

Computer Assisted Language Learning Software: The Effect of Integrating Computer Assisted Pronunciation Training on Kenyan English Phonetics Class at the University Level

Dr. Nancy Anashia Ong'onda

Department of Languages, Mount Kenya University, Kenya.

Mary Nguvi Muindi

Department of Languages, Mount Kenya University, Kenya.

DOI: 10.6007/IJARPED/v5-i4/2278 URL: <http://dx.doi.org/10.6007/IJARPED/v5-i4/2278>

Abstract

This paper aimed to investigate whether the introduction of Computer Assisted Language Learning (CALL) software at the university level would result in developments in English phonetics learners' pronunciation. The study made use of a quasi-experimental intervention design which consisted of control and experimental groups. Two groups of 40 students who were all studying English to become English Language teachers at the Department of Languages in Mount Kenya University participated in the study. While the control group followed traditional pronunciation training, the experimental group attended computerized pronunciation instruction which integrated a Computer Assisted Pronunciation Training (CAPT). Results of the study suggest that in EFL settings, where exposure to target language is quite rare, software programs can be perfect options to compensate for limited real life pronunciation practice. In conclusion, EFL learners can be provided with extra exposure to target language input and practice with specifically designed CAPT programs.

Key words: Computer Assisted Language Learning, Computer Assisted Pronunciation Training, English phonetics

Introduction

The purpose of the present article is to describe the application of the Computer Assisted Language Learning (CALL) technique to the teaching of English phonetics. CALL is succinctly defined in a seminal work by Levy (1997: p. 1) as "the search for and study of applications of the computer in language teaching and learning". CALL embraces a wide range of information and communications technology applications and approaches to teaching and learning foreign

languages, from the "traditional" drill-and-practice programs that characterized CALL in the 1960s and 1970s to more recent manifestations of CALL, e.g. as used in a virtual learning environment and Web-based distance learning. The term CALI (computer-assisted language instruction) was in use before CALL, reflecting its origins as a subset of the general term CAI (computer-assisted instruction). CALI fell out of favor among language teachers, however, as it appeared to imply a teacher-centered approach (instructional), whereas language teachers are more inclined to prefer a student-centered approach, focusing on learning rather than instruction. CALL began to replace CALI in the early 1980s (Davies & Hewer 2011: p. 3) and it is now incorporated into the names of the growing number of professional associations worldwide.

One of CALL program that has assisted in teaching of English phonetics is Computer Assisted Pronunciation Training (CAPT). CAPT has been found to be a great aid for teachers, especially for non-native teachers of the target language. Hence, pronunciation, as a principal component of oral skills and communication, has gained great significance at the global level. According to Fraser (2000), pronunciation is essentially one of the most influential aspects of language skills, in the sense that it helps learners be understood even if the grammar and vocabulary are limited. Moreover, Pennington & Zegarac (1998) observe that pronunciation plays a crucial role in the development of pragmatic competence, and that pronunciation errors can cause pragmatic misunderstanding. That is, to be able to speak English fluently is not enough to have good knowledge of grammar and a large number of vocabulary communication depends on one's ability to present what they are saying in proper way and in the listeners ability to clearly hear what one has said. In fact, Gilakjani (2012) asserts that the interlocutors must comprehend and produce the target language sounds accurately to exchange information.

For the last couple of decades, various CALL programs have been developed and become widely available. This implies that Pronunciation pedagogy has undergone a great change by the emergence of modern technologies, eliminating some of its present limitations. As an example of such technologies, CAPT paved the way for teachers to provide enriched learning environments for their learners. English phonetics at the university level entails teaching articulatory phonetics. Articulatory phonetics describes how vowels and consonants are produced by use of human vocal tract. Thus, CAPT plays a crucial role in foreign language learning contexts where exposure to native accent is quite scarce. In fact, CAPT is an ideal educational tool to supplement the shortcomings in current methods of English phonetics at the university level.

