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EFFECT OF COMPUTER-BASED INSTRUCTION ON PERFORMANCE IN PRONUNCIATION OF BACK AND CENTRAL VOWELS OF ENGLISH LANGUAGE AMONG SECONDARY SCHOOL STUDENTS AT FCT, ABUJA

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ABSTRACT

This study investigated Effect of Computer-based Instruction on performance in pronunciation of Back and Central Vowels of English Language among secondary school students at FCT, Abuja. Two research questions and two null hypotheses were formulated to guide the study. The research design for the study was quasi-experimental. The sample for the study consisted of 160 SSS2 students from two co-educational schools in Gwagalada Area Council. A multi-stage random sampling technique was used. The experimental group comprised 84 school students located in rural area and 76 school students located in urban area. Both the experimental group and control group were given the same back and central English vowels performance test questions. The instrument used for data collection was the English Vowels Performance Test (EVPT). Mean was used to answer the research questions while ANCOVA was used to test the hypotheses at $p < 0.05$. From the results obtained, it was found that students in the experimental group had significantly higher performance scores in back and central vowels of English than their counterparts who are in the control group. Also, location had a significant effect on students' achievement in back and central vowels of the English language. Based on the findings, it was recommended the English language teachers should adopt computer-based instruction in teaching the back and central vowels of English.

Keywords: English, Pronunciation, Back and Central Vowels, Performance, Students

INTRODUCTION

The importance of the English language as a medium of communication cannot be over-emphasized. As far as English language remains Nigerian's official language and the language of instruction in our schools, it will continue to be ranked as the most important subject in our educational system. The government of Nigeria considers English language as a core subject in the school curriculum and a major medium of communication both within and outside the school system. The National Policy on

Education (FRN, 2017) demands the ability to communicate effectively at the primary level. The policy demands that the medium of instruction at primary school shall be the language of the environment for the first three years and from the fourth year, English language shall be taught as a subject and used progressively as a medium of instruction. English language is also the index for measuring the quality of any senior school certificate examination result, as it is the subject that candidates must pass if their

overall success in the examination is to have any value (Olayinka & Akabogu, 2020).

The aim of teaching the English language at all levels of education is to give students permanent literacy and the ability to communicate effectively. Also, it is to guide the learners to understand the four language skills: listening, speaking, reading, and writing. The listening skill as the first of the four major language skills is the key and gateway to language learning and it is very vital and fundamental in the process of language acquisition. The three other skills, speaking, reading, and writing build upon it and are more or less dependent on it (Akintunde & Angulu, 2017). As the child consolidates his listening skills, he moves into the speaking stage which will enable him to join his speech community. A user of a language is said to be competent if he is able to use the four basic skills effectively.

The focus of this research is mainly on back and central vowel sounds of English language, an aspect in speaking skill. The essence is to make users of English, especially as second language more competent in listening to the native speakers so as to speak the language as effectively as possible. This can be achieved through the aspect of language study which deals with speech sounds and how they are arranged, that is, phonetics and phonology. The study of English vowels is a crucial component of oral language learning for English as a Second Language (ESL) learners. It provides them with the opportunity to understand and produce accurate word pronunciations. Since English originates from Britain, ESL learners aiming to pronounce words correctly, similar to native speakers or ensuring international intelligibility, need to be familiarized with the various vowel sounds and their articulation (Brinas-Gomez, 2018).

The significance of proper pronunciation in the learning of the English language cannot be over emphasized. It is undeniably crucial for effective oral communication, both in educational settings and professional environments. Pronunciation encompasses the production of sounds that convey meaning. This involves being mindful of the specific

sounds of a language, as well as aspects of speech beyond individual sounds, such as intonation, stress, rhythm, and vocal projection (Smith, 2019). According to Akintunde and Ohiare-udebu (2020), speaking English fluently requires not only a solid grasp of grammar and an extensive vocabulary but also the ability to speak smoothly and expressively with accurate pronunciation. Also, Okika (2021) argued that studying vowel sounds enables us to improve our speaking abilities by helping us recognize the sounds of the English language and how they are combined in speech.

