



IMPLEMENTING TEXT-TO-SPEECH TECHNOLOGY AS A MEANS OF ENHANCING L2 READING FLUENCY

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ABSTRACT

This article reports on the results of a participatory action research project carried out with a group of ten elementary level students from extension courses in a private university in Bogotá, Colombia (Universidad Minuto de Dios, main branch). The main objective of this study was to determine the effect of text-to-speech (TTS) technology usage on reading fluency in speakers of English as a foreign language. The results show that learners develop oral reading fluency in areas such as linking sounds, pronouncing accurately, and reading timing. Furthermore, learners raised their awareness of the benefits of using Information and Communication Technologies (ICTs) in the process of learning a foreign language, as well as the importance of being autonomous learners. Pedagogical implications and prospects for future research are included.

Introduction

This article reports the results of a participatory action research project carried out at a private university in Bogotá, Colombia. The research determines the potential of text-to-speech (TTS) technology to enhance foreign language oral reading fluency (ORF). An issue was identified during the classes in which students exhibited a lack of confidence when reading aloud and speaking during different class activities. The study also aims at providing learners with strategies to overcome this noticeable weakness and, by doing so, will allow them to develop an initial oral reading fluency in the L2, as well as establish a foundation for autonomous learning.

Reading is a skill that has traditionally been addressed in many language classrooms with a clear focus on comprehension. This has hindered to some extent the benefits that can be derived from this skill, namely, pronunciation, reading fluency, accuracy, vocabulary and even writing. Thus, the ultimate goal of reading is to understand the message and be able to account for it through questionnaires or other class activities aimed at checking the students' understanding of what they read. Nevertheless, when it comes to reading aloud it is easy to notice the students' inability to read a text at an acceptable speed, which is characterized by factors such as hesitation and lack of fluency, inaccurate pronunciation, verbal omission of written punctuation marks and word-by-word utterances.

At the same time, another goal was to provide learners with meaningful opportunities to develop autonomous learning to the extent that learners were able to develop an initial awareness of their weaknesses when reading aloud, and then address those weaknesses. As Swain (1995) mentions, learners are able to notice a flaw in their output and take a course of action to improve it. Wright (2010) adds, "Teachers need to understand the ELL students' strengths and challenges, and they need to be clear about what they want their students to know and be able to do with reading as a result of their instruction" (p. 177).

1. Theoretical framework

1.1 Oral reading fluency

Brown (2001) describes the two different types of classroom reading performance. He states that

oral reading may be highly beneficial for students at the beginning and intermediate levels because it can: "serve as an evaluative check on bottom-up processing skills, double as a pronunciation check, and serve to add some extra student participation if you want to highlight a certain short segment of a reading passage" (p. 312).

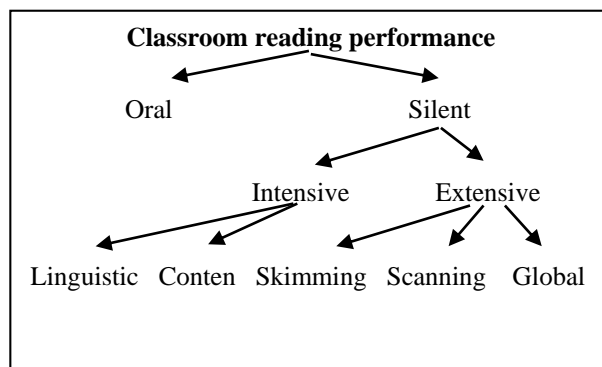


Figure 1. Classroom reading performance. Source(s): Brown, 2001.

From the very beginning of this research project, learners were informed about the different mechanisms their teacher might implement in order to evaluate how well they were doing using text-to-speech (TTS) technology to improve their reading skill. Even though reading every single time in class was not always assessed, learners felt motivated enough to analyze how much or how little they evolved in their reading fluency. Moreover, when opportunities to practice reading were given in class, many students on their own initiative shared their reading style and strengths or weaknesses with others when they read aloud. This was one indicator of success since participation was highly promoted. Learners also felt they were moving forward with a detailed and concise learning process to improve their fluency. Nes-Ferarra (2005) wrote, "Fluency is a skill that develops with practice and observation, and permits the reader to grasp larger units and even phrases with immediate recognition" (p. 215).

Oral reading fluency is useful for this research project because it accurately predicts later reading success. By the end of this research, learners made substantial progress in reading fluency: they read faster, smoother, and with more phrasing and emphasis.

Learners know that being fluent when reading in English benefits them in other areas.

Learners must be able to read English to be successful in their other academic classes and to function as literate people in a global environment. Learners agree they need to be proficient in the language no matter where they work and what profession they have. As Wright (2010) claims, "Reading is not only the goal of instruction. It is also the process by which learners can develop their language abilities and strategies for language use" (p. 177).

Different theoreticians in the field of language learning have acknowledged the important role of oral reading fluency in developing reading comprehension (DeKeyser, 2001; Rasinski & Samuels, 2011; Segalowitz, 2003; Segalowitz & Segalowitz, 1993). There is a close relationship between oral reading fluency and reading comprehension. This reciprocal relationship allows one to comprehend more thoroughly as one reads more fluently. In this research project, the teacher identified that learners who focused more intensely on practicing their reading skills were generally able to become more fluent readers. As students become more fluent readers, due to extensive practice, they are able to apply a more conscious effort to the task of comprehending a text. This is why Wright (2010) states, "Reading is a great source of comprehensible input that promotes second language acquisition" (p. 172). Thus, the practice of reading should be promoted in learners in order to maximize their learning opportunities in the L2.

