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New Technology-based techniques aimed at overcoming
phonetic difficulties to produce the fricative phoneme /θ/ and
final consonant cluster /st/ in adult EFL learners

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Dedication

First of all, I want to dedicate this achievement to my mother who has always been so supportive through this whole process which has been a real challenge not only academically but also personally.

I also want to dedicate it to my father who has helped and supported me during my entire life and even after his. With love and admiration.

To the most important person in the world, my daughter, whose love, innocence and tenderness represent an inspiration to overcome any challenge despite the continuous difficulties of each day.

Finally, I want to dedicate this accomplishment to each person who contributed to the successful development of it in many and different ways. It would have been impossible to accomplish this goal without you.

Christian

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Abstract

Acquiring appropriate speaking skills of a foreign language is one of the major challenges when learning a language, for that reason, this research aimed at determining the most suitable new technology-based techniques for overcoming difficulties when articulating and producing the fricative phoneme /θ/ and the final consonant cluster /st/ in Ecuadorian EFL adult learners. With this purpose, an experimental research approach was applied through a Control Group with 12 college students ages 22 to 30 years old. During this process, a Participant Observation was applied as well as an Unstructured Interview directed towards a group of experienced college teachers. Moreover, data from secondary sources were collected. All of this information was put through a Triangulation procedure in order to achieve relevant results. From this process, it was found that a combination of current teaching approaches with computer-based techniques represents the most appropriate method for overcoming pronunciation difficulties when learning a foreign language. Moreover, it was concluded that neither teachers nor students are well familiarized with new technology instruments.

Keywords: Pronunciation difficulties, new technology-based techniques, EFL adult learners

Resumen

Adquirir habilidades comunicativas apropiadas en un idioma extranjero es uno de los mayores retos al aprender un idioma, por esa razón, esta investigación pretendió determinar las técnicas basadas en nuevas tecnologías más apropiadas para superar dificultades al articular y producir el fonema fricativo /θ/ y la combinación consonántica final /st/ en estudiantes adultos de inglés como lengua extranjera en Ecuador. Con este propósito, se aplicó un diseño experimental a través de un Grupo de Control con 12 estudiantes universitarios de entre 22 y 30 años de edad. Durante este proceso, se aplicó una Observación Participativa al igual que una Entrevista No Estructurada a varios docentes universitarios experimentados. Además, se obtuvo información de fuentes secundarias. Todos estos datos atravesaron un proceso de triangulación a fin de alcanzar resultados relevantes. Así, se estableció que una combinación de enfoques pedagógicos actuales con técnicas basadas en la computación representa el método más apropiado para superar dificultades en la pronunciación al aprender un idioma extranjero. Además, se concluyó que tanto profesores como estudiantes carecen de conocimientos necesarios sobre los nuevos instrumentos tecnológicos.

Palabras clave: Dificultades en la pronunciación, técnicas basadas en las nuevas tecnologías, estudiantes adultos de inglés como lengua extranjera

Introduction

Along with the development of the educational practice, the implementation of new technologies has had a great impact since they represent appealing instruments that lead to significant opportunities for learning while avoiding difficulties when learning a new language (L2). It is well known that speaking English is one of the most important skills that any person can acquire in order to be competent in work and academic fields (Reyes, 2019). Moreover, it represents an essential tool for developing in the occupational and educational areas so people can be more competitive (Benítez, 2012). It is also important to mention that speaking skills represent a core element for ESL learners to communicate successfully and to be aware of their own potential (Cox, Henrichsen, Tanner, and McMurry, 2019).

In this regard, the appropriate development of accurate speaking skills in English language (L2) has become of great need and, at the same time, it represents a serious challenge for students to obtain, basically due to a negative state of mind present at the moment of using L2 orally because of fear and anxiety that pupils may feel (Ramirez and Anturdanga, 2018). In this context, Villegas (2019) has mentioned the positive effect that media and educational resources have in order to improve speech performance in L2 as well as Wang (2005) who has stated that the use of technology promotes an improvement in students' competences by reducing anxiety.

It has been determined that many EFL adult learners in the Ecuadorian Amazon context find it extremely hard, if not impossible, to produce the fricative phoneme /θ/ and the final consonant cluster /st/. Moreover, through an extensive literature review and the application of various research instruments, it has been established that the use new technology-based techniques (NTBTs), such as applications (Apps), language laboratories and automatic speech recognition tools (ASR), is effective in order to improve different language skills. For the aforementioned reasons, this study aims at determining which NTBT is the most appropriate in order to develop speaking skills, and specifically in order to

overcome difficulties for producing the fricative phoneme /θ/ and the final consonant cluster /st/ in EFL Ecuadorian adult learners through an *Experimental Research Approach*.

It is important to define what we mean by difficulties in oral production. In this study, it refers to the most common ones such as diction and vocalization and its effect on the L2 learning process (Ansari, 2015). On the other hand, the term “new technology-based techniques” refers to the “current trend for EFL teaching” which requires the implementation of computer mediated tools (Pasupathi, 2012).

Once we have reviewed some basic definitions, it is necessary to analyze important data gathered through the literature analysis. In this regard, Cox et al., (2019) aimed at determining the reasons and solution to the insufficient attention that pronunciation skills receive in the classroom through a qualitative research. These authors have determined that teachers have not had sufficient training on teaching pronunciation and therefore, they recommend the use of new technology-based material for improving teaching practices on this area. In this respect, by means of an exploratory study, Pasupathi (2012) aimed at determining the impact of technology tools in order to developing listening competences in students from first year of engineering. This author determined that effective L2 teaching practices “have shifted to internet-based learning” since it reduces anxiety while there is an important improvement on students’ acquisition of listening skills. It is necessary to add that the use of computer-based techniques such as ASR, language laboratories and Apps have helped 1st year college students to improve their language skills (Pasupathi, 2012).

In the same line of thought, it is important to analyze what Abdelaziz (2017) has found about one of the instruments previously mentioned. Through a descriptive and analytical approach, this author aimed at determining the impact of language laboratories on L2 learners’ performance. As a result, this author states that the application of effective language laboratories in L2 teaching is fundamental in order to develop listening skills and for “mastering better features of speaking”. Similarly, by means of a quasi-experimental research, Shahrokhi, Zoghi, and Assadi (2013) compared the effects of synchronous

computer-mediated communication (SCMC) and face-to-face (FTF) strategies in order to determine the benefits of each approach for teaching speaking skills. These authors discovered that “participants taught based on SCMC fared better than those that were taught according to FTF interaction”.

According to Calvo and César (2019) phonetics of L2 is one of the most complex elements for achieving mastery in L2 because of the big influence of the mother tongue (L1). In this regard, Park (2019) has determined that EFL adult students demonstrate difficulty for acquiring L2 because of pronunciation issues which result from their “incomplete phonological acquisition”. It represents a major constraint for this group which prevents these students from developing fluent L2 speech. Research on this area is of great necessity since most of the studies in relation to cognitive perception of L2 focus basically on reading and writing skills of L2 learners. Meanwhile, other research has focused exclusively on primary and secondary school students (Wayne & Zhang, 2019). For these reasons, the present research represents a starting point for future investigation, which should pay special attention on topics related to the development of speaking skills in EFL adult learners since a lack of data in this respect has been determined through the literature review.

In this respect, different research questions have been set which are: Do new technology-based techniques have an impact on adult EFL learners in relation to oral skills? To what extent do such techniques affect the improvement of oral skills, specifically the production of the fricative phoneme /θ/ and the final consonant cluster /st/ in Ecuadorian EFL adult learners? What are some of the most suitable technology-based techniques in order to foster EFL oral skills in Ecuadorian adult learners? In order to answer these questions, different chapters are presented which are Chapter one, Literature review, where important themes related to the topic of study are analyzed. Chapter two, Method, which is based on an experimental approach. Finally, Chapter three, Results & Discussion, presents a description and the interpretation of the main findings followed by important conclusions and recommendations.

