

Pronunciation Patterns of Primary and Secondary School Teachers in Ekiti State: AI to the Rescue

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Abstract

Pronunciation is a fundamental aspect of spoken language that affects effective communication in English. The teacher's good pronunciation plays a critical role in learners' ability to acquire the target language as they are expected to serve as models for the students. This research seeks to investigate the pronunciation patterns of Primary and Secondary school teachers in Ekiti State and to also explore the potentials of Artificial Intelligence in improving their pronunciation. The study was examined within the purview of Chomsky and Halle's Generative Phonology, which was employed to generate rules which account for the patterns of the participants' realizations of English sounds. A total number of sixty teachers were purposively selected from Ekiti State three senatorial districts for the study; thirty from Primary schools and thirty teachers of English from Secondary schools. The data for the study were collected through structured questionnaire and a prepared word list given to each participant to be read into recording device. The data collected were listened to and transcribed in order to identify patterns of the participants' pronunciation and also subjected to phonological and descriptive analyses. The findings show the phonological features that characterized the pronunciations of the selected participants which are substitution, de-affrication, neutralization, de-dentalisation, devoicing and reduced vowels of English. The study, therefore, explored the potentials of Artificial Intelligence in improving their pronunciation as models for learners to emulate.

Key words: *pronunciation patterns, teachers, phonological features, AI potential*

1. Introduction

The status of English as an official language, and its multifaceted role in the country's social, educational, political and economic spheres of lives calls for effective communicative competence in the spoken aspect of the language. Good and correct pronunciation is a critical component of English language learning significantly impacting a learners' ability to communicate effectively and achieve language proficiency. Having good pronunciation often correlates with better understanding of reading and writing skills. This involves understanding the correct realization of the sounds (consonants and vowels) which are combined to form words which can help learners decode written language more effectively and improves spelling. The pronunciation aspect of English which is taught as phonics at primary level is also treated as oral English at secondary level, (Anyagwa:2017). Correct pronunciation is better achieved at early stage of learning. Research had shown that age can influence the speed, and eventual proficiency with which a child acquires a new language. The critical period hypothesis posits that there is a specific window during early childhood when the brain is particularly receptive to language learning. This period

is believed to extend from birth to puberty. During this period, a child is thought to acquire language more naturally and with greater ease than with older learners. They can learn to have native-like pronunciation and fluency because their brains may likely distinguish and replicate the subtle phonemic differences in a new language which enhances their ability to achieve accurate pronunciation. Roach (2000) asserts the ability of young children to acquire rapid and casual pronunciation if exposed to correct and meaningful pronunciation patterns. Hence, having good exposure to correct pronunciation at primary and secondary levels of education becomes very important and crucial. Teachers, especially at the primary and secondary levels are significant figures in the language acquisition process as they serve as models for their students. This is required and important in Nigeria, where English is not the first language but a second language that occupies a key role in educational system of the country. Having good pronunciation by the teachers, who are seen as models by their students, and even colleagues in the use of English becomes imperative. Teachers are expected to model the correct pronunciation of words and appropriate intonation in speech. It is also expected of teachers to set standard for what correct realization of English sounds look like in order to provide a benchmark for students to strive at in their own pronunciation. While teacher's clear and correct pronunciation promotes effective learning, a consistently mispronounced words by teacher could hinder students' ability to acquire correct phonological skills. As observed by the researcher and corroborated by Fakeye (2017), this aspect of English has been identified as one of the concepts that teachers both at primary and secondary schools usually avoid to teach and students equally find it difficult to pass at any level of education. The teaching of pronunciation is affected by various factors which include, mother tongue interference, differences in the phonological system of English and learners' mother tongue and lack of exposure to the native speaker's pronunciation. This study, therefore, intends to examine the pronunciation patterns of Primary and Secondary school teachers in Ekiti State. The understanding of their pronunciation patterns is crucial to inform the need for the development of teachers' pronunciation through personalized pronunciation digital apps. It is expected that the study will improve the pronunciation of English teachers in Ekiti State and also alleviate the difficulty encountered in teaching of oral English. The study will clearly explore AI potential personalized tools to assist teachers in improving their pronunciation skills.