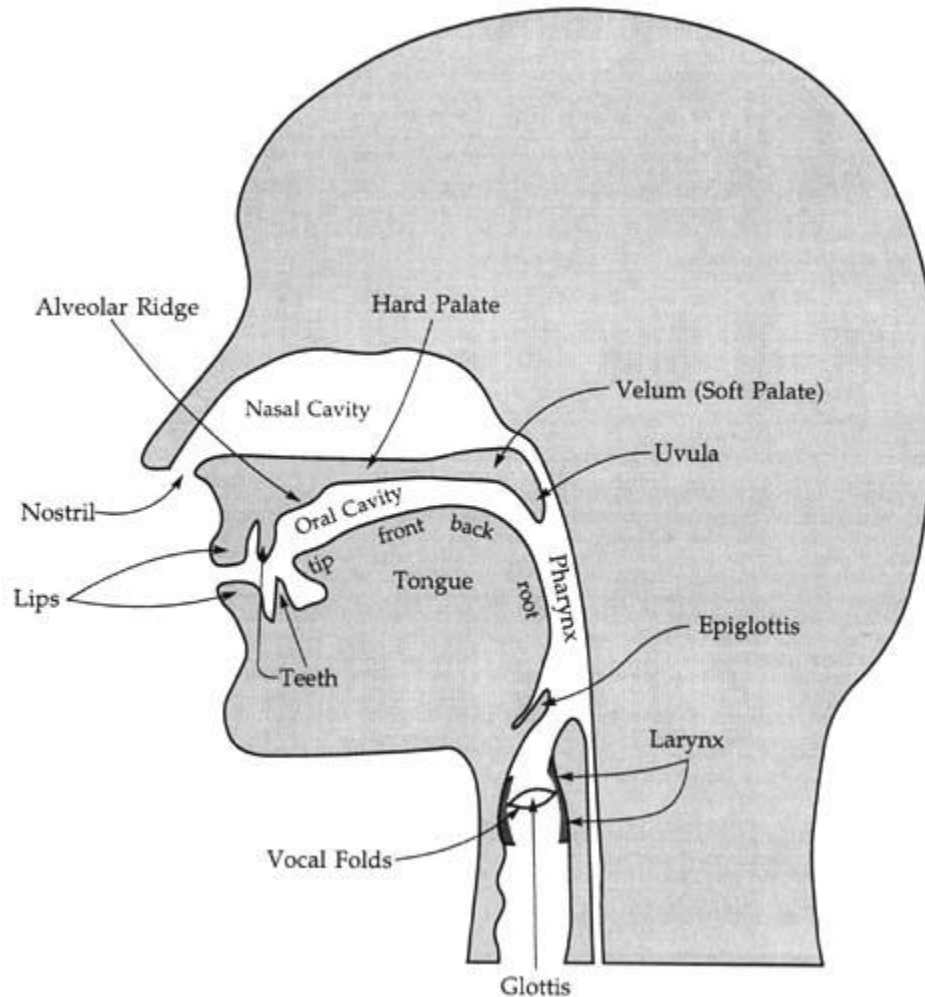
Students must learn control of articulatory variables and develop their ability to recognize fine differences between different vowels and consonants (Catford, 2001). As part of the training, they must become experts in using phonetic symbols, usually those of the International Phonetic Alphabet. A large body of literature (Celce-Murcia, Brinton, Goodwin & Grinner, 2011; Neri, Cucchiari, Strik & Boves, 2002; Pennington, 1999) supports the notion of integrating CAPT into language courses can contribute significantly to promoting students' pronunciation competence with the gift of new technologies.

English phonetics

Phonetics is not an instant remedy for all pronunciation problems; it offers the means to develop good pronunciation through enhanced awareness of relevant aspects of speech. Hence, Phonetics is the study of human speech. There are several different approaches to the study of phonetics. One is the approach on the articulation aspects such as the anatomy of the speech mechanism and the manner in which the airflow is modified, placement of the articulators, and whether or not sounds are voiced or unvoiced. This approach is referred to as articulation phonetics or articulatory phonetics (Stockwell & Minkova, 2001). Articulatory phonetics is the study of the production of speech sounds by the articulatory and vocal tract by the speaker. Another approach that has gained popularity because of the advancement of available instrumentation is referred to as acoustic phonetics (Kent & Read, 2002; Johnson, 1997). Acoustic phonetics is the study of the physical transmission of speech sounds from the speaker to the listener and the last is auditory phonetics: the study of the reception and perception of speech sounds by the listener.

Phonetic science includes an examination of the following items: Acoustical properties (sound waves) of the sounds—spectrograms, Anatomic structures involved in speech sound production (e.g., tongue, teeth) and Perception (hearing acuity and discrimination) of the speech sounds; accuracy in hearing the exact sound that is spoken.

In Kenya emphasis is placed in articulatory phonetics. Thus, Articulatory phonetics, how sounds are made, can be useful for teachers and learners. Problems with the pronunciation of certain sounds can be discussed in terms of how they are made with the mouth, and learners can be made aware of the differences between their first language phonemes, and English phonemes. Thus the focus on teaching English phonetics at the university level is on anatomic structure as shown below:



Source: Catford (2001)

The above diagram shows the Structures of articulation. Students at the university level evaluate structures involved in the production of sounds, absence of structure, deformity of structure, nerve damage such as in dysarthria, and other articulation disorders such as dyspraxia.

