. This

theoretical stance resonates deeply with Tanzania’s Competence-Based Curriculum (CBC), which reimagines learners as constructors of knowledge rather than passive recipients (Tanzania Institute of Education [TIE], 2023). Both frameworks share a philosophical commitment to self-regulation, reflection, and accountability in learning processes.

AI-driven speech technologies provide a practical embodiment of this autonomy. Pronunciation learning, often hindered by performance anxiety and lack of individualized attention, can now occur in a personalized, low-pressure environment. Learners can engage in repeated oral practice without the social discomfort that sometimes accompanies classroom correction. Immediate feedback from systems such as *ELSA Speak* or *Speechace* allows users to visualize their progress, identify recurring errors, and set personal pronunciation goals. This dynamic mirrors Benson’s (2013) principles of autonomous learning, where feedback serves as both a mirror and a motivator—encouraging learners to plan, monitor, and evaluate their development. For Tanzanian learners who may have limited exposure to spoken English outside the classroom, such individualized digital companions extend learning beyond school hours, transforming language acquisition into a continuous, self-paced process.

However, autonomy in learning is not synonymous with isolation. In practice, autonomy thrives within a social framework. Adaptive AI tools can enhance—not replace—human interaction. When students practice pronunciation independently using AI feedback, they return to class better prepared to engage in communicative tasks. Teachers can then focus on contextual use, rhythm, and prosody in authentic discourse. Peer collaboration can also follow individual practice, as learners share progress, exchange

strategies, and build confidence through joint reflection. This model aligns with social constructivist theory, which holds that learning occurs through interaction and dialogue (Vygotsky, 1978). AI, in this sense, acts as a bridge between individual reflection and collective engagement-scaffolding both independent mastery and social learning.

For Tanzania, this theoretical integration holds significant promise. In classrooms often characterized by limited instructional time and large student-teacher ratios, AI systems can democratize learning by giving each learner access to consistent, personalized feedback (Mgaya, 2024). More importantly, it aligns with the CBC's broader pedagogical intent to cultivate critical, reflective, and self-motivated citizens capable of lifelong learning. The ability to manage one's progress in pronunciation is not merely a linguistic skill; it is a transferable competence that reflects self-discipline and self-efficacy.

UNESCO (2023) observes that technology-mediated autonomy nurtures a culture where learners design and direct their own learning journeys. When aligned with national goals for digital literacy and communicative competence, adaptive speech technologies evolve from simple instructional aids into instruments that shape resilient and adaptable learners within a dynamic global economy. Integrating AI within the Tanzanian CBC framework allows educators to shift traditional dependency patterns toward empowered learning partnerships in which technology enhances teacher guidance and enables learners to discover the voice, both literal and figurative, that defines their educational growth.

ADAPTIVE SPEECH TECHNOLOGIES IN ENGLISH PRONUNCIATION

Adaptive speech technologies represent a new generation of digital learning tools designed to

reduce the long-standing gap between pronunciation instruction and individualized feedback. These systems integrate Automatic Speech Recognition (ASR), Text-to-Speech (TTS), and machine learning models trained on large multilingual speech datasets. They analyze learners' spoken output against model pronunciations and generate detailed, real-time feedback on articulation accuracy, intonation, rhythm, and pitch control (Li & Ni, 2021; Neri, Cucchiarini, & Strik, 2019). Contemporary AI-driven pronunciation systems differ significantly from early Computer-Assisted Pronunciation Training (CAPT) tools, which relied on fixed templates. Modern systems adapt continuously to learner performance, producing personalized learning trajectories that reflect the learner's progress and error patterns over time (Chung, 2020; Yang and Chen, 2022).

Global evidence reinforces the pedagogical value of these tools. Studies in Asia, Europe, and Sub-Saharan Africa report measurable gains in phonetic accuracy, oral fluency, and learner confidence when AI-based pronunciation systems are integrated into language instruction (UNESCO, 2023; World Bank, 2021; Kabugo, 2022). For example, ELSA Speak uses deep neural networks capable of detecting micro-level phonetic deviations, while Speechace integrates AI-powered scoring into learning management systems, enabling teachers to track oral proficiency development using performance analytics. Google Read Along has shown particular effectiveness in low-resource environments, improving children's oral reading and pronunciation accuracy in India, Nigeria, and Kenya (World Bank, 2021; UNESCO, 2023). These developments reflect core principles of Competence-Based Education (CBE), prioritizing demonstration, practice, and iterative feedback over rote memorization.

