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FACULTAD DE CIENCIAS HUMANAS Y DE LA EDUCACION
CARRERA DE PEDAGOGÍA DE LOS IDIOMAS NACIONALES Y
EXTRANJEROS

Informe final del trabajo de Integración Curricular previo a la obtención del título de Licenciada en Pedagogía del Idioma Inglés.

Theme:

Automatic Speech Recognition (Speechnotes) and the English Pronunciation.

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SUPERVISOR APPROVAL

CERTIFY:

I, Mg Manuel Xavier Sulca Guale, holder of the I.D No. 1802447548, in my capacity as supervisor of the Research dissertation on the topic: “Automatic Speech Recognition (Speechnotes) and the English Pronunciation” investigated by Miss Adriana Nicole Lozano Celleri with I.D No. 1805276373, confirm that this research report meets the technical, scientific and regulatory requirements, so the presentation of it is authorized to the corresponding organism in order to be submitted for evaluation by the Qualifying Commission appointed by the Directors Board.

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DECLARATION PAGE

I declare this undergraduate dissertation entitled " Automatic Speech Recognition (Speechnotes) and the English Pronunciation " is the result of the author's investigation and has reached the conclusions and recommendations described in the present study.

Comments expressed in this report are the author's responsibility.



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DEDICATION

To me for persevering on this learning journey and not giving up. To my dear parents, sisters, and friends for always supporting and motivating me.

Adri.

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I thank God and my dear parents for always supporting me. To my sisters and close friends for motivating me, especially my Ecuadorian-Swedish friend who, in spite of he is in another country, has encouraged me to continue in this process. Finally, to my professors for guiding me in my university studies, especially my tutor, who despite the fact that I was not the Andy he expected, we were able to carry out this research work.

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THEME: “Automatic Speech Recognition (Speechnotes) and the English Pronunciation”

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ABSTRACT

The current study determined the importance of pronunciation through the Speechnotes application. A total of 73 university students (33 males and 40 females) were enrolled in a descriptive and non-experimental research. The data were collected through a survey with 31 items on a Likert scale and, 3 open-ended questions. It was validated by experts and with the coefficient Cronbach's Alpha (0,856). Moreover, it was based on three research questions: What are the dimensions and phases of the Speechnotes application? To what extent does Speechnotes application benefit the English pronunciation? What are the strategies that learners use to improve their pronunciation? The results revealed that Speechnotes application is a good means of practicing pronunciation because it has free access, the speaker's voice adapts smoothly, and it converts the spoken phrases and words into text. Learners considered that Speechnotes have several benefits such as encouraging them to improve their pronunciation and speaking and oral communication skills. It assists students to develop pronunciation features, and it promotes autonomy work. Furthermore, there are many strategies to put into practice the improvement of pronunciation. Most of the students preferred the use of media by watching videos or listening to music or podcasts in English and they usually repeat the pronunciation of sounds and words. However, pronunciation rules are infrequently considered as a principal strategy because learners do not have sufficient knowledge of them, and they are not implemented in the curriculum or lesson planning.

Keywords: Speechnotes, benefits, phases, pronunciation strategies, pronunciation features.

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RESUMEN

El estudio actual determinó la importancia de la pronunciación a través de la aplicación Speechnotes. Un total de 73 estudiantes universitarios (33 hombres y 40 mujeres) participaron en una investigación descriptiva y no experimental. Los datos fueron recolectados a través de una encuesta con 31 ítems en escala Likert y 3 preguntas abiertas. Fue validado por expertos y con el coeficiente Alfa de Cronbach (0,856). Además, se basó en tres preguntas de investigación: ¿Cuáles son las dimensiones y fases de la aplicación Speechnotes? ¿Hasta qué punto la aplicación Speechnotes beneficia la pronunciación en inglés? ¿Cuáles son las estrategias que utilizan los alumnos para mejorar su pronunciación? Los resultados revelaron que la aplicación Speechnotes es un buen medio para practicar la pronunciación porque tiene acceso gratuito, las voces de los hablantes se adaptan sin problemas y convierte las frases y palabras habladas en texto. Los alumnos consideraron que Speechnotes tiene varios beneficios, como alentarlos a mejorar su pronunciación y sus habilidades de habla y comunicación oral. Ayuda a los estudiantes a desarrollar características de pronunciación y promueve el trabajo autónomo. Existen diversas estrategias para poner en práctica la mejora de la pronunciación. La mayoría de los estudiantes prefirieron el uso de medios viendo videos o escuchando música o podcasts en inglés y suelen repetir la pronunciación de sonidos y palabras. Sin embargo, las reglas de pronunciación es una estrategia poco frecuente porque los alumnos no tienen suficiente conocimiento de ellas y no se implementan en el plan de estudios o en la planificación de lecciones.

Palabras clave: Beneficios, fases, características de pronunciación, estrategias de pronunciación, Speechnotes.

CHAPTER I

1.1. Research background

This research was supported by previous studies and the information was collected from different academic databases such as Google scholar, online libraries, Taylor & Francis, ResearchGate and Eric that work with journals, magazines, papers and articles. The research covered essential information about the function of automatic speech recognition (ASR), Speechnotes to improve the English pronunciation.

Nurjanah et al. (2019) conducted a research with students of XI-1 IPS of MAN 1 Semarang High School which main aim was enhancing the students' pronunciation accuracy by using Speechnotes application. The researcher made an action classroom research methodology in three cycles, using a mixed approach. Each cycle was about planning, action, observation, and reflection. The instruments that the teacher applied were a pre and post-test, a questionnaire and an interview. Besides, the Speechnotes application was used during the research. The data collected was analyzed by using SPSS to describe the statistics, sample test, t-test. Finally, the results showed that in each cycle there were many mistakes in the pronunciation of words including the homophones but there was a significant improvement during the experiment. Students concluded that Speechnotes can improve their pronunciation and confidence during the class.

Varasarin (2007) led a research which main purpose was to improve students' pronunciation and spoken intelligibility. The researcher collected the data from pronunciation training in one school in Thailand. The methodology used for this study was collaborative action research because the research included two cycles: the first was related to the training of five teachers using language learning strategies, and the second cycle was in relation to teach a group of 4 students by those teachers who realized they got similar improvements. The project resulted in a policy change by Thai schools to include teaching pronunciation and assigning English classes to teachers who understand the process. The pronunciation learning strategies in this

study and other researchers are presented to formulate strategies as input for teachers to include pronunciation teaching in their classroom teaching.

Sidgi and Shaari (2017) found out that by using Automatic Speech Recognition technology students made some progress. This software employed was very useful in improving the learners' pronunciation and correcting their mistakes. A qualitative methodology was used in this descriptive research. The participants were 20 students randomly selected from the first year of college at Al-Turath University College from the Department of English in Baghdad-Iraq. The data collected was through testing, questionnaire and interviews and it was analyzed by taking only from the questionnaire.

Ammar et al. (2022) carried out a study which objective was to determine students' problems in pronunciation, especially consonants, vowels and diphthongs. The methodology used was a qualitative approach and a descriptive method to explain and describe the contents of the research and give a point of view that will lead to philosophical assumptions that will be different from other perspectives. Therefore, three different forms of performance test and different applications such as Speechnotes were used as instruments to improve the students' pronunciation. The study was conducted at English Education Study Program and there were 23 students from second semester who have taken IEC: pronunciation courses, in this way, they understood the phenomenon of pronunciation. Through the tests, the learners could develop pronunciation exercises that it was possible to conclude that the students have progressed and improved their pronunciation through the tools employed.

Elimat and AbuSeileek (2014) conducted a study aimed to explore the effect of automatic speech recognition (ASR) on the third grade EFL students' performance in pronunciation. A quasi-experimental design was used and a pre and post-test was applied as an instrument in this research. The participants were sixty-four students (28 males and 36 females) of third grade at Al-Abrar Basic Mixed School. The participants were assigned randomly into four groups, 3 experimental and one control group. A pre-test was applied before the experiment and a general post-test was applied after it. The results revealed that there were statistical differences between the experimental

and control groups. At the end of the research, the dialogue level was where the learners fared best since they were able to build intonation and stress in sentences rather than single phrases. The speech recognition offered good results improving students' pronunciation using regular instruction.

Jiang et al. (2021) managed a research which examined the effects of using (ASR) technology on oral complexity in a flipped English as a foreign language (EFL) course. Regarding the methodology used for this study, the researchers has chosen a quasi-experimental method and a flipped learning approach. Meanwhile, A pre-intervention survey to know about the participants' EFL experience and a placement test were applied to the students. The participants were 160 first-year students between males and females from a public university in China and were divided into experimental and control group. Both groups were taught with a flipped approach in which ASR technology was included. At the end of the study, the experimental group performed better on lexical and syntactic complexity than the control group. Additionally, both groups improved significantly their phrasal complexity.