1.2 ICT for Language Learning

Using technology outside the language classroom helps learners become more autonomous. One key advantage of using technology is that it allows language practice and study to take place away from the confines of the classroom (Sharma & Barret, 2007). Learners, after becoming familiar with the websites *Vocaroo*, which offers a voice-recording service; and *IVONA*, a site that develops and delivers multi-language Text-to-Speech technology, were told to practice extensively during their free time with these texts, which were chosen specifically for this research project. Learners learned to use them during a practice that was done in one of the sessions. As they were learning about these sites, they were also taught how to use "*Keynote*", which is an application quite similar to "*PowerPoint*". Through "*Keynote*," learners were trained on the websites (*Vocaroo* and *IVONA*), and learned about another

software application to create multimedia presentations to demonstrate what they knew and could do with language as well as the content areas. Indeed, many free software programs are available to help learners learn English as a second or foreign language by engaging them in speaking, reading, listening and writing activities. Surely, teachers and learners can find better and more sophisticated programs or applications; some of them assess learners and tell them what level of English they have achieved so they can start using the programs, monitor their progress, and increase the difficulty as their English language proficiency increases. They interact with others online via not only typing or speaking but also viewing by way of a webcam. However, beyond all this, it is certain that technological resources are varied, sufficient, and accommodating to all tastes, and using these two simple websites enhances learners' interaction and learning.

With the quick development of information technology, Moon (2012) says "text-to-speech (TTS) synthesizers and computer programs converting written texts into spoken words, offers great potential for learners to have varied and easily accessible spoken and reading language input" (p.1). Using text-to-speech (TTS) technology allowed learners to interact with the computer and with other learners in the class. Learners not only surf the internet, they are now able to read on it, write on it, speak on it and listen on it, and they are able to do all of this using *Vocaroo* and *IVONA*. Then, "when teachers employ appropriate strategies and methods to integrate those technologies into the classroom curriculum, the internet can be a powerful tool to motivate students and engage them in learning" (Mills, 2006, p. 46).

1.3 Autonomy

Learner autonomy is described by Peñaflorida (2002) as "a process that enables learners to recognize and assess their own needs, to choose and apply their own learning strategies or styles eventually leading to the effective management of learning" (p. 346). No matter how much students learn through lessons, there is always plenty more they will need to learn by practicing on their own (Scharle, 2000, p. 4). Moreover, Wright (2010) argues,

Reading and learning to read does not take place just during the language arts time or in ESL and English classes. Students read all day in all content areas. Reading from textbooks and other supplementary materials is required for success in most content areas [as it comprises students'] assignments and projects. (p. 178)

Computer Technology has also contributed greatly to the concept of Autonomous Learning since learners have easy access to a variety of materials for self-learning. Schemenk (2005) suggests, "The popularity of learner autonomy may be partially related to the rise of computer technology and the growing importance of computers in language learning environments worldwide" (p. 107); therefore, Autonomous Language Learning makes students responsible for their own learning process. In this research study, learners experienced independent learning by finding opportunities to improve oral fluency themselves through technology. Learners use technology to engage in autonomous learning. First, with *IVONA* they type the desired information to hear a natural-sounding voice in quality and accuracy. Second, learners carefully listen to pronunciation and apply modeling to repeat speech patterns. Finally, using *Vocaroo* technology, learners record themselves and then listen to themselves. Careful attention is paid to oral reading fluency, pronunciation, and, specifically, speed.

Autonomy was also fostered by letting learners determine their own learning objectives or outcomes. Learners established their communicative needs and set their objectives. Teachers established learner outcomes and provided guidance in terms of using the websites effectively. The objective was to encourage learners to use these websites critically knowing both their benefits and possible limitations.

In a publication examining the practicalities of developing autonomy in the classroom, Benson (2003, cited in Nunan, 2003) argues that:

Autonomy is best described as a capacity because various kinds of abilities can be involved in control over learning. Researchers generally agree that the most important abilities are those that allow learners to plan their own learning activities, monitor their progress and evaluate their outcomes. (p. 290)

Thus, in this research study, outcomes are measurable reasons why learners should be aware of how much progress they desire to obtain with their practice, so learners are the ones who select the method and technique to be used while they practice. In that way, while learners were recording what they read they reflected on their achievements and on the weaknesses they had not improved upon yet. Learners must find the tools and the skills to become responsible for their own learning process and, at the same time, they must find the motivation to achieve their improvement goals.

2. Method

2.1 Context and participants

This study was carried out with ten students, five women and five men, whose ages ranged from eighteen to thirty years old who were taking an English level 2 extension course at a private university in Bogotá. The students take these classes as a means of complementing previous instruction in English they received from a secondary school, university or other places offering English courses. Additionally, they acknowledge the importance of the English language and think studying it will help facilitate a better academic and professional future.

The participants were classified as "false beginners", since, despite their having received previous instruction in English, they could not account for such instruction in a meaningful way. One of the most noticeable factors that demonstrated this void was their inability to read a text fluently and accurately.