Contrary to the expectation, the objectives of teaching and learning English language, especially vowels of English at the secondary school level seem not to be achieved. Egbe (2015) asserted that students from secondary schools demonstrate narrow range of ability in the English language. Ali (2016) also stated that the effective use of English is what many students lack, lamenting that the performance of students in the subject in the school certificate examination does not fall in line with the great importance attached to it. Results of previous research in oral English indicated that most students find the back and central vowels of the English language difficult. Some could not articulate them correctly hence they failed most of the questions in this aspect (WAEC, 2024).

Researchers have long been focused on understanding the reasons behind poor performance in back and central vowels of English. It has been noted that the ineffective teaching methods and unfavorable learning environments contribute to the underperformance in back and central vowels (Senam & Senam, 2017). Brinas-Gomez (2018) further observed that the absence of modern teaching techniques and students' inability to grasp and internalize what is being taught are challenges in the teaching and learning of the English language. Consequently, it can be inferred that these same issues are affecting the teaching and learning of English vowels, particularly back and central vowels. Most teachers have been using conventional method or oral approach to teach, where the students are arranged in straight lines

down and across the classroom. The teacher assumed that all the students in the class have equal knowledge or that they have little or no knowledge at all on the subject matter. The teacher used to stand in front of the class to deliver his lessons. As the teacher dominates the class, the students' potentials are rarely used to the fullest and the students become impatient rather than being enthusiastic (Idris, 2019). In using conventional method to teach vowels of English, the teacher devotes his time explaining vowel sounds with or without examples. Some teachers will give examples, ask the students to check up the phonetics transcription of some words and how they are articulated. There are no practical strategies or instructions such as flash cards and word games that will stick the sounds system into the students' memory when articulating the sounds of English language. Throughout the lesson period, there will be no attempt made by the teacher to enable the students to practice sounds system. The students, therefore, become passive rather than active in classroom activities. Since no single teaching method takes care of all the skills of the language, it may be possible for teachers to combine appropriate methods to suit the lessons they want to teach. As a result of the shortcomings of the existing method of language teaching, the researcher decided to investigate the effect of computer-based instruction on secondary school students' achievement in vowels of English language in Federal Capital Territory, Abuja.

Teaching and learning have undergone significant transformations in the digital age, with technology-enriched instructional innovations, particularly computer-based instruction (CBI), playing a crucial role (Akintunde & Angulu, 2020). Countries worldwide are placing emphasis on the integration of computer-based instruction in language classrooms. This shift is driven by the fact that contemporary society is increasingly reliant on digital devices, making it essential for students who will live and work in the digital world to be familiar with such technology. Computer-based instruction is seen as electronic tutors that can deliver

personalized learning experiences, accurately tracking learners' interests, knowledge, attitudes, and skills (Senam & Senam, 2017). This perspective provides a pedagogical rationale for introducing computers into the school curriculum (Obodo & Ani, 2023). Incorporating computer technology as a tool for teaching English vowels can serve as a way to integrate technological intervention into language classroom instruction. The introduction of computer-based learning environments has demonstrated its ability to foster student-centered language learning, encourage cooperative learning, and facilitate greater interaction between teachers and students (Nnamani & Akabogu, 2020). The author argued that computer-based instruction allows students to actively engage in the learning process. Also, Iain (2019) states that immediate feedback provided by the computer tends to enhance student motivation and active participation, ultimately leading to improved learning outcomes. A study conducted by Nguyen (2022), showed that there was a statically significant difference between the means in the overall pronunciation proficiency. Computer-based instruction leads to gain not only in cognitive domain but also in affective domain. Nguyen, and Ngo (2021) found out that the CBI was more effective in helping students and responsible for the learning achievement and retention observed.

