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Strategies for Learning English Pronunciation in an EFL or ESL classroom through the Use of ICT Tools and CALL

Trabajo de titulación previo a la obtención del título de Licenciados en Ciencias de la Educación en Lengua y Literatura Inglesa

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Resumen

Las tecnologías de la información y la comunicación (TICs) son el conjunto de herramientas tecnológicas ampliamente utilizadas para ayudar a expandir la calidad de la enseñanza y el aprendizaje mediante la asimilación de la autonomía, la capacidad y la creatividad de los estudiantes (Ghasemi & Hashemi, 2011). Por otro lado, ALAC hace referencia al aprendizaje de lenguaje asistido por una computadora que se enfoca en la función de apoyo y facilitación de la computadora y enfatiza el papel de los medios digitales como herramientas para el aprendizaje (IGI Global, 2019). Este trabajo de investigación tiene como objetivo analizar literatura existente que sea relevante sobre la aplicación de diferentes herramientas pertenecientes a las TICs y ALAC para aprender la pronunciación del inglés en dos contextos diferentes, las aulas de ILE (inglés como lengua extranjera) e ISI (inglés como segundo idioma). Un total de veinte estudios empíricos fueron identificados y elegidos para ser analizados. Estos estudios recopilados se centraron en el aprendizaje o mejora de la pronunciación del inglés, pero con diferentes estrategias como las TICs y ALAC se desenvuelven en diferentes entornos y con diferentes participantes. Como resultado de la revisión, la presente síntesis de investigación ofrece recomendaciones para futuras investigaciones sobre el uso de estos dos tipos de estrategias de herramientas TICs y ALAC, mismas que necesitan la guía de un maestro o instructor capacitado.

Palabras clave: Pronunciación en Inglés. ALAC. TICs. Estrategias.

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Abstract

Information and communication technologies (ICTs) is the set of various technological tools widely used to help to expand teaching and learning quality through the assimilation of students' autonomy, capability and creativity (Ghasemi & Hashemi, 2011). On the other hand, CALL refers to computer-assisted language learning that focuses on the support and facilitation function of the computer and emphasizes the role of digital media as tools for learning (IGI Global, 2019). This paper aims to analyze relevant exiting literature on the application of different ICT tools and CALL for learning English pronunciation in two different contexts, EFL and ESL classrooms. A total of twenty empirical studies were identified and chosen for the analysis. These collected studies focused on English pronunciation learning or improvement, but with different strategies regarding ICTs and CALL and how they perform in different settings and participants. The present research synthesis offers conclusions and recommendations for further research on the applications of these two types of strategies, ICT tools and CALL, which need the guidance of a well-prepared teacher or instructor.

Keywords: CALL. English Pronunciation. ICTs. Strategies.

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Dedication

This thesis made with commitment and effort is dedicated to my beautiful and supportive family, who has been my mainstay of motivation and desire to get ahead for becoming the professional that I always wanted to be. Graduating is a very special achievement for me and my family, so this whole process of professionalization is dedicated to each member of my beloved family.

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To the future children, teenagers and adults who are going to learn English: learning a language is not only about grammar, pronunciation is very important as well.

Lastly, I dedicate this work to the Ecuadorian government, who needs to see that we as Ecuadorians have many resources to raise well-educated people, and not be the second worst country for English proficiency.

Nicolas

Introduction

Different types of pronunciation learning strategies have appeared to help learners during their English learning. Pronunciation learning strategies may be defined as "specific actions taken by the learner to make learning (pronunciation) easier, faster, more enjoyable, more self-directed, more effective and more transferable to new situations" (Oxford, as cited in Rokoszewska, 2012, p.8). Regarding technology, ICTs and CALL English pronunciation strategies can be effectively applied in an EFL or ESL classroom with the objective of training and improving learner's pronunciation. On the one hand, Ghasemi and Hashemi (2011) defines Information and Communication Technologies (ICTs) as a set of various technological tools and resources used to communicate, create, disseminate, store, and manage information; these technologies include computers, the Internet, radio, television and telephony. On the other hand, IGI Global (2019) defines Computer Assisted Language Learning (CALL) as any kind of use of computers and digital media in language learning which focuses on the supportive and facilitative function of the computer and stresses the role of digital media as tools for learning.

Regarding the contexts for the application of ICTs and CALL pronunciation strategies, we have EFL and ESL. English as a Foreign Language (EFL) refers to learning and using English as an additional language in a non-English speaking country (TeachingEnglish, 2019). While, English as a Second Language, or ESL, refers mainly to learning English as a new resident in an English-speaking country (TeachingEnglish, 2019). In an ESL classroom, learners have more access to other types of English input and

feedback outside the class. It would have different efficacy in an EFL context since the only English instruction that learners receive is inside the classroom.

The present research synthesis analyzes ICTs and CALL as the two main groups of English pronunciation strategies, which present different characteristics and methods, and are applied in EFL and ESL contexts. The mentioned pronunciation strategies could be helpful for English learners who look for improving their pronunciation and teachers who aim to make pronunciation learning effective. Therefore, this research synthesis is divided into six chapters. In chapter one there is a description of some important aspects related to the study as well as the description of the research, questions and objectives. The second chapter comprises the theoretical framework, which consists of key concepts and definitions that help to understand some terms mentioned along the research. The third chapter presents an overview of the literature that sustains the use of ICTs and CALL in the pronunciation instruction in ESL and EFL classrooms. The fourth chapter is the methodology, which describes how the research synthesis was elaborated and the inclusion criteria to choose the studies. In chapter five there is a classification and analysis of the gathered studies according to seven categories. Finally, the sixth chapter presents the conclusions and recommendations.

CHAPTER I

1. Description of the research

1.1.   Background

The definition of pronunciation given by the Oxford dictionary states that "pronunciation is the way in which a language or a particular word or sound is pronounced" (Oxford, 1999). On the other hand, the Cambridge dictionary defines pronunciation as "the way in which a word or letter is said, or said correctly, or the way in which a language is spoken" (Cambridge, 1999).

According to Jenkins (2006), the study of pronunciation has been a relatively neglected issue in English as a foreign or second language acquisition. Likewise, in classroom contexts, pronunciation has received less attention as compared to the other language components and skills because of the belief that it is peripheral to successful communication. Nevertheless, there is a recent revival of interest in pronunciation research. Seferoglu (2005) stated that in second or foreign language acquisition research, it has been observed that compared to receptive skills, productive skills are acquired later and through a more difficult process. Especially in speaking skills and pronunciation, most of the time learners never reach native-like diction (Seferoglu, 2005).

Throughout the years, several different strategies to learn this particular component of the English language have appeared to spread around many countries in the world and to help students to improve their pronunciation skill in its educational field. Studies that have

looked at pronunciation strategies have mostly investigated learner's choices of strategies without prior instruction (Eckstein, as cited in Sardegna, 2011). Likewise, among the strategies that we found in our preliminary research, we have ICT tools such as the Web-Based Text-to-Speech Tool, Accent reduction software, HolograFX, Vocaroo and vozMe recording systems, etc. Since the 1980s the importance of pronunciation has been recognized after communicative approaches to language teaching became influential in language teaching; so many scholars agree that learning the target language pronunciation is an indispensable part of mastering a foreign or second language (Celce-Murcia & Goodwin, as cited in Murat 2006). Pronunciation is a basic and important skill that should be mastered by English foreign language learners, so the existence of many different technological resources may be useful for the development of pronunciation with truly positive result on students.

1.2.   Statement of the problem

It is widely thought that pronunciation is one of the most neglected aspects of English teaching, and many teachers make little effort when teaching pronunciation in any open way and only give attention to it hurriedly (Harmer, 2016). Regarding this aspect of the language, as stated by Morley (1991), intelligible pronunciation is an essential component of communicative competence. In accordance with Harmer (2016), pronunciation teaching not only makes students aware of different sounds and sound features, but it can also improve their speaking immeasurably and consequently help them achieve the goal of improved comprehension and intelligibility. On the other hand,

confidence with pronunciation allows learners the interaction with native speakers which is essential for all aspects of their linguistic development.

Learners with good English pronunciation are likely to be understood even if they make errors in other areas, whereas learners with bad pronunciation will not be understood, even if their grammar is perfect (Gilakjani, 2012). Thus, English pronunciation is very significant for successful communication. However, relatively little is known about strategies for learning to pronounce English as a foreign language (Berkil, 2009).