Chapter one

Literature Review

Since the present study is related to new technology-based techniques aimed at overcoming specific phonetic difficulties presented by adult English as a Foreign Language (EFL) learners, this chapter presents the results of previous studies in relation to the impact of speaking skills difficulties on speech performance of EFL in order to reach a fluent level. According to Tanner & McMurry (2019), pronunciation is an essential element for achieving successful communication, therefore, it will be also focused on speaking difficulties presented by adult learners, specifically for producing the fricative phoneme [θ] and final consonant cluster /st/ since the production of these phonemes represent a real challenge to some EFL pupils who have never been familiarized with this kind of sounds. On the other hand, the development of new technology-based techniques for EFL teaching will also be an important issue to address in this chapter since technology has become an important “ally” for teaching EFL pronunciation and even grammar (Trujillo & Salvadores, 2019). New resources as well as techniques have appeared over time, for this reason, it is essential to analyze different techniques that could become significant means for teaching English (L2) to adults, especially in relation to their speaking skills.

Speaking Skills Development in EFL

Many studies have addressed the importance of an adequate pronunciation in order to be communicative effectively as Cox, Henrichsen, Tanner & McMurry (2019), who state that pronunciation plays an essential role in the accuracy of EFL learners' speaking skills and the way these people perceive they are doing so. The same authors suggest that pronunciation needs to become an essential element of the activities carried out in the classroom (Cox et al., 2019). They also state that according to different studies students' difficulties towards pronunciation could be imputable to teachers' practices since speaking skills are not considered a core element of the lesson and/or because teachers do not feel

competent to work on these skills. On the other hand, Park (2019) mentions that it is challenging for adult EFL students to acquire a second language, especially due to pronunciation and lack of completeness in their phonological acquisition which leads to foreign accent, “a common and persistent feature of otherwise fluent L2 speech” (Park, 2019). This is a result of the effect of learner’s L1 phonological system on L2. Thus, due to the significance of speaking skills for producing L2 effectively, and given the different aspects that prevent L2 adult learners from acquiring effective speaking skills, it is necessary to make a deeper analysis on the reasons and the progress of investigations towards this topic.

In this context, different authors report that the majority of studies related to cognitive perception of EFL only focus on reading and writing skills and add that some studies have been developed specifically in relation to primary and secondary students (Wayne & Zhang, 2019). This reinforces the need of extensive research about new techniques aimed at adult EFL learners. It is of essential importance for this population so they are able to achieve appropriate oral skills in order to communicate in L2 effectively.

In relation to pronunciation errors made by EFL learners, Yaslam, Jaganathan and Mohamad (2019) describe two of the main literature approaches related to phonology through a case study, in order to explain the reasons of these errors. The first one suggests that L2 students commit errors when pronouncing L2 due to the influence of L1 when pronouncing the “target” language which is called Transfer Theory. As a result, communication between native and nonnative speakers may be deficient since second language learners cannot reach a native-like pronunciation of L2. This is because students depend on their knowledge of L1 to produce L2 orally (Yaslam, Jaganathan & Mohamad, 2019, p. 2). On the other hand, the Markedness Analysis Hypothesis theory proposed by Tarone (1980) opposes the former theory since it was not able to explain all errors in L2 acquisition. According to this theory, the differences in pronunciation between two languages (L1 – L2) makes more difficult to perform an appropriate pronunciation in L2.

In this regard Park (2019) states two different historical approaches of L2 phonological acquisition. The first one called “Contrastive Analysis” (CA), which assumed that L2 learners set up different habits when acquiring a new language (Park, 2019), which means that L2 learners “transfers” their L1 habits to produce L2 utterances leading to a foreign accent. According to this approach, errors made by L2 learners can be predicted “on the basis of a comparison of thorough descriptions of the L1 and L2, and L2 learning is a result of transferring L1 articulatory habits” (Park, 2019). On the other hand, Lado (1957) states that the biggest difficulty in relation to phonological production is the allocation of two or more phonemes sounds in L1 to other phonemes in L2 and takes as an example the difference between the sounds [d] and [ð] in L2 which are reduced to /d/ in Spanish (L1), and because of this cross-linguistic difference, L2 speakers are likely to produce Spanish-accented phonemes. In accordance to this line of thought, it is notable that specific phonemes such as the fricative phoneme [θ] and final consonant cluster [st], which are commonly found in English language, do not exist in Spanish spoken in Latin America, specifically in Ecuador.

Palladino and Ferrari (2008) and Bishop & Snowling (2004)’s studies state that “Foreign Language Learning Difficulty (FLLD) may represent a unique natural condition of a partial dissociation between phonological and semantic modules involved in language learning” and so these authors recommend that systematic investigation should focus on phonological processing in relation to the necessary sensitivity to identify, code and process unknown sounds and the necessary phonological memory in order to acquire new speaking sequences and structures (Palladino & Ferrari, 2008).

Finally, a more recent approach to the causes of speaking difficulties in L2 has been presented by Abdolrezapour (2018), who relates Emotional Intelligence (EI) to L2 oral performance and mentions that various methodologies have come up in order to deal with emotional factors in the classroom such as Suggestopedia. The author adds that more recent literature has begun to support the validity of EI in EFL or ESL competence, and as

an example refers to Dewaele, Petrides & Furnham (2008) who focused their study on “foreign language anxiety” (FLA) defined as the sentiment of tension related to contexts where L2 is used, which includes speaking, listening, and learning skills (MacIntyre & Gardner, 1994, p. 284). In accordance to this point of view, Aki (2006) mentions that Emotional Intelligence is more relevant in L2 learning than high levels of intelligence itself (Abdolrezapour, 2018).

Regardless of whether any of these approaches is the most appropriate to explain the speech difficulties present in adult EFL learners, it is important to notice that factors such as teachers’ practices, L1 phonological transfer to L2, and EI are core aspects when developing speaking skills in EFL adult students. Therefore, it is necessary to analyze new teaching techniques that can be helpful for dealing with different aspects that intervene in the process of L2 speaking skills development.

The Role of Technology in the EFL Classroom

In order to respond to L2 learners’ requirements, the use of technology has had a significant impact on teaching EFL practices. In this respect, Trujillo, & Salvadores, (2019) mention that the relation between technology and language teaching and learning has been long and, in many ways, productive. On the other hand, these authors also advise teachers to be careful when choosing technology-based techniques in the classroom due to the continuous appearance of these tools which could be a great opportunity for meaningful learning (Trujillo & Salvadores, 2019, p. 154). In this line of thought, Pasupathi (2012), through an exploratory study, states that “teaching aids such as tape recorders, VCRs, and projectors were used in the classroom for effective teaching until some time ago. However, during the recent past, effective teaching strategies have shifted to internet-based learning”. The same author states that the use of “technology-enabled” strategies has been possible with the use of computers and, referring to Coiro (2003), ensures that the use of internet will become an essential element in L2 teaching and learning in the medium and long term (Pasupathi, 2012). These authors have reported the importance of new technology for

improving teaching of EFL practice and, so that, it is extremely necessary to pay special attention, based on a critical judgement, to the new trends of technology in relation to EFL teaching, especially in order to reach an efficient speech level in L2.

In relation to the introduction of new technology in EFL teaching, one of these techniques is the use of Language Laboratory (LL). According to Mohammed (2017) the 1960s have been recognized as the golden era of this kind of technology. This author also mentions that many researchers have provided “a clear and strong link between the educational technology field, the programmed instruction movement and the foreign language profession” (Mohammed, 2017). On the other hand, at the beginning of the same decade, strong criticism towards the use of language laboratory started to emerge due to the prevalent methodology for EFL teaching (audio-lingual) which was based on behaviorism and structuralism linguistics (Tejada, 2019). For that reason, it was necessary to implement a new generation of laboratories. These facilities had a different design based on practice spaces and group or individual activities in order to work on oral and contextual features of L2, moreover they offered independent learning spaces as well as teacher’s direction (Tejada, 2019). It meant:

Changing the traditional fixed individual cabins by optional individual cabins, work systems totally dependent on the teacher's team by distributed systems that allow the individual and collaborative work of the students and add the necessary resources to perform research, experiments, and works of a scientific or technical nature. (Tejada, 2019, p. 9)

Form a behavioral view:

The laboratory provides each student with their own learning environment, encouraging the participation of those who are more timid, who have the opportunity to explore the experience at their own pace, increasing the probability of achieving the competencies. (Tejada, 2019, pp. 12-13)

On the other hand, this author also refers to virtual language laboratories which are developed as a computer software easily accessible through the internet (Tejada, 2019). The author mentions that this technique has a similar function as the conventional laboratory, which means students will be presented to dynamic materials including images and animation.