2. Objectives of the Study

The specific objectives of the study are:

- i. to analyze the pronunciation patterns of primary and secondary school teachers in Ekiti State
- ii. to analyze phonological peculiarities of the pronunciation patterns of the selected participants
- iii. to explore and propose AI-personalized tools relevant to assist teachers to improve their pronunciation skills.

3. Research Questions

The following questions were generated from the stated objectives:

- i. what are the prevalent pronunciation patterns among the primary and secondary school teachers in Ekiti State?
- ii. What are the phonological peculiarities of the pronunciation patterns of the selected participants?

- iii. What specific AI personalized tools could be explored and utilized to assist teachers in improving their pronunciation skills?

4. Literature Review

Pronunciation is an aspect of spoken language that involves a comprehensive understanding of the phonological system of the target language. Having an understanding of it goes beyond mere articulation of speech sounds; it embodies the knowledge of both segmental and suprasegmental features which are expected to be understood by teachers of English at primary and secondary school levels for them to be models for their students. At pre-primary and primary school, the pronunciation aspect of language is taught as phonics, oral English at the secondary school level, and spoken English at the tertiary level, (Anyagwa:2017). Oral English has been identified as one of the aspects of English that students find it difficult to pass at national examinations, (Fakeye:2017). The teaching of pronunciation has its different challenges encountered by the teachers ranging from different phonological systems of the learner's mother tongue and target language, lack of educational resources, non-exposure to native speaker's pronunciation, and above all, the diverse linguistic backgrounds and accents variations of the students, (Hari:2023) to mention but a few. These challenges need to be addressed for effective pronunciation in spoken English to be achieved.

Fakeye (2017), who investigated the extent to which teachers' quality and textbook content correlates with students' achievement in oral English in the Ikole local government area of Ekiti State came up with the recommendation that the organization of in-service training, seminars, and workshops for serving teachers to improve their content knowledge in oral English is sacrosanct. Anyagwa (2017) conducted research on oral and visual English and the need for revisiting English pronunciation in Nigeria. She observed that the current trends show that in a good number of cases, neither of the targeted skills is actually enhanced as both the teaching and testing methods tend to de-emphasize production and perception which focuses on symbol identification and recognition. The study draws the attention of the stakeholders in education to revisit current content and approaches because the trend undermines the orality of English.

Ulo-Bethels, and offorma (2019) carried out a study to determine secondary school students' learning outcomes in English consonant clusters using pronunciation drill, the research also investigated the impact of school location on the student's learning outcomes in the Nsukka local government area of Enugu State. The findings indicated that despite their location, students' learning outcomes were greatly enhanced because of their exposure to pronunciation drills. However, location was a significant factor of achievement since students in the urban area achieved higher than those in the rural areas. It was, therefore, recommended that government and school administrators should ensure equal distribution of educational resources and facilities in the urban and rural areas and that English teachers should adopt the use of pronunciation drills technique in teaching consonant clusters.

Faloye (2022) examined the availability and effect of Elsa Speak; a digital instructional application on senior secondary school performance in oral English. He confirmed the positive effect of Elsa Speak on the young learners' pronunciation in English and therefore recommended the need for retraining programs for teachers in charge of phonics.

Hari (2023) posits that effective communication hinges on accurate pronunciation which is a crucial factor in bolstering students' speaking proficiency in his research; challenges in teaching pronunciation at the secondary level and English teachers' perspectives. The qualitative inquiry

probes the multifaceted challenges of secondary-level English instructors when teaching pronunciation skills. The findings identified nine salient challenges, which collectively illustrate the intricacies surrounding pronunciation education. The study proposes prioritizing pronunciation instruction, refining skills, integrating feedback, immersive practice, enriching resources, fostering reading habits, and real-world learning.

All the above research works have examined the pronunciation patterns of students and the teachers as well as the significance of retraining and workshops for teachers to improve their pronunciation as models. This research intends to investigate the pronunciation patterns of primary and secondary school teachers in Ekiti State and also explore the capabilities of AI personalized tools in improving the spoken English of the teachers to enhance both national and international intelligibility.

