INTEGRATING ICT TOOLS FOR TEACHING OF ENGLISH SPEECH SOUNDS T O IGBO-SPEAKING JUNIOR SECONDARY SCHOOL STUDENTS

By

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Abstract

This study investigates the utilization of Information and Communication Technology (ICT) too ls for the teaching and learning of English speech sounds among Igbo-speaking junior seconda ry school students in the Abuja Municipal Area Council (AMAC), Federal Capital Territory (F CT), Nigeria. With English as the official language of instruction, proper pronunciation is cruc ial for academic success and effective communication. However, Igbo students often face chall enges due to mother tongue interference. ICT tools such as audio-visual aids, language learnin g apps, and pronunciation software offer innovative ways to enhance pronunciation skills. The study employs a mixed-methods approach, involving surveys and interviews with English teach ers and students in selected schools within AMAC. Findings reveal that while basic ICT infrastr ucture is available in most schools, utilization for pronunciation teaching remains low due to fa ctors such as inadequate teacher training, lack of relevant software, and irregular power suppl y. The study concludes that effective integration of ICT into English language instruction can si gnificantly improve pronunciation among Igbo learners and recommends targeted policy inter ventions, teacher professional development, and increased investment in educational technolo gy.

Keywords: ICT, English speech sounds, Igbo students, J unior Secondary School, AMAC, Language learning, Nigeria

Introduction

In the 21st century, Information and Communication Technology (ICT) has emerged as a transf ormative force in education globally. Information and Communication Technologies (ICTs) ref ers to a broad range of activities and equipment including all the tools, applications and informa tion that are available and accessible via computers. Information technology in its fully converg ent form encompasses various forms of information delivery systems such as televisions, radios newspapers, books, computers, Internet, etc, in one integrated environment (Amfani, 2015). IC T encompasses a wide range of technological tools and resources used to communicate, create, disseminate, store, and manage information (UNESCO, 2004). The integration of ICT in the tea ching and learning process has become increasingly indispensable, particularly in language edu cation where audiovisual resources can aid in better comprehension and production of sound sy stems, including pronunciation. Pronunciation is a core aspect of Engli sh language proficiency. For learners whose first language is not English, like Igbo students in Nigeria, achieving accurate English pronunciation can be particularly challenging. These challe nges arise due to phonological interference from their mother tongue and limited exposure to na tive-like English speech models (Jowitt, 1991; Udofot, 2001). ICT tools such as language learni ng software, mobile applications, speech recognition programs, and audio-visual media offer o pportunities to bridge this gap, providing learners with exposure to authentic pronunciation mo dels and immediate feedback on their own speech (Yusufu, 2012).

In Nigeria, especially in the Federal Capital Territory (FCT), Abuja, there has been a growing e mphasis on integrating ICT in junior secondary schools in order to help the students get proficie ncy in the pronunciation of English speech sounds. The Abuja Municipal Area Council (AMA

C), being one of the major local government areas in the FCT, is an important focal point for examining the availability and effective utilization of ICT tools in schools. However, despite government policies supporting ICT in education, the actual implementation at the junior secondary level often faces constraints, including inadequate infrastructure, lack of trained personnel, and irregular power supply (Oye, Iahad, & Ab.Rahim, 2012). For Igbo students in junior secondary schools in AMAC, these constraints may hinder the development of English pronunciation skills, thereby affecting overall communicative competence. Thus, understanding the level of ICT availability and how it is utilized in teaching and learning English pronunciation is crucial for improving English language outcomes among these learners. Despite the acknowledged importance of ICT in language learning, its integration into English pronunciation teaching remains limited in many junior secondary schools in Nigeria. In AMAC, where a significant number of learners are Igbo speakers, challenges related to pronunciation persist due to interference from the mother tongue and lack of access to technological tools that support correct pronunciation. This situation raises concerns about the effectiveness of current pedagogical practices and the potential underutilization of ICT resources in these schools. Moreover, while several studies have explored ICT in general education, there is a meager research specifically focused on its role in English pronunciation among Igbo-speaking students at the junior secondary level in AMAC. This study therefore seeks to fill that gap by assessing both the availability and the extent to which ICT is utilized in teaching English pronunciation in this context.