Moreover, Sardegna (2009) explored the long-term effectiveness of teaching student pronunciation strategies to improve English stress and found strong evidence supporting instruction. Finally, despite the fact that English pronunciation is very important for oral communication and communicative competence, it is sometimes neglected in many language teaching programs (Sardegna, 2009).

1.3. Rationale

Several research studies about pronunciation and pronunciation strategies can be found. However, a research synthesis that organizes information about a variety of pronunciation strategies and concepts has not been done yet in our context. As considered by Seferoglu (2005), pronunciation is one of the most neglected components by students and teachers in EFL and ESL environments; it can be said that learners almost never reach native-like diction. An EFL or ESL student is supposed to acquire appropriately the four skills that constitute the English Language: speaking, listening, writing, and reading, in order to achieve communicative competence. Perhaps, pronunciation acquisition problems

are experienced even more severely in EFL contexts because learners usually do not have natural exposure to the target language out of the classroom (Seferoglu, 2005). Possibly, teachers just do not have the background, tools or strategies to properly teach pronunciation and therefore it is disregarded (Elliot, as cited in Shak, Chang & Stephen, 2016). Pronunciation plays a meaningful part in language learner's social lives because the way they speak reflects their identities and indicates their association to particular communities (Seidlhofer, as cited in Shak, Chang and Stephen, 2016).

In accordance to Shak, Chang and Stephen (2016), in most language classrooms, attention is paid mainly to the intelligibility and the ability of students to express themselves in a way that is intelligible to their classmates and the class teacher rather than to how much they resemble native speakers. Plenty of research has been done in the speaking field to improve pronunciation. For instance, James (2017) found that the web-based text-to-speech tool can be seen as the appropriate intervention because online learning provides flexibility of access to material anywhere anytime. This tool was used to assist learners in pronouncing words correctly by producing conversation scripts and converting them into spoken output. Likewise, Trooster et al. (2016) found out that serious online games are digital games that are developed not only for fun and entertainment, but also for educational purposes, in which an interactive aspect can be implemented easily. Besides, Foote and McDonough (2017) state that shadowing activities with mobile technology may offer a valuable tool for learners that look for a way to practice their pronunciation while potentially improving comprehensibility without the need for explicit instruction. As a personal experience, in our English classes the teacher was the only one

who provided the pronunciation of the words which in some cases were incorrectly uttered. This happened in all our school path until we reached this bachelor degree of English literature in which the teachers used the correct pronunciation of words and taught us how to do it properly.

Based on what has been presented in this section, we will analyze several tools that have been used to improve the pronunciation of EFL or ESL students. Also, we consider that the research on the improvement of pronunciation may help English learners to find possible solutions to the issues that students and teachers currently experience. Therefore, this research synthesis is a necessary means for the inquiry of the most effective strategies related to the use of ICT and CALL to improve the pronunciation competence.

1.4.   Research Questions

After preliminary research, we have come up with the following questions:

1. What are the advantages and disadvantages that the collected studies on pronunciation learning strategies using ICT tools and CALL have reported?
2. What are the pronunciation strategies within ICT tools and CALL that have been reported as effective in the EFL or ESL context?
3. What are the positive and negative effects that the collected studies on pronunciation learning strategies using ICT tools and CALL have reported?

1.5.   Objectives

1.5.1.   General Objective

To analyze the different English pronunciation strategies within ICT tools and CALL that existing research on pronunciation has proposed and tested.

1.5.2.   Specific Objectives

- To determine the advantages and disadvantages that the collected studies on pronunciation learning strategies using ICT tools and CALL have reported.

- To identify the pronunciation strategies within ICT tools and CALL that have been reported as effective in the EFL or ESL context.

- To examine the positive and negative effects that the collected studies on pronunciation learning strategies using ICT tools and CALL have reported.

CHAPTER II

2. Theoretical Framework

It is essential to provide a conceptual basis for this research synthesis. This theoretical framework includes definitions of the following terms: EFL, ESL, pronunciation, and the two main strategies that were subject of analysis Information and Communication Technology (ICT) and Computer Assisted Language Learning (CALL).

2.1. Definitions

2.1.1. EFL and ESL

According to TeachingEnglish (2019), English as a Foreign Language (EFL) refers to learning and using English as an additional language in a non-English speaking country. Likewise, inside the classroom, EFL materials tend to be written for learners either studying English in their own country or at a short course in an English-speaking country. On the other hand, English as a Second Language (ESL) refers mainly to learning English in an English-speaking country. Inside the ESL classroom, materials tend to focus on "survival English" for people now living in an English-speaking country (TeachingEnglish, 2019). In addition, EFL students may not have significant exposure to spoken English outside the classroom environment; they benefit only from enhanced speaking and listening opportunities in their classes (Core Languages, 2015). While ESL students are already living in an English-speaking environment where they will benefit from learning key words, phrases, and cultural features of daily life, having a great deal of opportunity for exposure to target language (Core Languages, 2015).

2.1.2. Pronunciation

In accordance with Szynalski (2007), pronunciation is definitely the major feature that people notice when speaking English; when talking to a person in real life situations, they may not notice limited vocabulary or grammar mistakes, but they will notice right away if the pronunciation is good or bad. Szynalski (2007) affirms that good pronunciation should be one of the first aspects that you learn in English. Szynalski (2007) states that three levels of English pronunciation exist. In the first level, people often do not understand what an individual wants to say and uses the wrong sounds in English words. In the second level, people can understand what an individual wants to say, but they have to concentrate on understanding. Finally, in the third level, people can understand the individual easily because the pronunciation is clear and pleasant. Notwithstanding, different types of pronunciation learning strategies have appeared to help learners during their English learning. Pronunciation learning strategies may be defined as "specific actions taken by the learner to make learning (pronunciation) easier, faster, more enjoyable, more self-directed, more effective and more transferable to new situations" (Oxford, as cited in Rokoszewska, 2012, p.8). In addition, Eckstein (as cited in Rokoszewska, 2012) enumerated 28 pronunciation learning strategies and linked them to four stages of pronunciation acquisition and one additional category, namely motivation. In the first stage called concrete experience, learners use pronunciation learning strategies concerned with input and practice. In the second stage called reflection on observation, learners use strategies connected with noticing and feedback. In the third stage called abstract conceptualization, learners form hypotheses about the pronunciation of the target language. In the fourth stage,

which is called action based on new conceptualization, learners test the hypotheses formed at the previous stage. The last component, namely motivational strategies, was added because research clearly indicated that motivation is a powerful factor in learning the target language pronunciation.

2.1.3.   Information and Communication Technology (ICT)

Ghasemi and Hashemi (2011) defined Information and Communication Technology (ICT) as diverse sets of technological tools and means used to communicate, create, disseminate, store, and manage information; these technologies encompass computers, the Internet, broadcasting technologies (radio and television), and telephony. In accordance with Emmanuel and Ako (2013), literacy in Information and Communication Technology (ICT) is fundamental to life in our alarming technological advancing society. For learners to be integrated into the system as global citizens, they should be introduced to ICTs which could be used as a tool in their learning process. According Emmanuel and Ako (2013), ICT provides opportunities to students to communicate more effectively and to develop literacy skills, so it is a valuable tool for researching, composing and responding, and viewing and representing in English. This is because ICT has a broad range of activities, programs, tools, applications and information that can be accessed through computers and other technological devices. ICT is an invaluable tool in presenting and representing information in different ways. This can be in the form of text, pictures, tables and graphs or by enhancing visualization and hearing of sounds produced in a language (Emmanuel & Ako, 2013). Additionally, Ghasemi and Hashemi (2011) affirm that the use of ICT offers learners real-life contact with, and exposure to the cultures of the peoples and countries

where the target language is spoken and allows children to access and research information worldwide. The opportunity for learners to develop an interest in the culture of other nations through comparison with their own is an integral part of primary languages entitlement (Ghasemi and Hashemi 2011). Using ICTs, especially email, blogs and video conferencing, foment children's interaction and communication with native speakers and other communities by enabling them to use language for real purposes and in real contexts.