Therefore, since the current trend for EFL teaching requires computer intervention (Pasupathi, 2012), new techniques have appeared. As the same author mentions, the use of computer mediated techniques such as the application of Automatic Speech Recognition (ASR), as well as computer-assisted language learning applications (apps), helped college students from the first levels to improve their L2 skills (Pasupathi, 2012, p. 127). Moreover, this author states that “using educational technology tools in ESL/EFL classrooms such as ESL websites, web-based language learning, along with language learning packages from the internet, assist students in developing their language and communication skills” (Pasupathi, 2012, p. 127). All of this information leads us to the conclusion that the new trend on EFL teaching in order to become more effective for communication is the use of the internet through computational devices such as laptop computers, tablets, or even smartphones.

The former information on technology-based techniques aimed at improving L2 speech brings us to the conclusion that L2 teaching based on new technology tools might be of great help to cope with the challenges that high education institutions face in order to make individual instruction available for L2 learners (Faria, Bergey, Baird & Lishinski, 2019).

The research in relation to oral skills difficulties has shown a strong relation between L1 when producing L2 which may be even more difficult for adult learners. Moreover, poor teachers' practice as well as anxiety have been shown as the causes of deficient speech skills in L2. In order to overcome these difficulties, new-technology based techniques have been analyzed from its appearance to current technology focused on difficulties presented by adult learners on L2 speech performance, which should be subject of further research

since most of it has been focused on younger learners and mostly related to writing and reading skills and little attention has been put to the effects of new technology-based techniques towards the improvement of L2 oral production. Finally, the literature review shows that recent technology-based techniques such as New Generation Language Laboratories, Automatic Speech Recognition (ASR), Computer-Assisted Language Learning Applications (apps), among others are highly effective techniques for adult learners to reach efficient oral skills in EFL.

Once the prior information has been analyzed, it is important to make a reference to previous research related to the present subject of study.

Al-Rubaat and Alshammari (2020) studied the pronunciation difficulties that EFL learners face in order to demonstrate an accurate pronunciation in L2. The participants in this research were 20 students who study English major in the sixth level at Jouf University, in the north of Saudi Arabia, and 10 English teachers from the same university. This study was conducted through a mixed-method approach where participants encountered an experiment on pronunciation sensitivity response and answered to some interviews. These authors identified six phonetic and phonological difficult patterns that EFL learners have to face. Among these patterns, the authors identified the production of final consonant clusters, which in our case is the phoneme [st], and unfamiliar sounds such as [θ]. As a conclusion, these researchers state that “the limited time for practice, the lack of authentic materials and tasks, and the need for immersion classes, and effective instruction and learning were all found to be responsible about the phonetic and phonological problems EFL learners encountered”.

In order to respond to the issue of ineffective instruction, through their research, Gilakjani and Sabouri (2014) aimed at understanding students' feelings towards computer technology in the EFL classroom, and how it can help teachers improve their methods. The authors chose four volunteer teachers from a university in Iran and used a Qualitative method where participants answered a semi-structured interview related to the

implementation of *Pronunciation Power* software for teaching pronunciation, and its effect on Iranian EFL traditional pedagogical methods. The findings show that EFL teachers changed their traditional methods which offered more opportunities in order to work on pronunciation. Moreover, this software offered better solutions for improving pronunciation such as native-like pronunciation and the opportunity to compare the user's pronunciation with it.

Ghoorchaei and Rahmani (2018) investigated the effect of *General English Training* (GET) software on intermediate EFL learners' pronunciation. The participants were thirty male EFL students ages 12 to 15 from a language institute in Tehran. The instruments used were the Students' Motivation Questionnaire and a task used as pretest and posttest. The findings obtained in this research show that learner's pronunciation, as well as motivation, have a significant and positive effect through the use of GET software.

In the same line of thought, Gao and Hanna (2016) investigated the effectiveness of working on pronunciation through a software with lower-intermediate students. The study population was integrated by 60 students at a language institute in China. 20 of them worked with a teacher, 20 worked with instructional software *New Oriental Pronunciation*, and 20 had a combined instruction from teacher and software. Students' pronunciation was assessed through pretests and posttests. Also, presurveys and postsurveys were used to assess students' attitudes in relation to pronunciation. A questionnaire was used to gather information related to students' reflections on the software, and finally observation was carried out during instruction. The results show that the best results in performance were achieved by those students who received combined instruction.

Another study that is closely related to the present research is the one presented by Sidgi and Shaari (2017) who tried to determine if Automatic Speech Recognition (ASR) technology is effective for improving English pronunciation. The study population was 20 students from first-year college in Iraq. These students had already participated in a two month course to work on pronunciation using ASR *Eyespeak* software. Students fulfilled a questionnaire related to the usefulness of this software in improving their pronunciation. The

findings obtained show that students considered ASR *Eyespeak* software really useful to improve their pronunciation and helped them notice their pronunciation mistakes.

Finally, Hamad, Metwally and Alfaruque (2019), carried out a research in order to determine the effectiveness of implementing YouTube videos and Listening Audio Tracks Imitation (YATI) as pedagogical instruments in order to improve L2 speaking skills. The study population was composed of 48 pupils studying major English at College of Science & Arts Muhayil, who were divided into two sections (control and experimental group). This research was conducted under a Qualitative experimental approach and data was collected through speaking tests which would be analyzed using SPSS Pearson Correlation Coefficient. The results show that using YATI technique has a positive impact on L2 speaking skills such as better fluency and pronunciation. This study also concluded that YouTube videos as well as YATI are very positive CALL (Computer-Assisted Language Learning) tools in order to improve students' speaking skills.

Chapter two

Method

Setting and Participants

A group of 12 college students ages 22 to 30 years old, chosen by their deficient speaking abilities in English language, were part of this study which was developed in Pastaza province located in the Ecuadorian Amazon region. It is important to mention that the sex and the age of these participants were not taken into account. These subjects were put into different groups (Control and Experimental groups) in equal numbers since “these groups are expected to be comparable as far as possible in every respect except for the intervention” (Kumar, 2011). In addition, a group of five EFL experienced college teachers, whose age ranged 36 to 45, was chosen in order to participate in an unstructured interview. According to Kumar (2011) this instrument is appropriate for studies which represent a challenge due to their complexity, moreover, an important lack of literature on this respect was identified which is why this instrument was selected in order to meet the demands of this study by gathering in-depth information from relevant sources since the professionals who participated contributed meaningful data based on their knowledge as well as experience.

Procedure

This study was carried out through a mixed methodology design since it combines qualitative and quantitative aspects for the research during different steps of the process (Tashakkori & Teddlie, 1998). This approach was implemented in order to respond to the specific needs of this research since it aimed at measuring the impact of new technology-based techniques (NTBTs) on learners’ speaking skills and so, it was also necessary to gather information from external sources for obtaining qualitative data on this respect. For that reason, quantitative and qualitative approaches were implemented during different stages of the investigation with single applications “such as a quantitative (experimental)

design, followed by qualitative data collection, followed by quantitative analysis after the data were converted" (Tashakkori & Teddlie, 1998). Finally, a triangulation technique was employed in order to contrast all the information gathered as previously described, for a better understanding of the issue investigated.

First, an experimental approach known as control group design was applied since the main objective of this research was to measure the impact of NTBTs, which would represent the extraneous variable, on adult EFL learners (control group) in regards to their speaking skills. In this sense, the experimental group was exposed to an intervention with the application of different NTBTs, whereas a control group was not, as proposed by Kumar (2011). This activity took place during two sessions in order to apply different NTBTs throughout two weeks where participants were evaluated through a pre-test and a post-test at the beginning and at the end of the intervention respectively by means of PRAAT software with the objective of measuring parameters such as formants, lapse and intensity when producing the fricative phoneme /θ/ and the final consonant cluster /st/ in order to determine the level of accuracy when producing these phonemes.

