



EFFECTS OF TECHNOLOGY-ASSISTED INSTRUCTION ON SENIOR SECONDARY STUDENTS' ACHIEVEMENT IN VOWEL SOUNDS IN JALINGO LOCAL GOVERNMENT AREA OF TARABA STATE, NIGERIA

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Abstract

Research findings indicate that most secondary school students achieve poorly in oral English despite the importance of the aspect of the language for communicative competence. To contribute to salvaging the situation, this study investigated the effects of Technology-Assisted Instruction (TAI) on senior secondary students' achievement in oral English in Jalingo Local Government Area of Taraba State, Nigeria. The study was guided by two research questions and two corresponding null hypotheses. Quasi-experimental pre-test and post-test design of non-equivalent groups was adopted for the study. Using simple random sampling technique, a sample of 50 students was used and assigned to experimental (TAI) and control (conventional) groups in two intact classes. Data were collected using Oral English Achievement Test (OEAT). Data collected were analysed using mean and standard deviation to answer the research questions and Analysis of covariance ANCOVA to test the null hypotheses at 0.05 level of significance. Findings revealed that there was a significant improvement in students' ability to pronounce short vowel sounds correctly after the treatment. It was also found that the experimental group had a better ability to produce words each for short vowel sounds than the control group after the treatment. The study, therefore, recommended among other things that teachers of English should adopt learner-centred instructional strategies like TAI to teach students oral English.

Keywords: *Technology-assisted instruction, oral English, short vowel sounds, pronunciation.*

Introduction

English language as a medium of communication lays emphasis on listening and speaking which are essential prerequisites to acquiring the other two basic skills in language learning, which reading and writing. The implication is that communication is the major function of language; and in communication, focus is on the oral or aural form of expression in any given language of the world at large (Priya & Kumar, 2020).

Oral English is an aspect of English that learners at all levels need to master. For one thing, effective pronunciation is premium, considering the role spoken English plays in academic pursuit. According to Rigg (2019), strong oral language skills form the foundation of literacy and academic success. A solid foundation of oral language helps students become successful readers and strong communicators. These skills also foster a child's confidence and overall sense of wellbeing. The ability to apply oral language effectively impacts all areas of a child's life; from the ability to learn in the classroom, relationship with others, and academic achievement; to sense of self.

Furthermore, Ellen (2016) observes that one significant risk factor for English learners (ELs) is the lack of exposure to English in their homes. If students are only hearing English stories, conversations, and vocabulary at school, they have less background knowledge of the language than peers who hear English spoken in all areas of their lives. For this reason, it is important to make sure that ELs have the right exposure to oral language in the classroom, as well as opportunities to practice it.

Another reason oral English is indispensable is that the productive skills of language are given significance since spoken communication is a basic life skill for interaction, through active listening, comprehension and feedback. Students are expected to develop mastery in the following areas: articulation to identify sounds as a segment, in words, spelling, relevant grammatical forms and proper pronunciation of registers. In addition, students also need this ability in other subjects to have a robust learning experience of the school curriculum, as English is the language of learning in the school environment.

Oral English is an area in which learners use

spoken words to express knowledge, ideas, and feelings. Baldwin (2017) observes that it is required for responses at an interview panel, getting an employment, carrying out assigned task in the work place, making intelligent contributions in a discourse and addressing a group of people. This implies that to develop oral English is to develop the skills and knowledge that go into listening and speaking all of which have a strong relationship to reading comprehension and to writing (Harris, Duke & Lesaux, 2022). Besides, language is identified as an expression of words by means of speech sounds combined into words, and words further combined into sentences, to reveal inner thoughts (Priya & Kumar, 2020).

However, students' grades in oral English in both external and internal examinations have consistently revealed a decline in students' achievement in oral English. For instance, West African Examination Council WAEC Chief Examiner's report showed that there was a 5% decline in candidates' performance in English Language for the year 2022. This was due partly to their abysmally poor performance in oral English. Worse still, in a phonological analysis of morphophonemic alternated front vowels and consonant sound in the spoken English among students in some selected senior secondary schools in Jalingo, Taraba state, students' performance was not up to the expected percentage of 50% as 35.65% of the students who were assessed did not meet up with optimal performance after being subjected to listening with the aid of an audio cassette. Ogunrinde and Ogunrinde and Aboki (2018)

Students' poor achievement in oral English can be attributed to poor linguistic background of learners, mother tongue interference, and inadequate provision for oral English practicals on the timetable (Ikwuka & Adigwe, 2017). Even more serious is the traditional teacher-centered instructional mode which is prevalent in the teaching of English Language. This results in the unsatisfactory achievements of students in examinations and consequently lack of motivation to learn pronunciation.

