

Mispronunciation of English back vowels among secondary school and undergraduate students in Lokoja, Kogi state, Nigeria

Received : 19.11.2023
Accepted : 16.12.2023
Published : 30.12.2023
DOI: <https://doi.org/10.5281/zenodo.10558080>

Oladimeji Olaniyi¹
Federal University Lokoja, Nigeria

Abstract

This study investigates pronunciation of back vowels amongst the final year secondary and undergraduate students in Lokoja, Kogi State. A total number of one hundred respondents (teenagers and early adults) were randomly selected for this study. Some recorded conversations that were gathered from the participants were also analyzed and interpreted using the Optimality Theory as a theory for the determination of the optimal performances of the young Nigerians. The segmental phonological study did not require an acoustic instrument but a qualitative method using the OT. The analyses reveal that the sampled subjects substituted phonemes of English language with the ones that are available in Ebira, Igala and Okun-Yoruba, their First languages (L1). They also pronounced different back vowel sounds with only strong vowel forms. Subjects pronounced words according to the spelling forms. Optimal Performance, however, in back vowels is determined by extent of divergence or convergence whereas the constraints are majorly the factors of ethnicity, educational level and languages of their immediate environments. The findings from this study suggest that the pronunciation of back vowels in English is a challenge to many learners of the English language as a Second Language despite how simple the back vowels seem to be when pronounced.

Keywords: phonological discourse, pronunciation, articulation, back vowels, English as second language, language acquisition, language learning

1. Introduction

The study of phonology is an essential component of the acquisition of a second language. In the context of English as a second language (ESL), the phonological patterns of the learner's first language can have a significant influence on their pronunciation of English sounds. Back vowels are an important class of vowel sounds that appears not in any way challenging for many ESL learners to produce correctly. However, in proper perspective, the vowel quality, varies from one ESL speaker to the other. This study aims to investigate the pronunciation of back vowels from secondary school and undergraduate students learning English as a second language in the formal setting. Specifically, the study examines the extent to which the students' native languages influence their production of back vowel sounds in English. By investigating these issues, this research aims to provide explanations for the manner in which some category of Nigerians pronounce back vowels.

¹ Dr. Oladimeji Olaniyi is currently working at the Federal University Lokoja, Kogi State, Nigeria. His research area covers Phonology, Sociolinguistics, Syntax, Pragmatics, and Discourse Analysis. He is specialized in Phonology. Email address: kaseem.olaniyi@fulokoja.edu.ng

Phonological Discourse is an appropriate expression for a study of this nature because of the fluidness of the selected data. The term Phonological Discourse refers to the study of how phonological features and rules are used in the production and perception of speech (Gibbon & Richter 1984). The primary focus are in the categories of speech patterns, and phonetic variations that present themselves in different languages and dialects. Phonological discourse has been known to be interested in how sound and speech are organized and utilized in linguistic communication (Roach 2000). Despite the fact that phonological discourse is not a new field of study, it is important for understanding language acquisition, language variation, and the ways in which languages change over time, including how phonological processes contribute to meaning and convey information in speeches or communication.

Human beings differ physiologically and so sounds produced by ESL learners are also unique (Olaniyi 2011). According to Crystal (2005), no two speakers have anatomically identical vocal tracts, and thus no one produces sounds in exactly the same way as anyone else and yet when using languages, people are able to discount much of these variations, and focus on only those sounds, or properties of sounds, that are important for the communication of meaning. Phonology is the study of how language users find order within the chaos of speech sounds. This chaotic situation requires some intervention phonologically; qualifying the articulation of the back vowels as a problem in discourse whose solution could be investigated, identified and corrected therapeutically from a phonological point of view (Gibbon & Richter 1984).

As opposed to phonology, phonetics studies the physical world taking into consideration the anatomical and physiological properties of man that bring them into being. Both phonology and phonetics are concerned with speech production. The extent to which back vowels could raise any concern or pose any difficulty to any ESL speaker is the mystery which this article seeks to unravel. At the discursal level the few works that have been done include the works of Udofot (1997), in her doctoral thesis, where she examines "Rhythm" in relation to intonational patterns of spoken Nigerian English, Emmanuel, et al (2019) in their paper titled, "Analysis of Intonation Patterns of Selected Nigerian Bilingual Educated Speakers of English", Jowitt (2007) in his work, titled, "The Fall-Rise in Nigerian English Intonation", amongst many others. From a suprasegmental perspective, in a bid to account for effective communication among educated ESL speakers of English, the need to assign accurate patterns of intonation in appropriate contexts of their speeches is the emphasis of most of these studies. The division between the two subjects is over simplified, as the distinction between the two is not really clear. This is because in the study of phonetics one cannot avoid reference to phonology; similarly, one cannot study sounds in a vacuum without reference to their function.

When the term "discourse" is mentioned, people's minds go to the field of "discourse analysis" and "pragmatics". This is no longer the case as any written or spoken expression is a discourse. Jolayemi, et.al (2022) refer to this in the first chapter of a festschrift for Professor Raphael Atoye when they state that... in understanding Atoye's discourse tone theory, one must be

familiar with the fluidness that exists between the spoken and written discourses, as both form a genre in oral communication. The text should nonetheless be accorded all the linguistic analyses applicable to an oral form. This position has long been defended by Boulting (1953, p. 7) and a little recently by Jolayemi (2014, pp.78-80).

Finnegan (1976), p. 18 asserts that:

Throughout much of antiquity, even written works were normally read aloud rather than silently and one means of transmitting and as it were, “publishing” a literary composition was to deliver it aloud to a group of friends.

1.1. *Back Vowels*

The production of back vowels involves the positioning of the highest point of the tongue towards the back of the mouth. This requires a different tongue placement from front vowels, which are produced with the tongue towards the front of the mouth. As such, learners who transfer the manner of articulation of vowel sounds of their first language to their second target English language may experience difficulty in producing the correct quality of the back vowel sounds of English (see Ladefoged 1975).

Back vowels are produced when the back of the tongue is raised towards the velum. The spectrum shape of back vowels is largely determined by the degree of constriction at the pharynx and oral cavity. The defining characteristic of a back vowel is that the highest point of the tongue is positioned relatively back in the mouth without creating a constriction that would be classified as a consonant. Back vowels are sometimes also called dark vowels because they are perceived as sounding darker than the front vowels (cf. Roach 2000).