For data collection, participant observation in a controlled setting technique was used since the researcher participated during the introduction of different NTBTs in EFL teaching and learning interventions while the groups were observed. It was controlled through a stimulus (NTBTs) for the subjects of study to react which was observed by the researcher (Kumar, 2011). This technique was useful in order to measure the impact of NTBTs on the improvement of speaking skills through the implementation of an observation checklist. This document was used to register learners' attitudes in relation to behavioral and cognitive engagement. These aspects were analyzed through the observation of off-task and on-task behavior in relation to attitudes such as disruption and motivation which offered meaningful data for determining the effectiveness of each NTBT in order to improve speaking skills of EFL adult learners.

Another instrument implemented in this research was a questionnaire made up of ten questions, which were mostly close-ended questions, applied towards the group of students who participated in the control group technique in order to know their perspectives in regards to their L2 speaking abilities, and their views in relation to the objective of the present study which is to determine the most appropriate NTBT for overcoming pronunciation constraints through the analysis of learners' perceptions in respect of these instruments and their implementation. This questionnaire offered mixed data (qualitative and quantitative) so it represented a useful technique to comprehend this phenomenon.

As previously mentioned, a group of EFL college teacher were chosen to participate in the implementation of an unstructured interview. This instrument consisted of ten open-ended questions, which were carefully selected, related to the most effective techniques in order to help students improve L2 pronunciation and the teachers' knowledge about the implementation of NTBTs in the EFL classroom, specifically for improving pronunciation and overcoming students' constraints in this regard. Its application took place through different video calls on WhatsApp platform due to the current health emergency we are undergoing.

Next, given that important scientific databases are available online such as eric.ed.gov and scholar.google.com, data from secondary resources were gathered and analyzed in order to obtain relevant information related to the subject of study, this way, it was possible to contrast the results for obtaining meaningful conclusions.

After this point, a process of editing and coding took place in order to transform "the information into numerical values, called codes, so that the information could be easily analyzed, either manually or by computers" (Kumar, 2011). While editing, possible errors or gaps that resulted from the previous stages were minimized by checking contents for completeness and responses for consistency. Finally, a statistical analysis was carried out by codifying the numerical data gathered in form of numbers and, by means of Current Triangulation Strategy, the expected results were achieved based on the different sources.

In relation to the last step, the Current Triangulation Strategy was selected since qualitative and quantitative data collection took place in different phases for their subsequent analysis. After this point, data were integrated during the interpretation phase and its main purpose was the cross-validation of results within this study based on all data collected (Terrell, 2012).

Chapter three

Results and Discussion

Description, analysis and interpretation of results

In order to determine the impact and the extent that NTBTs have for overcoming pronunciation difficulties and the most significant procedures for the improvement of oral skills in adult EFL learners, different research instruments were applied to make sure that valid results are reached. This section will therefore focus on the elucidation of the main findings obtained in relation to the research questions stated. First of all, it was proposed to determine the impact of NTBTs in relation to the improvement of speaking skills in EFL adult learners through research question one which is, do new technology-based techniques have an impact on adult EFL learners in relation to oral skills? After this point, the extent to which new technologies influence on the improvement of the production of specific phonemes by adult EFL learners is discussed by means of the research question two which is, to what extent do such techniques affect the improvement of oral skills, specifically the production of the fricative phoneme /θ/ and the final consonant cluster /st/ in Ecuadorian EFL adult learners? Finally, some NTBTs were analyzed with the objective of responding to the research question three which is, what are some of the most suitable technology-based techniques in order to foster EFL oral skills in Ecuadorian adult learner

Impact of new technology-based techniques on adult EFL learners in relation to oral skills

Table 1

Students' favorite activities to develop L2 speaking skills

Activity	%
Reading texts	16.6
Computer based	16.6
Songs	33.3

Activity	%
Expositions	16.6
Picture cued	8.3
Listening exercises	8.3

Note: Percentages of students who prefer the referred techniques

to improve speaking skills.

In relation to students' views on their favorite activities in order to develop speaking skills in L2, it can be seen in Table 1 that the majority of them (33.3%) consider that the use of songs is the most relevant technique followed by others such as reading texts, computer based and expositions. Based on this data, we can infer that students in this context are not well familiarized with the use of technology in order to work on L2 pronunciation, instead, traditional techniques are the most implemented. This information links to the fact that dialogues and repetition drills are the most common activities in order to develop speaking skills in public high schools in the Ecuadorian Amazon region (Gonzales et al., 2015). Moreover, listening to English music with lyrics technique is one of the "most frequently suggested for enhancing listening and speaking" (Gonzales et al., 2015).

Another negative fact in relation to the appropriate implementation of NTBTs is that the use of technology is not common in state schools of Ecuador and, if it is used, it is not correctly applied (Solano, 2017). Based on the above information, it can be assumed that students do not consider NTBTs as the most relevant for developing speaking skills due to the lack of appropriate implementation of these materials in the classroom, which is why these students still consider traditional strategies better than innovative resources.

Table 2

*Students' perspectives on language
laboratory for L2 pronunciation development*

Degree of satisfaction	%
Extremely satisfactory	
Very Satisfactory	50
Fairly satisfactory	
Unsatisfactory	50

Note. Students' opinions regarding the use of
Language Laboratory to improve
pronunciation.

According to the results in Table 2, students' opinions related to the application of language laboratory for improving pronunciation in L2 are divided between very satisfactory and unsatisfactory which demonstrates that a significant number of pupils do not consider this technique is efficient for developing speaking skills. On the other hand, it is important to cite Mohammed (2017) who states that according to many researchers, there is "a clear and strong link between the educational technology field, the programmed instruction movement and the foreign language profession" when referring to the positive features of language laboratory technique. In addition, Abdelaziz (2017) mentions that the effective application of language laboratories is a fundamental technique for the purpose of improving speaking skills significantly. If we consider that technology is not commonly implemented and/or not properly applied in Ecuador (Solano, 2017) we can suggest that the lack of appropriate application of NTBTs in general, and particularly of language laboratories, has been negatively affected losing the opportunity to access the positive and meaningful teaching and learning experiences that these resources offer.

Table 3

Effective strategies to improve pronunciation of EFL adult learners

Strategies	Percentage of teachers' answers
Songs	40%
LRCR	20%
Imitation	20%
Immersion	20%
Group work	20%

Note. Teacher's views on appropriate strategies to improve L2 pronunciation.

(LRCR= listening, recording, comparing, recording imitation technique)

^aTotal percentage is more than 100% since some teachers mentioned more than one technique.

In relation to the impact that NTBTs have on the development of speaking skills, according to Table 3, teachers' opinions are similar to those of students since the use of songs is considered as the most effective technique in order to develop these kinds of skills. Once again, new technology-based techniques were not mentioned in this respect. Teachers' answers confirm what Solano (2017) has stated in relation to the lack of appropriate implementation of technology in the Ecuadorian EFL classroom despite the undeniable advantages of these instruments such as the reduction of anxiety and the fact that technology, specifically the Internet, will represent a core element in the English teaching and learning process for the short and medium term (Pasupathi, 2012).

To sum up, we can conclude that although research has demonstrated that the use of technology has a positive effect on EFL students in terms of improving their abilities while reducing anxiety (Wang, 2005), the results given by the different instruments applied for this research show that students, as well as teachers, still consider conventional strategies such as songs and repetition to be the most effective in order to improve L2 pronunciation. It may respond to the fact that teachers do not feel confident to work on this ability since they have not had formal training on this area (Cox et al., 2019) which may be the reason why

technology is not commonly implemented in EFL classes in Ecuadorian state schools or it is not properly applied. These facts lead to what authors such as Gürleyik and Akdemir (2018) mention when they state that technology-enhanced learning environments do not positively affect the view of undergraduate students for the second language learning.

