



## Phonological constraints on English speech production among Kiswahili-speaking learners in Tanzanian technical education: A systematic review

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### ABSTRACT

Oral English communication skills are essential for success in learning and subsequent employment in the Tanzanian vocational and technical education environment, where tasks require effective interactions. However, consistent problems with pronunciation amongst Kiswahili-speaking students reflect a significant lack in the body of research and practice related to teaching English pronunciation, specifically in the area of phonological constraints. This paper examines segmental, suprasegmental, and orthographic constraints that impact spoken English communication and assesses the effectiveness of pronunciation pedagogy in terms of Contrastive Analysis Theory (CAT) and Speech Learning Model (SLM). A comprehensive literature review was conducted based on the guidelines proposed by the PRISMA model. Scopus, Web of Science, and Google Scholar were used to collect relevant articles. The results of the research showed that phonological constraints remain a problem that impedes communication in English. Segmental pronunciation problems occur as a result of the substitution of sounds; suprasegmental constraints impact intelligibility through stress and intonation patterns. In turn, the orthographic constraint reflects the inconsistency between spelling and pronunciation. Each of these phonological constraints is related to first-language transfer, perceptual processing barriers, and insufficient attention to pronunciation instruction. The study shows that existing approaches towards developing English pronunciation skills are insufficient. Therefore, the author suggests adopting explicit pronunciation teaching and learning strategies, increasing teachers' awareness of phonology-based instruction, and integrating both segmental and suprasegmental aspects of phonological awareness into classroom practices. Also, more attention should be paid to context-based strategies, including audio-visual means of instruction. Moreover, curriculum and educational policymakers should include pronunciation skills as part of communicative competence requirements.

**Keywords:** English as a Foreign Language (EFL), Kiswahili-Speaking Learners, Phonological Constraints, Tanzanian Technical Education

### I. INTRODUCTION

English oral proficiency has been established as an important skill in EFL contexts due to its ability to improve learning outcomes and boost the employability of individuals in various labour markets (Idham et al., 2024; Karmaker & Hasan, 2025). The relevance of oral English proficiency is especially true in Tanzania's technical education system programs where graduates are required to perform task-oriented activities. Effective communication in such circumstances ensures that instructions are delivered so that the activity is accomplished effectively and safely. As a result, communication skills have become important in the employability of individuals in administrative, management, and service roles (Duvvuri, 2024; Pham et al., 2025).

However, despite its significance in enhancing employability, there seems to be no universal agreement on how much one needs to master a language in order to gain employment opportunities. There are scholars who believe that spoken communication is central to employability, and that language skills can be enhanced further by additional elements such as the ability to write in English, Information and Communication Technology [ICT], and intercultural competence (Bahrain et al., 2023; Langaas & Mujtaba, 2023). Nonetheless, when task performance requires real-time action and communication, it becomes necessary. In Tanzania, English language is used extensively at the university level, in addition to being a language of communication for professionals. However, many students in technical institutions appear to lack mastery in spoken communication.

Based on empirical data, the aforementioned issues mainly relate to problems in pronunciation concerning not only segmentals but also suprasegmentals (stresses, rhythm, and intonation), causing a lack of intelligibility (Lasi, 2020;

Umar & Aspany, 2024). For example, one of the challenges faced by Kiswahili-speaking learners is the inability to distinguish vowel-consonant sounds due to the development of certain phonological adaptations, which prevents people from communicating effectively (Lasi, 2020; Nshimiyimana, 2024). Besides, Ahsan et al. (2020) and Sari (2022) assert that the problem of fear of mistakes, low self-esteem, and anxiety in the communication process limit students' participation in oral practice. Although the above-cited sources bring important contributions to the research field, they are focused on EFL in general rather than technical and vocational communication contexts.

Pronunciation competence entails the ability to identify, classify, and generate sounds that are phonologically appropriate (Brosseau-Lapr e & Roepke, 2022; Genelza, 2022). While some experts have argued that pronunciation mistakes may not affect intelligibility as long as the interaction is carried out in an intercultural environment, there is no doubt that such mistakes within technical communication can cause confusion, inefficiency, and even possible danger. It is clear from these arguments that pronunciation proficiency can be considered an important skill that is both linguistic and pre-requisite to carrying out tasks within task-based learning frameworks.