Theoretical framework

Independent variable

Computer assisted language learning (CALL)

CALL stands for Computer Assisted Language Learning is a computer-assisted learning tool that is easy to use, publish, and store in the classroom and it is used in the teaching field (Ratnaningsih et al., 2019). The use of technology in language learning and instruction, whether in or outside of the classroom, is made possible by computer assisted language learning (Levy & Hubbard, 2005). CALL can be used for education and language acquisition both within and outside of the classroom. Education professionals are more interested in employing computer technology as a tool to enhance the teaching of foreign languages as they become more aware of its possibilities. CALL relates to the use of computers in the process of learning languages (Morton & Jack, 2010).

The main benefit of CALL resources is that they help students interact and use language more effectively. Therefore, they encourage learning at their own pace and are student-centered learning aids (Derakhshan et al., 2015). According to Levis (2007), computer technology can be an effective means of teaching English pronunciation especially on pronunciation features. Some of them involve speech rate, fluency, and liveliness, intonation, pronunciation quality of individual words, pitch accents and phonemic duration, vowels, and English stress timing. In this way, teachers can use computer in their pronunciation classes to improve these features. It can provide them an interactive learning environment in different modes such as whole class, small group or pair, and teacher to student.

Utilizing CALL has certain benefits that enable and support improved learning. These benefits include creating a sense of fun in the classroom and giving students the chance to take charge of studying the topic by doing their homework (Neri et al., 2002). It encourages students to participate fully in all activities throughout the learning process. Students can use their imaginations, which could be displayed through computer simulations, to learn interactively in class. It gives controlled interactive speaking practice outside of the classroom and to support speaking abilities closely related to communicative competence. Additionally, CALL believes that classes should enable students to learn on their own through interactive, unstructured, and structured sessions (Okonkwo, 2011).

Automatic speech recognition

Automatic Speech Recognition (ASR) is a specialized, automated method for detecting and transcribing spoken language. Speech recognition is the term used to describe a device's capacity to understand uttered words (Levis & Suvorov, 2012). ASR is a well-designed speech recognition-based technology that, when properly used, can be a useful aid in teaching pronunciation. The learning process is made more realistic and interesting by the computer's ability to analyze and interpret the student's voice and respond by writing the words that were spoken. It also allows for the provision of feedback on the learners' pronunciation (Liu et al., 2019).

Automated Speech Recognition (ASR) transforms speech audio streams into text. Although ASR is still not perfect, it is becoming more accurate at identifying spoken words and turning them into written text (Carrier, 2017). A range of speech tools have become available as a result of the development of information technology to assist students in improving their pronunciation. ASR is a cutting-edge technology that enables students to communicate vocally with data-processing applications (Sidgi & Shaari, 2017). The use of automatic speech recognition (ASR) can help students sound more comfortable when speaking. For skills training, speaking with ASR was helpful for students in EFL settings. Although recording and monitoring were not unfamiliar to the learners, they responded favorably when they were linked with technology. Learners demonstrated good attitudes towards the use of ASR in learning English and it made the speaking activity more dynamic and motivated student performance (Ahn & Lee, 2016).

This approach promises a stress-free environment, which motivates students to contribute more as independent learners. It is highly important since it may have a big impact on how well learners pronounce words (Yaniafari & Olivia, 2022). For teaching the new abilities, the teacher employs many techniques. The teaching-learning process has recently concentrated on the classroom as well as teaching and evaluation methods. ASR technology can be used to assist different speaking practice methods and provide real-time feedback on many aspects of language competency, such as pronunciation and usage of the target language, to help learners improve their speaking abilities (Jiang et al., 2021).

Carrier (2017) focused on pedagogical approaches, the training, learning, and evaluation of languages are precisely a few aspects of language teaching where ASR might be helpful. ASR could be used in a variety of in-class and extracurricular tasks, including those of dictation, pronunciation drills, vocabulary and grammar exercises, and grading student assignments. Whether with and without a partner present, the ASR exercises can help students improve their speaking skills. Whenever a learner works independently to dictate a text or play out a conversation given by the teacher, dictating to a device, they are engaged in self-study (between the learner and device). ASR, on the other hand, can be utilized for teamwork like storytelling and dialogue exercises.

Additionally, students can work in pairs to develop a script and recite it aloud. Students can analyze about what they said after reading the ASR engine's written output, which gives them feedback on pronunciation and speech structure. If the ASR system can understand what they said, then it was probably pronounced correctly. If it is not understood, the speaker most probably said the words inaccurately, which can be corrected.

Speechnotes

Speechnotes application was created by Wellsource in 2018, and it is lightweight and takes up minimal space on users' mobile phones and it is easy to use in any time (Nurjanah et al., 2019). Speechnotes is an online speech recognition notepad designed to bring ideas to life with a simple and efficient layout. Speechnotes lets people go from voice dictation writing to typing. In this way, it is possible to dictate and edit the resulting text immediately and continue dictating. No need to change the application mode or even a registration, it means that it has free access without the need to register with an account unless a premium account is chosen. In addition, it is based on Google's high-quality speech recognition (Adawiyah et al., 2021).

Vasilescu et al. (2014) mentioned that Speechnotes can transform a written message, usually a voice signal, into a text file. This system oversees decoding the voice signal obtaining as output a transcription in text form. Furthermore, this voice recognition applications guarantee that learners continually use the correct spelling and the words in an ideal way. The automatic speech recognition systems are those systems in charge of decoding the voice signal obtaining as output a transcription in text form. Speech-to-text recognition which is an inter disciplinary field of computational linguistics aids in developing technologies that empowers the recognition and translation of speech into text (Vinnarasu & Jose, 2019).

Levis and Suvorov (2012) mentioned that ASR software such as Speechnotes application can be characterized by three main dimensions: speaker dependence, speech continuity, and vocabulary size:

Speaker dependent: It develops when the training record has a significant number of speech samples from various speakers, enabling the system to accurately identify any new speaker. However, adaptive software occurs when a speaker-independent software gradually adapts to a specific user throughout training.

From the dimension of speech continuity: It entails the employment of both continuous speech recognition systems, which are effective at identifying full sentences without pauses between words, and individual word recognition systems, which recognize words that are spoken individually.

Vocabulary size: This technique can be described based on the small or large vocabulary to which the system has.

According to Neri et al. (2003), the ideal automatic speech recognition (Speechnotes) can be regarded as a development of phases: Speech recognition, Feedback presentation and Error diagnosis. On the basis of the speech recognition phase is by using internal phonetic and syntactic models, the software converts the input voice signal into a series of words. Meanwhile, the feedback presentation phase offers meaningful feedback from the teacher, and the student can understand and practice several times to develop their pronunciation. In addition, Nurjanah et al. (2019) stated that the error diagnostic refers to the application that will convert the sound recording into a written form so that it may be used to count the number of speech errors people make when speaking. However, if the user speaks too quickly or incorrectly, the recording device is too far away from the program, the internet connection is unstable, or the device's performance is poor, the writing from this application will be inaccurate.

In teacher-fronted lessons, feedback in language learning appears to be most efficient when the teacher constantly monitors the learners' progress to guide the advancement of speaking performance. Speechnotes aids learners reach the language target and teachers offer individual feedback. This encourages the learning process to take advantage of the technology that has been used this year to assist learning, especially pronunciation (Yaniafari & Olivia, 2022). The rapid development of technology has opened up an attractive and convenient new field for language learning.

Recording and shadowing, although not new to the students, gained positive responses from the students when combined with mobile technology. Further, this kind of learning practice needs to include interactions among the learners, as well as between the device and the learner (Ahn & Lee, 2016). Basically, the Speeachnotes system has to combine multiple registers of spoken signals related to fundamental units (such as phonemes) after the input text (Aziz et al., 2018).