Meanwhile, for the teaching of a complex aspect of English as orals, technological assisted instructional tools like the internet, podcasts,

video conferencing, videos and speech recognition software are considered the best for teaching speaking skills and using such tools have motivated and improved students' achievement in language learning. According to Bahadorfar and Omidvar (2014), this would initiate a paradigms shift from the norm by engaging the teachers and learners to critically think of new ways in learning and teaching. It was for this reason these researchers investigated the effects of Technology-Assisted Instruction (TAI) on students' achievement in oral English.

Technology-Assisted Instruction (TAI) has been described as the application of information and communication technology in the process of teaching and learning (Walker, Voce, & Ahmad, 2020). This means that it is an online facility that directly supports teaching and learning. Roberts (2016) states that Technology-Assisted Instruction (TAI) is considered to be synonymous with hard and software. This is because it is of various kinds such as computer based instruction, interactive multimedia board instruction, internet based education, virtual field instructional strategy to mention but a few.

Ringstaff and Kelley (2022) observe that the use of TAI can foster more of student-centered learning and can help to extend the period of interaction from in class to out of class settings; thus the place of interaction is no longer limited to the classroom. The adoption of TAI has numerous advantages in the teaching and learning process as it offers exciting approaches not only in the area of teaching and learning but in everyday life. Moreover, McFarlane and Sakellariou (2022) reported that simulation varieties provide an excellent means of developing oral English process skills and higher order thinking skills as a part of students' good communication with software and can be extended beyond the classroom.

From the foregoing, it can be deduced that the use of TAI in oral English language learning would enhance students' communication skills. These researchers are optimistic that if the package is applied in the area of the study, students' achievement in oral English would improve significantly. The question this study was designed to answer, therefore, was: what would be the effects of Technology-Assisted

Instruction (TAI) on senior secondary school students' achievement in oral English in Jalingo Local Government Area, Taraba State, Nigeria?

Meanwhile, relevant to this study are Elimat and Abuseileck (2014) and Otegbayo and Onasanya (2015). Elimat and Abuseileck examined the effects of automatic speech recognition technology in Jordan and found the package to be effective for teaching pronunciation. Similarly, Otegbayo and Onasanya investigated the effects of computer-assisted oral English instructional program on high school students in Nigeria and findings revealed that students taught with the strategy had an excellent performance over those taught with the conventional approach.

Research Questions

The study was guided by the following research questions:

1. What are the pre-test and post-test mean scores of SS1 students' ability to pronounce correctly 7 short vowel sounds in the experimental and control groups?
2. What are the pre-test and post-test mean scores of SS1 students' ability to produce 10 words each for the 7 short vowel sounds in the experimental and control groups?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance. In this study:

1. There is no significant difference between the post-test ability to pronounce correctly the 7 short vowel sounds mean scores of SS1 students in the experimental and control groups.
2. There is no significant difference between the post-test ability to produce 10 words each for the 7 short vowel sounds mean scores of SS1 students in the experimental and control groups.

Methodology

This study was carried out in Jalingo Local Government Area of Taraba State, Nigeria. The population for the study consisted all the SS1 students of public senior secondary schools in Jalingo Local Government Area of Taraba State, Nigeria. The sample was made up of 50 students

from two schools selected using simple random sampling technique and assigned to two groups in intact classes: 24 for experimental group and 26 for control group.

Pre-test and post-test quasi-experimental research design was adopted for the study. This design was used because the school authorities did not afford the researchers the opportunity to randomize. The design compared two groups (experimental and control) to ascertain the effects of the treatment. The two groups were pre-tested, then the experimental group was exposed to the treatment package (Technology-Assisted instruction), while the control group was not exposed to oral English using the conventional teacher-centred method. A post-test was administered to both groups which was used to ascertain the effects of the treatment.