Another important aspect of phonetics that students are introduced to at this level is International Phonetic Alphabet (IPA). The most widely known aspect of its work has been the development and revision of the IPA. The IPA consists of unique symbols assigned to each of the sounds identified by the association. It even includes a different symbol for the clicking and lip smacking sounds made in some African and Asian languages that convey meaning. However, Ball and Lowry (2001) note that speech sounds not only include vowels and consonants but also other aspects such as intonation, rhythm, loudness, and tempo. A sample of IPA charts that university students are taught is shown below:

THE INTERNATIONAL PHONETIC ALPHABET (revised to 2005)

CONSONANTS (PULMONIC) © 2005 IPA

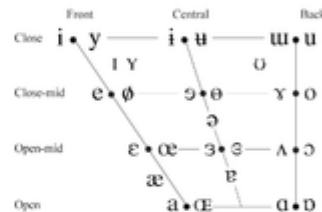
	Bilabial	Labiodental	Dental	Alveolar	Postalveolar	Retroflex	Palatal	Velar	Uvular	Pharyngeal	Glottal
Plosive	p b			t d		ʈ ɖ	c ɟ	k ɡ	q ɢ		ʔ
Nasal	m	ɱ		n		ɳ	ɲ	ŋ	ɴ		
Trill				ʀ					ʁ		
Tap or Flap		ⱱ		ɾ		ɽ					
Fricative	ɸ β	f v	θ ð	s z	ʃ ʒ	ʂ ʐ	ç ʝ	x ɣ	χ ʁ	ħ ʕ	h ɦ
Lateral fricative				ɬ ɮ							
Approximant		ʋ		ɹ		ɻ	j	ɰ			
Lateral approximant				l		ɭ	ʎ	ʟ			

Where symbols appear in pairs, the one to the right represents a voiced consonant. Shaded areas denote articulations judged impossible.

CONSONANTS (NON-PULMONIC)

Clicks	Voiced implosives	Ejectives
ʘ Bilabial	ɓ Bilabial	ʼ Examples:
ǀ Dental	ɗ Dental/alveolar	ɓʼ Bilabial
ǃ (Post)alveolar	ɟ Palatal	ɗʼ Dental/alveolar
ǃʰ Postalveolar	ɠ Velar	ɠʼ Velar
ǁ Alveolar lateral	ʄ Uvular	ʂʼ Alveolar fricative

VOWELS



OTHER SYMBOLS

ʍ Voiceless labial-velar fricative	ɕ ʑ Alveolo-palatal fricatives
ʋ Voiceless labial-velar approximant	ɺ Voiceless alveolar lateral flap
ɥ Voiceless labial-palatal approximant	ɥɥ Simultaneous ɥ and ɥ
ħ Voiceless epiglottal fricative	
ʕ Voiceless epiglottal fricative	Affricates and double articulations can be represented by two symbols joined by a tie bar if necessary.
ʡ Epiglottal plosive	

SUPRASEGMENTALS

- ˈ Primary stress
- ˌ Secondary stress
- ː Long ːˌfoʊnəˈtʃən
- ˑ Half-long eˑ
- ˑˑ Extra-short eˑˑ
- ˑˑˑ Minor (foot) group
- ˑˑˑˑ Major (intonation) group
- ˑˑˑˑˑ Syllable break ji.ækt
- ˑˑˑˑˑˑ Linking (absence of a break)

DIACRITICS

Diacritics may be placed above a symbol with a descender, e.g. ɨ̥

	Voicless	Breathily voiced	Dental
Voicless	ɲ̥ ʈ̥	ɓ̥ ɗ̥	ʈ̥ ɖ̥
Voiced	ɲ̬ ʈ̬	ɓ̬ ɗ̬	ʈ̬ ɖ̬
Aspirated	tʰ dʰ	tʰ dʰ	tʰ dʰ
More rounded	ɔ̹	ɔ̹	ɔ̹
Less rounded	ɔ̜	ɔ̜	ɔ̜
Advanced	ɥ̟	ɥ̟	ɥ̟
Retracted	ɥ̠	ɥ̠	ɥ̠
Centralized	ɥ̟̞	ɥ̟̞	ɥ̟̞
Mid-centralized	ɥ̟̞̞	ɥ̟̞̞	ɥ̟̞̞
Syllabic	ɲ̩ ʈ̩	ɓ̩ ɗ̩	ʈ̩ ɖ̩
Non-syllabic	ɲ̩̥ ʈ̩̥	ɓ̩̥ ɗ̩̥	ʈ̩̥ ɖ̩̥
Rhoticity	ɹ̥ ʀ̥	ɹ̬ ʀ̬	ɹ̬ ʀ̬

TONES AND WORD ACCENTS



Source: IPA Kiel (2005)

The amount of phonetic knowledge appropriate is age-dependent. School-age learners need guiding (virtually no theory but lots of carefully structured, phonetically-informed practice); older learners need guiding and informing (facilitating self-help, including use of interactive websites). The effectiveness of ear-training based on knowledge that hearing and recognition of sounds must precede attempts to make them (Pisoni, et al. 1994, Rvachew & Jamieson, 1995.; the value of theoretical understanding as part of the learning process is convincingly illustrated by Catford & Pisoni (1970). Additionally, the ability to read transcription is essential to access

information in a pronouncing dictionary for languages without phonetic spelling (French, Russian, English, etc.); pronunciation must be learnt in parallel with meaning and use for every new word.

