

as multimedia facilities.

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hence, it can be concluded that EFL learners' performance has shown reasonable improvement. (Figure 1);

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t-test for paired samples (experimental group) (Figure 1)

Variable	Number of pairs	Corr	2-tail Sig	Mean	SD	SE of Mean
POST 1	35	.811	.000	15.7143	3.064	.518
PRET 1				13.3429	2.667	.451

Paired Differences

Mean	SD	SE of Mean	t-value	df	2-tail Sig
2.3714	1.800	.304	7.79	34	.000
95% CI (1.753, 2.990)					

T-test for paired samples (control group):

As it goes without saying the magnitude of the calculated T value which is 1.22 reveals no noticeable changes. (Figure 2)

t-test for paired samples (control group) (Figure 2)

Variable	Number of pairs	Corr	2-tail Sig	Mean	SD	SE of Mean
POST 2	35	.858	.000	13.1429	2.881	.487
PRET 2				12.8000	3.225	

Paired Differences

Mean	SD	SE of Mean	t-value	df	2-tail Sig
.3429	1.662	.281	1.22	34	.231
95% CI (-.228, .914)					

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Also, the scores were submitted to computer to carry out a T-test in order to capture and compare the means of two groups to find out whether the differences are due to normal and inherent differences which may naturally exist in both groups, or the magnitude of this

difference is large enough to show the effect of apparently the only extra variable, i.e. *CALL TECHNOLOGY*, in experimental group.

T-test for the scores obtained from both groups' post tests:

The table of T-distribution reveals that since the t-value of 3.81 exceeds the T critical of 2.000 for a non-directional test at 0.05 level of significance at 68 degrees of freedom, the hypothesis is conformed, that is:

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t-test for paired samples (both groups' post tests)

Variable	Number of pairs	Corr	2-tail Sig	Mean	SD	SE of Mean
POST 1	70	.098	.575	15.7143	3.064	.518
POST 2				13.1429	2.881	.487

Paired Differences

Mean	SD	SE of Mean	t-value	df	2-tail Sig
2.5714	3.995	.675	3.81	68	.001
95% CI (1.199, 3.944)					

Since *Call* speech analysis is a self-speech therapy, it may save a lot of time, budget and energy. It increases learners' autonomy & self confidence; debilitating anxiety will also be eliminated.

CALL SPEECH ANALYZER and self-speech analysis can be useful for TEFLers who want to improve their students oral skills as well as their own pronunciation power. They can also be useful for test developers who prepare tests of speaking & listening comprehension.

Ergonomical studies may find *CALL SPEECH ANALYZER* quite helpful as well.

And finally, the outcome of this investigation can be fruitful for institutions, colleges or universities which prepare materials as well

forms without trying to compare differences in volume.

When learners are comfortable with their ability to make the sound, they proceed to the four different exercises from the *exercise menu* practice saying and hearing the sounds in words and sentences. The exercise menu allows learners to enter into any of the four exercises. It is suggested that they first practice Sample Words, then practice Comparative Words, then proceed to the Listening Discrimination and finally, Practice Sentences.

In his Ph.D. dissertation, Baradaran (1999) verified the impact of speech analyses via CALL technology on improving Iranian sophomore EFL learners' pronunciation power. Therefore, in a TRUE EXPERIMENTAL *research* first the researcher chose seventy sophomore university students from amongst Iranian sophomore EFL students of Tehran Azad University (Central Branch) via simple random sampling procedure. Next, they were divided randomly into two groups: control group & experimental group.

Since a lot of probable variables may exist which can not be controlled and hence they may affect the outcome of the research and hence decrease internal as well as external validity of the research findings, randomization procedure was applied to give all individuals with different variables and traits an equal chance to be chosen which indirectly distributes all these issues evenly in the samples

to lessen the impact of them on the outcome of the research to the least which will automatically increase the most important features of any scientific study, i.e. internal as well as external validity.

Both experimental and control group attended a listening pre-test to capture the initial differences of both groups. The experimental group received the *TREATMENT*, i.e. speech analyses via *CALL* Technology. The control group received the *PLACEBO*; Placebo is harmless substance given as if it were medicine to calm a patient who mistakenly believes s/he is ill. In this research the placebo was the traditional mould of correcting pronunciation, i.e., making mould on the teacher, on the spot correction as well as peer correction.

After a period of four months, a computerized test of pronunciation was administered to both groups.

In order to compare the means of scores in each group before and after the experiment separately, the scores obtained from pre-test as well as post-test were submitted to computer to carry out a T-test by *SPSS* under *WINDOWS* 98 for each individual group.

