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The Use of Computer-Assisted Keyword Technique in Learning Pronunciation of English Weak Forms

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ARTICLE INFO	ABSTRACT
	Keyword technique has been investigated extensively in the literature to examine its effectiveness on second language pronunciation. However, previous studies have not examined how computer-assisted keyword technique could aid second language learner to pronounce weak forms in English accurately. Therefore, this study aims at investigating the effect of computer-assisted keyword technique on acquiring weak forms pronunciation. Sixty Arab learners who learn English as a foreign language participated in the study and assigned into three groups. The first group viewed a video containing weak forms in English dubbed with the first language keyword. The second group was taught weak forms and aided with keyword traditionally. The third group was taught the same content using the traditional way without the keyword. Results of the post-tests indicated that participants in the keyword technique (either computer-assisted or traditionally) outscored the participants who did not use keyword technique. The study concluded that keyword technique either used with the help of a computer or used traditionally, is a useful tool to enhance weak forms pronunciation.

1. Introduction

Pronunciation is a key element in language learning. In addition to other aspects of language such as grammar and vocabulary, pronunciation plays a key role in determining the extent to which mutual understanding occurs among communicators. Regarding this, Lee, Jang, and Plonsky (2015) concluded that pronunciation instruction had a statistically significant impact on language learners[1]. Despite the importance of pronunciation, pronunciation training is mostly ignored in language classes[2]. It should be noted that the goal of teaching pronunciation is not to make learners sound like native speakers of the target language, but rather to enable learners to pronounce the target language in an intelligible way[3][4].

Technology offers several benefits for pronunciation instruction, such as the possibility to receive immediate feedback, individualized instruction, and access to an authentic input. Research need to explore the extent to which tools can be suitable for a given group of learners at a given point in time[5]. This study explores the potential of computer-assisted keyword technique to help English Foreign Language (EFL) learners improve their pronunciation of English weak forms.

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2. Literature Review

2.1 Pronunciation and Foreign Language Learning

Pronunciation is considered one of the primary features when assessing oral communication and spoken proficiency[6]. Indeed, pronunciation is important since mispronunciation may cause misunderstanding. Pennington and Richards (1986) defined pronunciation as the way to utter individual sounds, stress, and intonation patterns of the target language[7]. The purpose of the development of a foreign language learners' pronunciation is not only to imitate one norm of native speakers; but rather to achieve real communication and intelligibility between speakers[8]. The tendency nowadays is to achieve the highest degree of comprehensibility, since sounding like a native speaker is rare and often difficult[9] Comprehensibility, as defined by Derwing and Munro (2005), is a listener's perception of how difficult it is to understand an utterance and comprehensible pronunciation is considered as the chief goal of pronunciation training[10][11] since perfect pronunciation is sometimes impossible and not necessary.

Pronunciation remains a challenging task that many language learners face. Teaching pronunciation is often neglected compared to other skills such as reading and writing in many educational contexts. This is due to the fact many teachers lack enough training in this area, including how to describe intonation and stress of various lexical items[12].

2.2 Keyword Technique

Keyword technique is a technique that is designed to make a strong connection between the unknown word and its meaning. It is defined by Richards and Schmidt (2002) as "a learning strategy in which the learner thinks of a homophone (the keyword) in the native language for the word he or she is trying to remember in the target language"[13]. This technique is basically composed of two steps. First, the new word in L2 is linked to a word (a keyword) in the learner's first language which sounds like a part or the whole of the new word. Second, learner needs to think of a visual image where the meaning of the new word and the meaning of the keyword is combined[14]. Atkinson, Raugh and Schupbach (1975) proposed the following criteria for keywords: (a) the keyword sounds as much as possible like a part (not necessarily all) of the foreign word; (b) it is easy to form a memorable imagery link connecting the keyword and its English translation and (c) the keyword is unique (different from other keywords used in the vocabulary[15].