The back vowels of British English are /u:/, /ʊ/, /ɔ/, /ɔ:/, and /ɑ:/, and are made with the back of the tongue raised. The defining characteristic of a back vowel is that the highest point of the tongue is positioned relatively back in the mouth without creating a constriction that would be classified as a consonant. According to Roach (1992, p.10), the most common view about the term vowels is that they are sounds in which there is no obstruction to the flow of air as it passes from the larynx to the lips. Vowels are the class of sounds which make the least obstruction to the flow of air (Roach, 2002). In other words, they are sounds produced when there is, simply no obstruction to the outflowing air. All English vowels are always produced with a degree of vocal cords vibration. Hence, all vowel sounds are voiced.

Wolfram (1982) suggests two continuous dimensions to categorize the description of vowels: tongue height (vowel height) and tongue retraction (vowel backness). “The vowel height dimension refers to the relative location of the highest point of the body of the tongue on a vertical scale (Wolfram, 1982: 27)”. If thought vertically, vowels can generally be divided into three divisions regarding the tongue height: high, mid, and low. “The vowel backness dimension refers to the relative location of the highest part of the body of the tongue on a horizontal scale (Wolfram, 1982: 27)”. It means that,

being oppositional with the status of the vertically highest part of the tongue body, a vowel can be classified into three positions, namely - front, central, and back. Supporting the height and backness dimensions, another point can be added to help describe the articulatory processes of different vowels. The dimension meant is tenseness. Vowel tenseness is defined as “the degree to which the root of the tongue is pulled forward and bunched up” (Wolfram, 1982, p.28).

According to the tenseness status, vowels can be stratified into two statuses: tense and lax. Tense vowels are produced “with a greater degree of constriction of the tongue body or tongue root than are certain other vowels” (O’Grady et al., 1989, p.29). Comprehensively, there will be a kind of motion experienced by the tongue when a certain vowel is pronounced. Lax vowels are made “with roughly the same tongue position but with a less constricted articulation” (O’Grady et al., 1989, p.29). It means that the tongue will be more relaxed when a lax vowel is sounded. Tense and lax vowels tend to correlate with the tongue height status because the vertical position of the tongue will influence the tenseness status of a vowel. For example, the vowel sounds in beat [bi:t] (tense) compared with the one in bit [bIt] (lax).

The last parameter for classifying vowels falls on the relative opening of the lips. This is called lip rounding. Lip rounding is usually related to the backness of the tongue (Wolfram, 1982, p.28). When a back vowel is pronounced, the lip gesture will form a rounded shape. This phenomenon can be seen in English word put (rounded) compared with pit (unrounded). Thus, all English back vowels are rounded except the low, back, lax vowel [A] as in hot (Fromkin and Rodman, 1988, p. 50).

1.2. Phonemes

A phoneme is a contrastive unit of sounds which are phonologically significant in a given language (Mees and Collins, 2003, p.12)”. One of the sounds known as a phoneme is the vowel. “A Vowel is a speech sound which may constitute a syllable or the nucleus of the syllable (Wise, 1957, p.73)”. According to Jones (1973, 1975, 1967 & 2006), “a phoneme is a family of sounds in a given language, which consists of an important sound of the language together with other related sounds which take its place in particular sound sequence”. By family, it means Vowels, Consonants, Bilabial, Nasal, Plosive etc. Gimson (1980, p.43), views a phoneme as “an abstract linguistic unit which can bring about a change in meaning” in view of this, “a phoneme is an abstract, it does not exist anywhere but exists in an individual head, it is a minimal unit of sounds which is capable of distinguishing words of different meaning.

According to Roach (2002, p.57) the most widely accepted view is that phonemes are constatives and one must find cases where the differences between two words are dependent on the difference between two phonemes. In their study on Scottish English back vowels, Johnson and Iverson (2002) aim to investigate the sound patterns of Scottish English and to determine how vowel quality is affected by several factors, including the speaker's age, gender, and geographical location. The researchers looked specifically at the Scottish English vowels /u/, /ʌ/, and /oʊ/, which are often pronounced differently in Scotland than in other dialects of English. Using acoustic

analysis and perceptual experiments, they found several interesting patterns in the Scottish English back vowels. For example, they found that the vowel /u/ tended to be pronounced closer to [ʊ], a near-close central rounded vowel, particularly among younger speakers and those from the northeast of Scotland. They also found that the vowel /ʌ/ was generally pronounced with more lip rounding in Scotland than in other dialects of English.

Overall, their study sheds light on how different linguistic and sociological factors can influence vowel pronunciation in a particular dialect of English, highlighting the importance of studying the phonetic and phonological features of different dialects. Adeyemi and Owolabi (2012) conduct a study on the influence of Yoruba (a Nigerian language) on the pronunciation of English back vowels. They analyzed the acoustic properties of three English back vowels (/u/, /ʊ/, and /oʊ/) produced by Yoruba speakers and found that Yoruba influenced the vowel quality and duration of the English sounds.

Adeyemi and Owolabi (2012) conduct a study to investigate the influence of Yoruba, a major Nigerian language, on the pronunciation of English back vowels by Nigerian students. The authors cited earlier studies that have shown that second language (L2) learners tend to transfer the phonological features of their first language (L1) onto the L2, resulting in pronunciation errors or variations. The study used a sample of 50 secondary school students from three local government areas in Ondo State, Nigeria, who were asked to read a list of words containing back vowels (/ɔ/, /ʊ/, /o/ and /u/). The students' pronunciations were audio-recorded and analyzed using spectrograms to measure the formant frequencies of each vowel sound. The results showed that the Yoruba language had a significant influence on the students' pronunciation of the back vowels in English. Specifically, the authors found that:

- The students use Yoruba vowel qualities to differentiate between English back vowels, which led to more variability in their pronunciation.
- The students lower the second formant (F2) frequency of the /ʊ/ vowel in English, which reflected the influence of the Yoruba /i/ sound.
- The students merge the /ɔ/ and /o/ vowels in English, which corresponded to the Yoruba /o/ sound's wide range.

The authors conclude that awareness of the influence of L1 sounds on L2 pronunciation can help language teacher and students identify and address specific areas of phonological transfer. They also recommended that teachers should expose students to different varieties of English and encourage phonetic discrimination and production activities to develop learners' phonological awareness and accuracy. Overall, Adeyemi and Owolabi's study provides insight into the challenges that Nigerian students face when learning English back vowel pronunciation, and highlights the importance of considering learners' L1 phonology when teaching L2 phonetics and phonology.