Learners attended 80 hours of face-to-face classroom instruction and 20 hours of virtual class meetings where teachers had the freedom to incorporate any activity using different technological tools. Then, these 20 hours outside the classroom were used to carry out the investigation, and some moments of the face-to-face classes were used to listen to the recordings made by the learners and how they evolved when reading was put into practice. The reading activities chosen for the recording exercises dealt with the topics related to the English level 2 program. There were four reading activities in total.

2.2 Ethical considerations

The participants were informed about the research study and signed an informed consent letter. The letter was written in Spanish in order to guarantee a full understanding of the research project in terms of its implications, benefits and impact regarding their language learning process.

2.3 Data collection

During the data gathering stage of this research study, the analyzed data were collected by using field notes, an entry and exit questionnaire and voice audio recordings. The rationale behind this choice was: firstly, to have evidence of the students' actual oral production; secondly, to provide the researcher's point of view of the issue under study, and finally, to have the learners' point of view of the role of fluency regarding the process of acquisition of a second language.

2.4 Audio recordings

Since the primary concept of this study is learners' oral production, it is relevant to have real evidence of how this process materializes in the classroom. Recordings are useful since they allow focusing on key aspects to study; the same as having the advantage of developing an examination in depth by replaying the data recorded (Richards & Lockhart, 1994). Using audio recordings as a research instrument has the primary aim of helping the researcher to identify what actually happens in the classroom with regard to the Uniminuto A1 students' lack of fluency when speaking in English.

2.5 Field notes

Another important element in this research study is the teacher-researcher's point of view in relation to the classroom events that take place during lessons. In this regard, a good way to collect data is by writing notes about outstanding events or situations that help enrich this project. Field notes are a valuable resource for data collection since they allow the researcher to contrast what was intended to be done (lesson plan) and what actually happened during the different implementation sessions.

2.6 Questionnaires

Questionnaires were valuable in this research study to the extent they helped the researcher to gather important information about learners' beliefs, attitudes, motivations and preferences. In addition to this, they allowed the collection of a large amount of information in a short time. The data obtained from their administration were contrasted with the data from the audio recordings and the teacher's field notes. There were two significant questionnaires, an entry survey and an exit survey.

2.7 Data Analysis Report

The data gathered from the implementation stage of the research project outlined in this paper were analyzed by contrasting three different instruments as a means of providing validity via the triangulation process. Firstly, the audio recordings were analyzed through the use of the speaking fluency assessment chart. This instrument aimed to account for the learners' improvement of fluency throughout the implementation stage. The learners' output was recorded in four different moments of the implementation process, then excerpts of that output were transcribed and analyzed to determine whether they fulfilled the criteria given for improved fluency (connection of sounds, use of fillers, lack of unnecessary long pauses, and effective communication of the intended message). Secondly, the lesson reports made by the teacher intended to show whether learners were improving their fluency in the L2 according to what was observed during the lessons. Finally, the learners' surveys attempted to provide them with an opportunity to self-assess progress throughout the project implementation.

2.8 Pedagogical design

Reading, as has been seen in the research, is one of the most important skills learners acquire at any level during their academic progress, and L2 learners deal with the great challenge of learning to read in a language in which they are not yet proficient. Bearing this in mind, the following strategies were implemented to help them overcome any problem they might have had during their practice. At the same time, these strategies served to strengthen reading skills regardless of the learners' proficiency level. Certainly, when

students worked autonomously on the proposed activities, they should have extracted the best result from each activity for their improvement in the target language.

2.8.1 Reading aloud

Reading aloud is a helpful activity every teacher can do with their students to help them learn to read. Wright (2010) argues that when teachers read aloud, they are demonstrating the connection between oral and written language while modeling fluent reading and oral production of English. Learners, therefore, can take advantage of this. During this research, before students were told to type on IVONA what they would then record on *Vocaroo*, they listened to teachers read the four different texts that were chosen for their autonomous practice. While teachers did so in class, learners were persuaded to listen carefully as to how to pronounce words, being mindful of the verbal manifestation of punctuation marks, the linking of sounds and intonation to better understand what they were reading. Likewise, Wright (2010) adds, “during read-aloud, the teacher can make the text more comprehensible and engaging by using gestures, pointing to parts of the illustrations that provide hints to the meaning, and rephrasing or explaining difficult words or phrases” (p. 182). Surely, teachers are the ones who decide when to use gestures and what words or phrases need rephrasing or explanation, and this is done according to the proficiency level of learners. Wright (2010) also says, “The lower the proficiency level, the greater the amount of gesturing, explaining, and rephrasing required” (p. 182).

Regarding reading aloud by students, they were told to do the reading activities at home or at their workplace, so they increased the amount of time they read aloud and engaged in the IVONA website for remembering some words they did not know how to pronounce well. These activities outside the classroom motivated them to work autonomously and they felt more relaxed since they were able to re-read and record their own voices as many times as they considered necessary until they felt comfortable getting the best recording to send through *Vocaroo*.

2.8.2 Shared reading

Shared reading suggests doing reading activities by means of interaction between learners and their teacher. This happens when learners join in or share the reading of a book, for example, while being guided and supported by a teacher. Through shared reading experiences, teachers listen carefully to learners while offering corrections or adjustments based on the learners’ performance. In this research project, shared reading contributes to the learners’ reading development of phonemic awareness and phonics/letter identification, builds concepts of print, improves fluency, and aids comprehension. Furthermore, during the classes, learners read the texts in groups, a practice which helps them learn from each other and build and make predictions during the reading process. Therefore, students reflected on their performance and the teacher made corrections whenever errors occurred.