Many approaches are used to teach English phonetics worldwide, and these include phonics, whole language, phonetic symbols and computer assisted programs (Heilman, 2000; Stanton, 2003). At the university level in Kenya, phonetics is taught theoretically rather than practically that is through phonics or phonetic symbols (Lin & Kuo, 2001). Today, the use of CALL to learning language is very instrumental since CAPT systems can provide language learners an authentic and native-like environment to learn English. This study, therefore, find it authentic to analyze the effect of integrating CAPT on Kenyan English phonetics class at the university level.

Computer Assisted Pronunciation Training (CAPT)

Technology has led to more academic approaches of teaching and learning of English phonetics basically in three ways. First, there is enhancement of instructional materials, second, increased level of sophistication in research and lastly prescriptive clinical applications. Hoffman and Buckingham (2000) recognize the need for and value of a computerized laboratory for phonetics students. They developed a set of digital videos that allows more flexibility for students to select transcription exercises to practice. Similarly, Ball & Lowry (2001) indicate that the advanced technological equipment provides students with improved clinical performances during their beginning clinical practicum experiences. However, this is not the case in Kenya since phonetics is taught theoretically.

Computers have become available for research in voice production related to speech perception, reception, and expression. CAPT systems make use of methods such as speech recognition, speaker normalization and signal parameterization to present visible comparisons between students' attempts and the model. Other software can also display pitch traces by which students can compare and get immediate feedback on their pronunciation using visual graphs (Celce -Murcia, Brinton, Goodwin & Grinner, 2011).

Appropriate computer assisted software provides a native-like, authentic language learning environment and it provides immediate feedback on students' performance (Neri et al., 2001; 2002; 2003). Computer-assisted pronunciation teaching (CAPT) systems can provide language learners an authentic and native-like environment to learn English. They also allow students to self-access and self-monitor their performance (Neri et al., 2002). CAPT is based on communicative approach and an interactive pace for students in phonetics and phonology. It includes Phonetics section containing all aspects of articulation of speech sounds, auditory and acoustic phonetics. It also includes phonology section having many pronunciation aspects "such

as the phoneme, distinctive features, non-linear phonology, British and American English sound system. The program has a variety of pronunciation activities, various exercises to develop awareness of pronunciation.

In this paper, phonics, phonetic symbols and CAPT were combined together in teaching English pronunciation to the experimental group. Computer software was used in the language laboratory in a tutorial setting for experimental group. The perspectives of the students regarding the useful characteristics of the computer based programs, and the opinions of students and their attitudes toward the feedback provided in the computer software were the focus of the research.

With modern technology to assist teaching English pronunciation, Chen and Liang (2003) proposed using 21 software facilitated telephone recording functions to assist elementary students learning English conversation, including pronunciation and intonation. Hsia, Wang and Chung (2004) investigated the attitudes of college students toward software with speech recognition functions. These studies were all concerned with the effectiveness of teaching methods and functions in the computer software. Most of them used experimental and quantitative methods, but Hsia et al (2004) used qualitative methods. For example, Hirata (2005) found that CAPT was effective in improving the ability of L2 learners to produce and perceive different aspects of pronunciation. Similarly, the findings reported by Raux and Kawahara (2002) showed that computerized pronunciation instruction and programs were effective because they provide meaningful feedback to the learners on their strengths and weaknesses. Stibbard (1996) also concluded that technological advances such as computerized facilities aided the development of learners' self-monitoring skills in learning different language areas like pronunciation. Moreover, the findings of Rostron and Kinsell's (1995) study showed that all participants who trained using computerized pronunciation program in their study made improvements and outperformed the control group on the pronunciation test. The current research will contribute to new understandings by investigating the impact of using computer software at higher level of learning.

Statement of the problem

Studying English phonetics involves not only learning theoretical material but also undergoing training in the production and perception of speech sounds (Daniel, 1948). However, this is not the case in Kenya since most universities lack a computerized laboratory for phonetics students. Thus, students are introduced to the theoretical part only. This creates a problem especially to English learners who are expected to teach oral skills such as appropriate English pronunciation in Secondary schools yet they are have a background of five English vowels sounds only (a, e, i, o, u). Having observed some classes for teaching English language in Kenyan universities, the researchers noticed that students had inappropriate pronunciation of English language yet they were all studying English to become English Language teachers. To solve this problem the

present study aims to investigate the effectiveness of CAPT on pronunciation instruction in a higher education context.

Research Methodology

This study aimed to investigate the effectiveness of CAPT on teaching of English phonetics in a higher education context. It intends to examine the effect of the CAPT program on learners' English pronunciation proficiency and tries to examine its effects on different aspects of pronunciation such as vowel sounds and consonants. Two research questions are thus put forward:

1. What is the effect of teaching English phonetics using CAPT?
2. In which aspects of the pronunciation skill do the Kenyan learners perform better after the CAPT intervention?

The study made use of a quasi-experimental, pretest -posttest control group research design. A convenient sample of 40 participants, 20 females and 20 males were selected. All participants were second year first semester students that were studying English and Literature at Mount Kenya University. At this level the students are introduced to Introduction to Phonetics and Phonology.