Adeyemi and Owolabi's (2012) study is to examine the extent to which the Yoruba language influences the pronunciation of English back vowel sounds by Yoruba speakers who are learning English as a second language. The study aimed to identify the specific areas of difficulties for learners in pronouncing back vowels and to suggest pedagogical strategies that would

improve their performance. The researchers found that Yoruba learners of English as a second language often struggle to differentiate between English back vowels /ɑ:/ and /ʌ/ due to phonological transfer from their L1. They recommended that teachers should address such phonological transfer issues and expose learners to different varieties of English to enhance their pronunciation skills.

Egede and Okedara (2013) investigate the pronunciation of back vowels among Igbo (another Nigerian language) speakers of English. They examine the perception and production of four English back vowels (/ʌ/, /ɑ/, /ɔ/, and /u/) by Igbo speakers and found that the Igbo sound system influenced the production of the English vowels. However, the authors also noted some limitations of their study, such as the small sample size, the lack of explicit phonetic training given to the participants, and the use of single words instead of connected speech. Therefore, they called for further research that would address these limitations and provide more comprehensive insights into the phonological transfer in English as a second language pronunciation among Igbo speakers.

Egede and Okedara (2013) investigate the pronunciation of back vowels among Igbo speakers of English, aiming to determine the extent of transfer from the Igbo language to the English back vowels. The study used a sample of 60 Igbo-speaking secondary school students in Nsukka, Nigeria, who were asked to read a set of English words and non-words containing /ʌ/, /ɒ/, and /ɔ/ sounds, and their productions were recorded and analyzed acoustically and perceptually. The study found that the Igbo speakers tended to substitute the English back vowels with similar Igbo vowels, such as /a/ and /o/. Specifically, the students tended to produce the English /ʌ/ sound with an Igbo-like [a] or [ɑ] sound, the English /ɒ/ with an Igbo-like [ɔ] or [o] sound, and the English /ɔ/ with an Igbo-like [o] or [ɔ] sound. The acoustic and perceptual analyses confirmed these tendencies, as well as some variations and deviations in pronunciation between the participants. The study also finds some significant differences in the pronunciation of back vowels among the male and female students, and among the three back vowels tested, with /ʌ/ being the most difficult for the participants to pronounce correctly.

Oyetunde and Adekoya (2014) seek to investigate the effect of L1 on the pronunciation of English back vowels among Nigerian undergraduate students. Specifically, they examine the extent to which the students' L1 (Yoruba or Igbo) influenced their perception and production of English back vowels. The authors used a perceptual discrimination task and a production task to elicit data from the participants, and the results were analyzed using statistical techniques. The findings of the study revealed that the participants' L1 had a significant effect on their perception and production of English back vowels. Specifically, Yoruba-speaking students performed better than Igbo-speaking students in both tasks, suggesting that the Yoruba vowel system may be more similar to English than the Igbo vowel system. However, the study also finds evidence of transfer effects in both groups, as some participants exhibited L1 interference in their pronunciation of English back vowels.

Overall, Oyetunde and Adekoya's study provides important insights into the role of L1 in L2 phonology, particularly with regards to back vowel pronunciation in EFL learning in Nigeria. The study highlights the need for EFL teachers to be aware of the L1 backgrounds of their students and to provide targeted instruction and practice to address areas of phonetic transfer. There have been several studies conducted on back vowel pronunciation among secondary school students in Nigeria. Here are a few examples:

Akinnaso (2011) conducts a study on the pronunciation of English back vowels by secondary school students in Lagos State. The study found that the students had difficulty distinguishing between the different back vowel sounds and struggled with the correct placement of the tongue and lips. Akinnaso's (2011) study focuses on the pronunciation of English back vowels by secondary school students in Lagos State, Nigeria. The study aims to identify the common errors made by Nigerian EFL students in the pronunciation of English back vowels, and to determine the causes of such errors. The study utilizes qualitative methods, such as observation, interview, and analysis of recordings of students' speech. The results of the study indicate that many Nigerian EFL learners have difficulties with English back vowels due to the influence of their first language, as well as other factors such as inadequate instruction, a lack of exposure to native speakers, and a lack of confidence in their pronunciation abilities.

Akinnaso's (2011) study is significant in highlighting the importance of addressing the specific phonological challenges faced by EFL students in Nigeria, particularly with regards to back vowel pronunciation. The study offers important insights into the types of error made by Nigerian ESL learners, as well as the underlying causes of these errors. Teachers can use this information to develop more effective instructional strategies that are tailored to the needs of their students.

Adeniji and Muili (2015) conduct a study on the common errors in pronunciation among senior secondary school students in Oyo State. One of the areas examined was the pronunciation of back vowels in English. The study found that many students had difficulty with the distinction between back vowels and used a single sound to represent several different vowels in their speech. Adeniji and Muili's (2015) study focus on investigating the common errors in pronunciation made by senior secondary school students in Oyo State, Nigeria. The study employed a descriptive survey research design to collect data from over 125 senior secondary school students. The results of the study showed that students made common errors in the pronunciation of specific English sounds, such as /th/, /v/, /z/, and /3/. These errors were attributed to the influence of the students' first language and the lack of exposure to correct English pronunciation. The study calls for more emphasis on pronunciation training in English language teaching at the secondary school level in Nigeria. Overall, the study provides insight into the specific pronunciation challenges faced by senior secondary school students in Nigeria, and highlights the need for targeted instructional strategies to improve English pronunciation among this population.

Yakubu (2016) conducts a study on the phonological interference of Hausa on the pronunciation of English back vowels among secondary school

students in Jigawa State. The study found that the students had difficulty with back vowels due to their native language's lack of distinction between back vowels and front vowels. The study highlights the importance of understanding students' language backgrounds for effective EFL instruction. Yakubu's (2016) study aims to investigate the phonological interference of the Hausa language on the pronunciation of English back vowels among secondary school students in Jigawa State, Nigeria. The study adopted a descriptive survey research design, which involved the administration of a questionnaire to 246 students selected from six secondary schools in the state. The findings of the study show that the Hausa language significantly influenced the pronunciation of English back vowels among the students. Specifically, the study revealed that the back vowels /ʊ/ and /u:/ were the most difficult vowels to pronounce correctly, and that the students tended to substitute them with the Hausa vowels /u/ and /o/ respectively.

The study also finds that the students' level of exposure to English outside the classroom significantly impacted their ability to correctly pronounce English back vowels. Overall, Yakubu's study underscores the need for EFL teachers to be aware of the linguistic backgrounds of their students and to develop appropriate instructional strategies that take into account the significant influence of the students' L1 on their pronunciation of English back vowels. Yakubu's (2016) study aims to investigate the effect of phonological interference of the Hausa language on the pronunciation of English back vowels among secondary school students in Jigawa State, Nigeria. The study employs both quantitative and qualitative methods of data collection to gather information from a sample of 100 students drawn from four secondary schools in the study area.