The use of programs such as Speeachnotes in English classes improves both the teaching environment for teachers and the overall learning experience for students. Computer use is a helpful tool for learning and teaching English pronunciation, and it offers interactive and engaging exercises including both students and teachers (Pourhosein & Sabouri, 2017). Further, Gottardi et al. (2022) mentioned several benefits of ASR (Speeachnotes) application. They said that technology can result in considerable benefits to learners, mainly as a supplement to pronunciation teaching: It encourages students to concentrate on their individual learning challenges, receive tailored feedback, and increase their level of independence. It promotes the autonomy of L2 learners by giving them the chance to practice their pronunciation on their own. Speeachnotes encourages students to perform additional work in a relaxed, stress-free environment. It assists students in developing their oral communication abilities, including speaking fluently and accurately. Also, it enhances students' oral communication abilities, including fluency and correctness of speech, as well as their pronunciation. It promotes a rather more positive attitude toward learning and involves students in the learning process, which boosts learners' motivation and confidence. It gives students the chance to get pronunciation help outside of the language classroom (from the application). It enables considerable practice of the language's segmental and suprasegmental elements, from the simplest pair to imitating well-known words or practicing presentations.

Dependent variable

English language skills

English language is given great consideration in education systems all throughout the world. The development of language is the primary goal of English

instruction. Although English is so crucial to the modern world, it is the language of the entire planet, and understanding it makes one a global citizen (Patel & Jain, 2008). English is a language that is also used to communicate the ideas and opinions of a social group. It is common for a language to go from spoken to written form. In this manner, it has four essential skills divided in receptive and productive. The listening and reading corresponds to the receptive skills. Meanwhile, the productive skills are writing and speaking (Husain, 2015). Teachers can adapt classroom activities thanks to technology, which improves language skills. Technology's significance as a tool to assist teachers in facilitating language learning for their students keeps growing (Ahmadi & Reza, 2018).

The four language skills of reading, listening, speaking, and writing should be effectively incorporated into English instruction in order to be successful. These skills should be managed in a way that enables learners to achieve the goals the teacher sets for them and gradually increase their communication proficiency. Consequently, speaking and listening are closely connected abilities that support efficient oral communication. Finally, writing and reading are two essential abilities for producing good written communication (Sadiku, 2015). The target language is taught in a manner that emphasizes how essential it is to provide students opportunities to communicate in English. Integrating linguistic elements with classroom language skills is a key component in teaching English. It corresponds to the four language learning skills of speaking, listening, reading, and writing. These four skills must thus be taken into account by language teachers as they work on each linguistic purpose (Setiyadi et al., 2018).

Speaking Skill

Speaking is one of the four productive skills that should be learned when studying a foreign language. It is a fundamental component of the education and learning of a second language. An effective speaking involves using language that listeners can understand. Nonetheless, speaking skills have indeed been underestimated, and the majority of English language teachers still only develop speaking abilities through drilling repetition or memorizing dialogues (Rao, 2019).

Speaking is the skill on which teachers will focus more when evaluating students in the classroom. Speaking clearly and with comprehension is crucial to a person's daily interactions and, in most situations, their initial impression (Bahrani & Soltani, 2012). As a result, teachers have the obligation to help students become as proficient in speaking English outside of the classroom as they can (Cong-Lem, 2018).

Speaking entails making orderly verbal statements to convey meaning and is a useful listening and speaking skill. The sub competences of speaking ability are diverse. For instance, the use of coherent pronunciation, following the syntactic norms correctly and using a relevant, adequate, and sufficient vocabulary variety. It is a mechanism that students use to interact with others and express themselves, as well as their thoughts, objectives, aspirations, and perspectives. Speaking is the most commonly utilized language skill in basically every context. (Torky, 2006). Talking ability includes the following abilities: Talking in a coherent and unified manner to keep the debate continuing, successfully manage collaboration and discussion. Practical proficiency includes the following abilities: properly expressing a range of abilities while appropriately accepting the setting and register. Fluency: This refers to speaking clearly and at a reasonable pace (Burns, 2019).

Pronunciation

Pronunciation is one of the language skills that international students must learn to improve their communication skills. Pronunciation is the process of producing speech sounds to convey ideas (Yoshida, 2016). Tergujeff (2013) emphasized that a key component of pronunciation instruction is what to teach about it. Teachers need to take into account certain important aspects of pronunciation. First of all, they need to be aware that there will be as many different pronunciation problems as there are students. Teachers should also be aware of the main language phonetic framework impedances. Lastly, they should be concerned that they are expected to have accurate hypothetical articulation information as well as palatable knowledge of variations and contrasts.

Since pronunciation directly impacts learners' conversational ability and performance, it is an essential part of learning a foreign language. Poor pronunciation

can have a detrimental impact on listeners' perceptions of a speaker's dependability and talents, lower learners' self-confidence, and restrict social connections (Pourhosein, 2012). The act or manner of pronouncing words, an utterance of speech, or a way of uttering a word is known as pronunciation. The production of sound, or pronunciation, is what gives words their meaning. By repeating sounds and correcting learners' inaccurate productions of the sounds, pronunciation is studied (Sidgi & Shaari, 2017).

Schmitt and Rodgers (2018) pointed out that the term "pronunciation" refers to all aspects of how humans use spoken sounds to communicate. They are known as suprasegmental (or "prosodic") qualities because they can be thought of as aspects of pronunciation that cover entire utterances (whether these are big texts or just one word) and so go beyond individual sound segments. Furthermore, as speaking is a physical activity that frequently requires the use of the entire body, pronunciation cannot be considered in isolation from other elements.

Speaking clearly requires good pronunciation. In this sense, segmental features and suprasegmental features both contribute to the creation of sounds in English (Gilakjani, 2012). The suprasegmental qualities are connected to units, like stress and tone, that span many sounds in an utterance. Learners should be aware of suprasegmental qualities in order to improve their pronunciation. Understanding the meaning of speakers is more important than just perfecting one's pronunciation (Ahmad, 2018). On the other hand, vocal-tract gestures are the units of segmental representation for particular vowels and consonants, which are segmental elements of the sound system (Wigfield et al., 2013).

According to Gilakjani and Ahmadi (2011), the factors affecting the learning of pronunciation are the accent that is the auditory effect of those features of pronunciation that identify where a person is from. The stress, intonation, and rhythm which focus both on the sounds of language (vowels and consonants) and on suprasegmental features. The motivation and exposure may be more important factors in the development of native-like pronunciation than is age at acquisition. Additionally, the attitude, the instruction, the age, and the mother tongue influence

involve the lack of emphasis on pronunciation development may be due to a general lack of fervor on the part of the second language acquisition researchers, second language teachers and students, that pronunciation of a second language is not very important.

Pronunciation strategies are an effective way of training pronunciation by listening to a recording and then recording oneself as shadowing. The task encouraged learners to focus on suprasegmental aspects of speech (O'Brien, 2020). Although pronunciation learning strategies are designed to be explicit tools provided to pronunciation learners, their primary function is to promote fluency in pronunciation (Eckstein, 2007). They could be beneficial for students looking to get their pronunciation better. The students' favored learning techniques for pronunciation were cognitive, metacognitive, memory, and emotional techniques. The most often reported pronunciation language strategies were on listening. People enjoyed listening to real music and films as well as native speakers who offered as good models. The second and third most effective strategies were imitation and repetition (Szyszka, 2015).

There are several strategies to enhance the English pronunciation. The covert rehearsal, is known as private practice, is the practice of speaking English aloud while the learner is alone. He auto evaluates his pronunciation if it is correct or incorrect by selecting words that he wants to learn. The self-monitoring involves focusing on a particular element of grammar or speech, for instance, the past tense of verbs. First, the student selects the language feature he wants to learn. Then, he starts self-monitoring during a conversation and evaluates his progress. Finally, he improves the harder aspect of his speech (Jensen, 2011). On the other hand, Pawlak (2018) mentioned the six language learning strategies related to pronunciation:

Cognitive strategy: Consist in using media, telling stories, repeating or talking with foreign people in order to practice the pronunciation.

Memory strategy: The learner repeats a statement many times, relating the manner a word or sound is pronounced to a context in which it was heard.

Compensation strategy: It refers to guess the pronunciation of a new word and try to avoid limitations.

Metacognitive strategy: It involves taking charge of own learning by centering, planning, and evaluating oneself. For example, taking note of mouth movements or lip movements, read up on the rules of the target language and put into practice the pronunciation.

Social strategy: It entails asking for help, cooperate, interact and empathizing with others.

Affective strategy: Being amusing when people mispronounce words and then ask the tutor to pronounce the word well or to look for the correct pronunciation.