In Tanzania, where English is widely acquired as a second or third language, adaptive speech technologies respond directly to documented instructional challenges. Research consistently identifies pronunciation as one of the weakest components of English instruction due to overcrowded classrooms, minimal teacher training in phonetics, and limited opportunities for oral practice (Mgaya, 2024; Rubagumya, 2020; Qorro, 2021; Komba & Shukia, 2023). Studies from local classrooms show that many teachers lack confidence in teaching oral skills and often focus on grammar and writing at the expense of spoken language (Mwajombe, 2022; Wamalwa, 2021). AI-supported pronunciation tools can help address these constraints by providing scalable, self-paced oral practice that supplements teacher instruction both in and outside school settings. Learners receive individualized feedback while teachers use aggregated analytics to target instruction effectively (Holmes, Bialik, & Fadel, 2022; Kabugo, 2022).

However, effectiveness depends on localization. Evidence from African EdTech deployments shows that tools designed around Western pronunciation norms can inadvertently penalize African accentual patterns, lowering learner confidence and introducing cultural bias (CIPIT, 2025; UNESCO, 2023; Mwaniki, 2022). For Tanzanian classrooms, AI systems must incorporate Tanzanian English phonology, support Kiswahili-English bilingual interfaces, and function reliably in low-bandwidth or offline environments. Local scholars emphasize that culturally responsive digital learning tools are essential for supporting equitable access, especially in regions where English exposure remains limited (Rubagumya, 2020; Qorro, 2021).

Collaborative development involving Tanzanian universities, the Ministry of Education, the Tanzania Institute of Education (TIE), and EdTech developers is therefore

crucial. Such partnerships can ensure that emerging tools reflect local linguistic realities, align with CBC requirements, and uphold ethical standards in data governance and learner privacy (MoEST, 2025; CIPIT, 2025).

When properly localized and implemented, adaptive speech technologies can shift English pronunciation learning in Tanzania from an irregular, teacher-dependent activity to a continuous and personalized learning process. These systems embody the CBC's vision of competence-oriented learning by enabling learners to practice autonomously, receive immediate feedback, and develop communicative proficiency that supports academic progression and participation in a globalized world.

PEDAGOGICAL OPPORTUNITIES FOR SELF-PACED LEARNING

Artificial intelligence-driven pronunciation systems are transforming the conditions under which language learning can occur, shifting practice from fixed classroom routines to flexible, self-paced environments. Instead of depending on rigid schedules or limited teacher availability, learners gain access to practice spaces that adjust to their individual pace and needs. These platforms allow repeated rehearsal of sounds, words, and sentences while offering real-time, personalized feedback that immediately guides improvement. For Tanzanian learners, especially those in rural or underserved regions, this shift carries deeper implications than convenience. It broadens access to quality English instruction in contexts where internet coverage, electricity, and trained language teachers remain unevenly distributed. The ability to practice pronunciation independently through a mobile phone or tablet, therefore, becomes a structural equalizer, extending opportunities beyond what traditional classroom delivery can consistently provide (UNESCO, 2023; World Bank, 2023).

Self-paced AI pronunciation tools also generate important emotional and motivational benefits. Evidence shows that private, automated feedback lowers learners' anxiety about making pronunciation errors and increases their willingness to speak (Derwing & Munro, 2015). This dynamic is particularly relevant in Tanzania, where many students are reluctant to speak English publicly due to fear of ridicule and limited exposure to fluent models. AI-mediated environments create psychologically safe spaces where learners can experiment freely without social pressure. As students engage repeatedly with the AI tutor, they gradually develop not only more accurate pronunciation but also greater confidence, an effective outcome that is essential for communicative competence.

Teachers likewise gain pedagogical advantages. When AI applications handle repetitive drilling and provide individualized corrective input, instructors can redirect class time toward higher-order communicative activities such as argumentation, presentation, problem-solving, and cultural awareness. The analytic reports generated through AI pronunciation platforms reveal patterns of learner progress and areas of persistent difficulty, enabling teachers to design more targeted and differentiated lessons. For example, if app-based data show widespread challenges with word stress or voiced–voiceless consonant contrasts, the teacher can plan focused lessons to address these gaps (Holmes, Bialik, and Fadel, 2022). This data-informed approach shifts assessment from a predominantly summative act to a formative process embedded within everyday instruction.