The effect of L1 on English pronunciation is significant, with Kiswahili as the mother tongue having great prominence in this regard. The mismatches in the two languages can lead to some of the systematic pronunciation mistakes, such as vowel substitution, consonant cluster reduction, and prosodic variations. While contrastive analysis theory (Lado, 1957) has provided explanations for such mistakes, it fails to explain why these pronunciation difficulties manifest consistently. Unlike the theory, speech learning model (Flege, 1995) provides another viewpoint based on the impact of cognition and perception in SLA. This implies that there are several interacting variables involved in pronunciation difficulties.

Although spoken English is increasingly recognized as important in Tanzania's technical and vocational education system, there is still limited research focusing specifically on the pronunciation difficulties faced by Kiswahili-speaking learners in these settings. Most existing studies on English pronunciation in Tanzania have concentrated on secondary schools and general university contexts (Abdala, 2025; Kilangi, 2023; Mwamakula & Magashi, 2024; Nanai, 2023; Wan, 2021) while technical education environments have received far less attention, despite their strong emphasis on practical and professional communication. Students in these institutions are expected to communicate effectively in presentations, workplace interactions, reporting, and public service activities. However, earlier studies have mainly focused on identifying pronunciation errors rather than examining how teaching strategies can effectively address these challenges (Kyara & Mapunda, 2022; Msuya & Mohamed, 2020). In addition, the combined influence of segmental features, suprasegmental features, and orthographic differences remains insufficiently explored in Tanzanian EFL contexts. Few studies have also integrated theories such as Contrastive Analysis Theory and the Speech Learning Model to explain both the causes and persistence of pronunciation difficulties. As a result, there is still inadequate evidence to guide effective teaching approaches aimed at improving intelligibility, communicative competence, and employability among Kiswahili-speaking learners in technical education institutions.

## 1.2 Research Objectives

- i. To identify segmental phonological constraints (vowels and consonants) affecting English speech production among Kiswahili-speaking learners.
- ii. To examine suprasegmental challenges (stress, rhythm, and intonation) influencing learners' spoken English.
- iii. To analyse the influence of orthographic interference on English pronunciation among Kiswahili-speaking learners.
- iv. To evaluate pedagogical approaches used in teaching pronunciation in Tanzania's technical education system contexts.
- v. To synthesize theoretical explanations (CAT and SLM) underlying the phonological challenges observed among the learners.

## II. LITERATURE REVIEW

### 2.1 Phonological Competence in EFL Contexts

Phonological competence is considered an important dimension of communicative competence in second language acquisition, which involves the identification, classification, and proper pronunciation of sounds in the target language (Brosseau-Lapr e & Roepke, 2022; Genelza, 2022). In EFL settings, phonological competence is often viewed as one of the most difficult aspects of the process because of the complicated interaction between perception, pronunciation, and previous language knowledge.

There exists considerable empirical evidence that pronunciation is considered to be among the key factors influencing speech intelligibility and successful communication as a whole, especially in multilingual situations when the phonological system of the learner's first language differs greatly from English. On the one hand, there have been claims that comprehensibility can be achieved despite having a foreign accent (Levis & Silpachai, 2022; P erez-Ram on

et al., 2022). On the other hand, many studies stress the influence of phonological differences on making communication impossible, which is important to consider in relation to vocational education.

## 2.2 Segmental Phonological Challenges (Vowels and Consonants)

Numerous empirical studies suggest that segmentals pose a great challenge to second language learners, especially those whose native language differs from the target language. For example, the fact that Kiswahili possesses a smaller set of vowels means that distinguishing contrasts like /ɪ/ and /i:/ or /æ/ and /ʌ/ in English poses a great problem (Lasi, 2020; Upor & Olomy, 2022). It should also be noted that consonant clusters and the phonemes /θ/ and /ð/ cannot be accurately pronounced by Kiswahili-speaking students as these segments do not exist in their native languages (Nshimiyimana, 2024).

Moreover, empirical research proves that substitution of segmentals does not happen randomly. Indeed, segmental substitution is a common feature of interlanguage, meaning that there are regular tendencies in this process which depend on the native language phonology. In this sense, segmental errors of Kiswahili-speaking learners can be predicted based on the observations of learners of various languages.