In addition, ICT helps to improve teaching and learning quality. Lowther et al., (as cited in Yunus and Suliman, 2014) mentioned there are three important characteristics needed to develop good quality teaching and learning with ICT. The three characteristics are autonomy, capability and creativity. The first implies that students will be in control of their own learning via the use of ICT, meaning that they are able to work on their own or with others. The second characteristic denotes that students can develop the capability to apply and transmit knowledge at the same time employing new technology whenever they have the confidence in learning processes. Finally, the third characteristic in which ICT assists students is in optimizing their creativity. New multimedia devices can be discovered and materials in the styles readily available can also be created. Thus, the use of ICT can help to expand teaching and learning quality through the assimilation of students' autonomy, capability and creativity.

2.1.4. Computer Assisted Language Learning (CALL)

IGI Global (2019) defines Computer Assisted Language Learning as any kind of use of computers and digital media in language learning, which focuses on the supportive and facilitative function of the computer and stresses the role of digital media as tools for learning. In accordance to Bataineh and Bani (2011) Computer-assisted language learning (CALL), which encompasses the use of computer applications in language teaching and learning, emerged in the early days of computers, in the 1960's, when its first programs were designed and implemented. Since then, the effectiveness of CALL in language teaching and learning has been highlighted by an abundance of empirical research (Bataineh & Bani, 2011). It goes without saying that effective computer use in teaching and learning requires effective instructional programs; however, teachers show their reluctance to use CALL in their classroom practice (Bonk, as cited in Bataineh & Bani, 2011). In addition, Egbert (2018) states that students participating in CALL must have access to, be trained in, and understand the possibilities of the technologies that they are required to use.

Although the computer comes first in the acronym "CALL", the focus on CALL instruction is language, it generally means that the focus is on language instruction that takes place with, throughout, and around technology (Egbert, 2018). Guan (2012) concluded that many language teachers have realized the important role of language teaching of CALL. On the other hand, CALL will not displace the traditional teaching method, in which the teacher directs students to learn through memorization and recitation techniques, so the language teaching will obtain the best effect (Guan, 2012).

The development of this theoretical framework has stablished the conceptual basis for carrying out this research synthesis, containing the definitions of the most relevant terms of this research, EFL, ESL, pronunciation, and the two main strategies that were subject of analysis: Information and Communication Technology (ICT) and Computer Assisted Language Learning (CALL).

CHAPTER III

3. Literature Review

This chapter presents an overview of relevant existing literature on ICT and CALL English Pronunciation Strategies. This review is organized in two sections, ICT tools for improving English pronunciation, and the use of CALL for learning pronunciation.

3.1. ICT Tools for Improving English Pronunciation

With the introduction of ICT tools, it has been possible to display human speech in a graphic representation on a computer screen, video games, mobile applications, CDs, DVDs, etc. (Cerezo, Calderón & Romero, 2019). Likewise, these types of programs are very effective because they provide useful feedback and assistance to the learners in correcting pronunciation problems (Trooster et al., 2016). For instance, Cerezo, Calderón and Romero (2019) and Trooster et al. (2016) carried out similar studies in which children were trained by using the online games LINGO and HolograFX, respectively. Making reference to HolograFX, twenty-three children were taught English Pronunciation through the use of this mobile-based application, which has a 3D robot as the virtual teacher and animated 3D images that represent the corresponding words as holograms. The researchers aimed at investigating if the HolograFX game may help to improve the children´s pronunciation of basic English vocabulary such as animals, plants, vehicles, clothes, etc. (Cerezo et al., 2019). At the end, the study confirmed that the children performed better when practicing pronunciation of basic English vocabulary words using a mobile-based

application than when using the traditional memorizing methodology. It was also found that students' motivation and interest in practicing more increased. Cerezo et al. (2019) concluded that introducing tools such as this game in educational settings could reduce practicing time and instructor load, affording opportunities for drill and practice, for example.

The authors Foote and McDonough (2017), Hengbin, Jiexuan and Ying (2018), and Saran, Seferoglu and Cagiltay (2009) conducted research on the use of mobile technology for the improvement on English pronunciation. To illustrate, Foote and McDonough (2017) conducted a study in which 16 university participants used iPods to practice shadowing short dialogues for 8 weeks. Foote and McDonough (2017) stated that shadowing offers learners a way to practice their pronunciation (thus potentially improving comprehensibility) without the need for explicit instruction. The results of the study were that the participants felt positive about their improvement because they could better express their emotions and feel more confident talking with native speakers. In addition, the findings of this study are in line with other studies that have investigated shadowing with mobile technology; the presented study extends these findings by demonstrating that these improvements can be identified by untrained listeners, and lead to improve comprehensibility of extemporaneous speech making this activity of potentially high utility for EFL and ESL learners who want to communicate more effectively.

Suryani, Syahrizal and Fauziah (2019) conducted a research study in which they used the ORAI android mobile application to know the students' perception about the app as a strategy for pronunciation practice. As reported by Suryani et al. (2019), teaching

pronunciation should go beyond just teaching the phonemes. It must also consider other

areas such as accent and intelligibility and prosodic features of pronunciation (stress,

intonation, and rhythm). They concluded that the ORAI app brings more benefits to the

teaching and learning process in pronunciation practice class. It helped learners to improve

their pronunciation skills and be more confident when speaking English. Vu and Bui (2018)

conducted a related study in which it was revealed that mobile phone applications did have

a positive impact on the effectiveness of the learning process. Students in this study showed

improvement in fluency and pronunciation of a number of individual words and sounds.

Kim (2014) performed a study in which he explores how ESL learners' oral

proficiency changed through online recording tools. Participants recorded, practiced, and

listened to their recordings of individualized storytelling. The result of this study was that

all the participants developed their oral proficiency and gained self-confidence through

self-assessment by recording their stories. This indicates that using a combination of

communication tools (Vocaroo and vozMe), gives ESL learners a positive learning

experience which promotes self-confidence, and autonomously develops their language

skills (Kim, 2014). Two complementary studies were conducted by Lazaro (2011) and

Walker (2005); in such studies, recording imitations of films, TV series and texts were used

as a training tool for pronunciation improvement. The authors concluded that imitations of

some students sounded more English-like in terms of intonation and rhythm.

3.2.   The Use of CALL for Learning English Pronunciation

There has been much debate over the use of CALL in the ESL/EFL classroom over

the past decade. By using the computer as a tool, learners become more involved in a task

such as creating student projects, researching information and providing context, thereby facilitating the necessity of effective communication within a group setting (Ibrahim et al., 2019). In other words, CALL is very useful for the teaching and/or learning experience. Ibrahim et al. (2019) fulfilled a study regarding students' perceptions towards a multimedia element called Sounds and Pronounce Interactive Software (SPISE). SPISE is an interactive multimedia software, which attempts to introduce learners to the English phonetic system. It is a learning aid that teaches learners the correct pronunciation of English words. The study involved a sample of 74 students comprising Primary 5 and 6 students in Malaysia. Employing a questionnaire because of its strong validity and reliability indices, students showed that the software was used as a supplementary learning aid, obtaining positive results. In addition, SPISE has great potential for success in any pedagogical setting, from schools to universities as it combines strong general learning principles with a clear focus on practical phonetics taught in a fun and friendly atmosphere.

The authors James (2017), Mak et al. (2003), McCrocklin (2016), and Sidgi and Shaari (2017) conducted related studies on the use of Web-Based Text-to-Speech and Automatic Speech Recognition tools for improving English pronunciation. For example, Sidgi and Shaari (2017) carried out a study about the Automatic Speech Recognition (ASR) which is a type of CALL that allows non-native English learners to improve their pronunciation skills. The study focuses on determining if the ASR (Eyespeak) software is reliable for improving English pronunciation of 20 participants, who were Iraqi EFL students. To conclude, Sidgi and Shaari (2017) suggest that the ASR method is found to offer a great opportunity in teaching and more useful learning pronunciation than traditional

instruction. The educational environments with the use of ASR in the classroom are highly motivating and reduce anxiety in learning English pronunciation.

Another research study performed by Seferoglu (2005) aimed to find out whether integrating Accent Reduction Software (ARS) in classes of advanced EFL learners at the university level would result in improvements in students' pronunciation. The study made use of a quasi-experimental, pretest–posttest control group research design in which 40 students from a University in Turkey participated. Based on the results of the study, it is suggested that especially in EFL settings where natural target language input is scarce, technology has a lot to offer, and EFL learners may be provided with exposure and practice/interaction opportunities in the target language through specifically designed software programs. In contrast, a study by Harper (2004) investigated the effectiveness of CALL based pronunciation exercises with respect to beginner level ESL students in Malaysia. The class size was formed of nine students ranged from 17-35 years old, which were asked to write down four of five words they have trouble pronouncing and a list was compiled. Harper (2004) concluded that CALL can be interactive thus making the learning experience more enjoyable for both the SL instructor and the ESL student. In addition, teaching pronunciation through CALL can be beneficial for ESL students especially students at the beginner levels who need more attention when acquiring accurate pronunciation skills.