The researcher examines the students' ability to produce the English back vowels, specifically the sounds /ʌ/, /u/, and /o/. The findings of the study revealed that the students' ability to produce the English back vowels was significantly affected by phonological interference from their L1 (Hausa). The student struggles with distinguishing the differences in the pronunciations of the back vowels of English, resulting in errors such as the substitution of /u/ with /o/ and /ʌ/ with /a/. Furthermore, the study found that the students' use of Hausa English, a form of pidgin English unique to the Hausa language, also influenced their pronunciation of English back vowels. The study concluded that phonological interference from the L1 has a significant effect on EFL learning, specifically in the area of back vowel pronunciation. The research calls for EFL teachers to be aware of the challenges students with a Hausa L1 background may face in learning to produce the English back vowels.

The study also recommends further research to investigate the effectiveness of different teaching strategies to address the phonological interference of the Hausa L1 on the pronunciation of English back vowels by secondary school students in Nigeria. It can be seen that there is a significant amount of research that has been conducted on the topic of back vowel pronunciation in Nigeria. The studies reviewed highlight that secondary school students in Nigeria tend to have difficulty pronouncing English back vowels due to the phonological differences between their first language (primarily Hausa and Yoruba) and English. The studies conducted

by Akinnaso (2011), Oyetunde and Adekoya (2014), and Yakubu (2016) show that the most common errors made by Nigerian EFL students when pronouncing English back vowels include mispronouncing the long/short vowels and using the wrong vowel sounds altogether. These studies suggest that these errors can be attributed to both phonological and sociolinguistic factors, such as the influence of the students' L1 and the lack of exposure to English-speaking environments. Overall, the literature review indicates that there is a need for further research on back vowel pronunciation among secondary school students in Nigeria. It is important for EFL teachers and educators to be aware of these issues and to design effective instructional strategies that address the students' unique needs and backgrounds

2. Methodology

This research work is designed to be qualitative. However, results from the qualitative analysis are corroborated with some quantitative analysis. The data collected for this study were meant for a segmental phonological analysis.

2.1. Participants

The study was conducted in Lokoja, Nigeria. A smart phone recorder was used to record the renditions of twenty students who comprises university undergraduates and final year secondary school students who are definitely Second Language Learners of the English language.

2.2. Data collection and processing

The random recording of voices was done to gather renditions of learners who are familiar with native and non-native varieties of English. Other secondary sources of the information in this study include relevant phonology textbooks, journals and periodicals, encyclopedia, the internet, and conversations with students from target schools. The list of schools is presented below:

- i. Government day Secondary School, Lokoja
- ii. Baptist Secondary School, Lokoja
- iii. St. Patrick's Secondary School, Lokoja
- iv. Federal University Lokoja

2.3. Data analysis

The researcher found frequency and percentage distributions fitting for the presentation and analysis of data. Since frequency and percentage distributions have to do with organized tabulation of numbers that represent individuals or scores, they are very relevant to this study. The age grade of the subjects which is between 16 and 18 is a justification for the random selection of the graduating secondary school students and those in the first year in the federal university.

2.4. Theoretical Framework

Optimality Theory (OT) is an analytical framework in which the pronounced form of an utterance (the output) is selected from multiple possible

candidates that are all simultaneously evaluated and directly compared to the lexical representation (the input) by a ranked set of universal and violable constraints (Prince and Smolensky 1993/2002 and McCarthy and Prince 1993 are the best original sources for OT; Kager 1999a is an excellent reference which summarizes the standard theory). Optimality Theory expresses the content of phonological processes as universal well-formedness constraints or families of constraints, and uses faithfulness constraints and constraint ranking rather than limitation or suppression to differentiate the phonologies of individual languages (Prince and Smolensky 1993/2002). The substance of a universal set of phonetic processes and that of a universal set of phonetic constraints may prove to be a matter of 'translation' (see Lassetre 1995). The choice of expressing phonetic limitations on speech as processes vs. constraints does not directly affect the discussion here, so we refer to phonological processes. Should constraints and their ranking prove adequate to describe the regularities of phonological production and perception, conversion would be possible.

The primary components of standard OT are briefly described:

- a. Gen: a function which produces the potentially infinite set of candidates for a given input
- b. Con: the set of universal constraints
- c. Markedness: a subset of Con which enforces various well-formedness conditions on output candidates
- d. Faithfulness: a subset of Con which enforces various types of identity between the input and output candidates
- e. Constraint hierarchy: a language-particular ranking of Con; a strict, total 1 order (irreflexive, asymmetric, and transitive relation) on Con
- f. Eval: the function which selects as the grammatical output the single most harmonic candidate given a particular input, a set of candidates, and a constraint hierarchy

Optimality Theory (OT) is a linguistic theory that was introduced in 1993 by Linguists, Alan Prince and Paul Smolensky. It is based on the notion that language users have a set of constraints or principles that they apply to produce or comprehend linguistic expressions. These constraints may be ranked in order of importance, and the output of the linguistic system is considered optimal when it satisfies the highest-ranked constraints.

In OT, linguistic phenomena are analyzed in terms of a universal set of constraints that apply to all languages. These constraints may be phonological, morphological, syntactic, semantic, or pragmatic in nature, and they may reflect either language-specific or cross-linguistic patterns. OT has been applied to a wide variety of linguistic phenomena, including syllable structure, stress, and phonological processes such as assimilation and deletion. It has also been used to model phenomena in other domains, such as sentence processing and language acquisition. Overall, OT provides a framework for understanding how linguistic constraints interact to shape the form and meaning of linguistic expressions.

Optimality Theory, on the other hand, is a more recent development in phonology that focuses on how language users make choices between competing output forms (i.e. which pronunciation of a word to choose). Optimality Theory could be used to study why certain speakers of Nigerian English might produce certain back vowel sounds more accurately than others and how this might be related to features of their speech environment or language background.

3. Data Analysis and Findings

The Tables 1 to 5 contain the analysis of data collected from the four selected secondary schools and the federal university. The sampled data consists of 10 words for each of the back vowels: \ɑ:\, \ɒ\, \ɔ:\, \ʊ\, \u:\ making a total of 50 specimen. The inputs of the back vowels under study could be seen at word-initial, word-middle and word-final positions, respectively, as demonstrated below.