Another variable considered in this study is school location. Many researchers have also been interested in whether school location has influence on the achievement of school children. Location as used in this study refers to the place or environment where a school is sited, that is, either in the urban or rural area (Bamidele & Ali, 2023). Olayinka and Akabogu (2020) is of the view that the location of a school determines so many things that are important in learning such as learning facilities, infrastructure, number of teachers and the class size, among others. The provision or absence of these facilities may facilitate or hinder learning. Studies carried out in Nigeria by Ajiwoju (2015) and Iwaniec (2020) showed that location had a significant effect on students' achievement while others by Ali

(2016), and Bamidele (2015) showed that location had no significant impact on students' achievement. From the findings of these studies, it is not certain whether rural or urban school will enhance students' performance in central and back vowels, thereby justifying the inclusion of school location as a variable in this study. Based on the foregoing narratives, therefore, there is the need to find out through empirical evidence, the extent to which computer instruction will affect students' performance in back and central vowels of English, as well as the influence of school location on students' performance in pronunciation of back and central vowels of English at Abuja, FCT, Nigeria.

Statement of the Problem

The teaching and learning of English pronunciation, particularly the articulation of back and central vowels, continue to pose significant challenges in Nigerian secondary schools. Traditional instructional methods, which rely heavily on chalk-and-talk techniques, often fail to provide students with adequate exposure to the sounds of native-like English pronunciation. This limitation affects learners' ability to distinguish and correctly produce back and central vowel sounds which are not readily available in many Nigerian indigenous languages. Consequently, many students exhibit poor pronunciation skills that hinder effective oral communication, academic performance, and confidence in English language usage. With the increasing integration of technology in education, computer-based instruction (CBI) has emerged as a potentially effective tool for enhancing language learning, especially in the area of pronunciation. CBI offers learners the opportunity to receive immediate feedback, interact with audio-visual models of correct pronunciation, and engage in self-paced practice, which are often lacking in traditional classroom settings. However, despite the recognized benefits of CBI, there is a paucity of empirical studies investigating its specific impact on the pronunciation of back and central vowels among senior secondary school students. This study, therefore, seeks to examine the effect of computer-based instruction on students' performance in

pronouncing back and central vowels in English.

Objectives of the Study

The study objectives were to:

1. determine the performance of students taught back and central vowels of English language with CBI and those taught with conventional method.
2. ascertain the effect of location on the performance of students taught back and central vowels of English language with CBI.

Research Questions

1. What is the difference in the mean scores' performance of the secondary school students who received Computer-based Instruction and conventional method in back and central vowels of English language?
2. Does location have any effect on performance of students taught back and central vowels of English language with CBI?

Null Hypotheses

The following null hypotheses were formulated to guide this study:

- HO₁: There is no significant difference in the mean scores of secondary school students who received computer-based instruction and conventional method in back and central vowels of English language.
- HO₂: There is no significant difference in the mean scores of urban and rural secondary school students who received CBI and Conventional Method in back and central vowels of the English language.

METHODOLOGY

The researcher adopted a quasi-experimental design, it is the non-randomized, control group, pre-test, post-test design. This design was adopted because the students that were used for the experiment are intact classes. Randomization would disrupt the existing structure in the school, thus posing some administrative problems. The sample consisted of 160 SSII students from two co-educational Senior Secondary Schools in Abuja, FCT in the 2022/2023 academic session. Two intact classes were drawn from each of the schools (One experimental and one control group

respectively). The sample size that was used for the experimental and control groups were the number of students in the intact classes. Eighty-four (84) rural and seventy-six (76) urban students were used for the research respectively. Multiple-stage sampling technique was used in drawing the respondents. The following are the stages of the sampling. Firstly, two schools were sampled across the area council by the researcher. In each of the schools, there were two intact classes, one class was selected to be experimental and the other one was the control group respectively. One instrument was used to collect data for the study: the English Vowels Performance Test (EVPT) is a 50-item dichotomous scored instrument that was adopted by the researcher, which tests subjects in various ways, and questions on back and central vowels of English were majorly tested. The English Vowels Performance test was further subjected to content validation. It was presented to the two experts in English education and Test and Measurement of Faculty of Education, University of Abuja, FCT. The test has two parts. Part A provides for the biodata of the research subjects (1-5), which part B is the actual test of 50 items (1-50), and 50 marks are allotted to it. The actual test was drawn from the Senior Secondary School education curriculum on the English language for SSII and the Abuja, FCT Uniform Scheme of work on the English language for SSII. The experimental group was taught with the use of CBI by the researcher assistance, after two weeks of teaching, questions were administered to the students. The scripts were collected, marked and recorded. Mean was used to answer the research questions while ANCOVA was used to test the hypotheses at $p < 0.05$