Another reason for these results may be that most of the studies in relation to cognitive perception of EFL “focus narrowly on the reading and writing aspects of L2 learners, while others have a restricted focus on primary and secondary school students” (Wayne & Zhang, 2019). In consequence, it is important to add what researchers Trujillo, Gabarrón and Salvadores (2019) have stated since they advise a “judicious alertness towards the constant appearance of technologies which afford new opportunities of memorable learning”.

NTBTs’ level of impact on the improvement of oral skills

Another essential objective of this study was to measure the impact of NTBTs on the development of speaking skills in L2, for that reason, it is necessary to analyze data gathered in relation to the second research question which is: To what extent do such techniques affect the improvement of oral skills, specifically the production of the fricative phoneme /θ/ and the final consonant cluster /st/ in Ecuadorian EFL adult learners?

Table 4

Students’ perspectives on computer-based technology for L2 pronunciation development

Degree of satisfaction	%
Extremely satisfactory	
Very Satisfactory	62.5
Fairly satisfactory	12.5
Unsatisfactory	

Note. Students’ opinions regarding the use of computer-based techniques to improve pronunciation.

Concerning the application of computer-based techniques in order to develop speaking skills, according to Table 4, 62.5% of the students consider these kinds of activities as effective. It is necessary to mention that not all of the students had an opinion in this respect since not all of them have had experience using this kind of technology for working on pronunciation. We must clarify that computer-based activities are those that require computer intervention which represents a wider spectrum of materials than the individual tools proposed in this study as it may include some of them such as Automatic Speech Recognition (ASR), but also different resources from the Internet, for instance, ESL websites along with language learning packages which have demonstrated to be of great help for college freshmen in order to improve their language skills (Pasupathi, 2012). Based on the literature review and the students' perceptions in relation to computer-based activities, we can conclude that this technique causes a great impact on the improvement of the pronunciation when learning a language so far, consequently it represents the most effective NTBT.

Table 5

Students' perspectives on learning applications for L2 pronunciation development

Degree of satisfaction	%
Extremely satisfactory	
Very Satisfactory	16.6
Fairly satisfactory	25
Unsatisfactory	

Note. Students' opinions regarding the use of learning applications (apps) to improve L2 pronunciation.

In regard to the use of Learning Applications (Apps) in order to improve pronunciation skills in L2, it is important to notice that according to Table 5 not all of the students have had the opportunity to use these instruments and so, only 41.6% of them gave their opinion in this respect. With this in mind, 25% of these students do not consider

this technique as appropriate while only 16.6% of the pupils think it is effective and 58.4%, which represents the majority of the participants, do not know about this tool. If we take into account that according to Mindog (2016) students consider that mobile apps are more helpful in order to learn vocabulary, reading, writing, grammar and translation, it demonstrates that this kind of tools are not considered as effective at the moment of improving speaking skills. Nevertheless, they do have a positive effect in relation to learning a second language and developing other skills.

Table 6

Effective NTBTs to improve L2 speaking

Strategies	%
Computer based	80
LRCR	20

Note. Teachers' appreciation in relation to different new technology-based techniques (NTBTs) on the improvement of speaking skills.

(LRCR= listening, recording, comparing, recording imitation technique)

About the implementation of NTBTs and its effectiveness on the improvement of speaking skills in L2, according to Table 6, teachers' answers are very similar to those of students since most of them (80%) consider that computer-based techniques are the most appropriate for working on speaking skills. As mentioned before, computer-based tools represent an excellent opportunity for improving speaking skills while reducing anxiety, for this reason, the implementation of computer mediated tools is considered as the "current trend for EFL teaching" (Pasupathi, 2012).

Data gathered through this research has demonstrated the effectiveness of internet-based learning on successful teaching. Moreover, according to the literature review, it has been determined that computer-based techniques have a great impact for developing speaking skills due to the reduction of anxiety during the teaching-learning process. In addition, the data obtained has demonstrated that resources available on the Internet such

as ESL websites and language learning packages represent a great opportunity for college freshmen to improve their language skills.

Due to its significant impact, the use of internet for language teaching will become a core element for the years to come (Pasupathi, 2012). In this respect, it is necessary to reflect on the fact that most of the teachers, as well as students, have reported that conventional and traditional techniques, such as repetition and reading-listening activities, are the most effective on the improvement of speaking skills while. On the other hand, they are not familiarized with most of the new technology-based techniques proposed which may be the reason why they cannot report the different advantages of these tools.

In short, based on the above information and the experience, it is undeniable that computer-based technology is and will be a central element of EFL teaching in order to develop communicative skills despite the numerous constraints that teachers as well as students have to face so they can meet the current educational needs and trends.

The most suitable technology-based techniques to overcome constraints when producing the fricative phoneme /θ/ and final consonant cluster /st/ in Ecuadorian adult learners

Finally, since one of the objectives of this research was to determine which NTBTs are the most appropriate in order to overcome constraints for producing specific phonemes in L2 by EFL adult learners, we must analyze the results in relation to the third research question: What are some of the most suitable technology-based techniques in order to foster EFL oral skills, specifically the production of the fricative phoneme /θ/ and final consonant cluster /st/ in Ecuadorian adult learners?

Table 7

Students' views on the best NTBTs to improve the pronunciation of /θ/ and /st/

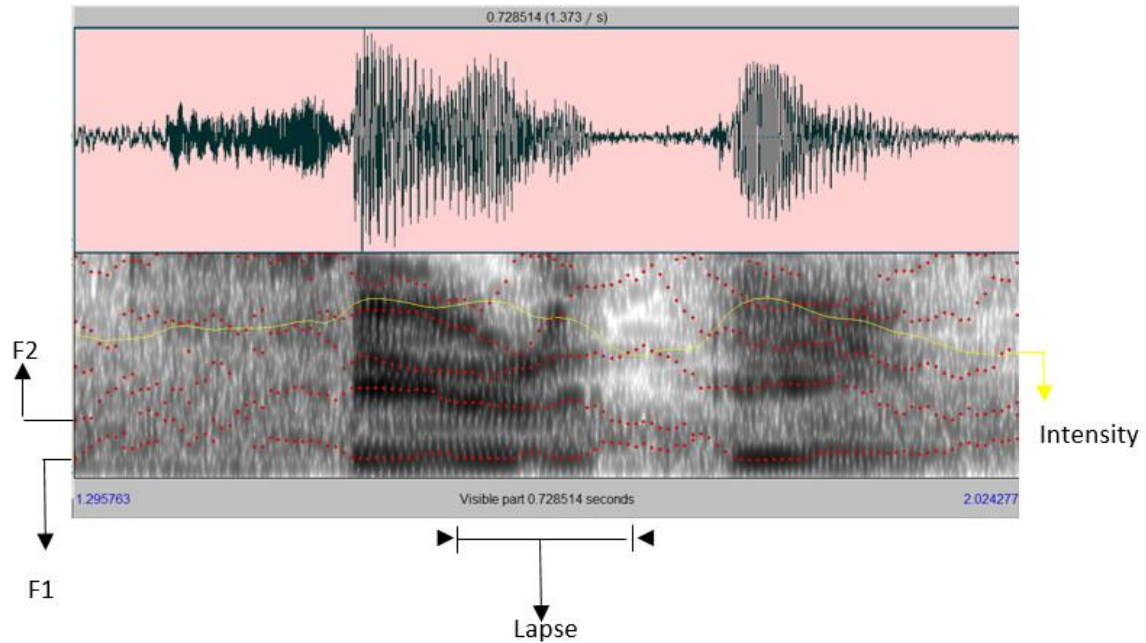
NTBTs	%
Language laboratories	16.6
Apps	16.6
Computer based	33.3
Listening/Reading	16.6

Note. Here are presented the most common new technology-based techniques (NTBTs) that were proposed in this study.

It is important to notice that, according to Table 7, the majority of the students (33.3%) consider that computer-based techniques are the most relevant new technology-based resources in order to foster an accurate pronunciation of the fricative phoneme /θ/ and final consonant cluster /st/, while participants think that the other NTBTs proposed, which have obtained similar percentages (16.6%), are not considered as suitable as the previous one. Once again, it shows the importance of implementing this technique which students are so familiarized with nowadays and are becoming part of the personal and professional aspects inevitably.