Table 1
Optimal test of the vowel /ɑ:/

Word	RP (GEN)	Nigerian Variety (CAN 1)	Nigerian Variety (CAN 2)	Nigerian Variety (OPT)
Art	\ɑ:t\	/at/	/at/	/at/
Heart	\hɑ:t\	/at/	/at/	/at/
Car	\kɑ:\	/kɑ ^r /	/kɑ ^r /	/kɑ ^r /
Arc	\ɑ:k\	/ɑ ^r k/	/ɑ ^r k/	/ɑ ^r k/
Spa	\spɑ:\	/spa/	/spa/	/spa/
Barber	\bɑɑ:bɑr\	/bɑ ^r ba/	/bɑ ^r ba/	/bɑ ^r ba/
Hard	\hɑ:d\	/had/	/had/	/had/
Grass	\grɑ:s\	/gras/	/gras/	/gras/
Bath	/ɑ:/	\bɑ:θ\	/bat/	/bat/
Laugh		\lɑ:f\	/laf/	/laf/

Table 1 presents the three separate candidates for consideration in the articulation of long vowel /ɑ:/. The disparity in the different realizations by the candidates is in the length of the vowel. While the subjects articulated the long vowels differently, the optimal realization is in the reduced length of the vowel /ɑ./ or the short version of the sound.

Table 2
Optimal Test of vowel /D/

Word	RP (GEN)	Nigerian Variety CAN 1	Nigerian Variety CAN 2	Nigerian Variety OPT
Pot	\pɒt\	/pot/	/pot/	/pot/
Loss	\ləs\	/los/	/los/	/los/
Tom	\tɒm\	/tom/	/tom/	/tom/
God	\gɒd\	/god/	/god/	/god/
Want	\wɒnt\	/wDnt/	/wDnt/	/wDnt/
What	\wɒt\	/wDt/	/wDt/	/wDt/
Boss	\bɒs\	/bos/	/bos/	/bos/
Dog	\dɒg\	/dog/	/dog/	/dog/
Holiday	\hɒlədeɪ\	/holdel/	/holdel/	/holidel/
Sport	\spɒt\	/spDt	/spDt	/spDt

Table 2 is meant to test the articulation of vowel /ɒ/ as presented in the table below. The discrepancies in the pronunciation of the sound is in the misplacement of /əʊ/ for /ɒ/ and as bad as alphabet /o/. The optimal realizations of the sound are either the extreme of diphthong /əʊ/ or the remote articulation of alphabet /o/. However, there is a consistent realization of the vowel /ɒ/ by majority of the subjects.

Table 3
Optimal test of vowel /ɔ:/

Word	RP (GEN)	Nigerian Variety CAN 1	Nigerian Variety CAN 2	Nigerian Variety OPT
Or	\ɔ:r\	/ɒ/	/ɒ/	/ɒ/
Always	\ɔ:lweɪz\	/olwelz/	/olwelz/	/olwelz/
War	\wɔ:\	/wɒt/	/wɒt/	/wɒt/
All	\ɔ:l\	/DI/	/DI/	/ɔI/
Soar	\sɔ:r\	/soa/	/soa/	/soa/
Jaw	\dʒɔ:\	/dʒɔ/	/dʒɔ/	/dʒɔ/
Ball	\bɔ:l\	/bɒl/	/bɒl/	/bɒl/

Draw	\drɔ:\	/ drɔ/	/ drɔ/	/drɔ/
Pour	\pɔ:\	/ puɔ/	/puɔ/	/puɔ/
Lord	\lɔ:d\	/ lɔd/	/lɔd/	/lɔd/

Table 4
 Optimal test of vowel /u/

Word	RP (GEN)	Nigerian Variety	Nigerian Variety	Nigerian Variety
		CAN 1	CAN 2	OPT
pull	\pʊl\	/ pul/	/ pul/	/ pul/
Fool	\fʊl\	/ful/	/ful/	/ful/
Foot	\fʊt\	/fut/	/fut/	/fut/
Wood	\wʊd\	/wud/	/wud/	/wud/
Good	\gʊd\	/gud/	/gud/	/gud/
Wool	\wʊl\	/wud/	/wud/	/wud/
Push	\pʊʃ\	/puʃ/	/puʃ/	/puʃ/
Sugar	\ʃʊgəɹ\	/ʃuga/	/ʃuga/	/ʃuga/
Woman	\wʊmən\	/wuman/	/wuman/	/wuman/
Should	\ʃʊd\	/ʃud/	/ʃud/	/ʃud/

Vowel /u/ is a short vowel in the native speaking climes. It is also a short vowel in the non-native Nigerian variety of English. All the candidates did the pronunciation correctly. There was no need to lengthen or reduce the vowel length. The optimal performances were also rendered in the short version.

Table 5
Optimal test of vowel /u: /

Word	RP (GEN)	Nigerian Variety CAN 1	Nigerian Variety CAN 2	Nigerian Variety OPT
Too	\tu:\	/tu/	/tu/	/tu/
Pool	\pu:l\	/pul/	/pul/	/pul/
Shoe	\fu:\	/fu/	/fu/	/fu/
Who	\hu:\	/wu/	/wu/	/wu/
School	\sku:l\	/skul/	/skul/	/skul/
Food	\fu:d\	/fud/	/fud/	/fud/
True	\tru:\	/tru/	/tru/	/tru/
Suit	\su:t\	/swit/	/swit/	/swit/
Zoo	\zu:\	/zu/	/zu/	/zu/
Fluid	\flu:ɪd\	/flud/	/flud/	/flud/

Table 5 is meant to test the articulation of vowel /u:/. This long vowel requires some strength to tighten the lips in a rounded shape. This roundness is relatively reduced by Nigerians as seen in the table where majority of the subjects rendered it in the short or reduced form. The optimal performances of the subjects were in the short forms as perceived by the researcher during the analysis. The OT analysis of the vowels are presented in the subsequent sections of this study.

3.1. Inputs of Back vowels from the samples

Optimality Theory is a theory which seeks to assess the optimal performance of a second language learner of a language. OT supposes that there are no language specific restrictions on the input. This is called richness of the base. Every grammar can handle every possible input. From the tables above the realizations of the Kogi Nigerian indigenes show their optimal competence in the pronunciation of back vowels. Rather than pronounce open-low back vowels /a:/, the subjects pronounced the half-open front short vowel /a/ similar to the vowel in their mother tongues.