Research about Computer Assisted Pronunciation Training (CAPT) systems was developed by Mahdi and Al Khateeb (2019), Neri, Mich, Gerosa and Giuliani (2008), and Tsai (2019). For instance, Neri et al. (2008) investigated whether a Computer Assisted

Pronunciation Training (CAPT) system called PARLING can help young learners improve word-level pronunciation skills in EFL classrooms at a level comparable to that achieved through traditional teacher-led training. PARLING is a modular system composed of a story, an adaptive word game based on the story, a set of active words and a visual dictionary which allows children to create their own dictionary. The participants were 28, 11-year-old children who are Italian native speakers attending the same public school and sharing the same curriculum. They were divided into two groups, the first group used the PARLING software while the second group received the lesson in the form of traditional, teacher-led classes. The study concludes that pronunciation quality of isolated words improved significantly for both groups of subjects.

In this chapter, many existing studies regarding pronunciation learning through ICT and CALL have been presented. The studies involved features that can work for different ages and contexts. This literature review is the starting point for the development of the analysis with the interpretations and descriptions.

CHAPTER IV

4. Methodology

A research synthesis is a systematic review of accumulated primary research studies (Norris & Ortega, 2006). In order to obtain the proper sources data for the present research synthesis, a complete search was developed. Data was collected from the following online databases: Google Scholar and ProQuest Educational Journals. The key terms for research were: 1. pronunciation strategies, 2. ICT tools and pronunciation, 3. CALL and pronunciation, 4. EFL and pronunciation strategies, 5. ESL and pronunciation strategies. For our research synthesis, qualitative, quantitative, or mixed methods studies were considered, and there didn´t exist any restriction related to the design of these studies. In addition, the sources remained digital due to the difficulty to find physical studies in the area within our context.

The criteria for selecting studies included; first, the articles referred to strategies that focus on ICT tools and CALL. Second, the articles were empirical studies so we can get a better idea about pronunciation strategies performance by means of direct and indirect observation or experience. Third, we excluded conference presentations, research reports available only for a fee, and unpublished research papers in order to make the present research synthesis more reliable because of the quality of the published studies. Fourth, we sought for studies applied in EFL and ESL classrooms and for that reason publications written only in English were considered for our research. Finally, we focused on articles

based on different strategies for the improvement of student's pronunciation rather than in techniques for improving the teachers' English pronunciation.

Some journals revised are the following, *Dialnet, GSTF Journal on Education (JEd), Journals International Journal on e-Learning practices, Language Learning & Technology, ResearchGate, and ScienceDirect,* among others, which we consider important and reliable journals that contributed positively to our research synthesis (Annex 1). Later, a relevant procedure showed up with the purpose of classifying the articles according to different criteria that arose through the analysis.

CHAPTER V

5. Analysis

For this research synthesis, 20 studies were selected, analyzed and classified according to seven categories. First, the year of publication was considered for developing our analysis since although the name of the term of CALL is a fairly recent one, the existence of CALL in the academic literature has been recognizable for almost the last twenty years (Levy, 1997). Second, location by continent where the studies were carried out was also considered for collecting the data. Another category of research was the academic setting in which the studies were conducted from primary school to university or even language institutes. In the same way, the context of the classrooms either EFL or ESL was also taken into account.

In addition, the 20 studies were classified into two groups according to the different strategies used for the improvement of English pronunciation, ICTs and CALL. Likewise, the advantages and disadvantages in the use of ICT tools and CALL were considered as well as the negative and positive effects in the use of ICT tools and CALL as strategies to improve English pronunciation.

5.1.   Analysis of the Data

5.1.1. Year of Publication

Table 1

Year of Publication

Year of Publication	N	%	Author/Year
2002-2010	6	30%	Harper (2004); Mak, Wong, Lo, Siu, Ng & Tam, (2003); Neri, Mich, Gerosa & Giuliani, (2008); Saran, Seferoglu & Cagiltay (2009); Seferoglu (2005); Walker (2005).
2011-2019	14	70%	Cerezo, Calderón & Romero (2018); Foote & McDonough (2017); Hengbin, Jiexuan and Ying (2018); Ibrahim, Noyan, Metomand, Ismail, Yusrina & Khedif, (2019); James (2017); Kim (2014); Lazaro (2011); Mahdi & Al Khateeb (2019); McCrocklin (2016); Sidgi & Shaari (2017); Suryani, Syahrizal & Fauziah (2019); Trooster, Goei, Ticheloven, Oprins, Van de Boer-Visschedijk, Corbalan & Van Schaik (2016); Tsai (2019); Vu & Bui (2018).

Note. N=20

Table 1 shows the studies organized according to their year of publication. The
studies were divided into two periods of time to demonstrate that 14 of them were
published within the last nine years, while six studies were published at an earlier period of
time. However, all of them were published after the year 2000. In a study carried out by
Harper (2004) indicated that when he took into account after-2000 studies, he began to see
a substantial body of qualitative and quantitative data related to CALL effectiveness. He

also started to see other languages such as English, rather than those that have always been prominent in the field of CALL emerging such as Japanese, Indonesian, Chinese and Russian. On the other hand, Kim (2014) affirmed that the use of information and communication technologies (ICTs) has restructured English teaching methodology in the past few years; he also stated that in no other era we have experienced this technological revolution in higher education.

Furthermore, a recent study developed by Saran et al. (2009) investigated the potentials and effectiveness of using ICT tools, specifically mobile phones in foreign language education for improving language learners' pronunciation of words. The authors indicated that majority of the students own and frequently use mobile phones in their lives, and the use of mobile phones, which are already used for communication and entertainment, should work for education. Finally, Saran et al. (2009) concluded that using mobile phones in educational settings may help learners to be more motivated and might make it possible to overcome the difficulties teachers or parents experience in order to make learners start studying.

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5.1.2. Location

Table 2

Location by Continent

Continent	N	%	Author/Year
Asia	9	45%	Hengbin, Jiexuan and Ying (2018); Ibrahim, Noyan, Metomand, Ismail, Yusrina & Khedif, (2019); James (2017); Mahdi & Al Khateeb (2019); Mak, Wong, Lo, Siu, Ng & Tam, (2003); Sidgi & Shaari (2017); Suryani, Syahrizal & Fauziah (2019); Tsai (2019); Vu & Bui (2018).
America	4	20%	Foote & McDonough (2017); Harper (2004); Kim (2014); McCrocklin (2016).
Europe	7	35%	Cerezo, Calderón & Romero (2018); Lazaro (2011); Neri, Mich, Gerosa & Giuliani, (2008); Saran, Seferoglu & Cagiltay (2009); Seferoglu (2005); Trooster, Goei, Ticheloven, Oprins, Van de Boer-Visschedijk, Corbalan & Van Schaik (2016). Walker (2005).

Note. N=20

Table 2 presents the studies' classification according to the continent where they were conducted as well as the percentage that they represent. As it can be seen, the majority of the studies, nine (45%), were carried out in the Asian continent, while in the European continent seven studies corresponding to the 35% were carried out, and the last four studies representing 20% took place in the American continent. As evidenced, studies developed in Africa, Oceania, Central and South America were not found.

Referring to Latin America, Foote and McDonough (2017) stated that the limited information available suggests that English Language Learning (ELL) in this area is deficient due to the education systems underperforming in English education. It is evidenced through the average results that Latin America obtained in the EF English First English Proficiency Index, in all age groups (EF English First, 2019). While many governments make important efforts to remedy this situation through policies and programs, the remaining gaps are significant. In contrast, Europe and Asia almost always perform above the world average, and always perform better than Latin America (EF English First, 2019).