Keyword technique has a positive impact on both im-

mediate and long-term retention. Beaton, Gruneberg, and Ellis (1995) concluded that even after ten years without opportunity for use, some memory for words learned by keyword technique remains[16]. Keyword technique is more powerful and easier to be used. Wang and Thomas (1995) found that the keyword technique took less time and gave better results for immediate recall and on a long-term measure[17]. Keyword technique as a way to enhance vocabulary learning has been examined by several studies[18][19][20][21][22][23][24][25]. The findings of these studies indicated that the keyword technique was effective, and learners' scores were higher in the case of experimental groups in both immediate post and delayed post-tests. The implementation of keyword technique has been examined for young children[26][27], teenagers[28], adults[29][23], and the elderly[31]. In addition, the effect of Keyword technique was examined to students with learning disabilities[31].

Although keyword technique has a lot of benefits, its effectiveness has been questioned in several studies. For example, Hall (1988) argued that the keyword technique can lead to poorer performances when it is used as the exclusive vocabulary learning method[32]. Other studies indicated that the keyword technique could produce similar or inferior results compared with traditional learning methods (rote learning), and that experienced language learners benefited less from the keyword technique than the inexperienced learners[33][34][35].

2.3 Computer-Assisted Pronunciation Training (CAPT)

Pronunciation learning can be enhanced with the help of a computer. The use of the computer in pronunciation learning can provide language learners with opportunities to practice L2 pronunciation in an effective and interesting way[36]. The use of computer has been recognized by many researchers as a beneficial tool for learning L2 pronunciation, as it has several characteristics that help L2 learners increase their performance in pronunciation. These characteristics can be categorized according to the following procedures: input, output, and feedback. Computer offers several opportunities that provide language learners with abundant input. Based on Input Hypothesis proposed by Krashen (1987), the basic component of successful language learning is input[37]. Learners need to be exposed to an abundant amount of L2 input. Using the computer to aid pronunciation learning can provide language learners with adequate authentic and contextualized spoken input.

Using CAPT enables language learners to access their own and others' pronunciation performance. It also offers a considerable promise for language pedagogy as a medium for improving language learners' productive and

receptive competence in the pronunciation of the target language[38], as well as providing visual displays of various speech patterns[39]. In addition, CAPT has a range of advantages that create new opportunities for language learners. Firstly, it is quick in performing, analyzing and giving language learners feedback far faster than a teacher can do. Secondly, tasks can be repeated, and they are also precise and reliable in the sense of being the same every time. Pennington (1999) summarizes the properties of CAPT as the following: quick, repeatable, precise, reliable, authoritative, highly salient, multi-modal, individual and variable[38]. Luo (2016) found the CAPT particularly useful for reducing non-native English language learners' mispronunciation errors when compared to in-class only instruction on pronunciation[40]. Pi-Hua (2006) commented on the usefulness of CAPT for learners and teachers, with learners being able to practice independently and individually, while teachers can use it for assigning drilling practice, which is considered by some teachers to be overwhelming and time-consuming[41]. CAPT is also useful for providing language learners with correct and reliable feedback. Neri, Cucchiarini, and Strik (2008) tested the pedagogical effectiveness of automatic corrective feedback on segmental quality using CAPT[42]. The findings revealed an improvement in learners' pronunciation accuracy because of the training and spontaneous feedback they received. CAPT is also useful for enhancing speaking skills, as Fouz-González (2015) suggested that technology can assist learners in their productive practice[43]. One of the most well-known techniques is automatic speech recognition technology.

2.4 Weak Forms

Weak forms are one of two possible pronunciations for a word, in the context of the connected speech, the other being strong. The weak form is that which is the result of a word being unstressed, as in the normal pronunciation of the preposition of in cup of tea, and in most other grammatical words. Several words in English have more than one weak form such as (and /ænd/ can be /ənd/,/ən/, or /n/). In English, certain words can be pronounced in two different ways; strong form and weak form[44]. For example, students may not recognize /kəm n si:/ as come and see. This aspect is considered one of the difficulties that many Arab EFL learners face. It affects comprehending sentences containing weak forms[45]. Thus, it is important for EFL learners to be aware of weak forms.

2.5 Dual Coding Theory

Several theoretical rationales have been advanced to encourage the use of computer-assisted language learning.

In his Dual Coding Theory (DCT), Paivio (1971, 1986) stated that the keyword method explicitly brings into play both verbal and imaginal processes[46][47]. He argued that the acoustical similarities between the first language (L1) keyword and the target word affects the development of vocabulary in the second language (L2) and direct relationships between L1 and L2 referents. He also argued that the use of mental images creates appropriate referential interconnections between L2 verbal representations and the imagery system.