## 2.3 Suprasegmental Features: Stress, Rhythm, and Intonation

In addition to segmental features, various suprasegmental factors like stress, rhythm, and intonation are important in making English speech understandable. Despite this, these elements are sometimes inadequately developed in EFL learning practices. As research indicates, Kiswahili speakers usually carry the syllable-timed rhythmic pattern of their first language into speaking English as a second language, which is characterized by a stress-timed rhythm, making speech uncharacteristic (Castrillo González, 2025; Inamjanovna, 2026).

Moreover, Jones (2017) and Afzal (2019) argue that misapplication of word stress and lack of appropriate intonation patterns are common issues that many EFL learners experience. For example, it is possible to overlook differences in stressing between grammatically distinct words (noun and verb forms of words such as *record*, *refuse*, *export*, *reject* when used as noun or verb depending on stress placement). It can cause difficulties in understanding what is said. Thus, one can conclude that these elements are essential not only for stylistic reasons.

## 2.4 Orthographic Influence on Pronunciation

The influence of orthography in the pronunciation behaviour of EFL learners is evident especially where the learners depend on written language input extensively. In contrast to the opaque orthography of the English language, Kiswahili is a phonetic orthography system. Consequently, the learners tend to employ spelling-based pronunciation strategies. It has been found that the learners often pronounce words like "comb" as "kombu" and "worked" as "workid," demonstrating orthographic transfer instead of phonological mapping (Babayigit, 2022; Sammour-Shehadeh et al., 2023). Diphthongs and silent letters have also been reported to be pronounced incorrectly owing to the influence of orthography. Despite reports indicating that orthography could be employed as a scaffold for learners at early stages of learning, overdependence on it might lead to inappropriate phonological mapping.

## 2.5 Theoretical Perspectives on Phonological Acquisition

Contrastive Analysis Theory (CAT) and Speech Learning Model (SLM) constitute two key theories that can be used to provide an explanation of phonological problems of EFL learners. According to CAT, learners' errors of pronunciation are caused by the structural difference between the two languages (Lado, 1957). In other words, errors of vowels substitution and consonant clusters reduction found in the case of Kiswahili learners of English can be attributed directly to the effect of language transfer. Unfortunately, CAT has been critiqued in terms of its insufficient explanatory capacity regarding persistent errors of pronunciation.

Alternatively, SLM by (Flege, 1995) is based on the idea that learners' perceptions of L2 speech sound categories play the central role in explaining the causes of learners' pronunciation problems. In particular, when L2 sounds are perceived similarly to those of L1, the learners do not create new phonetic categories, and therefore commit mistakes in pronunciation of sounds. Hence, SLM can be considered an attempt at developing a cognitive approach to explaining phonological difficulties.

## 2.6 Pedagogical Practices and Pronunciation Instruction

Notwithstanding its significance in communicative proficiency, studies have shown that pronunciation is often neglected in English as a Foreign Language (EFL) class. Teaching focus is usually placed on grammar, reading, and writing because of exam-focused curriculum requirements, with very little attention paid to pronunciation practice (Paker, 2022; Wu et al., 2026). Research shows that such disparity leads to students who have sufficient listening and reading skills but lack speaking ability, especially during spontaneous communication. Some experts such as Hassan et al. (2025) and Pawlak (2025) argue that acquisition can be done implicitly by means of exposure and interaction:

meanwhile, Mathews and Cohen (2022) and Fahmie et al. (2023) show that explicit phonology instruction is beneficial in enhancing learners' segmental and suprasegmental abilities. Such teaching methodology is not widely used in technical and vocational education settings.

## 2.7 Research Gap and Conceptual Positioning

Despite a considerable body of research on phonological problems in EFL environments, current literature is still disjointed regarding three main issues. Firstly, most studies consider general or secondary education contexts while disregarding technical education environments where speaking skills are associated with the job performance of students. Secondly, segmental, suprasegmental, and orthographic aspects lack coherence and unity in the analysis of pronunciation problems. Lastly, very few studies link their empirical evidence to CAT and SLM theories. Such an incomplete body of research hinders the generation of contextually informed pedagogic strategies that help enhance spoken English skills in technical education contexts. Thus, a synthesis of current research knowledge is vital for identifying trends in phonological constraints and teaching gaps in Tanzania's technical education system environments.