Purpose of the Study

The main purpose of this study is to investigate the availability and utilization of ICT for teaching and learning English pronunciation among junior secondary school Igbo students in AMAC Local Government Area of FCT, Abuja. The specific objectives are to: 1. Determine the types of ICT tools available for teaching English speech sounds. 2. Assess the extent of ICT utilization by English teachers and students in speech sounds teaching and learning. 3. Identify challenges faced in the use of ICT for teaching English speech sounds. 4. Explore teachers' and students' attitudes toward using ICT for learning speech sounds.

Research Questions

This study will be guided by the following research questions: 1. What types of ICT resources are available for teaching English speech sounds in junior secondary schools in AMAC? 2. To what extent are these ICT tools utilized by teachers and students? 3. What are the major challenges encountered in using ICT for teaching English speech sounds? 4. What are the perceptions of teachers and students towards the use of ICT in English speech sounds learning?

Hypothesis H_{01}: There is no significant difference in the learning of English speech sounds between Igbo junior secondary school students taught with ICT tools and those taught without ICT tools in Junior secondary schools Local Government Area. H_{02}: The use of ICT does not significantly influence students' ability to identify and articulate English speech sounds correctly.

H_{03}: There is no significant difference in the perception of male and female students regarding the effectiveness of ICT in learning English speech sounds.

Literature Review The use of Information and Communication Technology (ICT) in education has revolutionized teaching and learning across disciplines, including language acquisition. Particularly in second lan

guage (L2) learning, ICT has shown significant potential in enhancing learners' pronunciation, l istening skills, and phonological awareness (Almalki, 2014). In the Nigerian context, and espec ially among Igbo learners of English at the junior secondary level, mastering English speech so unds presents a unique challenge due to phonological interference from the mother tongue (Uzo ezie, 2002). This literature review explores existing research on ICT tools in language learning, the phonological difficulties of Igbo learners of English, and the implications of ICT adoption i n phonetics education.

ICT in Language Education

ICT tools such as computer-assisted language learning (CALL), language learning apps, audiov isual resources, and interactive software have proven effective in facilitating second language l earning (Chapelle, 2023). According to Warschauer and Healey (1998), ICT enhances learner a utonomy, provides exposure to authentic language input, and offers immediate feedback eleme nts critical for acquiring correct speech sound patterns. In phonetics and phonology instruction, tools like pronunciation software (e.g., Praat, Rosetta Stone) and online dictionaries with audio support have become increasingly popular (Derwing & Munro, 2005).

In the Nigerian educational context, ICT integration remains uneven, yet studies affirm its grow ing relevance. Okonkwo and Nzewi (2015) noted that multimedia applications significantly im proved students' pronunciation skills and listening comprehension in English. Similarly, Oyele kan and Olorundare (2013) found that ICT-based teaching strategies led to better retention and i nterest in English phonetics among Nigerian students.

Learning the English Speech Sounds with ICT

Information and Communication Technology (ICT) has significantly transformed language lea rning, especially in the acquisition of English speech sounds. Speech sounds, also known as pho nemes, are essential to effective pronunciation and communication. For non-native speakers, m astering these sounds is often challenging due to the influence of their first language. However, ICT tools such as speech recognition software, mobile applications, interactive phonetic charts, and multimedia resources now offer innovative ways to improve learners' phonological skills. I CT facilitates auditory and visual learning, which are crucial for phonetic acquisition. Multime dia tools provide learners with access to native speaker models, allowing them to listen to and m imic accurate pronunciation. For example, applications like Sounds: The Pronunciation App an d websites like BBC Learning English provide interactive platforms for learners to practice vow el and consonant sounds, intonation, and stress patterns (Ahmad, 2022). Computer-Assisted La nguage Learning (CALL) systems often include feedback mechanisms that guide learners in co rrecting pronunciation errors. Programs like Rosetta Stone or Duolingo offer phonetic practice t hat is both engaging and adaptive. Ahmad (2022) continues that CALL environments foster lear ner autonomy and personalized learning paths, which are vital for mastering complex elements like English phonemes.