Cognition according to DCT involves the activity of two distinct subsystems, a verbal system specialized for dealing directly with language and a nonverbal (imagery) system specialized for dealing with nonlinguistic objects and events. The systems are assumed to be composed of internal representational units, called logogens and imagens, that are activated when one recognizes, manipulates, or just thinks about words or things. The representations are connected to sensory input and response output systems as well as to each other so that they can function independently or cooperatively to mediate nonverbal and verbal behavior. The representational activity may or may not be experienced consciously as imagery and inner speech. The theory means that both systems are generally involved even in language phenomena.

2.6 Computer-assisted Keyword Techniques and Pronunciation

The combination of keyword technique with other strategies proved as efficient in aiding the information retention and recall over a period of time[48]. Therefore, using computer as an environment for keyword technique can be useful and create opportunities for language learners improve their achievement in language learning. The effect of the combination of keyword technique and computer in promoting EFL pronunciation has not yet thoroughly examined. The present study is an attempt to fill in this gap and explore the effect of using computer as an environment to present keyword for EFL pronunciation. The study seeks to answer the following research question: What is the effect of keyword technique on FL learners' pronunciation of English weak forms?

3. Methods

3.1 Research Design

This study follows the experimental design of the study in which three intact EFL university classes were randomly assigned to one of three groups: computer keyword technique, traditional keyword, and no keyword. The experiment was conducted for a month, as shown in Figure 1.
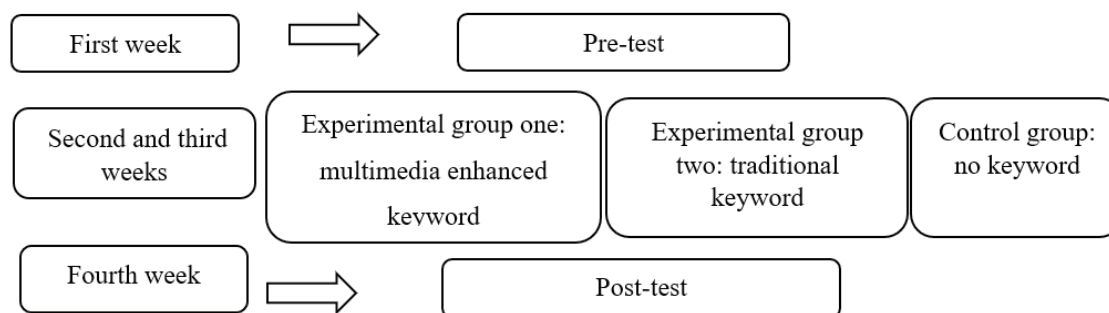
Figure 1. Study Design

In this study, the Keyword is the dependent variable and the independent variable is the use of computer as an aided technique to the Keyword. The dependent variable is a variable, which is observed to determine what effect the other types of variables may have on it. The dependent variables are the conditions or characteristics that appear, disappear, or change as the experimenter introduces, removes, or changes the independent variable.

3.2 Participants

The participants in the present study were 60 students from three intact EFL classes from three different colleges of University of Bisha, Saudi Arabia. The study was conducted in the first semester in the academic year 2018/2019. Their ages ranged from 19 to 24 years old. Twenty students were fe-male, and 40 students were male. Their average proficien-cy in English was categorized as intermediate based on the documents of the department. These students had been studying EFL for more than 7 years. Three experienced EFL instructors participated in the study. Each instructor used one different method to present the weak forms in his class.

3.3 Procedures

One class was held with the EFL instructors prior to the beginning of the study. In the first session, the pretest was distributed to all groups. The pre-test was administered in one regular session prior to the treatment. The participants were asked to read aloud ten sentences and record them. Their recordings were saved on the desktop in the language lab to be used later in the analysis. In the second and the third sessions, the weak forms were introduced (fourteen weak forms in each session). The same content was taught for all groups. However, participants in each group were trained with a different technique. Participants in the computer keyword group were instructed to watch a video which contained a speech of a native speaker of English. At any point where a word pronounced in a weak form, a short video clip with a keyword was added. The clips were added successively (i.e. the weak form in English was articulated and immediately a clip with a keyword was added). Participants in the traditional keyword group were taught weak forms using keywords traditionally. The instructor explained the weak form and presented a word that can be used as a keyword to enhance learning weak forms. No video was used to show the pronunciation of the weak forms in this group. Participants in the control group were taught weak forms traditionally. The instructor explained the weak form and pronounced them orally and the learners should repeat the correct way of pronunciation of weak forms. No video was used to show the pronunciation of the weak forms in this group. In the fourth session, the post-test was administered. The participants were asked to read aloud the same sentences as they appear in the pre-test and record them. Their recordings were saved on the desktop in the language lab to be used later in the analysis.