During the classes, and keeping in mind what was done with each of the reading activities proposed, teachers attempted to follow the six recommendations identified by daCruz Payne (2005) for conducting a shared reading:

Selecting a text that both teacher and learners can enjoy is very important. The text must have instructional value for demonstrating and discussing the reading process.

Looking at the size of the printed text is another aspect in determining what reading to select.

Look at the amount of print (single or multiple lines) and illustrations appropriate for learners.

Look at the punctuation marks involved in texts (periods, question marks, exclamation marks, commas).

Select texts based on the needs of the learners and the purpose of the reading.

Extend the shared reading. (p. 83)

Undoubtedly, these strategies or criteria for conducting a shared reading have made the reading process viable for students. In the same way, the topics studied in classes were extended beyond the classroom, and learners went into detail about those topics when shared reading was done. In this research project teachers were

able to identify the fact that shared reading is meaningful for learners since the texts matched the learners' reading abilities and needs as well.

2.8.3 Guided reading

Guided reading was conducted two times a week, bearing in mind that the classes were held from Monday to Thursday and lasted two hours daily. It was done with small groups of three students or in pairs. Learners were told to read the texts using the strategies they had learnt through read-aloud sessions and shared readings. According to Wright (2010):

The teacher does not read the text to or with the learners but instead prepares them to read it on their own. The teacher serves as a coach, providing scaffolding as needed to help learners apply their skills to read and make sense of the text. The ultimate goal of guided reading is to help learners move up to higher reading levels and become independent readers of increasingly difficult texts. (p. 185)

So, classes were guided, and during the first five minutes of class, the teachers introduced the text and the skill; then the teacher and learners modeled the skill together through the text. Finally, learners had to read the text independently. By the end of this process, learners should be tested independently to see if they are able to apply the skill, and be able to read it back, first using *IVONA* to emulate pronunciation, pace and sound linking. After that, they record their own voice on *Vocaroo*, reading the texts and implementing the input from the Text-to-Speech Technology to improve their pronunciation and reading fluency in English.

Finally, as was done for conducting a shared reading, teachers followed some suggestions offered by Wright (2010) for guided reading with English language learners:

First of all, the selected texts have language structures, concepts and/or vocabulary that are within the readers' control with teachers' support. In this specific research project teachers tried not to include too many new things to learn in any one text.

In the introduction, teachers included as much practice as needed to help learners become familiar with the new language structures. In the same

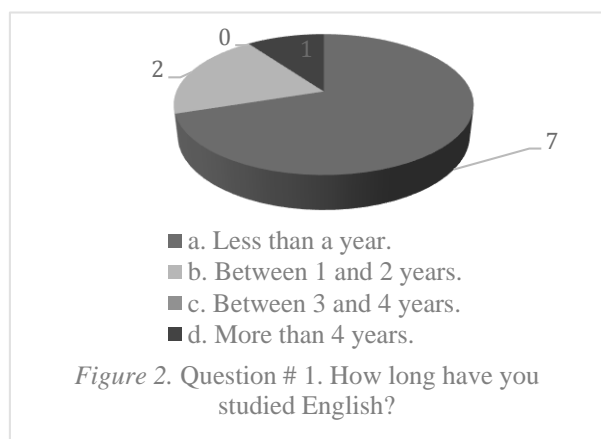
sense, teachers helped learners to identify language structures and vocabulary that might be challenging at the moment to do the recording activities by themselves on *Vocaroo*.

During the introduction teachers used pictures, mimic and concrete objects that helped learners understand the concepts and ideas in the texts much better.

As a regular activity, ask learners to identify any words or phrases in the text that they cannot understand. This will help learners learn to monitor their own understanding, provide feedback to teachers on the appropriateness of the texts, and give teachers an opportunity to clarify concepts. (p. 186)

2.8.4 Independent Reading

In this research study, independent reading was carried out in two different moments. The first moment was in class where learners needed to have some time to read independently. Teachers monitored learners without providing any assistance unless the learner asked for help to figure out a word. Something important teachers noticed when independent reading was put into practice is that reading fluency increases when learners read at their own specific level. Furthermore, independent reading leads to increased vocabulary development. Learners were more likely to infer the meaning of unfamiliar words from the context or to associate its meaning ac-



ording to their understanding.

The second moment when learners engaged in independent reading occurred at their home or workplace where they had to prepare the reading exercise to be recorded on *Vocaroo*.

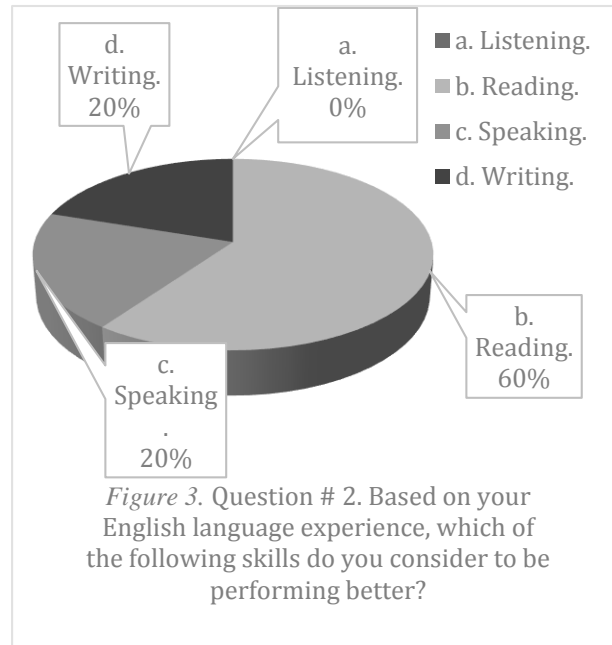
They did not have any assistance, so they had to practice reading aloud as many times as they considered necessary in order to record the best output keeping in mind the strategies they learned in class.