The instrument for data collection was Oral English Achievement Test (OEAT) developed by the researchers to test students' achievement in oral English. OEAT was used as pre-test and post-test and was made up of four sections (A and B). Section A consisted 2-item on *bio-data of the respondent*, section B consisted 10 items on short vowels for students to pronounce and be scored on the spot. The section also required the students to produce 10 words each for the 7 short vowel sounds. The instrument was based on SS1 students' oral English curriculum and what the students were taught during the treatment. It consisted of 20 questions which had equal marks each. 5 marks were allocated to each question answered correctly, making the total of 100 marks.

To ensure the content validity of the Oral English Achievement Test (OEAT), the judgment of three experts in the areas of English Language, Research, Measurement and Evaluation units were sought. This was done using the University of Jos's Department of Arts Education Expert Evaluation Form, while Kendall's coefficient of concordance (W) was used to judge the agreement among the experts. The experts scrutinized the instrument in terms of comprehensiveness, adequacy, relevance, clarity, simplicity and ambiguity of the items. According to Cohen, Manion and Morrison (2018), for a strong agreement, the Kendall's coefficient value should be greater or equal to 0.60. In this study, the

Kendall coefficient value of 0.97 was obtained, which showed that the agreement between experts in their judgment was strong. Therefore, the instrument was considered valid and was used for the study. In the same vein, the reliability of the instrument was established using Cronbach alpha method to estimate the internal consistency of the instrument and a coefficient of 0.975 was obtained. Since Emaikwu (2014) indicates that coefficient between 0.68 and above is a sign of acceptable reliability, the instrument was considered reliable.

Students in the control and experimental groups were given a pretest to ascertain their entry equivalent in Oral English. The researchers administered the treatment package on the experimental group and the control group. The research assistants were used to distribute treatment materials and to the participants. The research assistants were further given guidelines on how to engage the students in the control group as they would not be undergoing activities in the technology-assisted instruction but the placebo method.

Participants in the experimental group met twice in a week for four weeks. This provided a tally of eight meetings. The duration for each meeting was 1 hour 20 minutes (double period), making the total number of 10 hours 40 minutes. Similarly, participants in the control group met twice for four weeks providing the total of eight meetings which lasted for 1 hour 20 minutes (double period) totaling 10 hours 40 minutes as well. Therefore, the treatment on the experimental group was achieved through a period of 8 weeks. The treatment was based on the application of technology-assisted instruction. A detailed lesson plan guided the conduct of the intervention, covering the objectives of each lesson and the duration, and students and teachers' activities in the course of the learning process. The process was interactive and participatory. However, the conventional teacher-centred teaching method was used for the control group.

The statistical tools used in the study to analyse data were mean and standard deviation were used to answer the questions raised. Analysis of Co-variance (ANCOVA) was used to test the null hypotheses at 0.05 level of significance. The choice of ANCOVA was

necessary to take care of errors of initial difference between groups.

Results

The data collected were analysed and interpreted based on the research questions and null hypotheses. Mean and standard deviation were

used to answer the research questions while Cronbach Alpha was used to test the null hypotheses at 0.05 level of significance. The decision rule was that the null hypotheses were rejected if the P value was less than 0.05. However, the null hypotheses were not rejected if the P value was greater than 0.05.

Research Question One

What are the pre-test and post-test mean scores of SS1 students' ability to pronounce correctly the 7 short vowel sounds in the experimental and control groups?

Table 1: Pre-test and Post-test Mean Scores of Students' Ability to Pronounce Correctly the 7 Short Vowel Sounds in the Experimental and Control Groups.