## III. METHODOLOGY

### 3.1 Research Design

The current research utilized systematic literature review (SLR) methodology in examining empirical and theoretical literature relating to phonological restrictions that could impact English speech among Kiswahili speaking students in Tanzanian technical and vocational settings. This study used qualitative synthesis method, which helped in the synthesis of results from different scholarly articles. The PRISMA guidelines were used in this systematic review to ensure validity and reliability.

### 3.2 Data Sources and Search Strategy

The process of searching literature was carried out through three main scholarly databases, which include Scopus, Web of Science, and Google Scholar. These databases were chosen because they provide extensive coverage of scholarly articles on linguistics, applied linguistics, and teaching English language. The search strategy adopted a systematic approach involving the use of keywords including phonology, pronunciation, EFL learners, Kiswahili-speaking learners, speech production, and technical/vocational education. Boolean operators such as AND OR were used in conducting searches for relevant articles.

### 3.3 Study Selection and Sampling Procedure

Systematic sampling was carried out following the PRISMA framework for transparency and rigorous methodology in the selection process. In the initial search, records were obtained from Scopus, Web of Science, and Google Scholar. In the process of removing duplicates, the studies were screened through their titles and abstracts, and most irrelevant studies that do not address phonological problems among EFL speakers were ruled out.

In the second stage of screening, the selected studies were assessed in terms of relevance using predetermined inclusion criteria. At this point, many studies were ruled out for various reasons, including their failure to address the target population, inadequate consideration of phonological elements, and limited theoretical and empirical support. Only those studies that met the established criteria for relevance, population, and phonology were considered for the analysis. Therefore, only a selected pool of studies informed the systematic synthesis of data in addressing phonological constraints among Kiswahili speakers.

### 3.4 Inclusion and Exclusion Criteria

The inclusion criteria for studies included addressing issues of pronunciation or phonological difficulties in EFL learners, the participation of Kiswahili-speaking participants or any other type of multilingual individuals, conducting the study in an African environment or environments similar to that of ESL/EFL learners, and being empirical or theoretical research papers dealing with segmental, suprasegmental, or orthographic issues in pronunciation.

The exclusion criteria included concentrating solely on grammar, reading, or writing skills, studies done outside an EFL context, lacking a basis in phonology either theoretically or empirically, and being non-peer-reviewed publications like opinion pieces or blogs.

### 3.5 Validity, Reliability, and Trustworthiness

A number of approaches were utilized in order to attain methodological rigor in the research, which helped improve the validity and reliability of the study. The use of multiple databases decreased publication bias and helped ensure an extensive review of relevant literature. The inclusion and exclusion criteria helped make the study more consistent. The PRISMA approach contributed to increasing the replicability of the study. Moreover, systematic



screening of titles, abstracts, and full texts helped reduce selection bias, and cross-checking of the extracted information helped increase consistency in the analysis.

### 3.6 Data Analysis

The thematic analysis technique as proposed by (Braun & Clarke, 2006) was adopted for data analysis. This process involved the following steps: familiarizing oneself with the chosen literature, coding data initially, developing themes and refining them, and defining the final thematic categories. Through this process, a recurrent pattern could be easily recognized among the studies and an effective synthesis achieved. A total of four main themes emerged from this analysis: phonological difficulties at the segmental level (vowel and consonant sounds), suprasegmental phonology (stress, rhythm, and intonation), the impact of orthography on pronunciation, and gaps in pedagogy regarding pronunciation instruction.