Oxford (1989) mentioned the different strategies and they are divided into indirect (metacognitive, affective and social) and direct (memory, cognitive and compensatory). Regarding to the indirect strategies, learners can organize their learning process through the use of metacognitive strategies. For successful language acquisition, they are crucial. In spite of this, the overwhelming amount of "newness," the foreign terminology, and the perplexing norms sometimes overwhelm language learners. Meanwhile, the affective strategies refer to feelings, perspectives, attitudes, and ideals. These factors can be controlled by language learners. One of the main factors determining whether a person learns a language successfully or not is likely their emotive side. Finally, cooperating and posing broad questions to peers and teachers are social techniques. It indicates a cooperative task structure or a cooperative reward system, which is essential for language learners. On the other hand, direct strategies involve: the use of simple ideas like putting items in the right sequence, creating associations, and evaluating are reflected in memory strategies. They provide students the ability to memorize verbal information and afterward recall it for speech when necessary. Likewise, the most well-liked tactics among language learners are cognitive strategies. It is related to the use of resources is beneficial for both productivity and understanding. Additionally, despite knowledge gaps, compensatory strategies let learners employ the new language for production or understanding. When a student is using compensation techniques, they guess the meaning of the words.

1.2 Objectives

General objectives

To determine the importance of pronunciation through the Speechnotes application in the higher levels of in “Pedagogía de los Idiomas Nacionales y Extranjeros” Program at “Universidad Técnica de Ambato”.

Specific objectives

- To describe the dimensions and phases of the Speechnotes application.
- To identify of the benefits of Speechnotes application for the English pronunciation.
- To analyze the strategies that learners use to improve their pronunciation.

Fulfillment of objectives

It was necessary to present the Speechnotes application to the students so that they have knowledge of its operation, content and tools. Through the survey, the students were able to evaluate the different dimensions and phases that the application contains, and it was possible to describe them.

It was essential that students download the Speechnotes app to do various individual and group activities. In this way, they were able to realize the benefits that it has. When developing the student survey, it was possible to identify several benefits that they considered to be the most important.

Through the survey, it was possible to analyze the strategies that the students use to improve their pronunciation. The most important strategies that they use were the cognitive strategy related to the use of media. In addition, they use the memory strategy because they often listen and repeat the pronunciation of the words several times. Finally, they develop the covert rehearsal strategy when they practice pronunciation by talking to themselves.

CHAPTER II

METHODOLOGY

RESOURCES AND MATERIALS

2.1 Materials

To develop this research, it was important to make use of technological and human resources. Regarding to human resources, they included the higher levels in “Pedagogía de los Idiomas Nacionales y Extranjeros” at “Universidad Técnica de Ambato”. Meanwhile, the technological resources used were laptops, smartphones, the Speechnotes application. Finally, Microsoft Forms was used to collect the data, and the SPSS (Statistical Package for Social Science) software was employed to analyze it.

Instruments

This research was developed with a survey which was used and applied to 73 students. Thus, it was focused and divided in three sections considering three main research questions: What are the dimensions and phases of the Speechnotes application? To what extent does Speechnotes application benefit the English pronunciation? What are the strategies that learners use to improve their pronunciation?

The survey had 31 items with Likert scale and 3 open-questions. It was divided in three sections according to the main aims. The first section was about the dimensions and phases of Speechnotes application. It had 9 items with an open question. The second section was related to the benefits of Speechnotes application for pronunciation. It involved 7 items with one open question. Regarding to the last section, it had 15 items with an open question associated to the strategies to improve students’ pronunciation. It is important to mention that a survey is a methodical way to collect data from a sample of individuals in order to create quantitative descriptions of the characteristics of the wider population to which the entities belong. The survey

provides quick access to precise data about preferences, needs, and behavior. It is most frequently used to describe a technique for collecting data from a sample of people (Groves et al., 2011). Additionally, the coefficient Cronbach's Alpha was used to validate the survey. It resulted in 0,856 that means all questions from the instrument had acceptable reliability. The results and the data were analyzed with SPSS (Statistical Package for the Social Sciences) software.

Population

In order to conduct the current research, a number of 73 university students from the higher levels in Pedagogía de los Idiomas Nacionales y Extranjeros Program at Universidad Técnica de Ambato participated in this study. There were 33 males and 40 females who, most of them, are considered mestizos and belong to the middle-class. Their ages range are from 20 to 28 years old. All of them participated in the survey voluntarily. They were selected because they are students to be future English teachers and they have knowledge of the English language and have practiced it, especially the pronunciation, during each semester of their university studies. In addition, they have been exposed to a technological environment. The majority of the participants have access to the technological devices such as laptops and smartphones. They have worked with different applications where they have developed several activities to improve different English language skills, including pronunciation.

Table 1:

Population

Population	Participants	Percentage
Male	33	45,21%
Female	40	54,79%
Total	73	100%

Note: These data were taken from the students surveyed.

Ethical considerations

The consent of the students was necessary for this descriptive investigation. The data obtained in the survey was treated with strict confidentiality. Haggerty (2004) claimed that there is a broad range of ethical guidelines that apply to all professionals and the subjects of the inquiry. When developing a research project, it is possible to take into account the ethical principles that convey the researcher, how participants are recruited, the responsibilities of the consenting participant, and the awareness of the relative vulnerability of particular participants within the ethical governance process of research. Lastly, volunteers must be shielded from any unwarranted attention from researchers.

Procedure

First of all, the researcher created the survey based on the information taken from the theoretical framework related to the Speechnotes application and the English pronunciation and the three research questions. Subsequently, the survey was validated to three experts in the field. Secondly, the operationalization of variables was performed with the following dimensions and indicators. For the independent variable, Automatic Speech Recognition (Speechnotes), it was possible to consider the dimensions and phases of the Speechnotes application which indicators were the speaker dependence, the speech continuity, the vocabulary size and the accessibility. Hence, the phases of Speechnotes application included the speech recognition, the error diagnosis and the feedback presentation. Moreover, it was possible to mention the benefits that the application had such as to focus on pronunciation difficulties, the effective and interactive learning environment, to improve the pronunciation and the speaking skill and practice of segmental and suprasegmental features. Further, the independent variable, the English pronunciation, was focused on the strategies that students use to improve their pronunciation: covert Rehearsal, self-monitoring, cognitive strategy, memory strategy, compensation strategy, metacognitive strategy, social strategy and affective strategy. After all the previous process, the survey was approved by experts.

Before applying the survey, it was necessary to do an intervention and present the Speechnotes application to the students so that they are aware of its characteristics and functions. Afterwards, the students made pronunciation activities with the application. They started by saying and recording words, principally, minimal pairs through the application. Then, they practiced with phrases and finally with a dialogue. The learners practiced until the correct word was written correctly in the application. At the end, the learners were able to complete the survey voluntarily without problems.

2.2 Methods

Mixed approach

The investigation was carried out with a mixed approach, qualitative and quantitative. Qualitative because there was a survey at the beginning and the end of the research. Furthermore, the textual data collected through the survey was described and compared with the data previously evaluated. Macnaughton (1996) stated that the qualitative approach allows the study things in their natural environment, and the interpretation of the phenomena in terms of the meanings that individuals give them. This includes field notes, surveys, conversations, recordings, and private notes. In contrast, it was a quantitative approach because the operationalization of variables was carried out, this process that is presented only in the quantitative approach because the variables must be susceptible to being observed and measured. The results obtained from the survey applied to the students were examined and compared through numbers. According to Kamolson (2007) this approach basically involves gathering numerical data to describe a specific phenomenon, and certain questions appear to be naturally adapted to being addressed with quantitative methods. Eventually, it provides statistical analysis via statistical comparison of the data collection groupings.

Descriptive

The descriptive research was applied to in this research because the data and results obtained were analyzed and described to determine the precision and the point of view of the students. It took place in the classroom, in an environment where students perform naturally. It consisted of collecting the data from the survey and

describe the real information that students completed according to their own experience and knowledge. Kothari (2004) states that the goal of a descriptive research study is to describe the qualities of a certain person or group. This research is focused on making specific predictions and narrating information about facts and features related to people, organizations, or circumstances. The purpose of this research is to gather accurate and reliable data, hence the method to be utilized must be properly designed. In order to optimize dependability and prevent bias, the research design must also take into account the feasibility of conducting the study economically. It is essential to clearly define the objectives of descriptive research in order to guarantee that the information gathered is pertinent. The researcher may then employ one or more of these techniques to obtain the data: surveys, observation, questionnaires, interviewing, examination of records, etc. Lastly, descriptive research focuses on describing the features of a certain person or group are known as descriptive research studies. The researcher should be able to determine precisely what he wants to assess, discover appropriate ways to use it, and define precisely the population he wants to examine.

Research questions

- What are the dimensions and phases of the Speeachnotes application?
- To what extend does Speeachnotes application benefit the English pronunciation?
- What are the strategies that learners use to improve their pronunciation?