5.1.3. Academic Setting

Table 3

Academic Setting

Setting	N	%	Author/Year
Primary School	5	25%	Cerezo, Calderón & Romero (2018); Ibrahim, Noyan, Metomand, Ismail, Yusrina & Khedif, (2019); James (2017); Neri, Mich, Gerosa & Giuliani, (2008); Trooster, Goei, Ticheloven, Oprins, Van de Boer-Visschedijk, Corbalan & Van Schaik (2016).
High School	3	15%	Mak, Wong, Lo, Siu, Ng & Tam, (2003); Saran, Seferoglu & Cagiltay (2009); Tsai (2019).
University	10	50%	Foote & McDonough (2017); Harper (2004); Hengbin, Jiexuan and Ying (2018); Kim (2014); Lazaro (2011); McCrocklin (2016); Seferoglu (2005); Sidgi & Shaari (2017); Suryani, Syahrizal & Fauziah (2019); Walker (2005).
Language Institute	2	10%	Mahdi & Al Khateeb (2019); Vu & Bui (2018).

Note. N=20

     Table 3 displays the studies' according to the setting where they were conducted. This category of analysis considers the participants and their level of education from primary school to university or even language institutes. For example, in a study developed by Gilakjani (2011), the author stated that those who start to learn English after their school years are most likely to have serious difficulties in acquiring intelligible pronunciation, with the degree of difficulty increasing markedly with age or their academic level.

It is noticed that the majority of the studies, 10, were conducted in a university setting, while the rest of them took place in different educational environments such as primary school, high school and language institutes. A recent CALL study conducted by Tsai (2019) in a high school, investigated how peers can help to mediate the pronunciation learning of students using MyET, a Computer Assisted Pronunciation Training (CAPT) system. Tsai (2019) concluded that the present study posits that the mediation of technology and that of humans can be complementary to each other. In addition, the audio and visual feedback that MyET provides can help raise awareness of the deviation of their speech production from the model teachers.

5.1.4. Context

Table 4

EFL and ESL Contexts

Context	N	%	Author/Year
EFL classroom	15	75%	Cerezo, Calderón & Romero (2018); Hengbin, Jiexuan and Ying (2018); Lazaro (2011); Ibrahim, Noyan, Metomand, Ismail, Yusrina & Khedif, (2019); Mahdi & Al Khateeb (2019); James (2017); Mak, Wong, Lo, Siu, Ng & Tam, (2003); Neri, Mich, Gerosa & Giuliani, (2008); Saran, Seferoglu & Cagiltay (2009); Seferoglu (2005); Sidgi & Shaari (2017); Suryani, Syahrizal & Fauziah (2019); Trooster, Goei, Ticheloven, Oprins, Van de Boer-Visschedijk, Corbalan & Van Schaik (2016); Vu & Bui (2018). Tsai (2019).

ESL classroom	5	25%	Foote & McDonough (2017); Harper (2004); Kim (2014); McCrocklin (2016); Walker (2005).

Note. N=20

Table 4 groups the studies according to the context where they were developed, namely EFL or ESL. As evidenced, the majority of studies, 15 (75%), were carried out in EFL environments where learners were not exposed directly to the target language as in the case of the ESL environments. The 15 studies developed in the EFL context have focused on supporting non-native speakers to improve their pronunciation without being in the target language environment. For instance, Vu and Bui (2018) conducted a study in an EFL classroom that investigated the effectiveness of an ICT tool, specifically a mobile phone application to improve students' pronunciation and fluency. The findings of the study revealed that using the recording function on the mobile phone did have a positive impact on the effectiveness of the learning process, and students showed improvement in fluency and pronunciation of a number of individual words and sounds.

On the other hand, five studies were developed in ESL contexts. It could be interpreted that researchers think that it is easier for learners to acquire better pronunciation when exposed to the target language all the time. In addition, it is important to highlight that these five studies only used CALL strategies. A study carried out in an ESL classroom by Harper (2004) investigated the effectiveness of CALL based pronunciation exercises with respect to beginner level ESL students. Harper (2004) concluded that CALL can be interactive, thus making the learning experience more enjoyable for both the SL instructor and the ESL student. Furthermore, the author highlighted that teaching pronunciation

through CALL can be beneficial for ESL students, especially students at the beginner levels who need more attention when acquiring accurate pronunciation skills.

Another study carried out by Foote and McDonough (2017) has shown that using shadowing with mobile technology is a way to help learners to improve their pronunciation and fluency. Also, shadowing activities with mobile technology may offer a valuable tool for learners looking for ways to improve pronunciation on their own. In addition, the findings have led learners to improve comprehensibility of extemporaneous speech, making this activity of potentially high utility for learners who want to communicate more effectively. This study took place in an ESL classroom, where learners have more access to other types of English input and feedback outside of class.

5.1.5. Pronunciation Strategies

Table 5

Pronunciation Strategies

Pronunciation Strategies	N	%	Author/Year
ICTS	10	50%	Cerezo, Calderón & Romero (2018); Foote & McDonough (2017); Hengbin, Jiexuan and Ying (2018); Kim (2014); Lazaro (2011); Saran, Seferoglu and Cagiltay (2009); Suryani, Syahrizal & Fauziah (2019); Trooster, Goei, Ticheloven, Oprins, Van de Boer-Visschedijk, Corbalan & Van Schaik (2016); Vu & Bui (2018); Walker (2005).
CALL	10	50%	Harper (2004); Ibrahim, Noyan, Metomand, Ismail, Yusrina & Khedif, (2019); James (2017); Mahdi & Al Khateeb (2019); Mak, Wong, Lo, Siu, Ng & Tam, (2003); McCrocklin (2016); Neri, Mich, Gerosa & Giuliani, (2008); Seferoglu (2005); Sidgi & Shaari (2017); Tsai (2019).

Note. N=20

Table 5 presents the evaluation of the two main pronunciation strategies analyzed for this synthesis. The evaluation of the studies demonstrates that 50% of them focused on strategies related to ICTs, while the other 50% of the studies focused on strategies related to CALL. Nevertheless, all of them were used for pronunciation learning, so they are appropriate for the present synthesis.

The collected studies regarding ICT strategies include interactive online games (Cerezo et al., 2018; Trooster et al., 2016), the use of mobile phones (Foote and

McDonough, 2017; Saran et al., 2009; Vu and Bui, 2018), the use of computer apps (Hengbin et al., 2018; Suryani et al. (2019), and the use of recording systems (Kim, 2014; Lazaro, 2011; Walker, 2005). For instance, Calvera and Fortuño (2017) investigated to what extent university students enrolled in the Pronunciation and Understanding of Spoken English module are able to improve their pronunciation through an ICT tool called Voki. The authors concluded that once students' experience with these online tools finished, most of them improved their English pronunciation. In fact, the number of mispronunciation errors decreased in their second attempt.

The 10 studies about CALL are basically related to computer usage, so we grouped them according to computer programs, which provide instant feedback in pronunciation (Ibrahim et al., 2019; Mak et al. 2003; McCrocklin, 2016; Tsai, 2019), and programs of pronunciation training (Harper, 2004; James, 2017; Mahdi and Al Khateeb, 2019; Neri et al. 2008; Seferoglu, 2005; Sidgi and Shaari, 2017). To illustrate, a study developed by Wang and Young (2014), presented the implementation of the ASR-based CALL (computer-assisted language learning based upon automatic speech recognition) system embedded with both formative and summative feedback approaches and using implicit and explicit strategies to enhance adult and young learners' English pronunciation. The purposes of this study were to implement the ASR-based CALL system to enhance learners' pronunciation and to conduct an empirical evaluation of a group of adult and young learners using this system to explore the factors influencing the effectiveness of pronunciation acquisition from the system feedback.

5.1.6. Advantages and Disadvantages of the ICT tool and CAL

Advantages of the ICT tools

Table 6

Advantages of the ICT tools

	Advantages					
Author/Year	Allows learners to practice pronunciation	Provides instant feedback	Encourages learner's motivation	Evaluates learner's language proficiency	Offers multi-Level instruction	Offers availability for different technological devices
Cerezo, Calderón & Romero (2018).	X	X	X	X		
Foote & McDonough (2017).	X		X		X	X
Hengbin, Jiexuan & Ying (2018).	X	X	X	X	X	
Kim (2014).	X	X	X	X		X
Lazaro (2011).	X		X		X	
Saran, Seferoglu and Cagiltay (2009).	X		X		X	
Suryani, Syahrizal &	X	X	X	X	X	X

Fauziah (2019).						
Trooster, Goei, Ticheloven, Oprins, Van de Boer-Visschedijk, Corbalan & Van Schaik (2016).	X	X	X	X		
Vu & Bui (2018).	X		X		X	X
Walker (2005).	X		X		X	X

Note. N=10

Table 6 shows the advantages identified in 10 studies when using ICT for English pronunciation learning. The five advantages identified are related to pronunciation practice, instant feedback provided, motivation, proficiency evaluation, multi-level instruction and availability. For instance, in a study about the game HolograFX, the authors Cerezo et al. (2018) concluded that all the children who used this ICT tool had access to an intensive pronunciation practice of English vocabulary. In addition, the authors stated that mobile applications could produce better performances than traditional memorizing methods as reported in other related studies with children learning in an EFL classroom.