## IV. FINDINGS & DISCUSSION

### 4.1 Findings

#### 4.1.1 Segmental Phonological Constraints: Vowels and Consonants

The review also reveals segmental phonological rules to be among the biggest obstacles towards producing comprehensible speech in English among Kiswahili speakers (Mramboa & Ligembe, 2022; Nandelenga, 2022). One of the main issues in this regard concerns the relatively small set of vowels available in Kiswahili as compared to English and consequently leads to perceptual and phonetic misperception of vowel contrasts. For example, it is very common for students not to recognize near vowel contrasts, such as /ɪ/ and /i:/ (for instance, in pairs like “ship” and “sheep”) as well as /æ/ and /ʌ/ (in “cat” and “cut”), thus distorting the meaning of utterances in communication

In addition, difficulties are observed in pronunciation of English consonants, especially the simplification of consonant clusters and the use of sounds not present in Kiswahili language (Nandelenga, 2022), (such as replacement of interdental fricatives by stops /t/ and /d/; for example, “thin” pronounced “tink” and “this” as “dis”). Also, such processes as reduction of consonant clusters (as in case with pronouncing “school” and “street” in phonologically simpler form due to influence of Kiswahili syllable structure which does not involve complex clusters of consonants) are characteristic of Kiswahili learners' English.

All these deviations from English phonological rules are well explained within the Contrastive Analysis Hypothesis as structural differences between L1 and L2 languages causing misperception of phonemic rules (Lado, 1957). At the same time, from the perspective of the Speech Learning Model, the same mistakes can be explained as perceptual grouping of new sounds into existing categories, thus preventing further acquisition of phonetic categories (Flege, 1995). This observation corroborates evidence of possible fossilization of L2 phonetics as long as perceptual differences are not recognized (Savira et al., 2026). Though some researchers maintain that certain violations of English pronunciation do not necessarily hamper comprehensibility (Aryadoust, 2024; Hirschi, 2024), there is evidence showing the impact of these segmental phonological deviations in technical environment.

#### 4.1.2 Orthographic Influence on Pronunciation

Spelling errors are among the major sources of pronunciation errors for Kiswahili-speaking learners. The transparency of the Kiswahili orthography, which is phonetic by nature, is a stark contrast to the lack of transparency and regularity of the English orthography, thus compelling learners to use spelling-to-sound correspondence rules (Landerl et al., 2022; Solity, 2022). These rules result in predictable errors where learners pronounce “comb” as “kombu,” “honest” as “honesti,” and “worked” as “workid.” Similarly, simplification of diphthongs and reduction of vowel-length contrasts can be expected due to direct conversion of orthography into phonology, a common trend noted in EFL phonology studies (Basseti et al., 2018; Kapatsinski et al., 2020).

From the Contrastive Analysis theory perspective, such errors arise due to negative transfer from a phonologically transparent L1 system to an opaque L2 (Lado, 1957). In line with the Speech Learning Model, another plausible explanation is that such errors are caused by the mediation of perception through orthography input, making orthography rather than auditory perception the primary factor (Flege, 1995). While orthography can help learners acquire new vocabulary and improve decoding skills, its overuse can make learners rely on incorrect pronunciation (Novitasari, 2023; Raheem & Ghafar, 2024).

#### 4.1.3 Suprasegmental Constraints: Stress, Rhythm, and Intonation

Suprasegmentals are also an extremely vital aspect of speaking a foreign language but not always recognized as one. According to the findings of the literature review, Kiswahili learners are prone to transfer their native syllable-timed prosodic patterns when speaking English. This results in unnatural prosodic flow and low level of fluency (Kim, 2017). Another category of common mistakes is related to word stress. For instance, students might be applying equal

stress to two syllables in words like “record,” thus not distinguishing noun/verb stress patterns, which differ. It results in incorrect perception of grammatical meaning (Ambalegin & Afriana, 2023; Riaz et al., 2023). Intonation mistakes include inappropriate use of rising or falling tones that influence pragmatic meaning of questions and statements (Rudin, 2022).

Contrastive Analysis Theory states that these mistakes appear due to the dissimilarity between prosodic systems of Kiswahili and English. On the contrary, according to the Speech Learning Model, these mistakes occur because of limited perceptual abilities to notice suprasegmental characteristics of a second language that lack salience in the L1 (Hosaka & Saito, 2026). It should be highlighted that suprasegmental mistakes can negatively impact not only comprehensibility of speech, but also its fluency and communicative competence in professional situations when certain tones and emphases carry special meaning.