CHAPTER III

RESULTS AND DISCUSSION

3.1 Analysis and discussion of the results

The current chapter contains the results of the data obtained from the survey to answer the three research questions:

1. What are the dimensions and phases of the Spechnotes application?
2. To what extent does Spechnotes application benefit the English pronunciation?
3. What are the strategies that learners use to improve their pronunciation?

The following analysis helped to compare the information with similar studies from other authors.

Table 2:

Dimensions and phases of Spechnotes application.

Item	Mean
Spechnotes application recognizes what I say.	3,88
When I say a word, the app recognizes and writes it.	3,93
When I speak, the Spechnotes app adapts to my voice.	4,03
When I say a phrase, the app recognizes and writes it.	3,96
When I practice with the app, it has a high range of vocabulary.	3,92
I have free access to the application, without the need to register or create an account.	4,66
When I practice my pronunciation by saying different words, dialogues, etc., the Spechnote application writes them into a text.	4,25
When I mispronounce a word, the app writes another word instead.	4,32
When the app does not write the word I pronounced, I practice until the correct word is written.	4,40

Note: The means were obtained from the following scales: 1. Never, 2. Rarely, 3. Sometimes, 4. Often, and 5. Always.

Analysis and discussion

Research question number one: *What are the dimensions and phases of the Speechnotes application?* The results showed that the students consider the dimensions and phases of the Speechnotes application that stand out the most are the accessibility because they agreed on, have free access without any registration with a mean of 4,66. This aspect allows students to work freely with the application. Consecutively, the application adapts to the students' voice while they are speaking through it with a mean of 4,03. It indicates that the application adjusts the voice of a new speaker and recognizes the words easily. Moreover, related to the phases of the application, when the students practice their pronunciation by saying different words, dialogues, etc., the Speechnotes application writes them into a text belongs to the speech recognition phase which has a mean of 4,25. Meanwhile, when they mispronounce a word, the app writes another word instead with a mean of 4,32 corresponds to the error diagnosis phase which if there is an inaccurate pronunciation, the software will not write the correct phrase. In this way, when the app does not write the word the students pronounced, they practice until the correct word is written with a mean of 4,40 is related to the feedback presentation phase which they ask for help or look for the correct pronunciation to improve it.

Table 3:

The benefits of Speechnotes application for pronunciation.

Item	Mean
When I use Speechnotes, I have the opportunity to focus on my specific pronunciation difficulties.	4,29
I think that working with app promises a stress-free environment, which motivates me a better learning.	4,11
I think, Speechnotes could be an effective means of teaching and learning the English pronunciation.	4,15
When I practice my pronunciation with Speechnotes, I prefer to work with the whole class.	3,08
When I practice my pronunciation, I prefer to work with a classmate.	3,78
Speechnotes helps me to improve my pronunciation and my speaking skill.	4,30
I would use Speechnotes to improve my pronunciation features (intonation, stress, etc).	4,14

Note: The means were obtained from the following scales: 1. Never, 2. Rarely, 3. Sometimes, 4. Often, and 5. Always.

Analysis and discussion

Research question number two: *To what extent does Speechnotes application benefit the English pronunciation?* Results showed that when students use Speechnotes, they have the opportunity to focus on their specific pronunciation difficulties with a mean of 4,29, as a result, they concentrate on their individual learning challenges. Most of the students think that Speechnotes is an effective means of teaching and learning the English pronunciation with a mean of 4,15. Therefore, it assists them in developing their oral communication abilities. Also, Speechnotes helps learners to improve their pronunciation and their speaking skill with a mean of 4,30 which they improve the pronunciation and their speaking skill. Thus, students would use Speechnotes to improve their pronunciation features (intonation, stress, etc) with a mean of 4,14 to practice of segmental and suprasegmental features. In contrast, when students practice their pronunciation with Speechnotes, they sometimes prefer to work with the whole class with a mean of 3,08, and with a classmate has a mean of 3,78. It indicates that they prefer work independently.

Table 4

Strategies to improve students' pronunciation.

Item	Mean
I practice my pronunciation by talking to myself.	4,16
I pay close attention to my pronunciation during a conversation.	4,16
I pay close attention to one specific aspect of pronunciation, for example, past tense verbs.	3,81
I practice my pronunciation by telling stories.	3,66
I practice my pronunciation by using media. For example, with audio, music, watching series, and movies on Netflix or listening to podcasts on YouTube or Spotify.	4,37
I practice my pronunciation by talking to foreigners.	2,82
I practice my pronunciation by listening and repeating many times the words and sentences.	4,01
I repeat the pronunciation of a word when I remember a situation in which I heard it.	4,12
I guess the pronunciation of the words when I see new vocabulary.	4,10
I take notes of my mouth movements or lips movements to check my pronunciation.	2,59
I study the pronunciation rules of words to pronounce them correctly.	3,21
I ask for help if I cannot pronounce a word correctly.	3,78

When I practice pronunciation, I prefer to work with my teacher.	3,10
When I mispronounce a word, I do not pay attention to the mistake.	2,64
When I mispronounce a word, I make fun of it, and I correct the mistake immediately.	3,58

Note: The means were obtained from the following scales: 1. Never, 2. Rarely, 3. Sometimes, 4. Often, and 5. Always.

Analysis and discussion

Research question number three: *What are the strategies that learners use to improve their pronunciation?* According to the results, the majority of the students use the cognitive strategy because they practice their pronunciation by using media. For example, with audio, music, watching series, and movies on Netflix or listening to podcasts on YouTube or Spotify mean of 4,37. Nevertheless, they rarely practice their pronunciation by talking to foreigners with a mean of 2,82. Another strategy that students use the most is self-monitoring because they pay close attention to my pronunciation during a conversation with a mean of 4,16 and they pay close attention to one specific aspect of pronunciation, for example, past tense verbs with a mean of 3,81. Also, the students practice their pronunciation by talking to themselves with a mean of 4,16 and it indicates that they often use the covert rehearsal strategy. On the other hand, learners hardly ever work with metacognitive strategy since they seldom take notes of their mouth or lips movements to check their pronunciation with a mean of 2,59; and they not often study the pronunciation rules of words to pronounce them correctly with a mean of 3,21.

Additionally, students use the memory strategy when they practice their pronunciation by listening and repeating many times the words and sentences with a mean of 4,01 and when they repeat the pronunciation of a word when they remember a situation in which they heard it with a mean of 4,12. Moreover, when students guess the pronunciation of words when they see new vocabulary with a mean of 4,10, they practice with the compensation strategy. However, the participants sometimes choose the social strategy, when they practice pronunciation, they occasionally prefer to work with their teacher; and, the affective strategy, when they mispronounce a word, they do not pay attention to the mistake.

Table 5:

Open-ended questions

Question 1	Answer	Total
What kind of applications do you use to improve your pronunciation?	Cambridge dictionary	2
	My English lab	2
	Youtube	2
	Windows 10 and Microsoft Word speech recognition.	4
	None	4
	Google: dictation, translation, voice.	5
	Other applications (Tandem, BoldVoice, Cake, HelloTalk, Reverso Context, Speak English Pronunciation)	6
	Elsa Speak	10
	Speechnotes	10
	Duolingo	28
	Total	73
Question 2	Answer	Total
What are the benefits of using an application like Speechnotes to improve your pronunciation?	I can practice more my speech delivery.	1
	I can recognize my pronunciation mistakes.	1
	I laugh with my partner.	1
	Improve my accuracy in pronunciation.	1
	I could practice stressed words and intonation.	3
	I can improve my speaking and communicative skills.	8
	I improve my fluency.	11
	I practice my pronunciation with motivation.	12
	I improve my pronunciation.	35
	Total	73
Question 3	Answer	Total
What kind of strategies do you use to improve your pronunciation?	By playing videogames.	1
	By singing songs.	1
	None.	1
	Roleplaying with my friends.	1
	Singing karaoke.	1
	Practicing with foreigners.	6

Studying pronunciation rules.	6
Dictating.	7
Listening to podcasts or Music.	9
Watching videos in English.	9
Working with an application.	9
Repeating sounds and words.	22
Total	73

Note: Qualitative results obtained from the open-ended questions.