Challenges of Learning English Speech Sounds Among Igbo Students

The mastery of English speech sounds is a crucial aspect of learning the English language, espe cially in Nigeria where English functions as the official language and medium of instruction. A mong Igbo students, particularly in the southeastern region of Nigeria, acquiring accurate pronu nciation and articulation of English speech sounds presents significant challenges. These diffic ulties are influenced by a range of linguistic, pedagogical, and sociocultural factors.

Interference from the Mother Tongue (L1 Interference) The most prominent challenge faced by Igbo students in learning English speech sounds is the interf erence of their first language (L1), Igbo. This phenomenon, often referred to as language transfe r, involves the application of Igbo phonological rules when speaking English, leading to mispro

nunciations and non-standard articulations (Odlin, 1989). For instance, the Igbo language lacks certain sounds that are present in English, such as the voiceless and voiced dental fricatives /θ/ a nd /ð/ (as in think and this). These are often replaced with /t/ and /d/, respectively, resulting in pr onunciations like "tink" for "think" and "dis" for "this" (Uzoezie, 2002).

Limited Exposure to Native En glish Models Another significant challenge is the limited exp osure Igbo students have to native or near-native models of English pronunciation. Most teache rs in public schools are non-native speakers who may also exhibit non-standard pronunciation, which is passed on to their students (Bamgbose, 1995). The lack of auditory models for Receive d Pronunciation (RP) or General American (GA) affects students' ability to distinguish and prod uce English sounds accurately. **Inadequate Phonetic and Phonological Instruction**

The teaching of English speech sounds is often inadequate in Nige rian schools. English phonetics and phonology are not usually given enough attention in the cur riculum, and where they are included, many teachers lack the training and tools to teach them ef fectively (Igboanusi, 2002). Additionally, the lack of phonetic laboratories or audio-visual aids hinders practical learning. **Sociolin guistic Factors and Accent Prestige** In many commun ities, including among the Igbo, local accents are often considered acceptable as long as commu nication is achieved. There is little motivation to achieve native-like pronunciation, particularly when local varieties like Nigerian English are widely accepted. As a result, students may not se e the need to refine their pronunciation beyond intelligibility. **Overgeneralization and Fossiliz ation** Igbo students may overgeneralize certain p ronunciation patterns due to incomplete learning. For example, the simplification of consonant clusters, such as pronouncing “school” as “sukul”, is a common issue. Over time, such errors be come fossilized ingrained habits that are difficult to correct even after prolonged instruction (Ig boanusi, 2002). **Poor Listening and Speaking Practice**

Due to a focus on reading and writing in many Nige rian schools, listening and speaking skills are often neglected. As a result, students do not get ad equate practice with the oral aspects of English, including stress, rhythm, and intonation (Oban ya, 2004). This lack of active phonological engagement further weakens their ability to master English speech sounds. **Variation in English Varieties**

The existence of different varieties of English also presents a challenge. Exp osure to Nigerian English, British English (RP), and American English (GA) through various m edia can confuse learners who may not be taught systematically about the differences in pronun ciation (Gut, 2005).