Moreover, instant feedback was provided during the use of the ICT tools such as online games or mobile phone applications. To illustrate, in a study conducted by Suryani et al. (2019), about ORAI application in different stages. The first stage of training was

recording; in this stage students recorded their words, utterances or speech. ORAI application provided a text to read or topic to expand. The next stage was revising; this ICT tool provided the percentage of achievements as well as the option of revising. If the speech of students was out of the topic or not read the exact similar text, the application would automatically ask students to revise it and reproduce it. This ICT tool also provided visual report projected by graph as well as a transcript of the students' talk.

In another study by Trooster et al. (2016), the authors affirmed that playing LINGO online game improves the learning of English pronunciation as compared to not playing the game, especially in primary education. In addition, students are able to train English pronunciation individually and feel motivated to learn in a self-directed strategy while saving time. Similarly, in a study conducted by Lazaro (2011), recording imitations of films and TV series was a good training tool for the improvement of pronunciation. Findings suggest that the task was not only useful but also highly motivating and entertaining.

Additionally, Kim (2014) conducted a study in which the use of Vocaroo and vozME recording systems had a significant improvement in all participants' proficiency in terms of vocabulary and sentence complexity. In addition, the author reported that all the participants developed their oral proficiency in comparison to their before-training proficiency and gained self-confidence through self-assessment by using the recording systems.

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Disadvantages of the ICT tools

Table 7

Disadvantages of the ICT tools

	Disadvantages	
Author/Year	Does not offer multi-level	Does not provide instant feedback
Cerezo, Calderón & Romero (2018).	**X**	
Foote & McDonough (2017).		**X**
Hengbin, Jiexuan & Ying (2018).		
Kim (2014).		**X**
Lazaro (2011).		**X**
Saran, Seferoglu and Cagiltay (2009).		**X**
Suryani, Syahrizal & Fauziah (2019).		
Trooster, Goei, Ticheloven, Oprins, Van de Boer-Visschedijk, Corbalan & Van Schaik (2016).	**X**	
Vu & Bui (2018).		**X**
Walker (2005).		**X**

Note. N=10

Table 7 points out the 10 ICT studies' classification according to the disadvantages that they showed in English pronunciation learning. As evidenced, eight studies presented disadvantages. The two disadvantages identified are related to the lack of multi-level ICT tools and instant feedback provided. As an example, the study developed by Kim (2014) indicated that Vocaroo and vozME recording systems do not provide instant feedback to learners since the main goal of these systems is to record and listen to recordings. Consequently, there was no significant improvement in learners' discourse. Likewise, Foote and McDonough (2017) stated that no feedback was provided while using systems such as Recordings Texts or Shadowing with Mobile Technology, since shadowing is an activity where learners only imitate a presented speech stimulus as closely and quickly as possible. On the other hand, although some ICT tools such as the online game LINGO offers instant feedback on the student's pronunciation, the availability of proficiency levels was limited since these games or systems were intended for children only.

Advantages of CALL

Table 8

Advantages of CALL

	Advantages				
Author/Year	Allows learners to practice pronunciation	Provides instant feedback	Encourages learner's motivation	Evaluates learner's language proficiency	Offers multi-Level instruction
Harper (2004).	X				X
Ibrahim, Noyan, Metomand, Ismail, Yusrina & Khedif (2019).	X	X	X		
James (2017).	X			X	X
McCrocklin (2016).	X	X			X
Mahdi & Al Khateeb (2019).	X	X		X	X
Mak, Wong, Lo, Siu, Ng & Tam (2003).	X	X	X		X
Neri, Mich, Gerosa & Giuliani (2008).	X	X	X		
Seferoglu (2005).	X	X		X	X

Sidgi & Shaari (2017).	**X**	**X**	**X**	**X**	**X**
Tsai (2019).	**X**	**X**	**X**		**X**

Note. N=10

Table 8 presents the reported advantages of using CALL for learning English pronunciation. The five advantages identified are related to pronunciation practice, instant feedback provided, motivation, proficiency evaluation and multi-level instruction. For instance, in a study about ASR (Accent Reduction Software), the author Seferoglu (2005) stated that using this CALL system, learners had the facility to hear each of the 52 sounds of English pronounced by native speakers, choose one of the sounds and practice their pronunciation with various exercises. In addition, learners practiced more than 500 selected words, sentences for stress, timing, articulation, intonation and rhythm, and finally record their own voice whilst pronouncing these words for further comparison.

Moreover, instant feedback was provided during the use of CALL. To illustrate, in a study conducted by Mak et al. (2003), about PLASER (Pronunciation Learning via Automatic Speech Recognition), two kinds of feedback of different resolutions were given for the word exercise: an overall phoneme score of the whole word and a visual feedback of phoneme-by-phoneme assessment that gives a color to the letters in the word spelling to indicate the pronunciation accuracy of their associated phonemes; each phoneme used the colors blue for good, the green for fair, the red for bad and the grey for unused. According to Mak et al. (2003), the objective of PLASER was to teach correct pronunciation and not to assess a student's overall pronunciation quality. The results have shown that students had their pronunciation accuracy improved, also, the students liked to use PLASER to learn

English Pronunciation because believed that their pronunciation skill was improved after using PLASER (Mak et al., 2003).

As shown in the table, motivation is another reported advantage, some authors affirmed that the educational environments with the use of CALL systems in the classroom is highly motivating in learning English pronunciation. For instance, Sidgi and Shaari (2017) conducted a study in which the use of a CALL software that focuses on ASR reduced anxiety and offered a great opportunity in teaching and more useful and motivating learning pronunciation than traditional instruction. According to Sidgi and Shaari (2017), their study focused on determining whether automatic speech recognition (ASR) technology is reliable for improving English pronunciation to Iraqi EFL students. Twenty subjects were selected randomly from the first-year college students at AL-Turath University College from the Department of English in Baghdad, Iraq. The findings of the study revealed that the students found ASR Eyespeak software very useful in improving their pronunciation and helping them realize their pronunciation mistakes; they also reported that learning pronunciation with ASR Eyespeak enjoyable (Sidgi & Shaari, 2017).

Some authors indicated that CALL systems offer a multi-level instruction for learners. For example, Mahdi and Al Khateeb (2019) indicated that the CAPT system they used offered a multi-level instruction for learners, categorizing them according to their levels, from young learners (seven to 17 years old), studying either primary or secondary school, to adult learners (18 and above) studying in universities and language institutes. The authors affirmed that the age of learners is a crucial factor that influences foreign language learning.

Disadvantages of CALL

Table 9

Disadvantages of CALL

	Disadvantages	
Author/Year	Allows its use through computer only	Presents time constraints
Harper (2004).	X	X
Ibrahim, Noyan, Metomand, Ismail, Yusrina & Khedif (2019).	X	
James (2017).	X	
McCrocklin (2016).	X	
Mahdi & Al Khateeb (2019).	X	
Mak, Wong, Lo, Siu, Ng & Tam (2003).	X	
Neri, Mich, Gerosa & Giuliani (2008).	X	
Seferoglu (2005).	X	
Sidgi & Shaari (2017).	X	
Tsai (2019).	X	

Note. N=10

     Table 9 shows the disadvantages of using CALL for improving English

pronunciation. The two disadvantages identified are related to the use of CALL limited to

be performed in a computer and time constrains. Egbert (as cited in Archileos & Jarvis,

2013) stated that CALL is a platform for language learning through and around only

computer technologies. For instance, Neri et al. (2008) investigated whether a system of

pronunciation training assisted by computer only can help two groups of 11 years of young learners improve word-level pronunciation skills in English as a foreign language. The results showed that pronunciation quality of isolated words improved significantly in the two groups, and both groups significantly improved in pronunciation quality of words that were considered particularly difficult to pronounce. However, this type of instruction assisted by computer only was limiting for those who prefer using other technological devices such as smartphones or tablets.