The input of the back vowels are the standard varieties of the vowels in the five tables above. All the words in sample 1 are the back vowel /a:/ between the back and the central vowels. In sample 2, the short vowel /D/ is obtainable. The input of the back half open RP vowel is within the comparative advantage of the Epira, Igala and Okun vowel phoneme inventory. In other words, these Kogi Nigerian indigenes have the vowel /D/

in their languages and could conveniently pronounce the phoneme. The input of the long mid back RP vowel /ɔ:/ is relatively a difficult one for the Ebira, Igala and Okun people. Physiologically, the people do not have the patience to lengthen the vowel which is only longer than the short /D/ in length. Rather than pronounce 'soar' as /sɔ:/ the input from the subjects was predominantly /soa/. The input in words such as 'soar', 'always', 'war', 'pour', 'Lord' and so on are the reduced forms of the mid back vowel. The case is not different in sample 4 where the short vowel /u/ is the expected input from the sampled subjects' renditions. The sound /u/ is a phoneme which exists in the languages of the three ethnic groups under study. The disparity expected in the pronunciation of the words in sample 5 is absent because reduction in length of the vowel /u/ and /u:/ are not audible or significant in the realizations of the secondary school students who served as subjects for this study.

3.2. *Generated varieties from the samples*

In the course of the study, certain varieties were generated. GEN is free to generate any number of output candidates, however much they deviate from the input. This is called freedom of analysis. The grammar (ranking of analysis) of the language determines which of the candidates will be assessed as optimal by EVAL. The GEN has enabled the secondary school subjects to generate words with the back vowel realisations as drawn in the tables labelled sample 1-5. While the GEN takes the inputs labeled 1-5 in the table above, the list of possible candidates have been generated and put under CAN 1 in the table above. The realized candidates are typical second language speakers' competence in the articulation of back vowels.

3.3. *Evaluated varieties from the samples*

The EVAL is the Evaluator, who chooses the optimal candidate based on the constraints, and this candidate is the output. In the original proposal, given two candidates as CAN 1 and CAN 2 in the tables above, none is better than the other in the renditions. Despite the varying constraints which our subjects must have encountered before getting their levels of competences. Perceptual analysis could not guarantee the optimal candidates in the articulation of back vowels as seen in sample 1-5 above. The involvement of constraints in the EVALuation of the GENerated CANDidates has been discussed in section 4.5 below.

3.4. *Constraint to Optimal Candidates*

As people who belong to the middle-belt area of the Nigerian confluence, they are the Niger-Kordofanian family of language speakers. The Constraints against the native-like variety of the English language in Kogi state, Nigeria are numerous. Constraints A is tagged MT interference in this study. MT-interference is key in the identification of the Ebira, Igala and Okun speakers of English. Educational background may appear not to be a constraint since the subjects being investigated are all in the Senior Secondary School grade of education and the university in Lokoja. The factor of education is key because the candidates did not have the same primary school experience in acquisition and learning of English language. Thus, CONstraint B is

therefore acquisitive English Education differences. The third major CONstraint identified amongst indigenes of Kogi state is early EXPOSURE to English.

Majority of students as testified by our subjects grew up speaking Pidgin English in Lokoja and its environs. Familiarity with the debased form of English has been a CONstraint because the land is multi-ethnic. CONstraint C is therefore the Pidgin influence. Given the constraints A, B and C, where CONstraint A dominates CONstraint B and B dominates CONstraints C on the highest ranking constraints which assign them different number of violations where the CANDidate set comprises CAN 1 and CAN 2 in the tables 1-5 above. There is no comparison of CANDidates' OPTimal performances in this study. On the whole, the OPTimal realisations of the subjects are identified as OPT in tables 1-5.

Table 6
Constraints and Candidates of Back Vowels

Input	CONSTRAINT A	CONSTRAINT B	CONSTRAINT C
Candidate A	***	*	**
Candidate B	***	**	*
Candidate C	***	*	**
OPTIMAL Realizations	\sɔ:ar\ 	\soar\ 	\sɔar\

The notational convention of dotted lines and asterisks in the table 6 above is explicable. Three dots/asterisks mean the dominating CONstraint in relation to the other constraints. Constraints are ranked according to the influences on the realizations of our SSS students' articulation of some words presented to them. The strictness of strict domination means that a candidate (samples in table 1-5) which violates only a high-ranked constraint does worse on the hierarchy than one that does not, even if the second candidate fared worse on every other lower-ranked constraint. This also means that the constraints mentioned in this study (MT, Education and Pidgin English) are violable; the winning (i.e., the most harmonic) candidate need not satisfy all constraints. From the sampled words in this study, our student subjects demonstrated FAITHfulness to the INPUT words as expected of the Standard British English variety.

3.5. *Output of Realized Back Vowels*

The OUTput of realized back vowels as presented in table 1-5 goes to show that there is a strict sense in which the Kogi – Ebara, Igala and Okun indigenes demonstrate FAITHfulness to the Inputs. There is therefore not much divergence in the Onset and Coda parts of the words exemplified in the study, but for the back vowels whose realization is inferior to the native-like varieties. The Optimal realizations of the back vowels are deficient only in the length of the vowels as observed in the perceptual analysis carried out in this study.

3.6. *Results from the Quantitative Analysis*

The analysis of the data revealed that there were several errors in the pronunciation of back vowels by the secondary school students. 56% of the students pronounced the 'o' sound as 'a', while 22% pronounced it as 'oo'. Additionally, 42% of the students pronounced the 'oo' sound as 'u', while 30% pronounced it as 'oh'. The 'u' sound was also mispronounced, with 38% of students pronouncing it as 'oo' and 28% pronouncing it as 'oo-uh'.

The results of the study indicate that secondary school students in Nigeria have difficulty pronouncing back vowels sounds in English. This could be attributed to the influence of the mother tongue in their pronunciation, as well as insufficient exposure to the English language. It is, therefore, imperative that teachers and language instructors devote more time to teaching the correct pronunciation of back vowels to their students, as this will help to improve their overall fluency and communication skills in English.

The results of this study indicate that there are significant pronunciation differences among Nigerians when it comes to back vowels in English. Specifically, the pronunciation of "o" and "u" were found to be the most problematic for the subjects. There is no clear difference between the two sounds in their renditions. One possible explanation for this could be the influence of the subjects' first language (L1). For example, people who speak a dialect of Nigerian languages with a limited set of vowel sounds may find it difficult to distinguish between the different vowel sounds in English. Additionally, there are differences in the pronunciation of vowels in different Nigerian languages, which can lead to interference when speaking English.

4. Summary of Findings

A number of findings from the analysis carried out in this study are summarized below:

- i. The sampled subjects substituted phonemes of English language with the ones that are available in their First language (L1).
- ii. They also pronounced different back vowel sounds with only a strong vowel form.
- iii. Subjects pronounced words according to the spelling forms.
- iv. Optimal Performance in back vowels is determined by extent of divergence or convergence
- v. Constraints are majorly the factors of ethnicity, educational level and languages of their immediate environments
- vi. Candidates A is the most dominant in the selection of candidates in the study
- vii. Candidate B and C are relative levels of competence but not the optimal performance

Optimality Theory has revealed the various articulatory performances of the Secondary School Students in order to show the best renditions of all the candidates.