3. Analysis, findings and interpretation of data

Before analyzing the recordings, the first instrument the teacher reflected on was the entry questionnaire. There were six different multiple-choice questions where the main idea was to know learners' perception and feelings regarding the language, how much time they are exposed to use of the language, and their reading habits. The first question was:

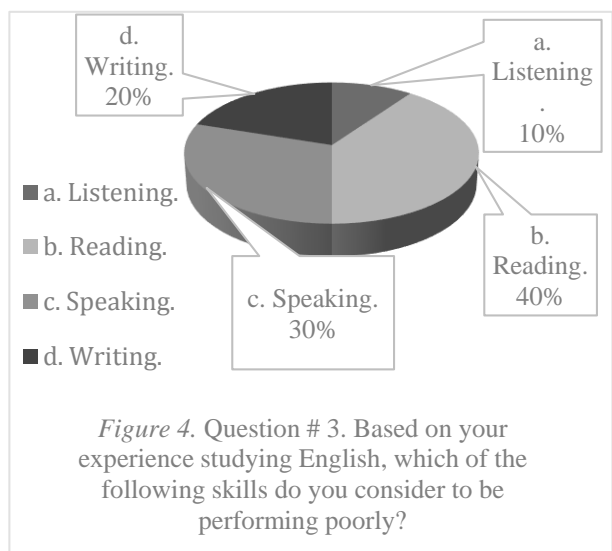
As mentioned before, 10 learners were part of the research project, and as the figure shows, most of them had not spent too much time studying the language. Of the ones who answered (a), two of them had just finished high school, and according to them, they did not spend too much time learning English. Their school only offered three hours per week practicing the language. Three other learners were in their undergraduate program; they were taking the first semesters of classes related to their professional career, and just two of them were already professionals. They agreed that the number of hours had always been very little for language learning, regardless of whether they were in college or school. The two students who answered b were high school students and the school where they were studying has in its curriculum more than 10 hours per week of exposure to the target language. The only one who answered d was also a high school learner and he was attending a bilingual school.

The second question shows that 60% of the learners agreed with their own point of view. Nevertheless, what they considered was in contrast to what was observed in the classes. The question is:



Learners reflected on this with the teacher and after a few lessons, they realized they definitely had to improve on reading more than the other skills, keeping in mind all the factors involved, which were given using the web pages, recommended for the research project, the TTS technology, and the correlation that the reading ability has with the other skills.

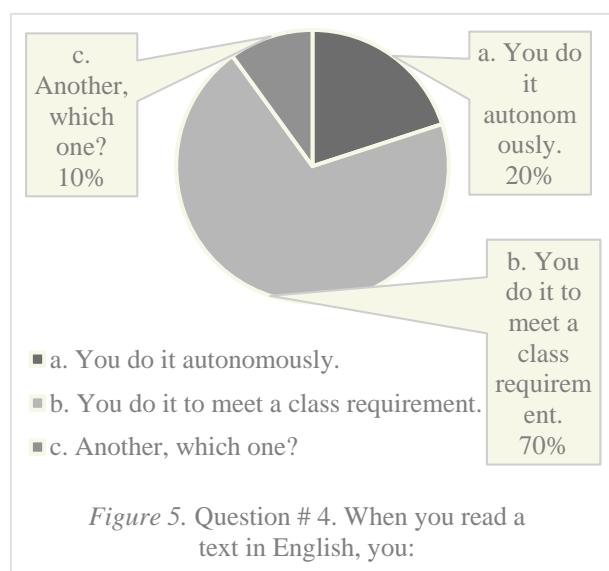
The next question took the converse point of view to the previous one. In this case, learners were asked about the skill in which they think they have the poorest performance.



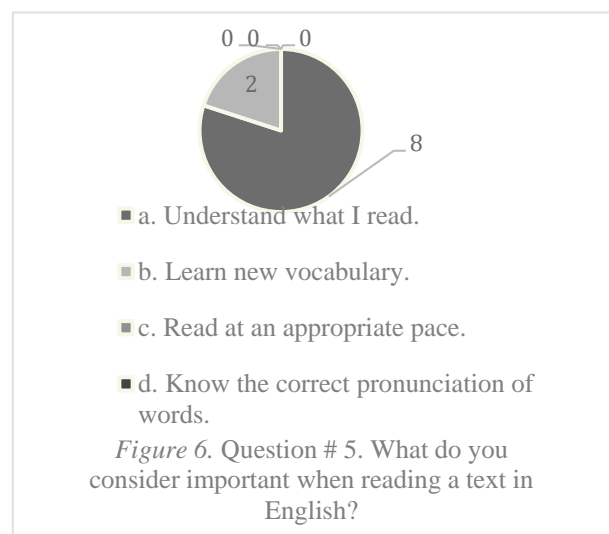
In the figure above it is clear to see the varied answers learners gave to the question. Most of the learners coincided in their self-assessment that speaking was the skill they had to improve

on the most bearing in mind that communication is what they need to put into practice no matter where they are. Nevertheless, in order to use the language communicatively and accurately, they are conscious they need to have good pronunciation, be fluent, and increase their vocabulary. In that way they will be successful, and in doing so, they will feel self-confident.