Group	N	Before		After		Mean Gain	\bar{x} - difference
		Mean	SD	Mean	SD		
Experimental	24	47.65	4.55	68.00	4.98	21.33	20.05
Control	26	49.24	6.52	50.52	4.90	1.28	

Table 1 shows the mean score of SSI students' ability to pronounce correctly the 7 short vowel sounds in experimental and control groups. The experimental group obtained a mean score of 47.65 with a standard deviation of 4.55 at pre-test. At post-test, a mean score of 68.00 was obtained with a standard deviation of 4.98. A mean gain of 21.33 was obtained. This implies that there is an improvement in ability to pronounce correctly the 7 short vowel sounds among SSI students after treatment. In the control group a mean score of 49.24 was obtained with a standard deviation of 6.52 at pre-test, while at post-test a mean score of 50.52 was obtained with a standard deviation of

4.90. The findings show that students in the experimental group had a higher mean score (68.00) after treatment using technology assisted instruction than those in the control group (50.52) who were not given treatment with a mean difference of 20.05. This means that in the pre-test the mean score of students' ability to pronounce correctly the 7 short vowel sounds in both groups had a poor performance, but after the intervention the experimental group performed better than the control group. It can be deduced that technology assisted instruction do improve students' achievement in English Language.

Research Question Two

There is no significant difference between the post-test ability to produce 10 words each for the 7 short vowel sounds mean scores of SS1 students in the experimental and control groups.

Table 2: Pre-test and Post-test Mean Scores of Students' Ability to Produce 10 Words Each for the 7 Short Vowel Sounds in the Experimental and Control Groups

Group	N	Before		After		Mean Gain	\bar{x} - difference
		Mean	SD	Mean	SD		
Experimental	24	47.20	4.25	71.76	5.60	24.56	21.96
Control	26	47.80	3.60	50.40	3.76	2.60	

Table 2 reveals the pre-test and post-test mean score of students' ability to produce 10 words each for the 7 short vowels sounds in the experimental and control groups. From the result, the post-test mean score ($\bar{x} = 71.76$, $SD = 5.60$) is higher than the pre-test mean score ($\bar{x} = 47.20$, $SD = 4.25$) with a mean gain of 24.56, indicating that there was improvement in the achievement of students after treatment. Also, for the control group the mean score was 47.80 and a standard deviation of 3.60 for the pre-test. However, the mean score of students in the control group increased to 50.40; $SD = 3.76$ in the post-test. The findings show that

students in the experimental group had a higher achievement mean score (71.68) after treatment using technology assisted instruction as against those in the control group (50.40) who were not given treatment with a mean difference of 24.48. This means that in the pre-test the Senior secondary I students in both groups had a poor performance, but after the intervention the experimental group performed better than the control group. This implies that technology assisted instruction does increase students' achievement in ability to produce 10 words each for the 7 short vowels sounds.

Hypothesis One

There is no significant difference between the post-test ability to pronounce correctly the 7 short vowel sounds mean scores of SS1 students in the experimental and control groups.

Table 3: ANCOVA Result of the Difference between the Post-test Ability to Pronounce Correctly the 7 Short Vowel Sounds Achievement of Students in the Experimental and Control Groups

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	4819.375	2	2409.688	649.979	.000	.965
Intercept	254.416	1	254.416	68.625	.000	.594
Group	4306.160	1	4306.160	1161.526	.000	.961
Error	174.245	47	3.707			
Total	180581.000	50				
Corrected Total	4993.620	49				

a. R Squared = .965 (Adjusted R Squared = .964)

The data were subjected to analysis of covariance (ANCOVA) having experimental and control for post-test ability to pronounce correctly the 7 short vowel sounds. The main effect of experimental group yielded ($M = 68.00$; $SD = 4.983$) and control group ($M = 50.52.97$; $SD = 4.903$); Table 12 shows that $F(1, 47) = 1161.526$, $P < 0.05$. Since the p-value of .000 is less than the 0.05 level of significance, the null hypothesis was rejected. This indicates that, ability to pronounce correctly the 7 short vowel sounds of students in the experimental group significantly differ from that of the control group. This means that the experimental group had a better ability to

pronounce correctly the 7 short vowel sounds than the control group after treatment. The result further reveals an adjusted R squared value of .964 which means that 96.4 percent of the variation in the dependent variable which is students' achievement in the ability to pronounce correctly the 7 short vowel sounds is explained by variation in the treatment, while the remaining is due to other factors not included in this study. Hence, we can say that technology assisted instruction does increase students' achievement in ability to pronounce correctly the 7 short vowel sounds.