3.4 Testing Procedure

The test was developed by the researcher based on the sentences given in the textbook[44]. The pre-test consisted of ten sentences (see Appendix A). These sentences contained 22 words that can be pronounced either strong or weak form. These sentences were presented in a random order to each participant and making sure that participants did not realize the real purpose of the test which was intended to test their pronunciation of target words. To evaluate the participants' improvements in weak forms pronunciation, the participants were asked to read and record a set of ten isolated sentences. After two sessions, a post-test for the three groups was administered to test participants' pronunciation of the weak forms. Again, their responses were recorded for further analysis.

3.5 Recording and Scoring

In the pre- and post-tests, the participants were asked to read the sentences aloud and record them. The recordings were made in the computer lab using head-mounted microphones. Head-mounted microphones were used to maximize the robustness of the recordings. The recording steps were performed as follows: First, the participants were asked to check the equipment by recording two short sentences which were not included in the tests. Second, the participants were asked to read aloud the sentences of the test. If the learner felt that he had not pronounced the sentences correctly, he or she could repeat them and record them as many times as needed. Third, each participant should record all the ten sentences and saved them in one file. By the end of the study, each participant would have two files: one for pre-test, and the second for the post-test. After recording, these files were given to three raters. The recordings were scored independently by three non-native speakers of English. Each rater was asked to provide a score of pronunciation quality of each sentence on a 5-point scale based on Isaacs, Trofimovich, and Foote (2017)[49].

Table 1. Isaacs et al. (2017) Comprehensibility global and analytical scale

Comprehensibility level	Overall description of comprehensibility
5	Speech is effortless to understand.
	Errors are rare and do not interfere with the message.
4	Speech requires little effort to understand.
	Errors minimally interfere with the message.
3	Speech requires some effort to understand.
	Errors somewhat interfere with the message.
2	Speech is effortful to understand.
	Errors are detrimental to the message.
1	Speech is painstakingly effortful to understand.
	Errors are detrimental to the message.
UR	Unable to Rate the speech.

The raters' scores were first analyzed to determine inter-rater reliability. A Cronbach's alpha coefficient of .88 was obtained, which can be considered good.

3.6 Data Analysis

Descriptive and inferential statistical procedures were performed in this study to determine the effect of keyword technique on EFL pronunciation. An ANOVA was conducted to determine the significance of the differences among groups and to which this significance referred to. An ANOVA describes a group of inferential statistical procedures which is used to analyze data from designs that involve two or more groups. Analysis of variance is a parametric statistical procedure for comparing two or more group means to see if there are any statistically significant differences among them.

The level of significance was .05 for all statistical analyses. These results will be discussed in the next section.

4. Results

To answer the research question of whether the students' pronunciation was improved as a result of the use of computer-assisted keyword technique, the mean and standard deviation across pre- and post-tests showed variation in the students' performance (Table 2). The use of Keyword technique was assigned as the between-subject variable, whereas the time of the tests was assigned as the within-subject independent variable. Levene test was used to examine the normality of the distribution. The results of the tests indicate that the data is normally distributed as p=.99 p >.05).

Results showed that a significant main effect of keyword technique existed from the pre-, and post-test designs. Results from ANOVA revealed that a significant main effect existed among the three types of keyword technique use. The computer-assisted keyword technique (CAK) and traditional keyword technique (TK) groups significantly outscored the no keyword technique (NK) group in the post-test (M = 39.3, 38.2, SD =3.37, 3.13 respectively). The performance of the CAK group over time was slightly higher than that of the TK group but the difference was not significant (MD =1.10, p=.273). The effect size was 1.9, which indicated a large effect of using the computer-assisted keyword in learning pronunciation.