The next three questions were focused on their reading habits, and how autonomous they are when it comes to reading in English.



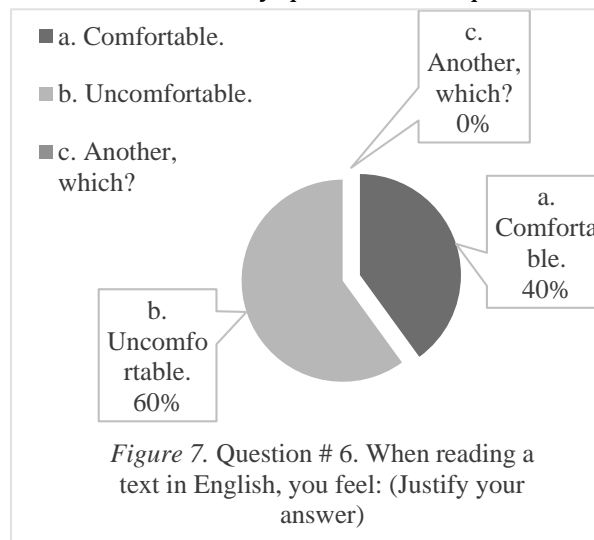
Taking into account what was established in the pedagogical design of this paper, the reading strategies applied during the research were significant since the learners understood easily that the more time they dedicated to the practice of the language by themselves, the better results they would have in their learning process. Ques-



tion number 5 is aimed at knowing which aspects learners consider important when they are reading a text in English.

Understanding is fundamental and despite learners' lack of always understanding what they read, they are interested in improving this skill. Each option they had for this question was strategically thought out; they summarized well the intention to use TTS and *Vocaroo*. Learners knew they only had to type into *IVONA* the pronunciations of some words, or the rhythm they had to have when reading, for instance. They were advised to search in their dictionaries the unknown vocabulary in each of the four suggested readings and record with their voice. In addition, all the readings were carefully chosen keeping in mind the topics that had been studied during the lessons, so vocabulary and some of the grammar structures they had practiced were found in the readings. By doing this, their level of reading comprehension, aided by subsequent pronunciation practice and becoming more fluent at the time of recording their voice, increased remarkably.

The last entry questionnaire question was:



Learners who claimed they felt comfortable when they read added that when they read aloud and were guided they understood better. They also considered they could be corrected more easily and accurately if their classmates listened to them carefully. Learners can work closely and cooperatively in order to overcome misunderstandings, especially in pronunciation. On the other hand, those learners who were not comfortable participating in shared reading attributed it to feeling nervous many times, or

stated they have no self-confidence, and they agree that if they do not have correct pronunciation and vocalization, others can make fun of them. Again, all of this proves why TTS technology benefits learners' proficiency process.

The first effect to be analyzed when implementing Text-to-Speech Technology was reading fluency. This was done by listening to students' recordings on *Vocaroo*. They had to read and record four different texts with different levels of difficulty since, according to the topics covered in class, the extension of the readings varied, in addition to the vocabulary and grammatical structures. For this, the next table (Table 1) shows the results gathered while analyzing student fluency in the form of the number and percentage of students who increased, decreased, or stayed the same.

Table 1: Learner Fluency

Fluency Level	Number of students (N=10)	Percentage of students
Increased	6	60%
Stayed the same	4	40%
Decreased	0	0%

It is important to say that this is a general analysis according to students' performance using the Fountas and Pinnell Guided Reading System (Fountas & Pinnell, 2011). These students who are in the measuring scale as "stayed the same" presented breakdown fluency. At the moment of reading they had certain short breaks, and their reading rate was not one that reflected a natural speed. There was wobbling in the pronunciation of some words. These students were also told to read what they recorded and what teachers observed then was the same information gathered when they listened to the recordings.

Accuracy was also analyzed to determine what effect guided reading had on it. Learners were assessed while reading a text from the Fountas and Pinnell Guided Reading System (Fountas & Pinnell, 2011). Learners' accuracy was determined by the number of errors they made while reading. Thus, the formula used to output a percentage of accuracy was $[(\text{number of errors}) / (\text{number of words})] * 100$.

Table 2 illustrates the results gathered while assessing learner accuracy in the form of the number and percentage of learners who increased, decreased, or stayed the same.

Table 2: Learner Accuracy

Accuracy Level	Number of students (N=10)	Percentage of students
Increased	8	80%
Stayed the same	2	20%
Decreased	0	0%

As the table shows, learners' accuracy level increased thanks to this practice. The data gathered allow inferring in this research project that learners, based on the implementation of text-to-speech technology, might improve accuracy if they rehearse frequently. A positive outcome from this study is that learners' accuracy did not decrease. However, this does not mean they did not encounter any issues when reading the text. They endured these issues by rehearsing autonomously and following the reading strategies described in the pedagogical design. Those learners who stayed the same were the ones who mispronounced a few words well during the activities. They were aware of it and were positive as they faced their difficulties concerning reading fluency by asking teachers to let them record the readings again.