T-test for paired samples (experimental group):

The calculated T value of 7.9 is more than the T critical value of 2.042 for a two-tailed test at 0.05 level at 34 degrees of freedom;

and select it by clicking on it. All 52 sounds necessary to speak English are listed in the main menu. Each sound is represented by a sound symbol in an English word containing the sound. English letters (there are 26 in the alphabet) do not necessarily correlate to English sounds; therefore, symbols have been used to indicate the sounds in the program. As many IPA (International Phonetic Alphabet) symbols have been used as was practically possible. Learners proceed to lessons' screen to learn how sound is made through the aid of a *side view animation and the front view video*. The side view animation shows a cross sectional view of how the sound is made by the movement of the different parts of the mouth. The "description" on the right details the mechanics of how to use mouth, tongue, lips and voice to make a specific sound. A special help button allows learners to view a legend which uses the various parts of a mouth and air flow symbols as well as a quick reference of the buttons shown on the control bar used to play the animation. This control bar is the same on the front view video. The front view video allows learners to watch to the mouth and lips of the female while she is voicing a sound. The "suggestion" of the right side will provide useful tips for making the sound or warn you of the mistakes most commonly made. A female with a different voice from the instructor has been used for the video to provide the opportunity to hear the sound made with different volume and intonation.

Then learners are ready to practice making the sound in *speech analysis*. They will be able

to visually and audibly compare their sound to the instructor's using the **wave form technology**. *The speech analysis screen is intended to be a visual aid for the process of learning how to pronounce a sound correctly*. They are able to record their voice as they pronounce a sound and a waveform will be created to represent visually what their recording looks like. It's important, however, that they use both visual and auditory skills. It is necessary to compare their voice to the voice of the instructor in addition to comparing their waveform to the waveform of instructor. If the learners have mispronounced a sound, they should be able to see the difference between their waveform and that of the instructor's and then be able to hear why there's a difference. A waveform is a graphic representation of the sound. It consists of two fundamental parts: **amplitude** and **frequency**. The amplitude is a measure of the relative strength or loudness of the sound. This means that the louder the result, the larger the height of the waveform. The frequency refers to the number of cycles (the distance between two peaks) in a waveform measured over a period of time. The frequency is often referred to as the pitch of a sound which suggests the highness or lowness of the sound. Therefore, the higher the pitch, the higher the frequency. Speech analysis program uses the normalization feature which graphically amplifies a waveform to fill the height of the display in which it is shown. In essence, the normalization feature will simulate a level of volume which would fill the display screen. As a result, it is possible to compare two wave-

years of research in the application of voice-activated machinery to language education. He knows that traditional methods of correcting students' pronunciation rely heavily on subjective evaluations (e.g. teachers saying "no, no that's not right", say it "like this"), or students having to recognize their own errors in a language lab exercise by comparing their pronunciations to that of a native speaker on a master tape.

The result is that many errors go undetected and become fossilized. A computer displays of pronunciation, comparing a native speakers, with students, can give the students objective information about the location, extent, type, and significance of the error as well as the progress made in correcting the error.

Pronunciation Power

Pronunciation power is a user friendly interactive program which will allow learners to gain maximum ability in speaking clear English. The program lets learners hear the sound and understand how the sound is made using the structure of the lips, tongue, and jaws. It offers a variety of exercises that they can practice *at their own pace*.

Pronunciatio power is designed to cover the most serious pronuciation problems of most language learners, to practice **52 sounds** necessary to pronounce English words clearly, to provide a link between listening and speaking, to provide speech adjustment techniques, and finally to improve speaking and listening skills.

While using this program, learners should keep in mind that the English language is complex. English spelling is often unusual and pronunciation of words should not be confused with their spelling. For example, *threw* and *throug*, although spelled differently, are pronounced the same. As well, identical letters or letter clusters in words do not always produce the same sound, for example. *the ough* in *though* and *through* represents a different sound in each word. Learners should learn to practice what they hear not necessarily what they see. Learners should imagine a sound in their mind before they say it. They should try *to visualize the positioning of their mouth and face*. They should think about how they are going to make the sound. Learners listen to and try to imitate the instructor. In addition to listening for specific sounds, learners should pay attention to pauses, the intonation of the insturctor's voice and patterns of emphasis. This can be just as important as the pronunciation of sounds. The English language has many different dialects and words can be pronounced differently. It is important, however, that words are pronounced and spoken clearly to ensure *effective communication*; hence, learners should know that pronunciation power is *only* a tool. Finally, learners must practice what they are learning; in fact. they teach their mouth a new way of moving.