#### 4.1.4 Pedagogical Gaps in Pronunciation Instruction

From the findings presented above, the trend is that there is persistent marginalization of pronunciation lessons in EFL classrooms, particularly evident in the Tanzania’s technical education context. The curriculum still revolves around the teaching of grammar, reading, and writing skills because of the examination-focused syllabus and curriculum, thereby limiting phonological skills training opportunities (Paker, 2022).

The learners will end up acquiring effective listening skills while their speaking skills are relatively poor. While some language teaching techniques emphasize implicit learning strategies, research indicates that explicit instruction of phonological skills enhances improvement in segmental and suprasegmental skills acquisition (Ramadhona et al., 2024).

Since one needs to speak clearly at work in Tanzania’s technical education system, the failure of students to acquire these essential linguistic skills affects their capacity to communicate effectively at work and ultimately limits employability opportunities.

#### 4.2 Synthesis and Critical Insights

Phonological difficulties faced by Kiswahili-speaking learners result from the multifactorial interplay of structural L1-L2 differences, cognitive elements of speech perception, and teaching English as an international language (EIL) in the classroom (Flege, 1995; Lado, 1957). In particular, problems associated with the pronunciation of vowels and consonant clusters, alongside suprasegmental difficulties, such as stress, rhythm, and intonation, become even more complicated due to orthographic interference. Yet, there is some controversy about the effect of these variables on the phonological system of EIL learners. While some authors place great importance on attaining segmental precision (Echols, 2014; Pietraszek, 2026), other researchers such as Zielinski (2015) and Wang (2022) note that suprasegmentals can help overcome these obstacles. Using the framework of CAT and SLM, the above-mentioned difficulties can be explained through L1 transfer and phoneme perception. It should be noted that there is limited research on the use of EIL in Tanzania’s technical education system, where speaking proficiency is key to professional activities. It is important to fill this gap to improve teaching methods for EIL, thus increasing its comprehensibility and efficiency.

### V. CONCLUSION & RECOMMENDATIONS

#### 5.1 Conclusion

This systematic review confirms that phonological constraints remain a major barrier to effective English speech production among Kiswahili-speaking learners in Tanzania’s technical education system institutions. These challenges are evident in segmental errors, suprasegmental difficulties, and orthographic interference, all of which reduce intelligibility in task-based communication. The findings indicate that such constraints arise from the interaction between first language influence and perceptual processing, as explained by Contrastive Analysis Theory and the Speech Learning Model. Their persistence is further reinforced by the limited emphasis on explicit pronunciation instruction in current EFL practices.

The review also highlights a significant research and pedagogical gap in Tanzania’s technical education system contexts, where pronunciation is underexplored despite its importance for workplace communication. To address this, pronunciation should be systematically integrated into EFL curricula, with explicit and context-specific instruction supported by trained teachers and appropriate audio-visual resources. Aligning pronunciation training with workplace communication needs is essential for improving learners’ intelligibility, academic success, and employability.

#### 5.2 Recommendations

Based on the literature reviewed, several interrelated recommendations are proposed to address the study objectives in a coherent and practical manner. First, pronunciation should be systematically integrated into the EFL curriculum, with balanced emphasis on both segmental features (vowels and consonants) and suprasegmental features (stress, rhythm, and intonation), ensuring alignment with communication demands in technical and vocational education

and training contexts. This should be supported by explicit phonological instruction, where structured learning activities deliberately target both sound-level accuracy and prosodic patterns to enhance overall intelligibility.

Second, improving teacher competence is critical. Instructors should be supported through targeted professional development that equips them to apply theoretically grounded approaches, particularly Contrastive Analysis Theory and the Speech Learning Model. Such training would enable teachers to design effective pedagogical strategies that address first language interference, reduce misperception of English sounds, and facilitate accurate phonological development.

Third, the use of instructional aids and audio-visual resources should be strengthened to provide learners with consistent auditory input, accurate pronunciation models, and timely corrective feedback. This approach can help minimize learners' overreliance on orthographic cues and improve their ability to perceive and produce English sounds accurately. Finally, pronunciation instruction in Tanzania's technical education system should be context-specific, with learning activities aligned to workplace communication requirements, including clarity, intelligibility, fluency, and safety. This ensures that phonological competence is developed as a functional skill that directly supports both academic performance and professional effectiveness.

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The authors declare that they do not have any known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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