Finally, the exit questionnaire provided meaningful data. First, there were four different questions to answer. All of them were open questions where, despite learners having had to decide between yes or no, they had to justify their answer. The first question is:

1. Do you consider the use of Text-To-Speech Technology to be useful in the learning process of a foreign language?

All the learners answered yes. They considered this technology gives them the chance to practice wherever they are and whenever they want. In that way, they could improve easily their oral reading fluency. Moreover, they associated this practice with their improved speaking due to the improvement in their pronunciation and fluency.

2. Do you think that the use of the *IVONA* website helped you improving your verbal fluency when reading aloud?

All learners agreed this is a great tool since it let them know how to pronounce correctly words that even they had never seen before. In addition, they said they felt comfortable and confident when they used the website before a presentation, or any other activity where they had to read or speak. Some also argued they were so shy, and when using the website, they loosened up in public because they were fluent. Others claimed it is an interesting website because it lets them listen to and learn different accents of people from different countries where English is spoken as a native language. Therefore, most of them were able to mimic the pace and intonation. Learners were able to repeat and listen to the same words or phrases the number of times they considered necessary until they got the correct pronunciation to be fluent. In addition, when reading was put into practice in class, learners felt motivated and self-confident to share and show their reading progress.

3. Do you think that the use of the *IVONA* website helped you improving your pronunciation in English?

By repeating what they heard the number of times they considered sufficient, they said *IVONA* let them internalize better the sounds of words and their intonations. They also recognized stressed and unstressed syllables better. A few learners whose English level was better than the others said this website helped them make corrections on pronunciation, clarifying doubts they had comparing British and American pronunciations. In addition, they used this site not only as a mean to improve fluency, but also to check the meaning of some words in the dictionary that helped them to enrich their vocabulary.

Students were highly motivated to use the website to listen to what they wanted to use orally later in class, so this tool promoted meaningful interactions because students had the opportunity to prepare different types of oral presentations for their classes. Each student's level of English language proficiency was taken into account to ensure that the expectations for the presentations were fruitful, having in mind what they did with this website before speaking English in front of the class.

4. Do you think the research project "Implementing Text-To-Speech Technology to Enhance L2 Oral Reading Fluency" contributed in any way to developing autonomous study practices?

Students agreed that the project was clear and consistent with the findings. They attributed those findings to the instructional strategies and techniques described in the project, like the key aspects of being motivated to practice the language more by themselves during their free time. They added the information that their teacher helped them to consolidate, elaborate, and intensify their understanding of the reading activities and the connections they had made. Therefore, students spent more time exploring and discovering for themselves what weaknesses they had, and after learners made them strong and overcome difficulties they found when reading aloud in class was developed.

Conclusions

The results derived from the present research study demonstrate that the implementation of text-to-speech (TTS) technology has a positive effect in relation to the enhancement of the learners' Oral Reading Fluency (ORF), particularly regarding features such as fluency, word linking, word stress and pronunciation. In addition to this, the crucial role that CALL plays in the development of key skills for language learning as well as autonomy was evident. Many students often feel frustrated while memorizing words because of not knowing how to pronounce them and, additionally, the same applies when they are listening to any conversation from a CD, a podcast, or other audio source. They are not able to follow up due to the complexity of the content that the speaker is talking about. Some learners also become frustrated with learning English because they do not have any idea as to how to speak with beautiful harmony or rhythm, so, and as Yi-Ching Huang and Lung-Chuan Liao (2015) state:

With substantial and rapid progress in TTS development, the most natural pronunciation and intonation generated through this technology has replaced the mechanized synthetic speech that was popular early before. This technology can provide learners not only with the best demonstration of the analog tone pronunciation, but also adds the flexibility and efficiency, which cannot be achieved with prerecorded files. (p. 20)

Therefore, exploring the relationship between TTS and learners' acquiring English proves to be necessary and meaningful. In the

same way, related research on TTS has not been very common in Colombia.

Finally, TTS Technology offers interactive learning, and thus enables learners to improve on all their skills progressively; provides them with a self-directed environment; and enhances their self-study motivation.

4. Pedagogical implications

Considering the aforementioned conclusions, different considerations arise when implementing Text-to-Speech Technology as a means of enhancing L2 Oral Reading Fluency in the process of teaching English as a foreign language. First of all, with the application of the activities for reading a text and the strategies or criteria each of them offers, learners were able to perform better when reading a text on their own or in front of their classmates; they improved reading comprehension. They also developed some features of autonomy like independence and self-direction. Learners enjoy the fact that they have to use technology as a means to dedicate more time to study the language outside the classroom. So, they were genuinely interested in accomplishing what they were told in class, working devotedly on the different recordings.

Furthermore, one way or another, teachers should encourage learners to use the language outside the classroom. In this project, learners had the option to take into consideration their interests, needs, English level, age, and context to choose the readings they wanted to read. The idea behind the freedom they had to select their own readings was to activate their language outside the classroom thus increasing their interests in recording their voices on *Vocaroo*, and then listen carefully to them to reflect on how they did. As a result, learners noticed how their pronunciation had improved thanks to the implementation of Text-to-Speech Technology when reading fluency was promoted. With the use of the website *IVONA* learners have the audio pronunciation of the words they considered to be the most problematic, thus, implicitly, they made corrections on pronunciation and they understand it goes further than individual sounds. Learners might work on word stress, sentence stress and word linkage using *IVONA* and then record their own voice on *Vocaroo* to test the efficacy of these websites. The exercises done on these websites allow clear practice in production

and reception and give concise feedback to learners in pronunciation.