5. Theoretical Framework

The study adopts Chomsky and Halle's (1968) Generative phonology theory. The focus of the theory is to generate set of rules, principles or constraints efficient to produce the surface phonetic forms of a language to model the internalized linguistic knowledge of the ideal speakers. The theory recognizes three levels of representations; these are phonemic level, transformational level and phonetic level. The interaction among the three different levels are as a result of phonological rules applying to the underlying forms of the language and yielding surface phonetic representations. The Generative Phonology (GP) concern is to generate rules that capture all the levels of representation in a language. Generative Phonology is premised on the fact that utterances are generated based on certain rules that govern that language. The underlying representation connotes the abstract form of a word before any phonological rules are applied to it. Goldsmith (1993:66) defines the phonological rules as mapping between two different levels of sound representation; the abstract underlying level and the surface level to portray the abstract representation in the mind to the actual sounds they articulate when they speak. Chomsky (1968), therefore, argues that phonological description is not based on 'analytic procedures of segmentation and classification but is rather a matter of constructing the set of rules that constitute the phonological component of a grammar. This implies that the phonological conditioning is inherently governed by bundle of phonetic features and the phonemes themselves. Thus, the concern of generative phonology is the formalization of rules to capture phonemic change (or alternation that occurs in languages by specifying distinctive features that capture the phonological conditioning. Onabamiro and Oladipupo (2023:56) explain that phonological rules delete, insert, change segments, or change the features of segments which are expressed through the process of rule formalization. Hence, the choice of the theory is premised on the ability to generate rules to account for the patterns of pronunciation of the participants.

6. Methodology

A total number of sixty teachers; thirty from primary and thirty English teachers from secondary schools, were selected for the study. The participants were purposively selected from primary and secondary schools across the central, North and East senatorial districts of Ekiti State. Also, the participants selected comprise both male and female teachers. The data for the study were collected through a structured questionnaire designed to obtain personal information about the respondents' qualification, ethnicity, gender age, first language, challenges faced regarding pronunciation when teaching and if there is any pronunciation guide used to improve their

pronunciation. The questionnaire also contained a prepared word list given to each primary school teacher (PST) and secondary school teacher (SST); to be read into a recording device. The recorded pronunciation of each participant was listened to and transcribed using phonetic transcription based on International Phonetic Alphabet, Roach (2000). In order to ascertain the correctness of the participants' production of English sounds, the voices recorded were scored and awarded marks. The data collected were analysed using simple percentages in order to determine the frequency count of the participants' pronunciation that conformed to the Standard English and those that did not. The data were further subjected to phonological and descriptive analyses.

7. Results and Discussion

Table 7.1: Production of English sounds by Secondary and Primary Teachers in Ekiti State

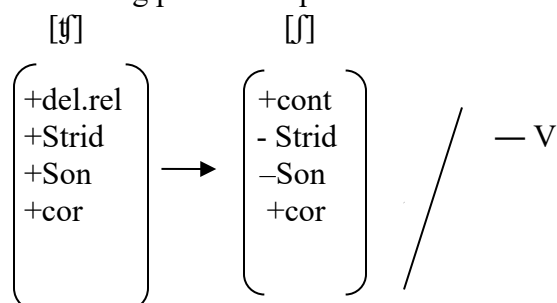
Selected Sounds	Example Of Words	PST Correct	%	PST wrong	%	SST correct	%	SST Wrong	%
Consonants	/tʃ/ in <u>teacher</u>	18	60	12	40	22	73.3	8	26.6
	/ʒ/ in <u>vision</u>	9	30	21	70	13	43.3	17	56.6
	/z/ in <u>rice</u>	14	46.6	16	53.3	14	46	16	53.3
	/θ/ in <u>bathroom</u>	13	43.3	17	56.6	14	46	16	53.3
	/ð/ in <u>wreath</u>	14	46.6	16	53.3	18	60	12	40
Monophthong	/v/ in <u>very</u>	9	30	21	70	13	43.3	17	56.6
	/ə/ in <u>afraid</u>	10	33.3	20	66.6	14	46	16	53.3
	/ɜ:/ in <u>bird</u>	20	66.6	10	33.3	20	66.6	10	33.3
	/ʌ/ in <u>come</u>	12	40	18	60	14	46	16	53.3
	/ɑ:/ in <u>star</u>	22	73.3	8	26.6	23	76.6	7	23.3
Diphthong	/ɔ:/ in <u>raw</u>	23	76.6	7	23.3	25	83.3	5	16.6
	/əʊ/ in <u>go</u>	11	36.6	19	63.3	15	50	15	50
	/iə/ in <u>here</u>	21	70	9	30	23	76.6	7	23.3
	/uə/ in <u>pure</u>	8	26.6	22	73.3	12	40	18	60
	/eə/ in <u>rare</u>	19	63.3	11	36.6	22	73.3	8	26.6
Triphthong	/aʊə/ in <u>hour</u>	5	16.6	25	83.3	6	20	24	80
	/aɪə/ in <u>higher</u> /eɪə/ in <u>prayer</u>	10 15	33.3 50	20 15	66.6 50	16 20	53.3 66.6	14 10	46.6 33.3