Table 2. Descriptive Statistics of the Students' Performance of L2 Pronunciation Tests

	CAK (N = 20)		TK (N = 20)		NK (N = 20)		All Groups	
	M	SD	M	SD	M	SD	M	SD
Pre-test	12.8	2.78	12.6	2.72	12.48	2.56	12.48	2.66
post test	39.3	3.37	38.20	3.13	33.05	2.89	36.85	4.13

Table 3. ANOVA Results for L2 Pronunciation Tests

	Df	MS	F	P
Between groups	2	222.65		.000*
Within groups	57	9.86	22.56	.000*

The level of sig. = .05

Table 4. Tukey HSD Post-hoc Test

Dependent variables	(I) Keywords	(J) Keywords	Mean Differences (I-J)	Sig.
Keyword post-test	Computer KW	Traditional KW	1.10	.513
		No KW	625	.000
	Traditional KW	Computer KW	-1.10	.513
		No KW	5.15	.000
	No KW	Computer KW	-6.25	.000
		Traditional KW	-5.15	.000

The mean difference is significant at the of .05 level

Post-hoc pairwise comparisons using Tukey HSD yielded significant differences among the three groups over time (Table 4).

5. Discussion

This study sought to examine the effects of computer-assisted keyword technique on the pronunciation of English weak forms. Three groups participated in this study to find out the effect of computer-assisted keyword technique on the pronunciation of English weak forms. The results revealed that the positive impact of the keyword in both conditions (i.e. computer-assisted keyword or traditional use of keyword) on the pronunciation of weak forms. Both groups who used keywords as a technique to aid weak forms pronunciation outperformed the students in the group where no keyword was used. However, no statistically significant difference between computer-assisted keyword technique and traditional keyword technique, the scores of the students in the group used computer-assisted keyword technique are slightly higher. This indicates that computer-assisted keyword technique can be more useful in learning L2 pronunciation.

The study results are in line with Paivio's dual coding theory[46][47], which assumes that information is coded dually in the human mind either verbally (i.e., text and sounds) or non-verbally (i.e., picture and objects). These two systems are interconnected when words are represented by one system and can be activated by the other system or vice-versa (e.g., verbal activated by non-verbal). In this study, students' scores in computer-assisted keyword were slightly higher than the scores in traditional keyword because visual information (L1 keyword clip) was coded with verbal information (English pronunciation of weak forms). However, the students learning with no keyword mode performed worse on the pronunciation post-tests, as information was only presented traditionally (verbally). This study's findings demonstrate the significant benefits of using the keyword technique to assist English weak form pronunciation.

6. Conclusion

This study explored the effectiveness of learning pronunciation with keyword technique to enhance pronunciation improvement. In general, keyword technique had been found an effective tool to aid L2 pronunciation and it is more effective than no keyword used. However, the computer-assisted keyword was found slightly superior to the traditional keyword to facilitate weak forms pronunciation. The participants learned pronunciation better when they used computer-assisted keyword than when they used traditional keyword technique.

6.1 Pedagogical Implications

This study has generated several pedagogical implications for foreign language teachers.

L2 instructors might benefit from the results of this study to present material in a way that enhances pronunciation. One of the pedagogical implications for L2 instructors is to use both types of keywords (computer-assisted or traditional) to teach pronunciation. The teachers should make the keyword salient in the video presented to help the learners match the pronunciation of the weak forms accurately.

6.2 Limitations and Suggestions for Future Studies

There were several limitations to the current study. First,

the small number of participants may threaten the validity of the study findings. Thus, a study with a large sample size would yield stronger evidence to generalize the findings. In this study, only one mode for a computer-assisted keyword was used (video L1 dubbing). Therefore, the study recommends that further studies investigate the impact of different modes (e.g. video + text that contains phonetic symbols) on learning pronunciation. The study suggests that further research explore the effect of computer-assisted keywords on learning pronunciation among young learners because age is a crucial factor for learning pronunciation.

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Appendix A (Sentences for the Pre- and Post-Test)

1- We can wait for the bus.
2- There are some books I must read.
3- She took her aunt for a drive.
4- The basket was full of things to eat.
5- You ought to have your own car.
6- He wants to come and see us at home.
7- Have you taken them from that box?
8- It's true that he was late, but his car was broken.
9- I shall take as much as I want.
10- I am too late to see him today.