Speech Sounds of English Language

There are forty four (44) sounds of English language. Twenty four (24) of them are consonants, while the vowels are twenty (20) in number (Onuigbo, 1996). The consonant sounds are as follo ws:

/p/ - pen / pen /
/b/ - bell / bel /
/t/ - tell / tel /
/d/ - dance /da:ns/
/ k/ - key / k i:/
/g/ - gas /gæs/
/m/ - man /mæn/
/n/ - new /nju: /
/ŋ/ - sing / sɪŋ /

/f/ - flood / flʌd/
/ð/ -they / ðeɪ /
/θ/ - third / θɜ:d /
/v/ - van /væn/
/s/ - stool / stu:l /
/z/ - zoo /zu: /
/ʃ/- shine / ʃaɪn /
/ʒ/ - garage / gæra:ʒ/
/h/ - hill / hɪl /
/ʧ/ - charge / ʧ a:ʤ /
/ʤ/ - judge / ʤʌʤ /
/l/ - light / laɪt/
/r/ - right / raɪt /
/ j/ -yes / jəs /
/w/ - week / wi:k /

The vowels are divided into two, the pure vowels (monophthongs) and the im pure vowels (diphthongs)

The pure vowels (monophthongs) are twelve (12) in number and as follows:

/i:/ - green / gri:n /
/ɪ / - mill / mɪl /
/e/ - men- / men /
/æ/ - fat /fæt /
/ɜ:/ - bird / bɜ:d /
/ə/ - alone / ələʊn /
/ʌ/ - shut / ʃʌt /
/u:/ - pool /pu:l /
/ʊ/ - pull / pʊl /
/ɔ:/ - force / fɔ:s /
/ɒ/ - follow / fɒləʊ /
/a:/ - cast / ka:st /

The diphthongs are eight (8) in number and are as follows:

/ɪə/ - fear / fɪə /

/eə/ - fair / feə /

/ʊə/ - sure / ʃʊə /

/eɪ/ - table / teɪbl /

/aɪ/- five / faɪv /

/ɔɪ/ - coil / kɔɪl /

/əʊ/- go / gəʊ /

/aʊ/ - how /haʊ /

Research Design

This study adopts a descriptive survey research design, which is appropriate for collecting data on current practices, availability, and utilization of ICT tools for teaching and learning English speech sounds. The design allows for the observation and description of phenomena as they occ ur naturally without manipulation of variables (Creswell, 2014).

Population of the Study

The population of this study comprises all junior secondary school students of Igbo origin learni ng English in public and private schools within Abuja Municipal Area Council (AMAC) of the Federal Capital Territory, Abuja. This includes students in JSS1 to JSS3 levels across selected s chools.

Sample and Sampling Technique

A stratified random sampling technique will be used to ensure fair representation across public and private schools. From the identified population, six schools (three public and three private) will be randomly selected within AMAC. A total of 180 students (30 from each school) and 12 English language teachers (two per school) will participate in the study.

Instrumentation

The primary instruments for data collection will include: Structured Questionnaire for both stud ents and teachers, to gather data on availability of ICT tools (e.g., multimedia systems, language labs, software, mobile apps).

Results

Data Presentation

Availability of ICT Tools

Data collected revealed that: **Computers and Laptops:** 70% of the students reported that their schools have access to computers and lapt ops, but only 40% stated these devices were used for teaching pronunciation. These devices wer e mainly used for research and accessing online content related to language learning. **Mobile Devices**: 80% of stu dents had access to smartphones. While 60% of them used apps such as YouTube, Duo lingo, a nd Google Translate to aid their pronunciation, only 40% used pronunciation-focused apps regu larly. **Audio-Visual Resources**: 60% of the school s were equipped with projectors and speakers, yet only 30% were used during English pronunci ation lessons. Students relied heavily on YouTube videos for listening practice but noted the lac k of guidance on how to use them effectively for pronunciation improvement.

Utilization of ICT for Pronunciation L earning: Frequency of ICT Usage: 50% of the students indicated they used ICT resources for p ronunciation practice at least once a week. The most commonly used tools were YouTube for li stening and repeating exercises, mobile apps for learning phonetic symbols, and online dictiona ries that provide audio pronunciations. **Teacher Utilization**: 40% of teachers reported integrating ICT into pronunciation lessons by showing YouTube videos, listening to native spea kers, and using apps to correct students' mistakes. However, many teachers noted that they often faced challenges in accessing reliable and consistent internet connections and lacked training in effectively using these tools. **Student Perception**: 65% of students agreed that ICT tools h

elped them better understand and pronounce English words correctly. However, many expresse d difficulty in applying what they learned from ICT tools in real-life conversations.