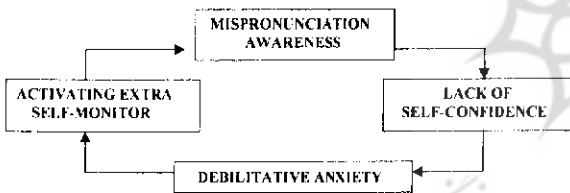
The main process of practicing is as follows:

First, learners identify the sound they would like to practice from the *main menu* of sound

as an obstacle in the process of learning.

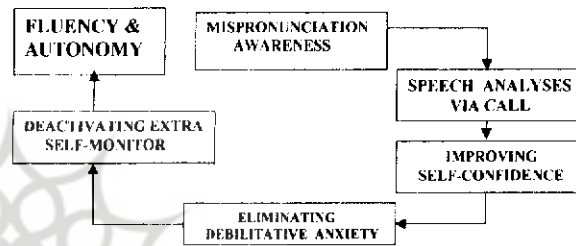
Even if all TEFLers in Iran be native-like, on the spot correction, and in some cases even peer correction may lead to anxiety.

Learners awareness of their own pitfalls, i.e. mispronunciation, affects their self-confidence and adds to their anxiety whilst involved in oral communication. This debilitating anxiety decreases EFL learners self-actualization. Meanwhile, they may appeal to self-monitoring more than necessary which may lead to more mispronounced words. Hence, unintentionally, the EFL learners may get involved in a *witches' circle*:



CALL Technology has provided TEFLers as well as EFL learners with appropriate software in order to eliminate all these shortcomings. As self-speech therapists, EFL learners navigate through speech analyses, lessons, or exercises. They work on both citation from and connected speech via multimedia equipment. They learn place of articulation as well as manner of articulation graphically; and finally, they record their own pronunciation and compare the sound and wave form of their own with that of the genuine speech. They follow the procedure till the time they pronounce words correctly. Since they are

involved in self-speech therapy, (i. e. no audience attend the sessions), and they are provided with appropriate evidence to verify their pronunciation, the debilitating anxiety will be reduced to the least which automatically removes the extra-self monitor and hence leads to fluency. The following diagram reveals how CALL Technology breaks the magic spell:

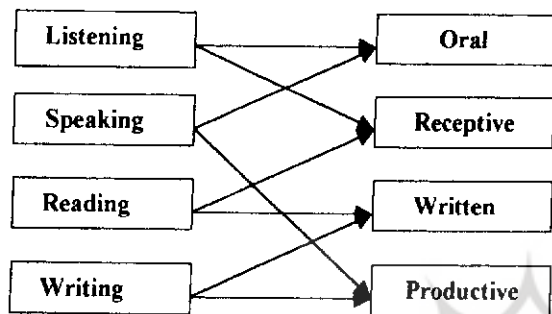


CALL, Computer Assisted Language Learning, has opened new horizons of success and has introduced innovative avenues towards TEFLers as well as EFL learners' autonomy in an anxietyless environment.

The fastest growing areas of research in computer technology is speech recognition (i.e. getting computers to recognize and understand human speech). This current focus has led to the commercial development and production of voice activated machinery.

Fortunately it has also spawned some practical applications for the teaching of pronunciation. Hardware and software for teaching both segmentals (i. e., individual sounds) as well as suprasegmentals (i. e., intonation, stress and rhythm) are emerging. Molholt (1988), for example reports on four

not able to discriminate between different speech sounds and cannot distinguish them from amongst the other speech sounds used in the stream of connected speech, therefore, they miss most of them.



As the following diagram reveals, all language skills, i.e. listening, speaking, reading and writing, are interrelated:

Therefore, any sort of deficiency in one of these skills inevitably affects the whole network either directly or indirectly.

The two main oral skills, i.e. listening & speaking, are closely interrelated; it seems that they both tap the same mental faculties in psyche. In order for a language learner to be able to enunciate any word correctly, first s/he must hear and perceive it correctly, otherwise, s/he will have no efficient paradigm to make mold on. Hence, this is crucial for EFL learners to be exposed to genuine language so that they can grasp the appropriate pronunciation of words both in isolation and in connected speech.