Their age ranged from 18 to 30 years. Due to registration considerations, random assignment of the learners into experimental and control groups was impossible and as a result, one class formed our experimental group (20 students), and the other, the control group (20 students).

Over the course of four weeks the test group used CAPT software program in the study of English vowels while the control group was given traditional phonetics methods in a classroom setting. The current study focused on English vowels and consonants only. Other aspects of phonetics like Stress, intonation and syllables that have a close connection to phonology were not analyzed.

Results and Discussion

Based on the findings of this study, the results of data analysis indicated that CAPT is much better than traditional methods learning of English phonetics. The experimental group of students was trained the physical presentation of monophthongs by a native speaker; then, they were asked to try the pronunciation paying attention to the shape of the lips and the position of the tongue. A monophthong is a vowel spoken with exactly one tone and one mouth position. The 12 major vowel sounds are shown below:

Examples Monophthongs

Close	i:	ɪ	ʊ	u:
Mid	e	ə	ɜ:	ɔ:
Open	æ	ʌ	ɑ:	ɒ
	Front		Back	

The experimental group was exposed to the twelve vowel sounds by CAPT language teachers as shown in the diagrams



The control group was on the other hand taught theoretical using the vowel trapezium. The researchers observed that students in experimental group liked to use the functions of playing, listening, and repeating after the speakers. The two groups after a period of four weeks were then given a list of words that had monophthongs and they were to pronounce them appropriately as a test.

The list is given below with the specific sounds that were tested:

- /i:/, as in “me”, “these”, “need” and “be”.
- /ɪ/ as in “with”, “this”, “if” and “think”.
- /ʊ/ as in “put”, “would”, “look”, and “woman”.
- /u:/ as in “to”, “you”, “new” and “who”.
- /e/ as in “get”, “when”, “well” and “very”.
- /ə/ as in “the”, “about”, “could” and “us”.
- /ɜ:/ as in “her”, “work”, “learn”, and “word”.
- /ɔ:/ as in “or”, “also”, “more”, and “call”
- /æ/ as in “have”, “that”, “as”, and “can”.

- /ʌ/ as in “but”, “up”, “one”, and “much”.
- /ɑ:/ as in “start”, “ask”, “large” and “after”.
- /ɒ/ as in “of”, “on”, “from” and “not”.

It was interesting how the experimental group could differentiate words with the vowel /æ/ vs /ʌ/ and /ə/. Another problematic vowel sound to most Kenyan students is /ɒ/ and /ɔ:/ but experimental group articulated appropriately the two sounds. The statistics findings were presented in form of tables. Table 1 & 2 shows means and standard deviations for both groups stating that experimental group outperformed control group on the post -test. The t-test was run to check the differences between the means and it was found that results were significant at the $p < .05$ level

Table 1: Descriptive Statistics for Pre-test

	No of students	Mean scores
Experimental Group	20	44.56
Control group	20	44.40

The results of the study indicated that there were no significant differences between the scores of the two groups on the pre-treatment pronunciation test. There were no significant differences in the performance of the two groups on the pronunciation pre-test. The results of T test analysis also confirmed this.

Table 2: Descriptive Statistics for Post Test

N	No of students	Mean scores
Experimental group	20	75.30
Control group	20	52.40

The above discrepancy in post-test show that using the communicative approach in learning of English vowel sounds is meaningful, interactive, and learners have the ability to engage in authentic activities. Thus, table 2 on descriptive Statistics for Post Test reveals that CAPT is effective in improving the EFL learners’ Pronunciation. These results are in line with a study

conducted by Zhang (1998) with learners of Chinese as a foreign language that also revealed positive results for using computer technology to teach pronunciation. Zhang (1998), hence, concluded that technology enables learners to take risks and follow their own path without the scrutiny of the teacher. It also allows the native speaker model to be readily available in proper contexts at any time.

Most Kenyans also Monophthongize diphthong vowel sounds. Monophthongization is a sound change by which a diphthong becomes a monophthong, a type of vowel shift. The experimental group was also exposed to the physical presentation of diphthongs by a native speaker; then, they were asked to try the pronunciation paying attention to the shape of the lips and the position of the tongue. The experiment took place for four weeks.

The following chart shows the Diphthongs that students were exposed to by CAPT language teacher



It was noted that each column is arranged according to the second sound in the Diphthong. The native speaker took the students through all the three rows. In the first row the students went through sounds that end with / ə/.

- /ɪə/
- /ʊə/
- /eə/

In the second column each sound ends with an /ɪ/ or /i:/ sound.

- /eɪ/
- /ɪi/
- /aɪ/

And in the third column each sound ends with an /ʊ/ or /u:/ sound.