Analysis and discussion

The table 4 presents the results of the open-ended questions used to reinforce the research questions:

The first open-question, *what kind of applications do you use to improve your pronunciation?* The principal application that a wide part of students (28) prefer to use to improve their pronunciation is Duolingo. This free application is famous for the different activities it has to develop the English skills (listening, writing, reading and speaking) followed by grammar and pronunciation. Another popular application that 10 learners use is Elsa Speak. It is focused only on pronunciation activities. Even though the Speechnotes app was just introduced to the participants, 10 of them would use it to practice their pronunciation. A small number of participants (2) make use of the MyEnglishlab platform to train their pronunciation despite the fact that it is a platform they manage during their college studies. Additionally, the rest of the interviewees work with other applications for pronunciation, for instance, HelloTalk, Tandem, Google dictation, Google translation, Google voice, YouTube and among others.

Regarding to the second open-question, *What are the benefits of using an application like Speechnotes to improve your pronunciation?* The students could realize many benefits of Speechnotes application. A greater number of students (35) stated that they can improve their pronunciation while they are training with the application. Other benefits, that 11 students considered important, were the opportunity to work with this application to improve their fluency, their oral communication abilities, as well as the correctness of speech. Moreover, 12 learners indicated that they could practice their pronunciation with motivation, and it

encourages students to perform pronunciation tasks in an effective and interactive learning environment. In addition, 8 learners could improve their speaking and communicative skills and 3 could practice stressed words and intonation which corresponds to the segmental and suprasegmental features.

The third open-ended question, *what kind of strategies do you use to improve your pronunciation?* According to the results, 22 interviewees claimed that the principal strategy they use to improve their pronunciation is by repeating sounds and words. It is common that students listen and repeat the pronunciation of new words either listening to audios in English or to their teacher. Consequently, 27 learners expressed that the strategies that most of the time use are by using media: 9 of them prefer listening to podcasts or music; the other 9 would rather watch videos in English, and the last 9 lean to work with an application. This means that it is more effective the use of technology to improve pronunciation by using an application, listening to podcasts or music, or simply watching videos in English is a useful strategy. Hence, most of them have easy access to it, which can develop interactive activities in a context closer to English pronunciation. However, 7 learners practice their pronunciation by dictating and 6 study pronunciation rules. These results suggests that a great part of students do not know much about them. Finally, it is possible to remark that only 2 students sing songs in order to practice their pronunciation. This indicates that even though teachers carry out tasks with songs in their classes, it is not the main method to practice pronunciation for the students surveyed.

Discussion

To determine the importance of pronunciation through the Speechnotes application, it is possible to describe in the questions below:

Question 1: *What are the dimensions and phases of the Speechnotes application?* Comparing with the previous results, the speaker dependence dimension is the dimension that stood out the most because the participants observed the Speechnotes app adapts to their voice when they speak. Nevertheless, they realized that it occasionally fulfills with the speech continuity and vocabulary size dimensions for the reason that it seldom recognizes the spoken words or phrases; and when they

practice with the application, it regularly has a high range of vocabulary. Whereas Levis and Suvorov (2012) described the principal dimensions that Speechnotes application have are: speaker independent, when the system adapts to the voice of a new speaker; speech continuity is related to the recognition of spoken words, and phrases, and converts them into text. Finally, the vocabulary size represents the variety of vocabulary that the system has.

The results showed that Speechnotes application respects the speech recognition phase when learners practice their pronunciation by saying different words, dialogues, etc., it writes them into a text. Also, the application comply the error diagnosis phase is when the application does not write the word they pronounced, they practice until the words or phrases are written correctly. In addition, it follows the feedback presentation phase because the learners ask for help if a word is mispronounced. Neri et al. (2003) explained the principal phases that Speechnotes application contains: error diagnosis phase and feedback presentation phase. The speech recognition phase which the system recognizes the incoming speech signal and writes it into text. The error diagnosis phase is when the participants speak too quickly or incorrectly, the application will write another word instead (Nurjanah et al., 2019). Finally, feedback appears to be efficient when the teacher constantly monitors the learners' progress to guide the progress of speaking skills pronunciation (Yaniafari & Olivia, 2022).

Question 2: *To what extend does Speechnotes application benefit the English pronunciation?* It can be shown from the results that while the participants were practicing their pronunciation with Speechnotes, it was possible to realize some benefits that Gottardi et al. (2022) mentions: Facilitates the extensive practice of segmental and suprasegmental features of the language, from minimal pair to mirroring famous speeches or rehearsing presentations. It would help learners improve their pronunciation and oral communication skills, speaking fluency, and accuracy. It allows learners to focus on their specific difficulties and work independently. In this wise, the results showed that the implementation of the Speechnotes application in class would help learners to improve their pronunciation and their speaking skill. They could work with words, for example, minimal pairs, and following phrases that

students consider are difficult for them to pronounce. Also, when they used Speechnotes, they had the opportunity to focus on their specific pronunciation difficulties, as a result, they concentrated on their learning challenges.

Further, it would assist students in developing their oral communication abilities because they think, Speechnotes could be an effective means of teaching and learning English pronunciation. Nevertheless, the students would sometimes prefer to train their pronunciation with the whole class or with a classmate, which means that they would rather work on their own. In addition, learners would use Speechnotes to improve their pronunciation features, in this way, they could realize their pronunciation errors and improve them. In this wise, Pourhosein and Sabouri, (2017) stated that computer technology can be an effective means of teaching English pronunciation especially on pronunciation features. Some of them involve speech rate, fluency, and liveliness, intonation, pronunciation quality of individual words. Therefore, teachers can use computer in their pronunciation classes to improve these features. It can provide them an interactive learning environment in different modes such as whole class, small group or pair, and teacher to student.

Question 3: *What are the strategies that learners use to improve the English pronunciation?* The previous results showed that the principal strategies that students use are the covert rehearsal strategy when they practice their pronunciation by talking to themselves. They make emphasize individual pronunciation activities. The self-monitoring strategy is drawn upon by students when, during a conversation, they pay close attention to their pronunciation, and one specific aspect of it, for example, past tense verbs. These two learning approaches reflects that they enjoy the autonomous work. Compared with Jensen (2011), the covert rehearsal strategy allows learners to focus on practicing their pronunciation on their own by talking with themselves. Subsequently, self-monitoring entails paying attention to specific aspect of grammar or speech and students assesses their advancement.

Students hardly ever use the metacognitive strategy because few of them pay attention to the pronunciation rules to check their pronunciation or their mouth movements. Further, students, the majority of the time, infrequently prefer the social

strategy because they work alone when they practice their pronunciation, and they sometimes request the advice of a teacher for a mispronounced word or phrase. Also, the affective strategy is occasionally used by the participants. They sometimes make jokes or fun with the wrong pronunciation of words. Consequently, Oxford (1989) explained that students often get confused when the rules and new vocabulary are presented, and they feel suffocated if they make mistakes with the metacognitive strategy. In respect of the social strategy, it is possible to contrast that it is important and recommended for learners to practice the communicative skills with a partner or cooperate with others, and if they have doubts, ask for help from the teacher. Moreover, the affective strategy is related to the attitude's emotions, a positive attitude. In this way, students have an enjoyable and effective atmosphere because of the good sense of humor with their mispronunciation.

Additionally, the majority of the students opt for the cognitive strategy because they usually make the use of media, for instance, they listen to music or podcasts, and watch videos in English for practicing their pronunciation, as well, they occasionally read aloud or tell stories. On the other hand, they almost never practice their pronunciation by talking with foreign people. In a somewhat similar vein, the memory strategy is the second strategy that learners employ the most. In fact, they frequently practice their pronunciation by listening and repeating several times the words and sentences, and when they associate them with a situation in which they heard them. Considering the compensation strategy, it is another one that students prefer to use. When they see new vocabulary or words, they use to guess their pronunciation. Pawlak (2018) explains that the cognitive strategy is more used by students because of the variety of resources they choose to enhance their pronunciation. However, they do not naturally practice with foreigners since they are not in a native speaking environment. Otherwise, memory is the kind of strategy that benefits students in remembering the pronunciation and sounds of words while they remember different situations, they were exposed. Finally, it is common for learners when they produce sounds from words as they think their pronunciation is, they apply the compensation strategy.

CHAPTER IV

CONCLUSIONS AND RECOMMENDATIONS

4.1 Conclusions

After comparing and analyzing the results related to the survey, it is possible to state the following conclusions:

According to the interviewees, the most important dimension and phases that Speechnotes application has are speaker dependence when speakers say words through the application, it adapts to their voice works without the need to register. The speech continuity is a dimension which the application recognizes and writes a word or phrase when the speaker says them. The participants asserted that Speechnotes has the advantage of having free access. This is evident when they downloaded the application, they used it instantly. Further, Speechnotes complies with the phases of speech recognition because converts the spoken words into text. Meanwhile, the error diagnosis phase is associated with a mispronounced word or phrase that is written instead of the correct one in the Speechnotes application. Finally, if the speaker asks for help or keep practicing until the word is written correctly, the feedback phase is applied.