Table 1 displayed the results of the performance of all the 60 respondents in the realization of selected sounds in English. Sounds selected are those that are absent in the inventory of the respondents' mother tongue. It was generally observed that secondary school teachers (SST) of English performed better in approximation of native speaker's pronunciation than the primary school teachers (PST). This might be due to the fact that secondary school teachers of English

often have more specialized training in pronunciation related courses and indepth understanding of sounds and structures of English language. This is unlikely of primary school teachers whose focus is often on fundamental skills rather than on precise pronunciation. The result shows that the voiced post-alveolar fricative constitutes problem for the teachers of English as a second language. The performance of the respondents in the pronunciation of English selected monophthongs indicated that vowels number 10 /ʌ/ and number 12 /ə/ constitute problem for the teachers because the higher percentages; 60% and 66% wrongly realized the sounds. The results of the production of English triphthongs by the respondents reveal that fewer number of them got the sound correctly. The results corroborate Roach (2000) who describes triphthong as the most complex English sounds. They can be rather difficult to pronounce, and very difficult to recognize. The cause of difficulty for the second learners is that the extent of the vowel movement in present-day English is very small, except in very careful pronunciation. The reason adduce to this mispronunciation is because of the absent of triphthongs in the inventory of sounds of our indigenous languages. The different pronunciation patterns of the respondents are analysed under these categories; affrication, deaffrication, reduced vowel system, devoicing and neutralization.

i) De-affrication and substitution:

This explains the process where affricate is substituted by another sound in a certain environment. The affricates are specified with the following phonetic features; [+cons], [+del.rel], [+strid], [-cont]. The voiceless alveolar affricate was wrongly substituted with a voiceless post-alveolar fricative at the medial position of the word ‘teacher’. Affricates are realized with a delayed released of airstream as opposed to fricatives which involve continuous frication without any delay. The realization of the sound [tʃ], voiceless alveolar affricate by some respondents evolved the following phonetics specifications:



The voiceless and voiced dental fricatives /θ/ and /ð/ were substituted with voiceless and voiced alveolar stops /t/ and /d/ respectively. This explains that the pronunciation of primary and secondary school teachers in Ekiti State are characterized with the features of Nigerian spoken English as earlier attested by language scholars.

ii) Devoicing:

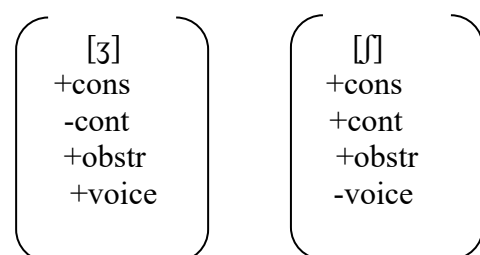
This involves the process where voiced sound is rendered as voiceless by some respondents in a certain environment. The prominent type is final devoicing which is described by Aitchison (1981) in Oladipupo (2004:113) as “the general and inevitable weakness of articulation of sounds at the end of words” which is a function of naturalness in phonology by which speakers tend to employ features that require less articulatory effort. The sound, voiced alveolar fricative [z] was realized as voiceless alveolar fricative [s] at the medial position of the word ‘rise’. The word was wrongly realized as [rais] as opposed to Received Pronunciation [raiz]. Thus, we have the formal rules of Generative Phonology to explain the phonological processes that had taken place:

[+sonorant] → [–voice] / V– as opposed to:
 [+sonorant] → [+voice] / V–

iii) Neutralization:

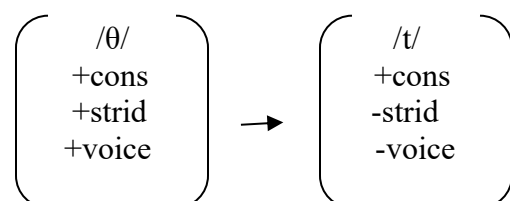
This is a phonological process whereby a perceived difficult sound by the learner is simplified and substituted with another sound from the inventory of the learner's mother tongue. This process is always triggered by mother tongue interference.

The sibilant, [ʒ], voiced post-alveolar fricative which is not attested in the inventory of Yoruba phonemes, has the variants [ʒ] and [ʃ] respectively. While some respondents realized the sound correctly as [ʒ] in the word 'vision', most of the participants reduced and simplified to a voiceless counterpart, [ʃ]. Based on the above neutralization process, the following phonological features are, therefore, specified



iv) De-dentalisation:

This is a phonological process that involves the substitution of dental sound with alveolar and labio-dental sound. The voiceless dental sound, [θ], was realized as [t], voiceless alveolar plosive, and /f/ voiceless labio-dental fricative by some respondents at the medial position of the 'bathroom'. Also, the sound the voiced dental fricative, [ð] was modified to [d], voiced alveolar plosive at final position of the word 'wreathe'. The different realizations attested to the assertion posited by Utulu (2014:101), that the realizations are either induced by mother-tongue interference, lexical type or word position. The variations that stem from realizations of the English sounds by PST and SST in Ekiti State are characterized by the following phonetic features:



The Rule explains that a non-strident sound becomes a strident at the initial position of a given word. Cruttenden (2008) attests to the replacement of voiceless and voiced dental fricatives, /θ/ and /ð/ with voiceless and voiced alveolar plosives, /t/ and /d/ respectively by second learners of English due to the absence of those sounds in the inventories of their mother-tongue. He explains that such replacement does not generally lead to neutralization but the voiceless alveolar plosive /t/ is aspirated when it occurs at the initial position followed by a vowel.

v) Reduced vowel

This refers to various changes in the acoustic quality of vowels as a result of changes in sonority, duration, loudness, articulation or position in the word and which are perceived as vowel weakening. Vowels which have undergone vowel reduction may be called reduced or weak. Vowel

reduction is described by Aiyeola (2020) as a major point of variation between Nigerian English, NE and Standard British English, SBE. This usually affects the reduction of English diphthong and triphthong to pure vowels of English. This research attests to the reduction of tense vowels /ɔ:/, /a:/ and /ɜ:/ in given words; 'law', 'star', and 'bird' respectively to lax vowels as /ɒ/, /stɑ/ and /bɜd/ by the respondents. Also, the analysis indicates monophthongization of diphthongs in tested words; 'here', 'rare', and 'pure' and 'go'. The sounds /iə/, /eə/, /uə/ and /əu/ are wrongly realized as /hə/, /rə/, /pə/ and /go/ respectively. It was observed that part of the sounds /i/, /e/, /u/ and /əu/ were deleted. The triphthongs of English were obviously reduced to pure vowels in given words such as 'hour', 'higher', and 'prayer'. The words were realized as /hawa/, /haə/ and /preə/ instead of /hauə/, /haiə/, and /preiə/ respectively. The results corroborate Roach (2000) who describes triphthong as the most complex English sounds. This, therefore, affects the realization of the triphthongs such that the middle of the three vowel qualities of the triphthong /ɪ/ or /u/ can hardly be heard and the resulting sound is difficult to distinguish from some of the diphthongs and long vowels. The reason adduced to this mispronunciation is because of the absence of triphthongs in the inventory of sounds of our indigenous languages. As observed by Jowitt (1991), the variation results in reduced vowels of Nigerian English when compared with Standard British English. The reduced vowel system of English spoken in Nigeria is as a result of mergers or neutralization of vowel length contrast.