- /əʊ/
- /aʊ/

The experimental group then tried correct pronunciation by listening to CAPT language teachers. They also tried the functions of role- play and self-detect for four weeks. They were

curious about their own pronunciation so they spoke, recorded, received correction feedback and listened to their own pronunciation. The experimental group was further taken through problematic monophthongs and diphthongs to make a difference between two related sounds by using minimal pairs of words as shown below:



The control group was subjected to the same content of diphthongs but they were taught through traditional methods. An independent-samples *t* test was carried out on diphthongs to determine whether there are any statistically significant differences between the achievements of the two groups on the pretest.

After a period of four weeks the two groups were given a list of words that had diphthongs and they were asked to pronounce them appropriately.

The list is given below that also show the diphthongs that were tested:

- ɪə : beard, weird, fierce, ear, beer, tear
- eə: aired, cairn, scarce, bear, hair,
- ʊə: moored, tour, lure, sure, pure
- eɪ : paid, pain, face, shade, age, wait, taste, paper
- aɪ: tide, time, nice, buy, bike, pie, eye, kite, fine
- ɔɪ: void, loin, voice, oil, boil, coin, toy, Roy
- əʊ: load, home, most, bone, phone, boat, bowl
- aʊ: loud, gown, house, cow, bow, brow, grouse

The results were as follows:

Table 1: Descriptive Statistics for Pre-test

	EXPERIMENTAL GROUPS	CONTROL GROUPS
MEAN	44.68	44 .58

Table 1 results indicate that the students had the same background concerning their knowledge of the English diphthongs before implementing the CAPT experiment. The figures also postulate that many English phonetics lecturers meet some difficulty in teaching pronunciation, mainly those who are not native speakers of English language and do not know how to use Technology based materials.

Table 2: Descriptive Statistics for Post-test

	EXPERIMENTAL GROUPS	CONTROL GROUPS
MEAN	70.39	48.86

After a period of four weeks a post test was done by the two groups feedback was provided by CAPT, data obtained was used to calculate the mean of both the control and the experimental groups. The mean of the experimental groups was higher than that of the control group. The experimental groups mean was 70.39 and the control groups mean was 48.86; this difference is large and exhibits a difference between the experimental and the control groups in terms of achievement in the tests. Most students in the control group Monophthongized a diphthong to become a monophthong. For example, the researchers observed that the following diphthongs were to a monophthongized, by dropping of the second element and slight lengthening of the first element: /aɪ/→[a:], /aʊ/→[ɑ:], /eɪ/→[e:], /əʊ/→[ɜ:].

The findings show that computer soft wares such as CAPT are very effective in teaching different aspects of language pronunciation such vowel sounds. This results show that technology has “a lot to offer “in an EFL setting. These findings are in tandem with Seferoglu (2005) that found that when students are exposed to the use of technology and more practice/interaction opportunities in their target language through specifically designed software they acquire the native speaker’s pronunciation.

The learners were also taken through triphthongs. A triphthong is a glide from one vowel to another and to a third, all produced rapidly and without interruption. The students were taken through physical pronunciation of five main triphthongs made from five diphthongs with a schwa /ə/ added at the end.

- eɪ + ə = eɪə
- aɪ + ə = aɪə
- ɔɪ + ə = ɔɪə

əʊ + ə = əʊə

aʊ + ə = aʊə

The experimental and control group were asked to try to read and pronounce as the speakers did, and as they did this they were scored. They cared about the scores very much, and these were influenced by speed, fluency, intonation and pronunciation. There was a significant difference in student's achievement in triphthongs after the exposure to CAPT. The words below show the task some common words containing a triphthong sound:

eɪə – layer, player

aɪə – liar, fire

ɔɪə – loyal, royal

əʊə – lower, slower

aʊə – power, flower

The researchers observed that the students in the control group smoothed the schwa /ə/ in all triphthongs. In Received Pronunciation, when a diphthong is followed by schwa (or possibly by an unstressed /ɪ/), a series of simplifying changes may take place, sometimes referred to as smoothing. Next, the following schwa may become non-syllabic, forming a diphthong with (what is now) the preceding monophthong. In certain cases, this diphthong can itself be monophthongized. Thus, most students in the control group changed the original sequences /aʊ/+ə/ and /aɪ/+ə/ to simply [ɑ:] and [a:]. For example, the citation form of the word *power* is /p'aʊə/, but in speech all students in control group pronounced it as as [pɑə] (two syllables or a diphthong), or as a monophthong [pɑ:ə]. Similarly, *fire* /'faɪə/ can reduce to [fæə].

Based on this performance, the researcher suggested that exposure to CAPT had a positive effect on the experimental group. CAPT software enhanced English learners pronunciation. It helped students in selecting what function to employ and how often to utilize it and it also gave them an opportunity to study independently. Moreover, CAPT also presents an interactive learning context in a range of modes, whole class, small group or a pair and teacher to student (Pennington, 1999). It can be viewed, therefore, that CALL has a positive effect on the learning of English phonetics in higher levels.