It was possible to identify the benefits of the Speechnotes application. It resides in the following pillars. It promotes concentration on the individual learning challenges and brings an effective and stress-free environment with motivation as it encourages students to state their points of view according to their preferences through Speechnotes. Second, the application allows the practice of segmental and suprasegmental features, and it promotes the improvement of pronunciation and speaking skills. Last but not least, it assists students to develop their oral communication abilities since it could be an effective means of teaching and learning English pronunciation. Speechnotes promote autonomy in L2 students, as a result, they prefer to perform the pronunciation activities on their own.

The principal strategies the students frequently use to improve their pronunciation are the covered rehearsal, indeed, learners practice their pronunciation by themselves in the target language, talking, or listening carefully to their utterances while speaking. Moreover, they showed a particular interest in the memory strategy, in view of the fact that, repeat the sounds and words that associate with situations that they have heard. Regarding the cognitive strategy, learners opt for the use different resources especially social media. Most of the time, they make use of it to practice their pronunciation by listening to music, podcasts, or watching videos or movies in or out of classes. However, they almost never practice talking to foreigners. It means that learners are not exposed to an English language environment with native speakers. Also worth mentioning is the social strategy is occasionally used by the participants which are related to practicing with a partner or asking for help if it is needed. They frequently prefer to work independently. Finally, they rarely take advantage of the metacognitive strategy because they hardly ever study the pronunciation rules which reveals that they employ the compensation strategy because they often guess the pronunciation of the words if new vocabulary is presented.

4.2 Recommendations

The use of the Speechnotes application is recommended to carry out activities to improve pronunciation. Students can develop different tasks with this application by practicing with words, phrases, and dialogues. If they don't have good pronunciation, teachers can give feedback.

It is recommended to make use of Speechnotes application as much as possible in the different English classes as it provides not only a good improvement of pronunciation features but also it develops the speaking, oral communication skills and learners concentrate on their individual learning challenges.

It is recommended to encourage teachers put into practice the different pronunciation strategies in their classes by incorporating them in their planning. Therefore, their students will have a variety of activities to perform in or outside the class and this will bring about the improvement of pronunciation to be remarkable.

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ANNEXES

Annex 1

ANEXO 3 FORMATO DE LA CARTA DE COMPROMISO.

CARTA DE COMPROMISO

Ambato, 04 de octubre del 2022

Doctor
Marcelo Nuñez
Presidente
Unidad de titulación
Carrera de Pedagogía de los Idiomas Nacionales y Extranjeros
Facultad de Ciencias Humanas y de la Educación

Yo Mg. Sarah Iza en mi calidad de Coordinadora de la Carrera de Pedagogía de los Idiomas Nacionales y Extranjeros de la Universidad Técnica de Ambato, me permito poner en su conocimiento la aceptación y respaldo para el desarrollo del Trabajo de Titulación bajo el Tema: "Automatic Speech Recognition (Speechnotes) and the English Pronunciation." propuesto por la estudiante Adriana Nicole Lozano Celleri, portadora de la Cédula de Ciudadanía 1805276373, Carrera de Pedagogía de los Idiomas Nacionales y Extranjeros, Facultad de Ciencias Humanas y de la Educación de la Universidad Técnica de Ambato.

A nombre de la Institución a la cual represento, me comprometo a apoyar en el desarrollo del proyecto.

Particular que comunico a usted para los fines pertinentes.

Atentamente.



Mg. Sarah Iza
0501741060
sj.iza@uta.edu.ec

Annex 2

Survey

-Survey available upon request.

Annex 3

Operationalization of variables



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OPERACIONALIZACIÓN DE VARIABLES

Table 1 – Variable System

VARIABLES	DIMENSIONS	INDICATORS	TECHNIQUE	INSTRUMENT	ITEM
INDEPENDENT					
Automatic Speech Recognition (Speechnotes)	Characteristics and dimensions	<ul style="list-style-type: none"> • Speaker dependence • Speech continuity • Vocabulary size • Accessibility 	Survey	Instrument Structured Questionnaire	1,2,3
					4
Automatic Speech Recognition is and ICT application that transforms speech audio streams into text. Moreover, Speechnotes is an application that identifies spoken words and turns them into written text.	Phases	<ul style="list-style-type: none"> • Speech recognition • Error diagnosis • Feedback presentation • Open question 			5
					6
	Benefits	<ul style="list-style-type: none"> • To concentrate in individual difficulties. • Effective and interactive learning environment. • To develop oral communication abilities. • It promotes the autonomy. • To improve the pronunciation and the speaking skill. • To practice of segmental and suprasegmental features. • Open question 	Survey	Instrument Structured Questionnaire	7
					9
					11
					13
					16
					18
DEPENDENT					
The English pronunciation					
Pronunciation is the process of producing speech sounds to convey ideas. It refers to all aspects of how humans use spoken sounds to communicate. The pronunciation strategies like covert rehearsal, self-monitoring, cognitive strategy, memory strategy, compensation strategy, metacognitive strategy, social strategy, affective strategy help students to improve their pronunciation.	Pronunciation strategies	<ul style="list-style-type: none"> • Covert Rehearsal • Self-monitoring • Cognitive strategy • Memory strategy • Compensation strategy • Metacognitive strategy • Social strategy • Affective strategy • Open question 	Survey	Instrument Structured Questionnaire	19
					22,23,
					25, 26
					28,29
					32, 33

Note: Operationalization of variables about automatic speech recognition (Speechnotes) and the English pronunciation.

Annex 4

Checklist validation

ITEM	CRITERIA TO EVALUATE										Observations
	Clarity in writing style		Internal Coherence		Induction to the answer (Bias)		Appropriate Language		It measures what it stated in the objectives/research questions		
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
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22											
23											
24											
25											
26											
27											
28											
29											
30											
31											
32											
33											
34											
General Aspects									Yes	No	
The instrument has clear and precise instructions to answer the questionnaire											
The items allow to accomplish the objective of the research.											

The items are distributed in a logical and sequential Way.			
The number of items is enough to collect data. If not, suggest the items to be included.			
APPLICABLE		NOT APPLICABLE	
Validated by:	ID:	Date:	
Signature:	Email:		
Place of work:	Academic degree;		
<p>Note. Taken and adapted from Corral, Y. (2009). Validez y Confiabilidad de los instrumentos de Investigación para la recolección de datos. <i>Revista Ciencias de la Educación</i>. 19. 228 - 247</p>			



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CHECKLIST VALIDATION

ITEM	CRITERIA TO EVALUATE										Observations	
	Clarity in writing style		Internal Coherence		Induction to the answer (Bias)		Appropriate Language		It measures what it stated in the objectives/research questions			
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No		
1	/		/			/				/		
2	/		/			/				/		
3	/		/			/				/		
4	/		/			/				/		
5	/		/			/				/		
6	/		/			/				/		
7	/		/			/				/		
8	/		/			/				/		
9	/		/			/				/		
10	/		/			/				/		
11	/		/			/				/		
12	/		/			/				/		
13	/		/			/				/		
14	/		/			/				/		
15	/		/			/				/		
16	/		/			/				/		
17	/		/			/				/		
18	/		/			/				/		
19	/		/			/				/		
20	/		/			/				/		
21	/		/			/				/		
22	/		/			/				/		
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24	/		/			/				/		
25	/		/			/				/		
26	/		/			/				/		
27	/		/			/				/		
28	/		/			/				/		
29	/		/			/				/		
30	/		/			/				/		
31	/		/			/				/		
32	/		/			/				/		
33	/		/			/				/		
34	/		/			/				/		



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General Aspects		Yes	No
The instrument has clear and precise instructions to answer the questionnaire	<input checked="" type="checkbox"/>		
The items allow to accomplish the objective of the research.	<input checked="" type="checkbox"/>		
The items are distributed in a logical and sequential way	<input checked="" type="checkbox"/>		
The number of items is enough to collect data. If not, suggest the items to be included.	<input checked="" type="checkbox"/>		
APPLICABLE		<input checked="" type="checkbox"/>	NOT APPLICABLE
Validated by: <i>Hg. Dorys Cumbe</i>	ID: <i>1803694569</i>	Date: <i>2/12/2022</i>	
Signature:	Email: <i>dm.cumbe@uta.edu.ec</i>		
Place of work: <i>Universidad Técnica de Ambato</i>	Academic degree; <i>Magister en Ciencias de la Educación</i>		
Note. Taken and adapted from Corral, Y. (2009). Validez y Confiabilidad de los instrumentos de Investigación para la recolección de datos. <i>Revista Ciencias de la Educación</i> . 19. 228 - 247			