But, solely being exposed to genuine language and understanding the correct pronunciation do not guarantee the comprehensible and appropriate enunciation of the required output, i.e. words and sentences. Language learners should be able to produce the language and verify it based on some genuine and dependable criteria. The traditional mould is that usually teachers, via applying different techniques, make corrections, which may have two main shortcomings: *first*, Language teachers are not always available; *second*, teachers themselves might have some pitfalls regarding their own pronunciation, especially non-native teachers. Further more, one of the unique properties of human psyche is metacognition, (human psyche can monitor its own function and progress). For instance, when we are involved in questions such as:

Am I learning anything? Am I improving in this respect? Is What I am doing correct?

We sure have some conscious alertness of our pitfalls. This conscious alertness of one's own pitfalls makes EFL learners hesitant whilst involved in an oral discourse, therefore, they falter since they are involved in monitoring and verifying their own production. They can pinpoint their own defects regarding language production which may lead to anxiety. Of course, not all kinds of anxieties are inappropriate. In fact, one may not study for examination if s/he does not care for what may come up as the final result. Generally, there are two kinds of anxieties: *facilitative anxiety* and *debelitative anxiety*. The latter can function

Schwa is especially difficult to identify when it occurs internally in a sentence and appears adjacent to another vowel. Note the following sentences which compare and contrast the name "Ann" and "Anna":

1. Have you seen Ann? Have you seen Anna?
2. Is Ann coming tomorrow? Is Anna coming tomorrow?

These sentences differ only by the schwa in Anna, and it is not hard to identify them accurately in the sentence pairs above. But if the schwa occurs internally and is adjacent to another vowel, it is much more difficult to hear:

Is Ann over the Flu? Is Anna over the Flu?

And if the adjacent vowel is another schwa, the difficulty is increased. Native speakers find the distinction easy, for most second, an especially foreign language students it is a demon.

"One of the difficulties ESL students consistently encounter is hearing and identifying the weak stressed particles that abound in spoken and written English. These particles are almost always reduced with a schwa replacing the full vowel that would appear in a citation form; (Bown, 1985, p:88)".

Besides vowel reduction, there are other features of connected speech such as *Liaison*, *Elision* and *Assimilation* that make them quite

different from well-pronounced sentences.

Liaison refers to the linking of words in speech, in particular when the second word begins with a vowel. For example, in English, the phrase "an egg" is often pronounced [əneg] with no noticeable pause between the two words.

Elision refers to the leaving out of a sound or sounds in speech. For instance, in rapid speech in English, "suppose" [səpəʊz] is often pronounced as [spəʊz] or "factory" [fæktəri] as [fæktəri], and "mostly" [məʊstli] as [məʊsli].

When a speech sound changes and becomes more like another sound which follows or precedes it, this process is called assimilation. For instance, in English the negative prefix [im] before words such as possible; appears as impossible. As "Possible" starts with a bilabial sound, the prefix [im-] ends in a bilabial sound which is [m]. Before words like "tolerant", however, the prefix is [in-] and it becomes intolerant. As tolerant starts with an alveolar sound, the prefix [in-] ends in an alveolar sound which is [n]. As the following sounds bring about the change, this process is called "regressive assimilation". On the other hand, the difference between the [s] in the English word "cats" and the English word "dogs" are examples of "progressive assimilation" because the preceding sounds bring about the change.

Being totally ignorant of the aforementioned features of spoken English, EFL learners are

means for the improvement of the Iranian students pronunciation power.

Today, nobody ignores the role of technology in improving all aspects of human life and in this regard TEFLing is not an exclusion. CALL, i. e. Comoputer Assisted Language Learning, has opened new horizons of success and has introduced innovative avenues toward TEFLers as well as EFL learners' autonomy in an anxietyless environment.

Since EFL learners in Iran are not frequently exposed to genuine input, they lack enough criteria to verify their own production of the target language; the inevitable outcome of this defective process of TEFLing is the great number of university graduates in the field who have grown up on a pile of mispronounced words originated in ineffective teaching as well as molding on mute phonetic symbols in different dictionaries. The differences between CITATION *form of words* and their enunciation in connected speech adds to the dilemma. Words in English have two forms, *Strong form* and *Weak form*. The form in which a word is pronounced in isolation is called its *citation form*. But in connected speech many alterations may occur. The vowel of a word may be reduced to a schwa ə, or it may completely disappear. Hence, for instance the word, "And", in its reduced form, may be pronounced as [ənd], [ən], or [n]. Thus, there is a strong form that occurs when the word is *Stressed*, and there is also a weak form when the word is *Unstressed*. For instance, the phrase "bread and

butter" can be pronounced as:

Bread [ənd] butter, Bread [ən] butter, Bread [n] butter

Many words are like "And" in that they seldom maintain their citation form in conversational speech.