The next task was for students to learn consonant sounds. The control group learnt both single and paired sounds using the traditional methods. However, the experimental group was taken through consonant sounds by CAPT language teachers and the software. The consonant sounds that were emphasized are shown below:



Source: IPA kiel (2015)

The experimental group was first taken through interactive phonetic chart. The CAPT native speaker first took them through Single consonants sounds that are on the bottom row of the interactive phonetic chart / m/, /n/ ^ŋ /h/ /l/ /r/ /w/ /j/

They are called single consonants because each is produced in a unique way. All single sounds are voiced except /h/. The CAPT language teacher taught single pairs explaining manner and place of articulation. The following words were used to teach single sounds and learners were to repeat appropriately.



as in make, man and money



as in now, need, number, and run



as in thing, young, long, nothing



as in how, health, home, and hold



as in look, real, life and old



as in right, run, already and reach



as in why, one, whether, win



as in you, year, million and continue

The experimental group also practiced the production of /ks/ sound in the words below:



as in boxes, axe, taxi, six, fox, boxer, mix, excitinct, exciting and x-ray

The experimental group also practiced the production of the following paired consonants. Paired consonants are paired because the sounds are produced in similar ways except that the one's on the left are aspirated while the ones on the left are voiced.



as in pat and bat, park and bark and pair and bear



as in time, train, to and dime, drain and do



as in choke and Joke, batch and badge and rich and ridge



as in came, card, cap and game, guard and

gap



as in fan, ferry, leaf and van, very and leave



as in think, through, something and the, another and within



as in ice, last, house (n) and eyes, maize and house (v)



as in she, education, information and television, confusion and vision

The experimental group reported that the CAPT lessons were interactive and the software provided feedback. The two groups were then given a post test on consonant sounds. The results indicate that using CAPT to teach consonant sounds can improve speech intelligibility without explicit practice in production. The results also show that consonant production training using a different environment can also lead to improved speech intelligibility.

For instance, it was amazing how the experimental group could differentiate the following pairs of sound which most Kenyans find problematic



as in as in she, education, information and






as in television, confusion

and vision



The students in control group replaced sound with in word such as **measure, treasure and leisure**. This implies that training learners to perceive English consonants resulted in significant improvement in training consonant. Significant improvement



was also found in  and  and  the which is also problematic to Kenyan students and Kenyans at large. Most students in the control group could not produce the following words appropriately: **Chauvinism, Chef, Charlatans, Chauffer, chores, champagne and charisma**. The context of the sounds in /ch/ differ from the training context along two phonetic dimensions, place and manner of articulation. The results of the present study also show that as students in experimental groups used activities including authentic-examples contexts (real words, phrases, or sentences), they achieved slightly higher scores on the pronunciation post-test than activities based on unreal single words or non-existing sequences of English words. It is therefore evident that CAPT offers more targeted teaching features of language that traditional classrooms are unable to provide.

Conclusion

This paper has reported on an experimental use of a CAPT program and has discussed the program's effectiveness. The CAPT program Pronunciation check is useful for self-study of pronunciation by compensating for the limitations of human conversation partners as correctors of pronunciation. Based on the findings of this study, it can be suggested that computerized instruction is more functional in teaching and learning of English vowels and consonants. The test group (the ones using the software) scored significantly higher on pronunciation and fluency ratings. Based on the results of the participants' evaluation and the capacity of the current CAPT program, it is considered that the program effectively serves the following purposes: practicing a difficult sound on your own, monitoring your own pronunciation familiarizing yourself with new sentence patterns. The current paper therefore recommends that, some aspects of labor-intensive language teaching will need to rely on technological advancements in the foreign-language classroom of the twenty-first century to cope with ever-increasing demands for cost-effective education. Moreover, all universities in Kenya should consider creating a Language laboratory since basing on the researchers findings we argue that CALL and CAPT in particular should become indispensable and never to be replaced by a teacher. The findings of this study also support using the approach of meaningful communication in learning pronunciation aspects of English sound system such as stress, intonation and tone.

References

Ball, M. J., & Lowry, O. (2001). *Methods in clinical phonetics*. London, England: Whurr Publishers.

Catford, J.C., and Pisoni, D.B. (1970). 'Auditory vs Articulatory Training in Exotic Sounds. *Modern Language Journal*. 54/7, pp 447-81.

Catford, J. C (2001). *A Practical Introduction to Phonetics*. Oxford: Oxford University Press.

Celce-Murcia M., Brinton D.M., and Goodwin J. M. (1996). *Teaching Pronunciation: a reference for teachers of English to speakers of other languages*. New York, NY: Cambridge University Press.

Chen, S.H., & Liang, Y.M. (2003). The influence of phonetic multimedia software on the oral conversation of the students in the elementary school: In the case of Talkworks. Proceedings of the Twelfth International Symposiums on English Teaching. Taipei: Crane.

Daniel, J. (1948). "The London school of phonetics". *Zeitschrift für Phonetik* 11(3/4): 127-135.