In addition, Harper (2004) affirmed that CALL based pronunciation exercises presented time constraints because most students seemed confused with the procedure and many of the computers lacked the proper software to run the sound spelling exercises. In addition, at the moment of accessing the website, some problems with the computers were presented. Although, the students showed signs of improvement in their pronunciation skills, the progress was minimal due to time constraints.

5.1.7. Positive and Negative effects of the ICT tools and CALL

Positive Effects of ICT tools

Table 10

Positive Effects of ICT tools

	Positive Effects					
Author/Year	Develops autonomous learning	Provides helpful instant feedback	Improves pronunciation	Reduces stress and anxiety	Offers an enjoyable experience for learners	Complements teacher's instruction
Cerezo, Calderón & Romero (2018).		X	X	X	X	X
Foote & McDonough (2017).	X		X		X	X
Hengbin, Jiexuan & Ying (2018).		X	X			X
Kim (2014).	X		X	X		X
Lazaro (2011).	X		X			X
Saran, Seferoglu and Cagiltay (2009).	X		X		X	X
Suryani, Syahrizal &		X	X	X	X	X

Fauziah (2019).						
Trooster, Goei, Ticheloven, Oprins, Van de Boer-Visschedijk, Corbalan & Van Schaik (2016).		X	X		X	X
Vu & Bui (2018).	X		X	X	X	X
Walker (2005).	X		X			X

Note. N=10

Table 10 details the positive effects of the use of ICT tools for improving English pronunciation. The six positive effects identified are related to autonomous learning, helpful instant feedback provided, pronunciation improvement, stress and anxiety reduction, enjoyable experience and teacher's instruction complementation. For instance, Kim (2014) affirmed that the use of voice recording systems promoted autonomous learning which could support learning opportunities without time and space constraints and help to improve English oral proficiency by using online self-study programs for high-intermediate and advanced ESL learners. Kim (2014) performed a study in which he explores how ESL learners' oral proficiency changed through online recording tools. Five participants used online recording program, Vocaroo, a Text-to-Speech (TTS) program and vozMe. The result of this study was that all the participants developed their oral proficiency

and gained self-confidence through self-assessment by recording their stories (Kim, 2014).
This indicates that using a combination of Vocaroo and vozMe, gives ESL learners a
positive learning experience which promotes self-confidence, and autonomously develops
their language skills (Kim, 2014).

The studies analyzed mentioned that during the use of ICT tools in the classroom,
helpful instant feedback was provided. For example, Suryani et al. (2019) affirmed that in
the use of a speech improving app, the feedback provided assisted to build learners
confidence and braveness to talk in public and to practice their pronunciation; also, learners
were able to share their process of progress with their classmates and teacher. The results
showed that students felt very comfortable with the feedback given by the ICT tool.

Improvement of pronunciation is another positive effect of the use of ICTs in the
classroom. For example, Foote and McDonough (2017) affirmed that ICT tools using
mobile technology helped learners improve their pronunciation and fluency. Likewise, the
use of mobile technology is a technique that may be a practical solution for learners who do
not have access to pronunciation instruction, and instructors who are looking to help
students who need extra help with pronunciation. Due to its repetitive nature, there may be
a reluctance to recommend this activity to learners, regardless of its efficacy. Foote and
McDonough (2017) conducted a study in which 16 university participants used iPods to
practice shadowing short dialogues for 8 weeks. Foote and McDonough (2017) stated that
shadowing offers learners a way to practice their pronunciation (thus potentially improving
comprehensibility) without the need for explicit instruction. The results of the study were

that the participants felt positive about their improvement because they could better express their emotions and feel more confident talking with native speakers.

In addition, ICT tools, especially games offer enjoyable experiences for learners. For instance, a study developed by Cerezo et al. (2018) confirmed that in the satisfaction survey about the use of a holographic game, the results showed positive attitudes. Children indicated that they enjoyed practicing English vocabulary pronunciation using the game, and that they preferred that over traditional memorizing methods.

Negative Effects of ICT tools

Table 11

Negative Effects of ICT tools

Negative Effects	N	%	Author/Year
Does not developed accuracy	1	33,33%	Vu & Bui (2018).
Presents installation issues	2	66,67%	Suryani, Syahrizal & Fauziah (2019); Trooster, Goei, Ticheloven, Oprins, Van de Boer-Visschedijk, Corbalan & Van Schaik (2016).

Note. N=3

Table 11 includes the negative effects in English pronunciation learning. Accuracy and installation issues while using ICT tools appeared to be the problem to many language learners. To illustrate, in a study about Mobile Phone Applications, the authors Vu and Bui (2018) indicated that learners who participated in their study improved fluency but

accuracy still remained a problem for many of them. Hammerly (as cited in Vu and Bui, 2019) affirmed that in the classroom environment, fluency does not lead to accuracy.

Installation issues were also reported as a disadvantage during the use of some ICT tools. For example, Trooster et al. (2016) stated that online games presented threats in motivation of teachers and students. The authors explained that the schools experienced critical issues during the implementation of the game because the installation of a secondary software was necessary, the firewall settings needed to be changed. In addition, after instruction and with a manual, students still had questions on how to use the game. However, they concluded that these issues can be solved with adequate support.

Positive Effects of CALL

Table 12

Positive Effects of CALL

	Positive Effects					
Author/Year	Develops autonomous learning	Provides helpful instant feedback	Improves pronunciation	Reduces stress and anxiety	Offers an enjoyable experience for learners	Complements teacher's instruction
Harper (2004).	**X**	**X**	**X**	**X**	**X**	
Ibrahim, Noyan, Metomand, Ismail, Yusrina & Khedif (2019).	**X**	**X**	**X**		**X**	**X**

James (2017).	X	X	X		X	
McCrocklin (2016).	X	X	X	X		X
Mahdi & Al Khateeb (2019).	X	X	X		X	
Mak, Wong, Lo, Siu, Ng & Tam (2003).	X	X	X		X	
Neri, Mich, Gerosa & Giuliani (2008).	X	X	X		X	X
Seferoglu (2005).	X	X	X			
Sidgi & Shaari (2017).	X	X	X	X	X	X
Tsai (2019).	X	X	X			X

Note. N=10

Table 12 presents the positive effects reported in the use of CALL for improving English pronunciation. The six positive effects identified are related to autonomous learning, helpful instant feedback provided, pronunciation improvement, stress and anxiety reduction, enjoyable experience and teacher's instruction complementation. For instance, in a study conducted by McCrocklin (2016), CALL, in this case Automatic Speech Recognition (ASR) programs, empowers students to work on their pronunciation on their

own speed, getting feedback from the words recognized, increasing self-efficacy and beliefs in their abilities to learn autonomously. In this study, teachers could not provide guide sheets or materials for practice, instead, students developed their own materials. The author concluded that Automatic Speech Recognition is a powerful tool for empowering pronunciation students to practice autonomously and get feedback on their pronunciation outside of class.

Sidgi and Shaari (2017) concluded that the automatic feedback provided while using ASR Eyespeak software raised the awareness of learner's pronunciation errors. Besides, the authors affirmed that the use of this tool, as many other tools of CALL in the classroom is convenient and can save time for the teacher; also, this software allows for effective pronunciation training in the classroom having teacher's instruction.

Computers have a great capability to improve pronunciation, which is one of the most reported advantages (Wester as cited in Sidgi and Shaari, 2017). To illustrate, Seferoglu (2005) developed a study, which demonstrates that accent reduction software used was helpful for improving students' pronunciation. The author concluded that practicing individual sounds and suprasegmental features in structured drills through pronunciation software may be helpful, while pronunciation taught in isolation may not lead to better pronunciation in real communication. Similarly, Neri et al. (2008) showed their results by using the CAPT system PARLING in which children who were trained by using this system of CALL improved pronunciation quality of isolated words. Additionally, children made comparable improvements in pronunciation quality of words which they did not know before the training.

In addition, Sidgi and Shaari (2017) developed the study in an EFL classroom in which ASR Eyespeak software enhanced the learning of individuals who were trying to improve their English pronunciation skills. Also, the authors affirmed that the educational environments with the use of ASR in the classroom are highly motivating and reduce anxiety in learning English pronunciation.