These developments align closely with the philosophical orientation of Tanzania's Competence-Based Curriculum (CBC), which emphasizes learner agency, self-reflection, and active participation. Adaptive AI pronunciation systems naturally support these values through graduated difficulty levels, gamified

challenges, and speech-recognition features that adjust to the learner's current competence. The ongoing feedback loop cultivates autonomy, while progress-tracking features sustain motivation. In effect, the technology functions as both a mirror and a coach, enabling learners to see and shape their own growth.

Recent investments within Tanzania's education system strengthen the feasibility of integrating such AI-driven learning models. The government's distribution of tablets to teachers in 2022 and the expansion of broadband connectivity under the Digital Tanzania Initiative have laid essential infrastructural foundations (MoEST, 2025). At the same time, the gradual adoption of e-learning tools in teacher colleges and schools is familiarizing educators and learners with digital platforms, reducing the cultural and technical barriers that previously limited technology-enabled learning. As these infrastructural and cultural shifts converge, AI pronunciation tools offer a practical entry point for introducing broader self-regulated learning approaches across subjects.

However, realizing this potential depends on a supportive ecosystem. Teachers require structured professional development to interpret AI-generated insights accurately and to facilitate responsible and effective learner use. Additionally, collaboration among local content developers, linguists, and ICT specialists is necessary to adapt AI pronunciation models to Tanzanian English and Kiswahili-influenced speech patterns, ensuring cultural and linguistic relevance (CIPIT, 2025). Such alignment must be coordinated at the national level through teacher-training programs, curriculum reform, and language education policy not left to individual teachers or schools.

Seen from this perspective, AI becomes more than a technical enhancement. It functions as a

pedagogical partner that complements teacher expertise with precision, scalability, and consistency while empowering learners to take greater ownership of their progress. As Tanzania continues to modernize its education system, the adoption of self-paced AI pronunciation training represents a practical and achievable step toward realizing the CBC's vision of communicative competence and lifelong learning for all.

Challenges and Ethical Considerations

Although adaptive speech technologies hold significant promise, their integration into English pronunciation teaching in Tanzania remains constrained by structural, pedagogical, and sociolinguistic challenges. Infrastructure is the most immediate barrier. Many schools, especially those in rural and economically marginalized districts, operate with unreliable electricity, intermittent internet access, and insufficient numbers of functional digital devices. These limitations restrict the continuity required for AI-supported learning and impede sustained learner practice (Mgaya, 2024; World Bank, 2023; Rubagumya, 2020). Even where devices have been distributed under national digital programs, inadequate maintenance, limited technical support, and high device attrition rates weaken the long-term viability of AI-enhanced instruction. Under such conditions, AI tools risk functioning as occasional add-ons rather than stable, integrated components of teaching and learning.

Teacher preparedness introduces an additional layer of complexity. Integrating AI-based pronunciation tools requires more than operational ICT skills; it demands pedagogical shifts toward data-informed, learner-centered instruction. Yet many Tanzanian teachers were trained under models emphasizing teacher authority, textbook reliance, and summative assessment (Qorro, 2021; Mwajombe, 2022). Research indicates that although educators express openness to digital innovation, they frequently feel underprepared to interpret AI-

generated analytics or to guide learners through self-paced, reflective pronunciation practice (Komba & Shukia, 2023; Wamalwa, 2021). Existing professional development programs tend to emphasize basic digital literacy rather than the pedagogical integration of AI, resulting in underutilization of adaptive speech tools and missed opportunities for formative assessment.

Cultural and linguistic alignment further complicates adoption. Most commercial AI pronunciation platforms are trained using speech datasets dominated by North American, British, or East Asian English. These models insufficiently capture Tanzanian English phonological features, such as vowel length reduction, syllable-timed rhythm, and common Kiswahili influence on stress placement. As a result, learners may receive unfairly low scores or feedback that fails to acknowledge locally intelligible speech forms, potentially reducing motivation and reinforcing linguistic hierarchies (CIPIT, 2025; UNESCO, 2023; Mwaniki, 2022). Without deliberate localization, AI systems risk privileging external linguistic norms at the expense of learners' identities and communicative realities.

Ethical considerations add yet another dimension. AI pronunciation systems collect extensive personal data, including voice recordings, behavioural logs, and detailed performance metrics. Inadequate regulation of such data poses risks related to privacy breaches, opaque algorithmic processes, and potential misuse of student information. International organizations warn that without clear governance frameworks, AI deployment in schools may compromise learner rights and widen digital inequalities (UNESCO, 2023; World Bank, 2023). Tanzania's emerging digital education policies do not yet provide comprehensive guidance on data privacy, consent, algorithmic transparency, or third-party data management, leaving a critical policy gap.