Davies, G. & Hewer, S. (2011). Introduction to new technologies and how they can contribute to language learning and teaching. In G. Davies (ED) *Information and Communications Technology for Language Teachers (ICT4LT)*, Slough, Thames Valley University [Online]: http://www.ict4lt.org/en/en_mod1-1.htm

Fraser, H. (2000). Literacy versus oral communication skills for ESL learners. *Literacy Link: Newsletter of the Australian Council for Adult Literacy*, 19(3) 4-6. Retrieved from <http://www.eleaston.com/pronunciation/links.html#teach>

Gilakjani, A. P. (2012). The significance of pronunciation in English language teaching. *English Language Learning*, 5(4), 96-107.

Hirata, Y. (2004). Computer assisted pronunciation training for native English speakers learning Japanese pitch and durational contrasts. *Computer Assisted Language Learning*, 17(3), 357–376

Heilman, A.W. (2000). *Phonics in proper perspective*. Ohio: Charles E. Merrill Publishing Company.

Hoffman, P. R., & Buckingham, H. W. (2000). Development of a computer-aided phonetic transcription laboratory. *American Journal of Speech-Language Pathology*, 9, 275–281.

Hsia, C.S., Wang, D. C., & Chuang Y.S. (2004). The perspectives and attitude of students about using speech recognition learning English. Paper presented at APAMALL & ROCMELIA Conference, National Chiao Tung University, Taiwan.

- Johnson, K. (1997). *Acoustic auditory phonetics*. Oxford, England: Blackwell Publishers.
- Kent, R. D., & Read, C. (2002). *Acoustic analysis of speech*. San Diego, California: Singular Publishers.
- Levy M. (1997). *CALL: Context and Conceptualisation*, Oxford: Oxford University Press.
- Lin, Y.C. & Kuo F.L. (2001). The Effect of Two Instructional Methods in Teaching Pronunciation to EFL Adult Learners in Taiwan: A Case Study. Proceedings of the Tenth Conference on English Teaching and Learning in the Republic of China. Taipei: Crane. P.186-201
- Neri, A., Cucchiarini, C., & Strik, H. (2001). Effective feedback on L2 pronunciation in ASR- based CALL. Paper presented at the workshop on Computer Assisted Language Learning, Artificial Intelligence in Education Conference, San Antonio, Texas. Retrieved August 3, 2016, from <http://lands.let.kun.nl/scratch/pubPERcat.php3?cat=1>
- Neri, A., Cucchiarini, C., Strik, H., & Boves, L. (2002). The pedagogy-technology interface in Computer Assisted Pronunciation Training. *Computer Assisted Language Learning*, 15(5), 441-467.
- Neri, A., Cucchiarini, C., & Strik, H. (2003). 'Automatic speech recognition for second language learning': how and why it actually works. Paper presented at the 15th ICPHS, Barcelona. Retrieved August 3, 2016, from <http://lands.let.kun.nl/scratch/pubPERcat.php3?cat=1>
- Pennington, M. C. (1999). Computer-aided pronunciation pedagogy: Promise, limitations, directions. *Computer Assisted Language Learning*, 12 (5), 427-440.
- Pennington, M.C. & Zegarac, V. (1998). What is pragmatic transfer? Conference of the International Pragmatics Association, Reims, France.
- Pisoni, D.B., Lively, E.S. and Logan, J.S. (1994). 'Perceptual learning of non-native speech contrasts: Implications for theories of speech perception.' in Goodman & Nusbaum 1994, pp121-166.
- Raux, A., & Kawahara, T. (2002). Automatic intelligibility assessment and diagnosis of critical pronunciation errors for computer-assisted pronunciation learning. *ICSLP*, 737-740. Retrieved July 20, 2016 from <http://www.isca-speech.org/archive>.
- Rostron, A., & Kinsell, P. (1995). Learning pronunciation using CALL: Some experimental evidence. *ReCALL Newsletter*, 5 (1). Retrieved July 30, 2016 from <http://www.fredriley.org.uk/call/pubs/newsletter/content95.htm>.

Seferoglu, G. (2005). Improving students' pronunciation through accent reduction software. *British Journal of Educational Technology*, 36(2), 303-316.

Stanton, A. (2003). Teaching pronunciation with phonemic symbols. *British Council Teaching English*. Retrieved, 9th June, 2016, from <http://www.teachingenglish.org.uk/think/pron/phonemic1.shtml>

Stibbard, R. (1996). Teaching English intonation with a visual display of fundamental frequency. *The Internet TESL Journal*, 2 (8). Retrieved June 30, 2016 from <http://iteslj.org/Articles/Stibbard-Intonation>.

Stockwell, R., & Minkova, D. (2001). *English words: History and structure*. Cambridge, England: Cambridge University Press.

Zhang, E. (1998). Exploring computer-based browsing systems in the teaching of Chinese pronunciation. *Language, Society and Culture* 3. retrieved July 19, 2016, from www.geocities.com/Athen/Troy/5618/PRONUNCIATION.HTML