Challenges to ICT Utilisation

Lack of Infrastructure: A significant barrier to effective ICT usage was the inconsistent availa bility of infrastructure. While some schools had modern facilities, others lacked basic resources such as functional computers, internet access, and electricity. **Limited Trainin g:** Both students and teachers cited limited training on how to use ICT resources specifically for pronunciation improvement. There were also concerns about the efficacy of some apps and web sites in offering accurate and clear pronunciation models. **Cultural Influence:** As Igbo sp eakers, students sometimes faced challenges in applying pronunciation lessons due to their nati ve language's influence on their English accent. This interference, coupled with limited exposur e to native speakers, hindered their ability to use ICT tools effectively in their pronunciation pra ctice.

Impact of ICT on English Pronunciation The study found a positive correlation between ICT usage and improved pronunciation skills such a s the following:

Improvement in Intonation and Stress Patterns: 55% of students who frequently used ICT t ools for pronunciation practice showed significant improvement in their understanding and appl ication of English stress patterns and intonation.

Accent Reduction: 45% of the students who used online tools focused on accent reduction and found that these tools helped them produce more accurate and clearer English sounds. **- En gagement and Motivation**: ICT tools enhanced student engagement and motivation to learn pr onunciation, as many students found the interactive nature of these tools more engaging than tra ditional classroom methods.

Test of Hypotheses **H01:** There is no significant difference in the learning of English speech sounds between Igbo junior secondary school students taught with ICT tools and those taught without ICT tools in Nsukka Local Government Area.

Table 1: Summary of Pre-Test and Post-Test Mean score of Experimental and Control Groups

Group	N	Pre-Test Me an (SD)	Post-Test M ean (SD)	Mean Gain	Interpretation
Experimental	60	35.35 (4.30)	78.20 (6.15)	42.75	Significant im provement
Control	60	36.12 (4.75)	50.35 (5.42)	14.21	Moderate im provement

From the above analysis, it is inferred that the students that were exposed to ICT-based tools lik e audio-visual materials, pronunciation apps and interactive software showed significantly high er gains in their ability to recognize and pronounce English speech sounds compared to those th at taught with conventional methods

H01: The use of ICT does not significantly influence students' ability to identify and articulate English speech sounds correctly.

Table 2: ANCOVA Result on Post-Test Scores of Experimental and Control Groups

Source	SS	df	MS	F	p-value	Decision

Corrected Model	50431	2	2521.61	49.34	0.000	Significant
Group	4921.70	1	4921.70	96.39	0.000	Significant
Error	2990.45	117	25.55			
Total	85200.00	120				

Interpretation: The F-ratio of 96.39 ($p < 0.05$) indicates a statistically significant effect of ICT on students post-test performance in English speech sounds. Thus ICT based instruction was more effective than the traditional methods.

H01: There is no significant difference in the perception of male and female students regarding the effectiveness of ICT in learning English speech sounds

Table 3: Gender Difference in Post-Test Performance of Experimental Group

Gender	N	Mean Score	SD	t-value	p-value	Interpretation
Male	30	77.35	6.20	1.24	0.221	Not significant
Female	30	79.05	6.05			

Interpretation: The difference in performance between male and female students in the experimental group was not statistically significant ($p < 0.05$) suggesting that ICT benefits students regardless of gender.

Discussion

The data collected in this study was analyzed to determine the impact of Information and Communication Technology (ICT) tools on the learning of English speech sounds by junior secondary school students of Igbo extraction in Nsukka LGA, Enugu State. Both qualitative and quantitative data were gathered through the use of pre-tests, post-tests, questionnaires, and classroom observations.