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CHECKLIST VALIDATION

ITEM	CRITERIA TO EVALUATE										Observations	
	Clarity in writing style		Internal Coherence		Induction to the answer (Bias)		Appropriate Language		It measures what it stated in the objectives/research questions			
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No		
1	✓		✓			✓				✓		
2	✓		✓			✓				✓		
3	✓		✓			✓				✓		
4	✓		✓			✓				✓		
5	✓		✓			✓				✓		
6	✓		✓			✓				✓		
7	✓		✓			✓				✓		
8	✓		✓			✓				✓		
9	✓		✓			✓				✓		
10	✓		✓			✓				✓		
11	✓		✓			✓				✓		
12	✓		✓			✓				✓		
13	✓		✓			✓				✓		
14	✓		✓			✓				✓		
15	✓		✓			✓				✓		
16	✓		✓			✓				✓		
17	✓		✓			✓				✓		
18	✓		✓			✓				✓		
19	✓		✓			✓				✓		
20	✓		✓			✓				✓		
21	✓		✓			✓				✓		
22	✓		✓			✓				✓		
23	✓		✓			✓				✓		
24	✓		✓			✓				✓		
25	✓		✓			✓				✓		
26	✓		✓			✓				✓		
27	✓		✓			✓				✓		
28	✓		✓			✓				✓		
29	✓		✓			✓				✓		
30	✓		✓			✓				✓		
31	✓		✓			✓				✓		
32	✓		✓			✓				✓		
33	✓		✓			✓				✓		
34	✓		✓			✓				✓		
General Aspects										Yes	No	
The instrument has clear and precise instructions to answer the questionnaire										✓		
The items allow to accomplish the objective of the research.										✓		



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The items are distributed in a logical and sequential way	<input checked="" type="checkbox"/>		
The number of items is enough to collect data. If not, suggest the items to be included.	<input checked="" type="checkbox"/>		
APPLICABLE	<input checked="" type="checkbox"/>	NOT APPLICABLE	
Validated by: <i>Ruth Infante</i>	ID: <i>0603016106</i>	Date: <i>12/10/2022</i>	
Signature: <i>[Signature]</i>	Email: <i>rutheinfante@uta.edu.ec</i>		
Place of work: <i>Universidad Técnica de Ambato</i>	Academic degree: <i>Maestría en Lingüística y Didáctica de la enseñanza de lenguas extranjeras</i>		
<p>Note. Taken and adapted from Corral, Y. (2009). Validez y Confiabilidad de los instrumentos de Investigación para la recolección de datos. <i>Revista Ciencias de la Educación</i>. 19. 228 - 247</p>			



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CHECKLIST VALIDATION

ITEM	CRITERIA TO EVALUATE										Observations	
	Clarity in writing style		Internal Coherence		Induction to the answer (Bias)		Appropriate Language		It measures what it stated in the objectives/research questions			
	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No		
1	✓		✓			✓				✓		
2	✓		✓			✓				✓		
3	✓		✓			✓				✓		
4	✓		✓			✓				✓		
5	✓		✓			✓				✓		
6	✓		✓			✓				✓		
7	✓		✓			✓				✓		
8	✓		✓			✓				✓		
9	✓		✓			✓				✓		
10	✓		✓			✓				✓		
11	✓		✓			✓				✓		
12	✓		✓			✓				✓		
13	✓		✓			✓				✓		
14	✓		✓			✓				✓		
15	✓		✓			✓				✓		
16	✓		✓			✓				✓		
17	✓		✓			✓				✓		
18	✓		✓			✓				✓		
19	✓		✓			✓				✓		
20	✓		✓			✓				✓		
21	✓		✓			✓				✓		
22	✓		✓			✓				✓		
23	✓		✓			✓				✓		
24	✓		✓			✓				✓		
25	✓		✓			✓				✓		
26	✓		✓			✓				✓		
27	✓		✓			✓				✓		
28	✓		✓			✓				✓		
29	✓		✓			✓				✓		
30	✓		✓			✓				✓		
31	✓		✓			✓				✓		
32	✓		✓			✓				✓		
33	✓		✓			✓				✓		
34	✓		✓			✓				✓		



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General Aspects	Yes	No	
The instrument has clear and precise instructions to answer the questionnaire	✓		
The items allow to accomplish the objective of the research.	✓		
The items are distributed in a logical and sequential way	✓		
The number of items is enough to collect data. If not, suggest the items to be included.	✓		
APPLICABLE	<input checked="" type="checkbox"/>	NOT APPLICABLE	
Validated by: Mg. Edgar Encabada T	ID: 050182417-A	Date: 25/11/2022	
Signature:	Email: eg.encabada@uta.edu.ec		
Place of work: UTA - FCH E	Academic degree: Magister		
Note. Taken and adapted from Corral, Y. (2009). Validez y Confiabilidad de los instrumentos de Investigación para la recolección de datos. <i>Revista Ciencias de la Educación</i> . 19. 228 - 247			

Annex 5

Cronbach's alfa validation

Reliability statistics	
Cronbach's Alfa	Number of elements
0,856	31

Note: Reliability statistics with Cronbach's Alfa of the 31 questions with Likert scale of the survey.

Item-total statistics				
	Scale Mean if item deleted	Scale variance if item deleted	Corrected item total correlacion	Cronbach's Alfa if item deleted
Speechnotes application recognizes what I say.	115,41	132,245	,367	,852
When I say a word, the app recognizes and writes it.	115,36	131,760	,381	,851
When I speak, the Speechnotes app adapts to my voice.	115,26	132,223	,368	,852
When I say a phrase, the app recognizes and writes it.	115,33	131,724	,350	,852
When I practice with the app, it has a high range of vocabulary.	115,37	133,709	,234	,855
I have free access to the application, without the need to register or create an account.	114,63	134,347	,222	,855
When I practice my pronunciation by saying different words, dialogues, etc., the Speechnote application writes them into a text.	115,04	132,123	,377	,852
When I mispronounce a word, the app writes another word instead.	114,97	132,638	,258	,855
When the app doesn't write the word I pronounced, I practice until the correct word is written.	114,89	132,960	,236	,855
When I use Speechnotes, I have the opportunity to focus on my specific pronunciation difficulties.	115,00	130,500	,445	,850
I think that working with app promises a stress-free environment, which motivates me a better learning.	115,18	133,093	,270	,854
I think, Speechnotes could be an effective means of teaching and learning the English pronunciation.	115,14	131,870	,382	,851
When I practice my pronunciation with, I prefer to work with the whole class.	116,21	130,249	,289	,854

When I practice my pronunciation, I prefer to work with a classmate.	115,51	130,753	,311	,853
Speechnotes helps me to improve my pronunciation and my speaking skill.	114,99	130,069	,482	,849
I would use Speechnotes to improve my pronunciation features (intonation, stress, etc).	115,15	128,546	,499	,848
I practice my pronunciation by talking to myself.	115,12	127,193	,592	,846
I pay close attention to my pronunciation during a conversation.	115,12	129,165	,550	,848
I practice my pronunciation by telling stories.	115,63	125,431	,484	,848
I practice my pronunciation by using media. For example, with audio, music, watching series, and movies on Netflix or listening to podcasts on YouTube or Spotify.	114,92	128,076	,499	,848
I practice my pronunciation by talking to foreigners.	116,47	129,141	,268	,857
I practice my pronunciation by listening and repeating many times the words and sentences.	115,27	131,063	,334	,852
I repeat the pronunciation of a word when I remember a situation in which I heard it.	115,16	127,056	,587	,846
I guess the pronunciation of words when I see new vocabulary.	115,19	127,324	,556	,847
I take notes of my mouth movements or lips movements to check my pronunciation.	116,70	127,213	,351	,853
I study the pronunciation rules of words to pronounce them correctly.	116,08	128,021	,459	,849
I ask for help if I can not pronounce a word correctly.	115,51	129,559	,354	,852
When I practice pronunciation, I prefer to work with my teacher.	116,19	125,768	,531	,847
When I mispronounce a word, I do not pay attention to the mistake.	116,64	138,010	-,028	,865
When I mispronounce a word, I make fun of it and I correct the mistake immediately.	115,71	129,152	,420	,850
I pay close attention to one specific aspect of pronunciation, for example, past tense verbs.	115,48	129,725	,476	,849

Annex 6

Urkund report



Document Information

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