Hypothesis Two

There is no significant difference between the post-test ability to produce 10 words each for the 7 short vowel sounds mean scores of SS1 students in the experimental and control groups.

Table 4: ANCOVA Result of the Difference Between the Post-Test Ability Produce 10 Words Each for the 7 Short Vowel Sounds in the Experimental and Control Groups

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	6653.925	2	3326.963	1087.737	.000	.979
Intercept	18.253	1	18.253	5.968	.018	.113
Group	6034.173	1	6034.173	1972.849	.000	.977
Error	143.755	47	3.059			
Total	193336.000	50				
Corrected Total	6797.680	49				

a. R Squared = .979 (Adjusted R Squared = .978)

The data were subjected to analysis of covariance (ANCOVA) having experimental and control for post-test ability to produce 10 words each for the 7 short vowel sounds. The main effect of experimental group yielded ($M = 71.76$; $SD = 5.607$) and control group ($M = 50.40$; $SD = 3.764$); Table 15 shows that $F(1, 47) = 6034.173$, partial $\eta^2 = .977$, $P < 0.05$. Since the p-value of .000 is less than the 0.05 level of significance, the null hypothesis was rejected. This indicates that, ability to produce 10 words each for the 7 short the vowel sounds of students in the experimental group significantly differ from that of the control group. This means that the experimental group had a better ability to produce 10 words each for the 7 short vowel sounds than the control group after treatment. The result further reveals an adjusted R squared value of .978 which means that 97.8 percent of the variation in the dependent variable which is students' achievement in the ability to produce 10 words each for the 7 short vowel sounds is explained by variation in the treatment, while the remaining is due to other factors not included in this study. Hence, we can say that technology assisted instruction does increase students' achievement in ability to produce 10 words each for the 7 short vowel

sounds.

Discussion

The discussion of findings in this study was based on the analysis and interpretation of the five research questions raised and five null hypotheses formulated. The discussion cuts across students' ability to pronounce short vowel sounds and produce words that contain them.

The finding revealed that there was a significant improvement in students' ability to pronounce short vowel sounds correctly after the treatment. This is because Technology-Assisted Instruction promotes interactive teaching and learning, as learners do not only receive content in a visual or auditory way but actively react to what is presented to them. This finding aligns with Elimat and Abuseilcek (2014) who found automatic speech recognition technology effective for teaching pronunciation. The implication of this finding is that TAI is an effective instructional strategy for developing students' pronunciation ability.

Furthermore, the findings show that students in the experimental group demonstrated a better ability to produce words each for short vowel sounds than students in the control group after

treatment. This is because the simulation varieties in TAI provide an excellent means of developing oral English process skills and higher order thinking skills as a part of students' good communication with software. This finding is in agreement with Otegbayo and Onasanya (2015) who reported significant improvement in the oral English achievement of students exposed to computer-assisted instructional strategy such as computer-assisted oral English instructional program (CAOEIP). This implies that TAI enhances students' achievement in oral English.

Conclusion

Based on the findings of this study, it can be concluded that Technology-Assisted Instruction improves students' ability to pronounce short vowel sounds. It can also be concluded that it enhances students' ability to produce words for short vowel sounds. If the strategy is utilised in the English Language classroom especially in the teaching and learning of oral English, students' achievement will significantly improve.

Recommendations

Based on the findings and conclusion of this study, the following recommendations are hereby made:

1. Teachers of English should adopt learner-centred instructional strategies like TAI programmes to teach students oral English.
2. Students should yield themselves to the instructional changes that come with the use of TAI.
3. Government should organise seminars and workshops for the retraining of English Language teachers on the use of TAI to improve students' achievement in oral English.
4. Curriculum designers should work in collaboration with English Language textbook writers to incorporate TAI into the secondary school's oral English programmes.
5. Teacher education programmes should be redesigned to incorporate effective technology-based instructional packages like TAI to acquaint prospective teachers of English with current trends in language

teaching.

6. School administrators such as the principals should supervise English Language teachers to ensure their application of technology-assisted instruction in oral English lessons.
7. Parents or guardians should endeavor to get their children or wards functional personal computers to be more prepared for the demands of TAI on students.
8. Government should ensure constant power supply to enable the use of technology-based instructional packages like TAI in schools.

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