RESULTS

Table 1: Summary of Mean performance scores of students in back and central vowels of English language before and after exposure to CBI and CM

Methods	N	Pre-test		Post-test		Mean difference
		\bar{x}	SD	\bar{x}	SD	
Computer-based-Instruction (CBI)	84	3.12	1.02	5.69	1.23	2.57
Conventional Method (CM)	76	3.57	.74	3.76	.69	.19

Table 1 shows that the students who were exposed to computer-based instruction (CBI) had a pre-test mean achievement score of ($\bar{x} = 3.12$, $SD = 1.02$) in back and central vowels of English language and a post-test mean achievement score of ($\bar{x} = 5.69$, $SD = 1.23$) in back and central vowels of English language. On the other hand, those exposed to conventional method (CM) had a pre-test mean achievement score of ($\bar{x} = 3.57$, $SD = .74$) in central vowels of English language and a post-test mean achievement score of ($\bar{x} = 3.76$, $SD = .69$) in back and central vowels of English language. Mean difference scores of 2.57 and .19 for the students exposed to CBI and those exposed to CM respectively, indicate that the CBI group had higher post-test mean performance score in back and central vowels than the CM group. However, the post-test standard deviations of 1.23 and .69 for the students exposed to CBI and those exposed to CM respectively, indicate that the individual scores of the students exposed to CBI differed more from their mean performance score in back and central vowels than those of the students exposed to CM.

Table 2: Summary of Mean performance scores of urban and rural students exposed to CBI in back and central vowels.

Treatment	Location	N	Pre-test		Post-test	
			Mean	Std. Deviation	Mean	Std. Deviation
Computer-based instruction (CBI)	Urban	51	3.61	.57	5.49	1.35
	Rural	33	3.62	.61	5.45	1.35
Conventional method (CM)	Urban	34	3.47	.79	3.82	.72
	Rural	42	3.45	.80	3.69	.60

Table 2 shows that students in urban schools who were exposed to CBI had a post-test mean performance score of ($\bar{x} = 5.49$, $SD = 1.35$) in back and central vowels of English language, On the other hand, the students in rural schools who were exposed to CBI had a post-test mean performance score of ($\bar{x} = 5.45$, $SD = 1.35$) in back and central vowels of English language. This means that the students in the urban schools who were exposed to CBI had higher post-test mean performance score in back and central vowels than the students in the rural schools who were exposed to CBI. The null hypotheses were tested using t-test and ANCOVA statistics. All tests were conducted at $P > 0.05$ level of significance.

Table 3: Analysis of covariance of the effect of computer-based instruction and conventional method on students' performance in back and central vowels

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	149.112 ^a	2	74.556	72.800	.000	.481
Intercept	267.081	1	267.081	260.789	.000	.624
Pre Central Vowel Treatment	.902	1	.902	.880	.350	.006
Error	134.112	157	1.024			.455
Total	160.788	159				
Corrected Total	3958.000	160				
Total	309.900	159				

a. R Squared = .481 (Adjusted R Squared = .475)

Table 3 revealed that there is a significant difference in the gain scores of secondary school students in the experimental group who received computer-based instruction (CBI) and the control group (CM) in back and central vowels of English language in favour of those exposed to CBI, $F(1, 157) = 130.952, p = .000$. This implies that the null hypothesis is rejected since the associated probability value of .000 is less than the .05 level of significance. Thus, the inference drawn is that CBI is more effective in enhancing students' performance in back and central vowels of English language than the CM.