Prospects for further research

Text-to-Speech Technology can be a very useful tool for learners with visual impairment. At the University where this project was carried out, there are even some students who are mildly or moderately visually impaired, so, it would be a great idea to start a project implementing this technology with them to study their process of learning English as a foreign language. Students, who have reading problems because they confuse words or word order (dyslexia), will benefit greatly from this technology as well.

In addition, this technology might be meaningful with learners who speak the language but do not read it. Many people who come to a new country learn to speak and understand the native language effectively, but may still have difficulty reading in a second language, especially small children. Though they may be able to read content with a basic understanding, text-to-speech technology allows them to take in the information in a way they are more comfortable with, making the content easier to comprehend and retain.

For those teachers who love designing new teaching material, adding TTS as a resource would be beneficial for planning lessons. In the past teachers had to create their own lesson plans and activities based on their schools' curricula, but now teachers have the freedom to use a variety of resources, and the internet is an excellent source for lesson plans and activities for ELL.

References

- Brown, D. (2001). *Teaching by Principles: An Interactive Approach to Language Pedagogy*. White Plains, NY: Pearson Education.
- Benson, P. (2003). *Learner autonomy in the classroom*. In Nunan, D. (Ed.) *Practical English Language Teaching*. New York: McGraw Hill.
- Crace, A, et al. (2011). *New Total English Pre – Intermediate*. Harlow, UK: Pearson Education.
- Chapelle, C., & Jamieson, J. (2008). *Tips for teaching with CALL: Practical approaches to computer-assisted language learning*. White Plains, NY: Pearson Education.
- daCruz Payne, C. (2005). *Shared Reading for Today's Classroom*. New York: Scholastic.
- DeKeyser, R. M. (2001). *Automaticity and automatization*. In P. Robinson (Ed.), *Cognition and second language instruction* (pp. 125–151). Cambridge: Cambridge University Press.
- Fountas, I.C., & Pinnell, G.S. (2011). *Fountas and Pinnell benchmark assessment systems 1 and 2* (2nd ed.). Portsmouth, NH: Heinemann.
- Huang, Y., & Liao, L. (2015). *A study of Text – To – Speech (TTS) in children's English learning* (pp. 14-30). Central Taiwan University of Science and Technology No.666, Buzih Road, Beitun District, Taichung City 40601, Taiwan (R.O.C.)
- Krashen, S. D. (2004, April). *The power of reading: Insights from the research* (2nd ed.). Portsmouth, NH: Heinemann.
- Longman Photo Dictionary ESOL Skills for Life Entry 1*. (2010). London, UK: Pearson Education.
- Mills, S. C. (2006). *Using the Internet for Active Teaching and Learning* New Jersey: Pearson Education, Inc.
- Moon, D. *Web-Based Text-to-Speech Technologies in Foreign Language Learning: Opportunities and Challenges in Computer Applications for Database, Education, and Ubiquitous Computing*, Springer, Vol. 352, 2012, pp. 120-125, DOI: 10.1007/978-3-642-35603-2_19
- Nes-Ferarra, S. L. (2005). *Reading, fluency and self-efficacy: A case study*. *International Journal of Disability, Development and Education*, 52(3), p. 215.
- Peñaflorida, A.H. (2002). "Non-traditional forms of assessment and response to student writing: A step toward learner autonomy", in J.C. Richards and W.A. Renandya (eds.), *Methodology in Language Teaching: An Anthology of Current Practice*. Cambridge: Cambridge University Press, 344-53.
- P. Sharma, & B. Barrett. (2007). *Review of blended learning: using technology in and beyond the language classroom*. Oxford: Macmillan Publishers Limited
- Rasinski, T. V., & Samuels, S. J. (2011). In S. J. Samuels & A. E. Farstrup (Eds.). *What research has to say about reading instruction* (pp. 94 –114). Newark, DE: IRA.
- Richards, J. & Lockhart, C. (1994). *Reflective Teaching in Second Language Classrooms*. Cambridge: Cambridge University Press.
- Scharle Agota & Schabo, A. (2000). *Learner Autonomy*. Cambridge: Cambridge University Press.
- Schmenk, B. (2005). *Globalizing Learner Autonomy*. *TESOL Quarterly*. 39(1), 107-118.
- Segalowitz, N. (2003). *Automaticity and second language learning*. In C. Doughty & M. Long (Eds.), *The handbook of second language acquisition* (pp. 382–408). Oxford, UK: Blackwell.
- Segalowitz, N. S., & Segalowitz, S. J. (1993). *Skilled performance, practice, and the differentiation of speed-up from automatization effects: Evidence from second language word recognition*. *Applied Psycholinguistics*, 14, 369–385.
- Swain, M. (1995). *Three functions of output in second language learning*. In G. Cook, & B. Seidlhofer (Eds.), *Principle and practice in applied linguistics: Studies in honour of H. G. Widdowson* (pp. 125-144). Oxford: Oxford University Press
- Wright, W. (2010). *Foundations for Teaching English Language Learners*. Philadelphia, USA: Caslon Publishing.