Developing local AI datasets offers a promising pathway toward equity and cultural relevance. When models are trained on Tanzanian English accents, Kiswahili-influenced phonological patterns, and multilingual classroom interactions, they are more likely to provide fair, contextually appropriate feedback. Partnerships among universities, teacher-training institutions, MoEST, and private EdTech firms could support the creation of such datasets through ethically informed data collection and collaborative model training (CIPIT, 2025; Rubagumya, 2020). This approach ensures that adaptive speech technologies evolve in alignment with local linguistic realities and educational goals.

Ultimately, the infrastructural, pedagogical, and ethical challenges surrounding AI pronunciation technologies reflect broader tensions between innovation and equity. For Tanzania, the task is not to reject these tools but to contextualize and guide their use—to adapt them in ways that support CBC principles and uphold linguistic diversity. Strengthening access, teacher capacity, ethical regulation, and localized design will be crucial if adaptive speech technologies are to function as instruments of democratization rather than new sources of exclusion in language education.

CONCLUSION AND WAY FORWARD

Adaptive speech technologies occupy a strategic position in Tanzania's push toward modern, learner-centered language education. Evidence from global and African studies demonstrates that AI-driven pronunciation systems can significantly improve pronunciation accuracy, reduce learner anxiety, and increase oral fluency outcomes that conventional instruction rarely achieves consistently (Derwing & Munro, 2015; UNESCO, 2023). Within the Competence-Based Curriculum (CBC), which emphasizes participation, reflection, and learner autonomy,

these technologies align closely with national pedagogical priorities. Their ability to deliver real-time, individualized feedback positions them as practical tools for addressing persistent pronunciation challenges in Tanzanian classrooms, especially where teacher expertise and instructional materials remain unevenly distributed (MoEST, 2025; World Bank, 2023).

Realizing this potential depends on intentional, coordinated leadership from education stakeholders. The Ministry of Education, Science, and Technology (MoEST) and the Tanzania Institute of Education (TIE) should drive national guidelines that define how AI pronunciation tools connect with curriculum standards, teacher competencies, and assessment frameworks (MoEST, 2025). Local universities and teacher-training colleges have a complementary role in guiding the development and evaluation of AI pronunciation models that accurately reflect Tanzanian English and the phonological influence of Kiswahili, ensuring that the technology is culturally and linguistically relevant rather than imported wholesale (CIPIT, 2025; UNESCO, 2023).

Teacher preparation remains central to sustainable adoption. Research indicates that many Tanzanian teachers support CBC reforms but lack structured training on how to integrate digital or AI-assisted pedagogies into daily practice (Komba & Shukia, 2023; Mgaya, 2024). Professional development must therefore move beyond basic digital literacy to include training on interpreting AI feedback, using analytics for formative assessment, and guiding learners in self-regulated pronunciation practice. Continuous mentorship, peer-learning networks, and school-based coaching can strengthen teacher confidence and reinforce AI as a supportive instructional partner rather than a competing authority.

Ethical and infrastructural safeguards must underpin this transition. Effective AI adoption requires strong data governance policies that protect learner privacy, ensure transparency in algorithmic decision-making, and clarify consent procedures, particularly for minors (World Bank, 2023; MoEST, 2025). While the National Digital Education Strategy (2024/25) and the Digital Tanzania Initiative offer a foundation for secure and equitable technology use, closer policy coordination is needed to ensure consistent implementation across schools and regions.

Public-private partnerships present an important avenue for scaling innovation. Collaboration among EdTech developers, telecommunications companies, and public education agencies can focus on creating bilingual, low-bandwidth, and offline-capable pronunciation tools suitable for both urban and remote schools (UNESCO, 2023). Embedding Kiswahili–English interfaces and culturally grounded content will further strengthen adoption and ensure that AI tools support Tanzania’s multilingual identity rather than reproduce external linguistic hierarchies.

Ultimately, the promise of AI in Tanzanian education lies in augmentation rather than automation. Adaptive speech technologies enhance teacher capacity through precision and scalability while empowering learners to take greater responsibility for their progress. When national policy, teacher competence, localized technological development, and ethical safeguards align, AI becomes a mechanism through which the CBC’s commitment to communicative competence and lifelong learning can be practically realized. If adopted thoughtfully, adaptive AI pronunciation tools can help ensure that all learners, regardless of location or school resources, gain the confidence and clarity needed to participate fully in academic, professional, and global conversations.

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