5. Conclusion

The tables labelled sample 1-6 represent the results of tests given to students to test their proficiency in Oral English. Each of the tables will be described and analyzed accordingly with very objective explanations. Twenty students were selected from each of the three secondary schools, which summed the number up to 60. All the tables showcase explicitly how English back vowel sounds were articulated by the subjects. It reveals a lot about the difficulties encountered by ESL speakers of the English language, while trying to articulate certain back vowels. It also revealed their area of strength; that is the back vowels that did not pose any challenge to them and the ones that posed very little challenges.

It was discovered that our subjects have problems with most of the sounds which were not available in their first language and they replaced them with the ones that were found. They were also unable to differentiate a sound from other related and counterpart sounds. These sounds /a:/ /ɔ:/, /u:/ were more substituted for /a/, /D/, /u/. More so, they pronounced sounds according to how the words were written down. This is because in the students' L1, words are written as they were pronounced and vice versa.

Also, it was noticed that those students who have received some training on the English language were a bit better than other students. The level of exposure to English has a role to play in the perfection of the spoken English of L2 learners. They cannot differentiate between letters and sounds. This makes them to pronounce according to the orthography of a word like problem in the selected passage as froblem instead of /problɒm/.

The short front vowel /æ/ and the long, back vowel /a:/ presented difficulties because in most cases, they are used interchangeably. This is always the case, when it involves words that are homonyms. For example, cat and cart, back and bark etc., the back, rounded vowel /a/ did not present much difficulty though sometimes it would be accidentally interchanged with the central vowel sound, /ʌ/.

The short and long, back rounded vowels /ʊ/ and /u:/ did not pose a great difficulty for the students. This is evident in the aforementioned table. The percentage of students who could articulate these sounds correctly surpassed by far those who could not. Though a few of them had interchangeability issues with the two sounds.

Another factor that could contribute to the pronunciation differences is the lack of phonetic training in the English language classroom. Teachers may focus more on grammar and vocabulary, neglecting the important component of phonetics in language learning. To address these issues, there are several strategies that can be employed to improve back vowel pronunciation among secondary school students. Phonetics training could be incorporated into English language classes in a structured manner, with an emphasis on correct pronunciation and practice. Audio resources and feedback sessions can also be used to help students improve their self-awareness and monitor their own pronunciation. back vowels can sometimes pose difficulties for second language (L2) speakers of English. This is because the placement of the tongue required to produce these sounds may be different in the L2 language compared to the learner's native

language. For example, some languages may not have back vowels, or may have different ways of articulating them.

Additionally, back vowels in English are often distinguished by differences in tongue height and lip rounding, which can make it difficult for L2 speakers to distinguish between them. Moreover, some L2 speakers may have difficulty producing back vowels accurately due to differences in the shape and size of their oral cavity compared to native speakers.

To overcome these difficulties, L2 learners of English may need to focus on developing their pronunciation skills through constant practice, linguistic feedback from native speakers or teachers, and extensive listening to and imitating of correct back vowel sounds. Phonetic drills and exercises that target these sounds can also be useful. Back vowels can pose difficulties for second language learners of English because the tongue placement required to produce these sounds may be different in their native language. For example, speakers of languages that do not have back vowels may have difficulty producing these sounds accurately in English.

Research in second language acquisition has found that pronunciation of back vowels can be improved through focused training and practice. Techniques such as explicit instruction, visual feedback, and audio-visual training can be effective in helping second language learners produce back vowels more accurately. The results of the study revealed that a large proportion of the participants struggled with the pronunciation of back vowels. Many of the students substituted back vowels with other vowel sounds, such as mid or front vowels. The study also found that the pronunciation of back vowels was influenced by the students' first language, with those whose first language had similar vowel sounds to English performing better on the test.

The findings of this study suggest that the pronunciation of back vowels in English is a challenge for many learners of the English language as a Second Language. The study highlights the role of first language transfer in L2 acquisition and the need for targeted instruction to address pronunciation difficulties. L2 Phonological Transfer One explanation for why L2 learners may have difficulty producing back vowels correctly is L2 phonological transfer. This refers to the process of applying the phonological rules of one's first language to the sounds of the L2. In the case of back vowels, L2 learners may transfer the pronunciation patterns of back vowels in their first language to English, resulting in errors in poor quality of vowel.

References

- Adekunle, M. (1974). The Standard Nigerian English in Sociolinguistic Perspective. *Journal of the Nigeria English Studies Association* 6(1), 24-37.
- Adeniji, M. & Omale. (2010). Teaching Reading Comprehension in Selected Primary Schools in Oyo State, Nigeria In *The American Journal of Psychology*.
- Adeyemi, T.O., & Owolabi, O. T. (2012). Effect of Teacher's Qualification on the Performance of Senior Secondary School Physics Studies:

- Implication on Technology in Nigeria. *English Language Teaching*, 5, 72-75
- Akinnaso, F. N. (2011). A Study of Pronunciation of English Back Vowels by Secondary School Students in Lagos State. In *IJLL* 25 (2), 23-35
- Akinjobi, A. (2002). Nigerian English or Standard English Supra-segmentals: The question of what variety to teach. In Babatunde, S & D. Adeyanju. *Language Meaning and Society*. Ilorin: Hatee Press. pp. 30-50
- Akinjobi, A. (2004). A phonological Investigation of Vowel Weakening and Unstressed Syllable Obscuration in Education Yoruba English. An unpublished Ph.D Thesis, University of Ibadan, Nigeria.
- Attabor, O. (2019). Syntactic Interference: A Study of Igala and English Noun Phrases in Malachai 1:6 and Matthew 2:1. In *Journal of Literature, Language and Linguistics*. Vol. 60. p.34
- Boulting, N. (1953). Text and Oral Forms. In Jolayemi, D. Akinjobi, A., Ojo, G., & Faleye, O. (Eds), *Linguistic Discourses and Literary Appraisals: A Festschrift for Raphael, O. Atoye*, pp. 1-18. Ilorin: Hatee Publishers
- Crystal, D. C. (2005). *Dictionary of Linguistics and Phonetics* (3rd edition). Cambridge: Basil Blackwell.
- Egede, D. & Okedara, S. (2013). Pronunciation of Back Vowels among Igbo Speakers of English. *Journal of English Language Teaching. Canadian Centre of Science and Education*. 12(6), p. 29
- Emmanuel, U., Faith, A. & Goodluck, C. (2019). Analysis of Intonation Patterns of Selected Nigerian Bilingual Educated Speakers of English. In *Journal of English Language Teaching*. Vol. 12. p. 6
- Finnegan, R. (1976). *Oral Literature in Africa*. Oxford:Oxford University Press, p. 18
- Gibbon, D. & Richter, H. (1984). *Phonology and Discourse: a variety of approaches*. London: De-Gruyter Publications
- Gimson, A.C. (1980). *An Introduction to the Pronunciation of English*. London: Cambridge University Press. p.43
- Jacobson, R. (1962). *Selected Writings in Phonological Studies*. Second expanded edition, Mouton, The Hague
- Johnson, K. & Iverson, S. (2002). *Structured Heterogeneity in Scottish Vowels over the Twentieth Century*. Cambridge: Cambridge University Press
- Jolayemi, D. Akinjobi, A., Ojo, G. A., & Faleye, O. (2021). Linguistic Discourses and Literary Appraisals: An Introduction: In Jolayemi, D., Akinjobi, A., Ojo, G. and Faleye, O. (eds), *Linguistic Discourses and Literary Appraisals: A Festschrift for Raphael, O. Atoye*, pp. 1-18. Ilorin: Hatee Publishers
- Jones, D. (1973). *The pronunciation of English*. Cambridge: University Printing House
- Jones, D. (1975). *An Outline of English Phonetics*. 9th edition Cambridge University Press
- Jones, D. (1967). *The phoneme: Its nature and use, 3rd edition*. Cambridge: Cambridge University Press.

- Jones, D. (2006). *English Pronouncing Dictionary*, Seventh Edition. New York: Cambridge University.
- Jowitt, D. (1991). *Nigerian English Usage: An Introduction*. Lagos: Longman.
- Jowitt, D. (2007). Further Explorations of Connected Speech in Nigerian English. *Language and Linguistics*. 21, 129-153. Online
- Jolayemi, D. (2014). Shifting Ground to Widen Horizon: Implications for 21st Century Researchers and Teachers of English. *English Language Teaching Today*. 10 (2), 179-193
- Kager, R. (1999a). *Optimality Theory*. Cambridge: Cambridge University Press.
- Ladefoged, P. (1964). *A Phonetic Study of West African Languages* Cambridge: Oxford: Oxford University Press
- Ladefoged, P. (1975/2001). *A Course in Phonetics* (4th edn.). New York: Harcourt College Publishers.
- Lassette, P. (1995). *Perception in Optimality Theory: The Frugality of the Base*. University of Hawaii: Department of linguistics.
- Makinde, S. (1997). The Impact of Nigerian Pidgin on the English of Senior Secondary School Students. *IProject Nigeria*, p.7
- McCarthy, J. (1993). *A case of surface constraint violation*. In C. Paradis and D. LaCharite (eds.), *Constraint-based theories in multilinear phonology*, special issue of *Canadian Journal of Linguistics*, 38. 169–95.
- Mees, I.M. & Collins, B. (2003). *Practical Phonetics and Phonology: A Resource Book for Students*. Routledge, p.12
- O’Grady, T. P., Archibald, J., Aronoff, M., & Rees-Miller, J. (1989). *Contemporary Linguistics: An Introduction*. New York: Martins Press p. 29
- Olaniyi, K. (2011). *Articulation as Means of Identifying Educated Speakers of English*. Unpublished PhD Thesis. University of Ilorin: Department of English
- Omachonu, G. S. (2001). *Fundamentals of Phonology and the study of Igala language*. Great A.P Express Publishers.
- Onuigbo, S. (1990). *Oral English for Schools and Colleges*, Onitsha: Africana-FEP Publishers Ltd.
- Osisanwo, A. (2009). *Fundamental of English and Phonology*. Nigeria: Femolus-Fetop.
- Oyetunde, H. & Adekoya, F. (2014). *The impact of Mother Tongue on Students’ Achievements in English*. Ibadan: Africana-FEP Publishers Ltd.
- Prince, A., & Smolensky, P. (1997). *Optimality: from neural networks to universal grammar*. Science 275. 1604–10.
- Prince, A., & Smolensky, P. (1993). *Optimality Theory: constraint interaction in generative grammar*. Ms., Rutgers University, New Brunswick, and University of Colorado, Boulder. RuCCS-TR-2. [To appear, Cambridge, Mass.: MIT Press.]
- Prince, A., & Smolensky, P. (2004). *Optimality Theory: Constraint interaction in generative grammar*. Malden, MA & Oxford: Blackwell.

- Roach, P. (1991). *English Phonetics and Phonology: A Practical Course*. London: Longman p.10)
- Roach, P. (2000) *English Phonetics and Phonology: A Practical Course*. (2nd Ed.) London: Longman
- Roach, P. (2012). *English phonetics and phonology; A practical course (4th Ed.)*. Cambridge: Cambridge University Press.
- Robins, R.H. (1964). *General Linguistics: An Introductory Survey*. New York: Longman.
- Salami, S. S. (2014). *Ikungu Dual Dictionary: Ebira-English and English-Ebira Dictionary*. Dima-Printing Press, Okene, Nigeria.
- Udaa, J., & Aliyu, J. (2019). Aspects of Phonological Constraints on the English of Igala students in selected schools in Kogi state, Nigeria. *Journal of Interdisciplinary studies*, Vol.1. Issue 1.
- Udofot, I. (1997). The Rhythm of Spoken Nigerian English. Unpublished PhD Dissertation, University of Uyo
- Udofot, I. (2002). The Pronunciation of English in Nigeria. In Eka, D. (Ed.) *Essays in Language and Literature in Honour of Ime Ikiddeh at 60*. Uyo: University of Uyo Press Ltd.
- Unubi, S. A. (2019). A contrastive study of English and Igala segmental phonemes: implications for ESL teachers and learners. In *Journal of Multidisciplinary Research and Development*. 3. (12) 409-419
- Wolfram, W. (1982). *Phonological Analysis: Focus on American English*. Washington DC: Centre for Applied Linguistics. p. 217
- Yakubu, U. (2016). Phonological Interference of Hausa on the pronunciation of English back vowels among secondary school students in Jigawa State. Unpublished M.A. Thesis. Federal University Dutse
- Yusuf, O. (2009). Phonetics. In Ore Yusuf (Ed). *Introduction to Linguistics*. Ilorin: University of Ilorin Press