All the analysis above can be categorized as phonological processes which characterized the Nigerian English phonology. Previous studies, Jibril (1982), Jowitt (1991), Ubong (2009), Olaniyi (2011), Utulu (2014) and Johnson (2017) posit that substitution of a phoneme is as a result of the difference in the phonetic system of English and Nigerian mother tongues. The above discussions have revealed that variations exist in the realizations of English sounds by primary and secondary school teachers in Ekiti State. The divergence between English and Yoruba languages plays a major role in the variations attested in the spoken English of the selected respondents. All the above findings, therefore, explain the need for improvement in the pronunciation of both the primary and secondary school teachers as model for their students.

Designing AI-driven tools to address pronunciation challenges faced by teachers in Nigeria can be incredibly impactful, considering the country's linguistic diversity and the importance of effective communication in education. Some specific tools could be developed to improve the pronunciation of both primary and secondary school teachers. The personalized AI language tools are Speechling, ELSA SPEAK, Pronunoid: IPA pronunciation, Google's pronunciation Tool, and Duolingo, to mention but a few. Pronunoid IPA pronunciation, Speechling and ELSA SPEAK tools are specifically efficient apps that improve pronunciation. This study will recommend Pronunoid IPA Pronunciation app for its effectiveness to provide phonetic guidance.

Pronunoid app: Pronunoid is a pronunciation-focused app that helps learners to practice and improve their pronunciation through analysis and real-time feedback. It's designed for learners looking for personalized guidance on their pronunciation. The app uses speech recognition technology to analyze pronunciation accuracy and provides feedback on areas of pronunciation that need improvement. This tool could use AI to analyze teachers' pronunciation in real-time or from recorded sessions. It could compare the teachers' pronunciation with standard English pronunciation and provide feedback on specific sounds, syllables, or words that need improvement. The app is designed to target specific areas such as English consonant and vowel sounds pronunciation, phonotactics, English syllables, stress placement, rhythm and intonation.

Nigeria has many regional accents and indigenous languages. This tool could recognize the teacher's regional accent and provide tailored pronunciation guidance to bridge the gap between the local accent and standard English pronunciation. This tool would help teachers visualize the correct articulation of challenging phonemes. It could use 3D animations to show mouth positions and movements required for accurate pronunciation.

Tips on how to use Pronunoid IPA Pronunciation Effectively

1. **Download the App:** Pronunoid is available on mobile platforms, download it from the App Store or Google Play.
2. **Choose Your Target Language and Accent:** Once the app is installed, select the language and accent you want to practice. This could be British English (Received Pronunciation) or General American English.
3. **Start with Initial Assessment:** Pronunoid typically starts with an assessment of learner's current pronunciation level. The app will give learner's sentences to read, mark and analyze the speech for common pronunciation mistakes.
4. **Personalized Lessons and Drills:** Based on the initial assessment, Pronunoid generates personalized pronunciation drills. These drills focus on learner's weaknesses, whether it's difficult consonants, vowel sounds, or stress patterns.
5. **Real-Time Feedback:** The app provides real-time feedback as learners speak. It will also provide visual indicators showing how well the sounds of English are pronounced, and as well can adjust learners' speech to match the correct pronunciation. The app allows learners to compare their pronunciation with that of native speakers.
6. **Track Progress:** The app keeps track of learners' improvement and provides periodic assessments to measure their progress. This will help where there is improvement and what areas still need assistance.
7. **Practice Daily:** Consistency brings perfection. Regular practice helps reinforce correct pronunciation. Pay close attention to the visual feedback the app provides. Adjust your pronunciation until you get a green light. Don't hesitate to repeat the same drills if you're struggling with certain sounds, most especially, those that are absent in the inventory of learners' mother tongue.
8. **Compare Often:** Learners should take advantage of the ability to listen to native speakers and compare their pronunciation often. This helps train their ear and mouth to reproduce the sounds correctly.
9. The platform is free to use without no hidden costs.

Conclusion:

Having correct pronunciation as a teacher can be achieved with the right Artificial Intelligence tools and consistent practice. The AI powered app provide personalized feedback and adaptive learning to help learners enhance effective and correct pronunciation in spoken English. Pronunoid IPA Pronunciation app, when localized and culturally adapted, could significantly enhance ability of teachers in Nigeria to improve their pronunciation skills ultimately benefiting their students' learning outcomes.

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