Negative Effects of CALL

Table 13

Negative Effects of CALL

Negative Effects	N	%	Author/Year
Gets learners frustrated	1	33,33%	McCrocklin (2016).
Do not provide helpful feedback	2	66,67%	Sidgi & Shaari (2017); Tsai (2019).

Note. N=3

Table 13 shows the negative effects that CALL might have for English pronunciation learning. The two negative effects identified are that the use of CALL gets learners frustrated and do not provide helpful feedback. Regarding the first negative effect, in a study about Automatic Speech Recognition, the author McCrocklin (2016) indicated that the larger issue with working with ASR is that it can be frustrating to use, even for native and highly proficient speakers. The author also affirmed that students are also likely to get frustrated with the technology for being too sensitive or not catching enough errors to provide helpful feedback.

In addition, in the study conducted by Sidgi and Shaari (2017), few negative responses were made by the students towards the ASR Eyespeak software. The negative responses indicated that the visual graphic feedback was not helpful in showing pronunciation mistakes. Similarly, the authors mentioned that this tool of CALL's exercise feedback gives the student's score on the entire pronounced word and not specifically on the phoneme-level error, which may not help them understand their pronunciation errors.

The analysis conducted indicated that the ICTs and CALL strategies examined presented a considerable number of advantages. They allowed learners to practice English pronunciation, provided instant feedback, encouraged learners' motivation, evaluated learners' language proficiency and offered multi-level training. On the other hand, regarding disadvantages, the use of CALL for the application of strategies limited its availability in computers only, presenting time constraints. In addition, in some ICT strategies applications, no instant feedback was provided and the availability of proficiency levels was limited for children only.

Furthermore, findings showed that using ICT tools in EFL contexts has a positive impact on the effectiveness of the pronunciation training. Additionally, the findings of other studies conducted in ESL contexts using ICTs and CALL have led learners to improve comprehensibility of extemporaneous speech through practice, making this activity of potentially high utility for learners who want to communicate more effectively.

It can also be said that the positive effects reflected on the results of the ICT and CALL studies showed that pronunciation and autonomous learning were successfully

improved; also, the instant feedback provided was highly helpful, interactive and complemented teachers' instruction. Additionally, learners had an enjoyable experience with low levels of anxiety and stress while using CALL and ICTs. On the other hand, reported negative effects of the application of certain pronunciation strategies using CALL frustrated students and did not provide helpful feedback. Similarly, results showed that the use of ICTs presented installation issues and students did not develop accuracy while using the tools.

CHAPTER VI

6. Conclusions and Recommendations

6.1.   Conclusions

This research synthesis aimed to analyze the different English pronunciation strategies within ICT tools and CALL that existing research on pronunciation has proposed and tested. Based on the data analysis of 20 published studies, we were able to identify the different advantages and disadvantages, the positive and negative effects that ICTs and CALL pronunciation strategies presented, as well as their effectiveness in the EFL and ESL contexts. Subsequently, the following conclusions can be stated.

Language pronunciation is a topic of theoretical and practical interest and relevance, which unfortunately has been left out for some decades (Gilakjani 2011). Thus, EFL/ESL teachers should incorporate pronunciation into their oral skills whenever there is opportunity and time. In addition, Szynalski (2007) mentioned that pronunciation is the most important aspect that people notice when someone speaks English, so proper pronunciation should be one of the first features to learn in English.

The two types of pronunciation strategies in which this research synthesis has focused on are ICTs and CALL. Ghasemi and Hashemi (2011) and Emmanuel and Ako (2013) agreed that ICTs must be used as a tool in students' learning process. In the same way, Bataineh and Bani (2011) affirmed that the effectiveness of CALL in language teaching and learning has been highlighted by an abundance of empirical research.

For the development of this research analysis, three research questions were formulated. Regarding our first research question, a considerable number of advantages were found in the studies analyzed. According to Emmanuel and Ako (2013), ICT provides opportunities to students to communicate more effectively since it has a broad range of activities, applications and information that can be accessed through any technological device. In the category of advantages, the analysis suggested that the whole group of ICT and CALL strategies analyzed allowed learners to practice English pronunciation through the use of online games, accent reduction and speech recognition software, applications, etc. Besides, instant helpful feedback was provided during the application of the two types of pronunciation strategies, having the characteristics of being online games, mobile phone application, ASR software, etc. Additionally, ICTs and CALL technological tools provided students enough motivation to practice since they offered a great multi-sensory experience, presenting information through text, graphics, images, audio, and video. Further, it is important to mention that a significant number of ICT and CALL strategies had the advantage of being multi-level which is convenient since they positioned students at the appropriate proficiency level and provided them the instruction for that level. However, a disadvantage in the use of ICT tools such as online games, is that the availability of proficiency levels was limited since they were intended for children only. Besides, some authors such as Cerezo et al. (2018) could not conclude that an ICT tool is better than a teacher or that it can replace teachers' instruction. Additionally, no feedback was provided while using systems such as Recordings Texts or Shadowing with Mobile Technology. In addition, the ICT strategies analyzed are available for any type of technological device,

facilitating student' access while, as mentioned by Bataineh and Bani (2011), CALL encompasses the use of computers only in language teaching and learning.

Referencing our second question, it is difficult for one strategy to be adapted either for EFL or ESL classrooms equally because they are different, and this distinction comes from the level of immersion in the learning process (Egbert, 2018). Based on what the studies conducted in EFL contexts reported, it can be said that the use of ICT and CALL pronunciation strategies such as mobile applications, computer applications, interactive online games and recording systems had positive effects on the pronunciation of a number of words commonly mispronounced by EFL students. Besides, it was evidenced that ICTs and CALL instructions did have a positive impact on the effectiveness of the pronunciation learning process. Additionally, ICTs and CALL instructions showed improvement in fluency and pronunciation of a number of individual words and sounds, and participants were actively engaged during the application.

On the other hand, based on what the studies conducted in ESL contexts reported, it can be said that the use pronunciation strategies within ICTs and CALL such as mobile applications, recording systems and shadowing with mobile technology are beneficial for ESL students especially students at the beginner levels who need more attention when acquiring accurate pronunciation skills. Besides, teaching pronunciation through these ICT and CALL strategies allowed learners to improve comprehensibility of extemporaneous speech through practice, making this activity of potentially high utility for learners who want to communicate more effectively. In addition, these instructions were interactive thus making the learning experience enjoyable for both instructor and student.

Finally, with respect to our third research question, it can be said that ICT and CALL strategies are useful to improve learners' English pronunciation since after their application, many positive effects were reported in the studies. Based on the data analysis, it can be said that the application of ICT and CALL strategies could improve learners' pronunciation. Also, the use of these strategies in the classroom complemented teacher's instruction. Besides, ICTs and CALL pronunciation strategies such as ASR, Computer Assisted Pronunciation Training PARLING or mobile applications worked considerably making learners able to improve pronunciation quality of isolated words. As evidenced in the analysis, the development of learners' autonomous learning though the use of these technological tools was significant. Additionally, the instant feedback provided while using the majority of the software and applications was enjoyable and interactive, and helped learners to improve their English pronunciation.

6.2.   Recommendations

There are some recommendations for future research on ICT and CALL pronunciation strategies, which have been obtained through the results of the analysis. First of all, the majority of the studies analyzed were developed in EFL classrooms. Hence, a suggestion is that more studies about ICTs and CALL pronunciation strategies should take place in ESL environments in order to have a broader resource of investigation, in which there could be information not only about pronunciation strategies performing in the EFL context but also in the ESL.

Furthermore, most of the research found focused on the Asian and European contexts. Therefore, a recommendation is that more studies about ICTs and CALL pronunciation strategies application should be conducted in Latin American contexts in order to have more information available suggesting a clearer panorama of English pronunciation instruction in this area.

Another recommendation for further research is that more strategies using ICT tools such as games or mobile apps, and CALL software such as ARS or CAPT should be investigated, studied, adapted and applied in EFL or ESL contexts, so that there are various ways of addressing pronunciation issues and as a result it may not be neglected and underperformed.

Finally, another recommendation for teachers and institutions is to motivate students to use ICTs and CALL in order to support their pronunciation practice. Therefore, institutions should integrate ICTs and CALL in their teaching methods. Also, it is recommended that students themselves look for learning sources related to the pronunciation of English by using the most accessible tool that currently exists, technology.

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