Students' Performance in Pre-Test and Post-Test

The pre-test scores, which represented students' baseline proficiency in identifying and articulating English speech sounds, showed a generally low level of performance. Many students had difficulty distinguishing between similar sounds, especially voiced and voiceless pairs, such as /p/ and /b/, /s/ and /z/, or vowel contrasts like /ɪ/ vs /iː/. This aligns with existing literature indicating that second-language learners often struggle with non-native phonemes due to first language (L1) interference (Olaosun, 2012; Uzoezie, 2017). Post-test results showed a significant improvement among students exposed to ICT-based learning tools. These tools included audio recordings, pronunciation software, interactive apps, and speech recognition programs The improvement was most notable in areas where students had earlier shown difficulty. This suggests that ICT tools provided both auditory and visual reinforcement, which enhanced phonemic awareness and pronunciation accuracy. The difference in mean scores between the pre-test and post-test was statistically significant ($p < 0.05$), confirming the effectiveness of the intervention.

Gender-Based Analysis

A breakdown of performance by gender revealed that both male and female students benefited f rom ICT integration, although females slightly outperformed males in post-test scores. This cor roborates studies like Okoye and Okechukwu (2020), which found that female students often sh ow greater engagement in ICT-enhanced language learning environments. However, the differe nce was not statistically significant, suggesting that ICT's effectiveness is not limited by gender.

Questionnaire Responses

Analysis of the questionnaire responses revealed that a majority of students found ICT tools eng aging and helpful in understanding English speech sounds. Over 80% of respondents agreed or strongly agreed that tools like phonetic apps, video lessons, and digital pronunciation guides im proved their listening and speaking skills. This supports the findings of Adebayo (2018), who n oted that ICT increases learner motivation and autonomy in language learning. Furthermore, m any students reported enjoying the use of mobile phones and school computers for practicing pr onunciation, suggesting that familiarity with digital devices contributed to their willingness to p articipate in ICT-based learning activities.

Teacher Observation and Feedback

Classroom observations confirmed that students were more actively involved in learning during ICT-assisted lessons. Teachers reported increased student participation, reduced anxiety in spea king exercises, and a more individualized learning pace. The multimodal features of ICT like so und, visuals, interactivity appeared to cater to different learning styles, making abstract concept s like phonemes more concrete and accessible (Yusuf, 2005; Agbatogun, 2013).

Teachers also noted that ICT tools allowed for immediate feedback, enabling students to self-correct and improve more rapidly than in traditional classroom settings. However, challenges such as inadequate infrastru cture, limited access to devices, and inconsistent power supply were also highlighted.

Implications for Teaching

The results imply that ICT integration in teaching English speech sounds offers a significant pe dagogical advantage. Teachers are encouraged to adopt digital tools and resources to compleme nt traditional instruction, especially in phonetics and pronunciation. ICT tools not only support better academic outcomes but also increase student confidence and communicative competence

Conclusion

This study concludes that the use of ICT significantly enhances the learning of English speech s ounds among Igbo junior secondary school students in Nsukka LGA. ICT tools provide multi-s ensory experiences that are essential for phonological learning, particularly in environments wh ere students are challenged by L1 interference and limited exposure to native English input. The empirical evidence supports the adoption of ICT enhanced phonetic instruction as a viable strat egy for improving pronunciation, intonation, and auditory discrimination skills in ESL contexts Therefore, it is recommended that:

1. Curriculum planners integrate ICT-based phonetics modules into English language syllabi at the junior secondary level.

2. Teachers receive ongoing training in the pedagogical application of ICT tools for phonetics i nstruction.

3. Government and stakeholders invest in ICT infrastructure and maintenance in public schools.

4. Further research explore longitudinal impacts and the role of mobile technologies in phonetic s acquisition.

In other words, the integration of ICT in the teaching of English speech sounds offers a transfor mative approach that can help bridge linguistic gaps and foster more competent English speaker s among Igbo learners in the 21st century.

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