Table 4: Analysis of covariance of the difference in the mean gain scores of urban and rural secondary school students in the experimental group who received CBI and the control group in back and central vowels

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	123.859 ^a	4	30.965	27.234	.000	.413
Intercept	174.121	1	174.121	153.141	.000	.497
PreBackVowel Treatment	4.610	1	4.610	4.054	.046	.025
Location	117.688	1	117.688	103.507	.000	.400
Treatment Location	.292	1	.292	.257	.613	.002
Error	*.100	1	.100	.088	.767	.001
Total	176.235	155	1.137			
Corrected Total	3769.000	160				
Total	300.094	159				

a. R Squared = .413 (Adjusted R Squared = .398)

Table 4 revealed that there is no significant difference in the mean difference scores of urban and rural secondary school students in the experimental group who received CBI and the control group in back and central vowels of English language, $F(1, 155) = .088, p = .767$. This implies that the null hypothesis is not rejected since the associated probability value of .767 is greater than the .05 level of significance. Thus, the students' performance

in back and central vowels of English language as a result of their exposure to CBI and CM is independent of school location.

DISCUSSION

The results from Table 1 shows that students in the experimental group or treatment group who were taught back and central vowels of English using computer-based instruction (CBI) obtained a higher post- test mean score than the control group who were taught the same back and central vowels of English through the conventional method. The findings presented in Table 1 indicated that those taught with the (CBI) in back and central vowels of English had a post-test mean score of 5.69 in back and central vowels of English, while those exposed to conventional method (CM) had a mean performance score of 3.76. Furthermore, on the effectiveness of computer-based instruction, the result of this study agrees with earlier studies by Nguyen and Ngo (2021), Nguyen (2022), Obodo and Ani (2023), Smith (2019). These empirical studies revealed that computer-based instruction brings about better performance of students in back and central vowels of English and other areas of the English language, in their study on the effectiveness of CBI on oral English in Florida, USA, showed that computer-based instruction had a significant effect on students' achievement in oral English.

The findings obtained from Table 2 with regard to location and students' performance in back and central vowels of English show that the students in the urban area had a mean score of 5.49 in the post-test, but those in the rural area had a mean score of 5.40 in back and central vowels of English. This shows that the students in the urban school performed better than students from the rural school. In the test of hypothesis, this was found to be statistically significant. In other words, both students in the urban and rural areas almost performed equally in back and central vowels of English performance test. However, the findings of the study are not in agreement with the findings of Smith (2019), Olayinka and Akabogu (2020). This study agrees with the research carried out by Akabogu and Ajiwou (2018) that there is no significant difference in the mean performance

scores of students from the urban and rural areas in vowels of English language.

Table 3 revealed that there is a significant difference in the performance scores of secondary school students in the experimental group who received computer-based instruction (CBI) and the control group (CM) in back and central and vowels of English language in favour of those exposed to CBI, $F(1, 157) = 130.952, p = .000$. This implies that the null hypothesis is rejected since the associated probability value of .000 is less than the .05 level of significance. This study agrees with the research carried out by Akintunde and Angulu (2017) and Brinas-Gomez (2018).

Results obtained from Table 4 revealed that there is no significant difference in the mean difference scores of urban and rural secondary school students in the experimental group who received CBI and the control group in back and central vowels of English language, $F(1, 155) = .088, p = .767$. This implies that the null hypothesis is not rejected since the associated probability value of 0.767 is greater than the .05 level of significance. Thus, the students' performance in back and central vowels of English language as a result of their exposure to CBI and CM is independent of school location. The study above is not in agreement with the study carried out by Bamidele and Ali (2023) and Iwaniec (2020). However, the study agrees with Nnamani and Akabogu (2020) and Obodo and Ani (2023) that there is no significant difference in the performance of students based on school location.

CONCLUSION

The implication of Computer-Based Instruction (CBI) in teaching English Language is profound, as it transforms traditional teaching methods by integrating technology to enhance learning outcomes. CBI offers interactive and individualized learning experiences that cater to students' diverse needs and learning paces. It promotes student engagement through multimedia resources such as audio-visual materials, animations, and language learning software, which make abstract language concepts more concrete and understandable.

RECOMMENDATIONS

The following recommendations were made based on the findings of the study:

1. Secondary school teachers at FCT, Abuja should make use of the computer-based instruction in teaching vowels of English.
2. Secondary school students should be encouraged to engage in extensive oral practice with the aid of computer-based instruction.

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