Figure 1

Parameters to measure the phonemes /θ/ and /st/ in PRAAT



Note. Spectrogram to determine the accuracy in pronunciation of the phonemes /θ/ and /st/ by comparison with native-like pronunciation. F=Formant: Broad peak in the sound spectrum.

With the objective of determining the most suitable technology-based procedures, a phonology intervention was carried out so four different techniques were implemented along various sessions with groups of three students. These pupils took a pre-test and a post-test by means of PRAAT software which helped to establish the level of oral production accuracy by recording their voices while pronouncing a group of words containing the fricative phoneme /θ/ and the final consonant cluster /st/. In this line of thought, in order to calculate the accuracy for the articulation of these phonemes, parameters such as formants 1 and 2 were considered for measuring the appropriate articulation of the phoneme /θ/, it is necessary to add that formants are defined as the peak of the speech sound within the spectrum (Sundberg, 1995). On the other hand, the final consonant cluster /st/ was measured taking into consideration the lapse, which is defined as the space of time that the articulation of a phoneme takes, and intensity, defined as the force applied when

pronouncing a specific phoneme. Figure 1 represents an example of the way that the aforementioned parameters were evaluated.

Table 8

Techniques to improve the pronunciation of /θ/ and /st/

Techniques	Does not meet expectations	Meets expectations (Weak)	Meets expectations (Strong)	Exceeds expectations
Language Laboratory		16.6%	8.3%	
Automatic Speech Recognition (ASR)	8.3%	16.6%		
Learning Applications (Apps)		8.3%	16.6%	
Conventional Strategies (Communicative / Cooperative)			8.3%	16.6%

Note. Techniques applied and results obtained from students' performance through the control group while producing the phonemes /θ/ and /st/

Once finished the pre-tests and post-tests analysis through the application of PRAAT software, according to Table 8, it is clear that the best results in order to improve the articulation for producing the fricative phoneme /θ/ and the final consonant cluster /st/ are given by the conventional and current methodologies for teaching English which are Communicative Approach and Cooperative Learning. It is necessary to add that according to the checklist implemented during the observation, students showed a high degree of motivation and they focused on the tasks during the development of the lessons under these approaches. It responds to the fact that Communicative Approach is considered an essential method for L2 teaching since it focuses on communication and so, it improves communicative competence while using L2 (Abrejo et al., 2019). On the other hand, Cooperative Learning has become an essential approach in order to foster communicative skills since students respond more actively and enthusiastically and so, they are motivated

to practice the language. Therefore, activities applied under this approach “can help students to develop a good habit of cooperative learning and overcome their reticence. Thus, their language competence can be considerably enhanced” (Wang, 2020).

In relation to the most suitable technology-based techniques for improving the articulation of the fricative phoneme /θ/ and final consonant cluster /st/, results from this research have shown that the computer-based technique in combination with conventional teaching approaches, which are Communicative Approach and Cooperative Learning, is the most effective method to overcome pronunciation constraints to produce specific speech sounds. In addition, Pasupathi (2012) has demonstrated how computer mediated techniques are effective for improving language skills in college freshmen.

It is important to mention that conventional approaches such as Communicative Approach and Cooperative Learning can foster a better development of oral skills since NTBTs cannot attract students’ attention and motivation by themselves. For this reason, Communicative Approach represents an appropriate method in order to promote communication leading to the improvement of communicative competence while using English language (Albrejo et al., 2019). Concerning Cooperative Learning, its implementation produces positive results since it encourages an active and enthusiastic attitude in students which enhances their language competence considerably (Wang, 2020).

These results give us a new vision on the implementation of technology combined with conventional methods which could represent an ideal approach to reach a native-like pronunciation in students and open a new field of investigation for future research.

Conclusions

One of the objectives of this study was to determine the impact of new technology-based techniques in order to improve pronunciation of English language in Ecuadorian adult learners, and specifically the articulation and production of the fricative phoneme /θ/ and final consonant cluster /st/. In this regard and by means of gathering data from previous studies, as well as the application of different research instruments, it has been determined that the implementation of New Technology-Based Techniques (NTBTs), specially computer-based activities, during EFL teaching and learning process is an essential element and it implies a great impact for the development of speaking skills since it reduces anxiety, which is a predominant constraint while students perform these kinds of activities, and that is why we have to consider these tools for an appropriate teaching practice due to the constant appearance of this kind of technology and the possibility of “memorable learning” that they offer.

In despite of the multiple advantages of NTBTs, it was also determined that teachers do not feel confident to work on speaking skills since they have not received enough training on this aspect. Moreover, data collected showed that students, as well as teachers, are not totally familiarized with NTBTs which may explain why these actors still consider conventional strategies such as songs, repetition, and listening-reading activities as the most appropriate for improving pronunciation in L2.

In relation to the scope of computer-based techniques and based on the findings, which showed that 80% of teachers, as well as 62.5% of students, it was determined that computer-based procedures have a wide reach, and so, they will become a paramount element for the next years specially for college freshmen in order to improve language skills. It is advisable for future research to focus in this matter and determine the effectiveness of the different tools that are appearing over time in order to take advantage of their full potential.

On the other hand, in order to determine which is the most suitable technology-based technique to overcome constraints when producing the fricative phoneme /θ/ and final consonant cluster /st/ in Ecuadorian adult learners, the results obtained through the participant observation showed that NTBTs are not efficient enough by themselves because the group of analysis presented a lack of motivation and concentration when implementing these tools exclusively.

Data gathered along the whole process of research has helped to determine that a combination of current teaching approaches such as Communicative Approach and Cooperative Learning with computer-based techniques is the most suitable alternative in order to develop speaking skills in English language and, more specifically, for overcoming difficulties for the appropriate articulation and production of the fricative phoneme /θ/ and final consonant cluster /st/.

Furthermore, based on the fact that the majority of studies have focused specifically on reading and writing skills of primary and secondary students, leading to a scarce literature on this regard, it is important to promote future investigation related to this topic in order to determine the most accurate techniques and methodologies to develop appropriate speech abilities in EFL adult learners.

Recommendations

Due to the important impact that NTBTs have on the teaching-learning process, they should be implemented during EFL lessons from the lower levels of regular education for students to reach better speaking skills so they can be proficient in L2 and, as adults, they would avoid constraints in pronunciation of basic phonemes such as the ones analyzed in the present research.

Since the effectiveness of new technology-based techniques in order to improve pronunciation of English language has been demonstrated, and due to the teachers' lack of training on necessary abilities to foster speaking skills in EFL adult students, it is recommended that teachers' training programs offered by universities and the different sectors in charge of EFL teaching in Ecuador, such as the Ministry of Education together with authorities from educational institutions, implement appropriate contents for educators to develop the necessary skills to work on speaking abilities in adult learners, as well as the appropriate use of new technology-based instruments. It is also important to encourage teachers to undergo a self-training process on these topics since it is relatively easy to find scientific and reliable data related to this area on the web.

Similarly, due to the far-reaching scope of NTBTs, it would be of great importance to implement different lines of research that guide the investigation of higher education institutions and universities for the appropriate implementation of NTBTs in curriculum planning. This with the objective of meeting the current needs of the educational area in a comprehensive manner.

It is also necessary to update teachers' knowledge and perspectives through a training process in relation to current approaches for EFL teaching since it has been shown that a combination of Communicative Approach and Cooperative Learning with the implementation of computer-based techniques and materials is the most effective procedure

to improve students' speaking skills in contrast to the implementation of traditional approaches.

Finally, in regards to future research, it is important to mention that investigation should focus on the study of the most effective techniques since lack of information in this aspect has been determined through the literature review, and also because of the undeniable fact that modern and innovative tools constantly appear on a par with great advances made in technology and pedagogy.