"If we were asked to pick out the one feature of English that most troubles foreign students who come to an English speaking country for advanced level educational training, we would without hesitation name the combination of weak stress and the vowel Schwa. Both of these features of spoken English are well-kept secrets. As far as many visiting students and most visitors whose English has been acquired in foreign schools, report a difficult adjustment when they first come to the United States, Britain, etc. A good part of this listening deficiency, is due to complete innocence about the stress and vowel combination in weak-stressed syllables. (Bown, 1985, pp: 85, 86)".

"The combination of reduction (i.e., substitution of Schwa for the vowels) and the very short and rapid pronunciation of the affected syllables is to a great extent responsible for the problems of oral comprehension that plague new comers who have not been informed of vowel reduction in English. This is a major problem that deserves a high priority in both listening and speaking activities. Special drills can be devised to help students sharpen their listening skills, with additional attention on examples of weak-stressed schwa (Bown, 1985, p:87)".

activity, in which the learner can take a more active role. Pemberton (1996:3) defines self-directed learning as "the techniques used in order to direct one's own learning". It refers to "learning in which the learners themselves take responsibility for their own learning". Thomson (1996: 78) also believes that "Autonomy" is often used interchangeably with self-direction, and it refers to the ability to take charge of one's own learning. Again Pemberton (1996:3) states that "Autonomy" is a capacity for self-directed learning and is a way of organizing learning.

In the past few years, however, the widespread adoption of communicative approach to language teaching has brought renewed urgency to the teaching of oral skills, i.e. listening and speaking. As a result, for the better establishment of proper and appropriate communication between interlocutors in an oral discourse and at the same time for the more appropriate and effective grasp of the oral stimuli, the teaching of pronunciation has been the most fundamental concern of the TEFLers, since without proper pronunciation, communication amongst interlocutors will face problems. For the teaching of pronunciation, one empirical study suggests that there is a threshold level of pronunciation in English such that if a given nonnative speaker's pronunciation falls below this level, he or she will not be able to communicate orally no matter how good his/her control of English grammar and vocabulary might be (Hinofotis and Bailey, 1980). According to Kenworthy

(1987: pp4-8) there are some variables that seem to impede or enhance the acquisition of a reasonable pronunciation in English. These variables include: The learner's native language, age, exposure, innate phonetic ability, attitude, motivation and concern for good pronunciation. Up to now, about teaching pronunciation to nonnative learners, different techniques such as "listen" "imitate and repeat", "tongue twisters" and "minimal pairs", etc which are used and practiced in direct approaches and audio-lingual method of instruction have been proposed about teaching pronunciation to nonnative learners. Widespread drilling of the vowel shifts and stress shifts is another technique proposed by the early work in generative phonology (Chomsky and Hale, 1968). While useful, on a limited individual basis for purposes of correction and drill, none of these techniques is truly compatible with the communicative approach to language teaching or will directly meet the needs of the groups of the learners. What has to be done, therefore, is to apply the most useful and usable techniques, along with some new and innovative means.

Regarding the nature of the communicative language teaching, as an approach that emphasizes meaningful interaction and information exchange, and the fact that effective communication, below a certain level, can not take place without correct pronunciation, even if the interlocutors have a desirable grammar and mastery over vocabulary, the researcher decided to take advantage of technological

The Impact of CALL Technology on Improving Iranian EFL learners' Pronunciation Power

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In recent years language teaching and especially English language teaching has been notoriously prone to rapid and very disconcerting changes of fashion. For teachers and learners, the results of such rapid changes have been disturbing, and often damaging. In particular, as we approach the beginning of twenty first century, English language teaching is still suffering the disruptive effects of two beliefs which, gaining currency from the 1970s onwards, have effected a major change. One is that language is best acquired when a student is exposed to "authentic" or "natural" language. The second is that the use of such language, both in production and reception, entails a focus upon meaning and purpose rather than on form. With these two beliefs, two different theoretical pedigrees converts: The social-linguistic theory of communicative com-

petence (Hymes 1972) and the psycholinguistic theory of natural second language acquisition (Krashen 1982).

These two beliefs may lead to two premises that are still the basis of many current approaches; including interactional, task based, process, procedural and learner-centered approaches. These two challenging premises at least reveal that authentic natural language is not only best, but also practical, purposeful, focused more upon meaning (Long and Crooks 1992).

Having an account of the significances of the communicative approach and its role in the establishment of an atmosphere in which learners learn the language through meaningful interactions and exchanging of genuine information, and that the learning can be a self-directed, self-assessing, self monitoring