References

- Abdelaziz, M. (2017). The role of language laboratory in English language learning settings. *Canadian Center of Science and Education*.
<https://eric.ed.gov/?q=language+laboratory&id=EJ1126748>
- Abdolrezapour, P. (2018). The relationship between emotional intelligence and complexity, accuracy and fluency in EFL learners' oral performance. *Cypriot Journal of Educational Science*, 13(3), 310–318.
- Abrejo, B., Sartaj, S., & Memon, S. (2019). English language teaching through Communicative Approach: A qualitative study of public sector colleges of Hyderabad, Sindh. *Advances in language and literary studies*, 10(5), 43-49.
<https://eric.ed.gov/?q=communicative+approach&pr=on&ft=on&id=EJ1248999>
- Aki, O. (2006). Is emotional intelligence or mental intelligence more important in language learning? *Journal of Applied Science*, 1(6), 66–70.
- Al-Rubaat, A., & Alshammari, H. (2020). Analysis of phonetic and phonological constraints of Saudi EFL learners.
<https://eric.ed.gov/?q=technology+EFL+learning+pronunciation&id=EJ1239139>
- Ansari, M. S. (2015). Speaking anxiety in ESL/EFL classrooms: A holistic approach and practical study. *International Journal of Education Investigation*, 2(4), 38-46.
- Bakar, Z. A., & Abdullah, M. R. (2015). Importance of correct pronunciation in spoken English: Dimension of second language learners' perspective. *Pertanika Journal of Social Sciences and Humanities*, 23(S), 143-158.
- Benítez, T. (2012). Método Híbrido: Un método para la enseñanza y el aprendizaje del inglés como lengua extranjera. *Zona Próxima* 17.

http://go.galegroup.com/ps/i.do?id=GALE%7CA347292199&v=2.1&u=ute_cons&it=r&p=AONE&sw=w&asid=cd89cfb174c1a20f6f016d09abfa78bb

- Calvo, D., & César, L. (2019). Entrenamiento fonético por ordenador para la adquisición de segundas lenguas: ¿Son efectivos estos sistemas de aprendizaje? *Revista de Humanidades*. <http://revistas.uned.es/index.php/rdh/article/view/20185>
- Chiu, T., Liou, H., & Yeh, Y. (2007). A study of web-based oral activities enhanced by automatic speech recognition for EFL college learning. *Computer Assisted Language Learning*, 20(3), 209-233.
- Christensen, L.B., Johnson, R.B., & Turner, L.A. (2014). *Research methods, design, and analysis* (12th Ed.). Boston, NJ: Pearson
- Coiro, J. (2003). Reading comprehension on the Internet: Expanding our understanding of reading comprehension to encompass new literacies. *Reading Teacher*, 56(6). http://www.readingonline.org/electronic/rt/2-03_column/
- Cox, J.L., Henrichsen, L.E., Tanner, M.W., & McMurry, B.L. (2019). The needs analysis, design, development, and evaluation of the “English pronunciation guide: An ESL teachers’ guide to pronunciation teaching using online resources”. <https://eric.ed.gov/?q=esl+pronunciation&id=EJ1204566>
- Dewaele, J. M., Petrides, K. V. & Furnham, A. (2008). Effects of trait emotional intelligence and sociobiographical variables on communicative anxiety and foreign language anxiety among multilinguals: A review and empirical investigation. *Language and Learning*, 59, 911–960.
- Derwing, T. M., Munro, M. J., & Wiebe, G. (1998). Evidence in favor of a broad framework for pronunciation instruction. *Language Learning*, 48, 393-410.
- Derwing, T. M., & Munro, M. J. (2005). Second language accent and pronunciation teaching: A research-based approach. *TESOL Quarterly*, 39, 379-397.

- El Comercio. (2018). Suficiencia en inglés, básica para seguir con los estudios. *El Comercio*. <https://www.elcomercio.com/actualidad/suficiencia-ingles-basica-seguir-estudios.html>
- Faria, A., Bergey, R., Baird, A. & Lishinski, A. (2019). Using technology to support English language learners in higher education: A study of Voxy's effect on English language proficiency. <https://eric.ed.gov/?q=LANGUAGE+LABORATORY+&ft=on&id=ED596252>
- Gao, Y., & Hanna, B. (2016). Exploring optimal pronunciation teaching: Integrating instructional software into intermediate-level EFL classes in China. <https://eric.ed.gov/?q=technology+EFL+learning+pronunciation&id=EJ1143542>
- Gilakjani, A. P., & Sabouri, N. B. (2014). Change of Irani EFL teachers' traditional pedagogical methods through using "Pronunciation Power" software in the instruction of English pronunciation. <https://eric.ed.gov/?q=technology+EFL+learning+pronunciation&id=EJ1075638>
- Ghoorchaei, B., & Rahmani, M. (2018). The effect of using get on Iranian intermediate EFL learners' pronunciation and motivation. <https://eric.ed.gov/?q=technology+EFL+learning+pronunciation&id=EJ1207740>
- Gonzalez, P., Ochoa, C., Cabrera, P., Castillo, L., Quinonez, Ana., Solano, L., Espinosa, F., Espinosa, F., Ulehlova, E., & Arias, M. (2015). EFL teaching in the Amazon Region of Ecuador: Focus on activities and resources for teaching listening and speaking skills. *English Language Teaching*, 8(8), 94-103. <https://eric.ed.gov/?id=EJ1075454>
- Gürleyik, S., & Akdemir, E. (2018). Guiding curriculum development: Student perception for second language learning in technology-enhanced learning environments. *Journal of Education and Training Studies*. <http://redfame.com/journal/index.php/jets/article/view/2994>

- Hamad, M., Metwally, A., & Alfaruque, S. (2019). The impact of using YouTube and audio tracks imitation (YATI) on improving speaking skills of EFL learners.
<https://eric.ed.gov/?q=technology+EFL+learning+pronunciation&pg=2&id=EJ121671>
 5
- Henrichsen, L., & Stephens, C. (2016). Advanced adult ESL students' perspectives on the benefits of pronunciation instruction. In J. Levis, R. Mohammed, M. Qian, & Z. Zhou (Eds.). *Proceedings of the 6th Pronunciation in Second Language Learning and Teaching Conference*. Santa Barbara, CA (pp. 197-205). Ames, IA: Iowa State University.
- Kessler, G. (2018). Technology and the future of language teaching. *Foreign Language Annals*, 51, 205-218. doi: 10.1111/flan.12318.
- Kumar, Ranjit. (2011). *Research Methodology: A step-by-step guide for beginners*. Third Edition. Thousand Oaks, California: Sage Publications.
- Lado, R. (1957). *Linguistics across cultures*. Ann Arbor, MI: University of Michigan Press.
- Levis, J. M. (2005). Changing contexts and shifting paradigms in pronunciation teaching. *TESOL Quarterly*, 39, 369-377.
- MacIntyre, P. D. & Gardner, R. C. (1994). The subtle effects of language anxiety on cognitive processing in the second language. *Language Learning*, 44, 283–305.
- Mindog, E. (2016). Apps and EFL: A case study on the use of smartphone apps to learn English by four Japanese university students. *JALT CALL Journal*, 64(3), 3-22.
<https://eric.ed.gov/?q=apps+speaking+EFL&id=EJ1107946>
- Mohammed, A. (2017). The role of language laboratory in English language learning settings. *Canadian Center of Science and Education*.
<https://eric.ed.gov/?q=language+laboratory&id=EJ1126748>

- Palladino, P. & Marcella Ferrari (2008) Phonological sensitivity and memory in children with a foreign language learning difficulty, *MEMORY*, 16:6, 604-625, DOI: 10.1080/09658210802083072
- Park, M. (2019). An exploratory study of foreign accent and phonological awareness in Korean learners of English. <https://academiccommons.columbia.edu/doi/10.7916/d8-3668-qv45>
- Pasupathi, M. (2012). Analyzing the effect of technology-based intervention in language laboratory to improve listening skills of first year engineering students. http://www.scielo.org.co/scielo.php?script=sci_abstract&pid=S1657-07902013000100009
- Ramírez, S. M., & Artunduaga, M. T. (2018). Authentic tasks to foster oral production among English as a Foreign Language learners. *HOW*, 25(1), 51-68. <https://doi.org/10.19183/how.25.1.362>.
- Reyes, O. (2019). Estrategia didáctica para desarrollar la producción oral en los estudiantes del curso de inglés en un instituto de educación superior de Lima. <http://repositorio.usil.edu.pe/handle/USIL/9133>
- Saleh, S. (2019). A case study to improve pronouncing English consonant clusters by young Yemeni learners in Malaysia. <http://ijollt.usm.my/images/IJoLLT-02012019-1.pdf>
- Shahrokhi, H., Zoghi, M., & Assadi, N. (2013). Effects of synchronous computer-mediated communication and face-to-face interaction on speaking skill development of Iranian EFL learners. *International Journal of Applied Linguistics & English literature*. <https://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.855.8111&rep=rep1&type=pdf>

- Sidgi, L., & Shaari, A. (2017). The usefulness of automatic speech recognition (ASR) Eyespeak software in improving Iraqi EFL students' pronunciation.
<https://eric.ed.gov/?q=technology+EFL+learning+pronunciation&id=EJ1138558>
- Solano, L., Cabrera, P., Ulehlova, E., & Espinoza, V. (2017). Exploring the use of educational technology in EFL teaching: A case study of primary education in the south region of Ecuador. *IATEFL Poland Computer Special interests Group and the university of Nicosia*. <https://www.cceol.com/search/article-detail?id=527570>
- Sundberg, J. (1995). The singer's formant revisited. Dept. for Speech, Music and Hearing Quarterly Progress and Status Report, 36, 083-096.
http://www.speech.kth.se/prod/publications/files/qpsr/1995/1995_36_2-3_083-096.pdf
- Tarone, E. (1980). Some influences on the syllable structure of interlanguage phonology, international review of Applied Linguistics. <https://doi.org/10.1515/iral.1980.18.1-4.139>
- Tashakkori, A., & Teddlie, C. (1998). Mixed methodology: combining qualitative and quantitative approaches. Sage Publications. <https://n9.cl/ntom>
- Tejada, V. (2019). Impact of the use of laboratories on EFL teaching in primary school.
<https://eric.ed.gov/?id=ED597099>
- Terrell, S. (2012). Mixed-methods research methodologies. *The Qualitative Report*, 17(1), 254-280. Retrieved from <https://eric.ed.gov/?q=Mixed-Methods+Research+Methodologies&pr=on&ft=on&id=EJ973044>
- Trujillo, F. S., & Salvadores, C. M. (2019). Tecnología para la enseñanza y el aprendizaje de lenguas extranjeras: revisión de la literatura. RIED. *Revista Iberoamericana de Educación a Distancia*, 22(1), 153-169. <http://dx.doi.org/10.5944/ried.22.1.22257>
- Villegas, Y. (2019). Interferencias lexicales más comunes del español en la producción oral del idioma inglés en los estudiantes de la unidad educativa Dr. Emilio Uzcátegui en

el 2do año de bachillerato del año lectivo 2018-2019.

<http://www.dspace.uce.edu.ec/handle/25000/18215>

Wang, L. (2005). The advantages of using technology in second language education. *T.H.E. Journal*, 32(10), 1-6.

Wang, G. (2020). On the application of cooperative learning in college English teaching. *International Education Studies*, 13(6), 62-66.

<https://eric.ed.gov/?q=cooperative+learning&pr=on&ft=on&id=EJ1254741>

Wayne, R., & Zhang, D. (2019). Cognitive perceptions of second language acquisition in Chinese undergraduate ESL/EFL students: a mixed methods approach. *International Journal of Evaluation and Research in Education*.

<https://eric.ed.gov/?q=esl+oral+skills&id=EJ1232306>

Yaslam, S., Jaganathan, P., & Mohamad, A. (2019). A case study to improve pronouncing English consonant clusters by young Yemeni learners in Malaysia.

<http://ijollt.usm.my/images/IJoLLT-02012019-1.pdf>

Appendix

Appendix A

Students' Survey

QUESTIONNAIRE ETHICS

I am carrying out an investigation as part of my studies at the Universidad Técnica Particular de Loja (UTPL) to pursue a master's degree in English Language teaching.

This study is aimed at recognizing the most appropriate technology-based techniques for improving phonological difficulties to produce specific phonemes. In order to reach the proposed objectives a questionnaire, which is attached, has been elaborated. I would really appreciate if you answer the questions below honestly.

You should take no more than 20 minutes to fulfill this questionnaire and all the information gathered is anonymous and confidential, so it is not necessary that you write your name on this document.

The information you give will be strictly used for research purposes and the findings of this study will be presented at the end of October 2020. If you would want to receive this information, please send your address/contact details in a separate piece of paper.

Thank you very much for your participation.

Christian Guillén

UTPL

Master's student in English Language Teaching

QUESTIONNAIRE FOR STUDENTS' SURVEY

1. What are your favorite activities in order to develop English Language (L2) speaking skills?

Reading Texts	Role Plays	Computer Based	Songs	Expositions	Others

If you chose "others", please specify: _____

2. What is your opinion about the use of new technology-based tools and techniques in the English Language Teaching (ELT) classroom?

Unsatisfactory	Fairly satisfactory	Very Satisfactory	Extremely satisfactory

3. Have you ever used computer-based instruments to work on L2 speaking skills?

Yes	No

4. How often do you use computer-based activities to work on L2 speaking skills?

Never	Almost never	Sometimes	Often	Usually	Always

5. How would you describe your experience in working speaking skills with computer-based technology?

Unsatisfactory	Fairly satisfactory	Very Satisfactory	Extremely satisfactory

6. Have you ever used computer assisted language learning applications (apps) to work on L2 pronunciation?

Yes	No

If you answered "yes", please specify which ones: _____

7. If you answered "yes" on question 6, how good was your experience?

Unsatisfactory	Fairly satisfactory	Very Satisfactory	Extremely satisfactory

8. Have you ever used any technology-based tools such as language laboratories, Automatic Speech Recognition (ASR), or computer assisted language learning applications (apps) to work on L2 pronunciation?

Yes	No

If you answered "yes", please specify which ones: _____

9. If you answered "yes" on question 8, how good was your experience?

Unsatisfactory	Fairly satisfactory	Very Satisfactory	Extremely satisfactory

10. In your opinion, which of these techniques would help you the most in order to improve the pronunciation of uncommon phonemes such as the fricative phoneme /θ/ and final consonant cluster /st/?

Language laboratories	Apps	Computer Based	Others

Please, explain your answer

Appendix B

Teachers' interview

SEMI-STRUCTURED INTERVIEW FOR ENGLISH LANGUAGE (L2) TEACHERS

1. What is the average level of L2 speaking skills of your students?
2. What are the techniques that you usually use in class in order to work on L2 pronunciation?
3. How well do each of the techniques mentioned on question 2 work?
4. What strategies do you apply with students who demonstrate a low level of L2 speaking skills?
5. Which techniques have been the most effective when developing speaking skills in L2?
6. What is your opinion towards the implementation of new technology-based strategies to develop L2 speaking skills?
7. Have you ever used new technology-based techniques in order to develop speaking skills in L2? If the answer is "yes", which ones and how was your experience?
8. What strategies or instruments do you apply in order to overcome students' difficulties to pronounce uncommon phonemes such as the fricative phoneme /θ/ and final consonant cluster /st/? How effective have they been?
9. What do you know about new technology-based techniques such as language laboratories, Automatic Speech Recognition (ASR), computer-assisted language and learning applications (apps)?
10. Have you ever worked on speaking skills through any of the instruments mentioned on question 8? If yes, how was your experience?

Appendix C

Observation Checklist

Observation Checklist – Classroom

Observer:

Date of observation:

Outcome:

Lecture topic:

Behavioral Engagement

Off-task behavior	On-task behavior
<ul style="list-style-type: none"> - Disruption - Non-research related discussion - Focusing on other activities - Head down 	<ul style="list-style-type: none"> - Motivation - Questioning for information - Focusing on activity - Working

Cognitive Engagement

On-task behavior
<ul style="list-style-type: none"> - Exchanging ideas about research - Keeping working on task

