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The use of a virtual environment to improve students' Listening skills: a learning analytics approach

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ABSTRACT

This study analyzes the use of virtual environments to improve the listening skills of students of English as a foreign language (EFL) from a quantitative approach. To achieve this goal, one hundred participants enrolled in a free English course using a platform with H5p activities, videos, quizzes, images, infographics, audio, forum, and synchronous Zoom sessions for four weeks, in addition to a KET test for the assessment of listening comprehension. Quantitative data were analyzed by comparing the mean scores of the pretest, posttest as well as the logs of the platform. Analyses confirm the benefits of applying ICT tools to develop listening skills. All subskills of the listening sections were benefited from the interactivity displayed in the online activities. The current study reinforces the notion of interactive online activities as motivators to improve listening comprehension in EFL.

Keywords: *information and communication technology; ICT; online activities; listening skills; learning analytics.*

[1] Autor Principal

El uso de un entorno virtual para mejorar la experiencia de los estudiantes. Habilidades de escucha: un enfoque de análisis de aprendizaje

RESUMEN

Este estudio analiza el uso de entornos virtuales para mejorar las habilidades auditivas de estudiantes de Inglés como lengua extranjera desde un enfoque cuantitativo. Para lograr este objetivo, cien participantes se inscribieron en un curso gratuito de Inglés mediante el uso de una plataforma con actividades H5p, videos, cuestionarios, imágenes, infografías, audio, foro y sesiones sincrónicas de Zoom por cuatro semanas, adicional a una prueba KET para la evaluación de la comprensión auditiva. Los datos cuantitativos se analizaron comparando las puntuaciones medias del pre test, del post test así como los registros de la plataforma. Los análisis confirman los beneficios de aplicar herramientas TIC para desarrollar habilidades de comprensión auditiva. Todas las micro habilidades de las secciones de comprensión auditiva se beneficiaron de la interactividad mostrada en las actividades en línea. El estudio actual refuerza la noción de que las actividades en línea son motivadoras para mejorar la comprensión auditiva en el aprendizaje del Inglés como idioma extranjero.

Palabras clave: *tecnologías de la información y la comunicación; TIC; analítica del aprendizaje; comprensión auditiva; actividades en línea.*

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INTRODUCTION

Nowadays, learners are exposed to ICT tools and resources in diferent ways from early ages of schooling (Quinga et.al., 2022; Vega et.al., 2022). ICTs (Information and Communication Technologies) are seen as different sets of tools and resources which people utilize to store, regulate, disseminate and create information, to communicate. The application of ICTs in the educational field is expected to help increase learning opportunities that develop quality and allow the betterment of educational systems (Azmi, 2017).

Within the vast array of ICTs is an LMS. A Learning Management System (LMS) helps to check students' progress and the interactive tasks motivate them to complete learning activities. Parallelly, part of an LMS is one of the popular packages known as H5P. H5P is a valuable framework to help educators to add interactive content. This framework can be embedded on an LMS to design and create more motivating, interesting, and engaging materials to help students to have meaningful learning (Addhiny, 2022). Besides, these resources are intended to increase self-directed study with a diversity of content such as games, quizzes, presentations, interactive videos, and so on.

On the other hand, regarding English language skills, listening is expected to be the main channel on which language and speech are sustained. We must consider that difficulty, in the listening range of the person and especially at an early age, is going to affect their linguistic and communicative development, their cognitive processes and, consequently, their subsequent school, social and labor integration (Cazar et.al, 2002). For this reason, ICT can become a powerful ally both to reduce the digital divide and in avoiding discriminatory processes (Akinwamide, 2011; Babak & Masoud, 2011).

The means to connect language skills and technology can be through online activities. Online activities can be an effective way to support EFL (English as a Foreign Language) learners in improving their language skills. One advantage of online activities is that they can provide learners with more opportunities to practice and interact with the language outside the classroom, which can lead to improved language proficiency (Nikou & Economides, 2018). These authors also suggest that online activities can be more engaging and motivating for learners than traditional classroom activities, which can lead to increased learner participation and better language outcomes (Nikou & Economides, 2018).

Furthermore, online activities can be tailored to meet individual learners' needs, allowing for more personalized language instruction (Benedetti, 2015; Nelson, 2008).

While online activities can have many benefits for EFL learners, there are also potential drawbacks. One issue is that online activities may not be appropriate for all learners, particularly those who have limited access to technology or who prefer traditional classroom learning (Carrick-Simpson & Armatas, 2003). Additionally, online activities may not always provide learners with opportunities for meaningful language use and communication, which are important for developing communicative competence (Sun, 2011, 2014). Moreover, online activities can be less effective than face-to-face instruction in promoting social interaction, which is essential for language learning (Li et.al., 2017). Another drawback is the lack of training and motivation teachers receive to implement ICT (Machmud, 2011; Owusu-Ansah, 2013; Pizarro Chacón & Cordero Badilla, 2013; Toledo, 2018).

Even if online activities may bring advantages to EFL learners, it is important to consider the individual needs and preferences of learners, as well as the limitations of online instruction (Quevedo, et.al., 2021). As some researchers have noted (e.g. Sibi, 2020), learners have decreased their enthusiasm for the traditional way of learning. ICT-based teaching methods can make their learning process more interesting than a traditional process. Teachers require to select appropriate tools from ICTs based on students' needs and other relevant facts to encourage them to learn. Taking a thoughtful and strategic approach to online language learning can help learners to improve their language proficiency and reach their learning goals.

In this context, it is important to acknowledge the role of the teacher and the role of students. Dornyei (2009) emphasizes that learning a second language cannot be disconnected from the social context in which it takes place. Social identity is determined by the environment. This knowledge allows teachers to select activities, resources, procedures, methods, or approaches to improve learners´ social, emotional, and cognitive skills to have good development in society (Hsuan-Yau, 2013).

Based on the context outlined earlier, there are several studies which are linked to the use of technology with online activities to enhance listening comprehension skills in students by analyzing the advantages and disadvantages of online activities. Smidt and Hegelheimer (2004) investigated the impact of online activities, including videos, podcasts, and quizzes, on language learning. The study found that online

activities can be effective in improving listening skills and other skills such as vocabulary acquisition and strategy use. Similarly, Roohani, et.al, (2020) explored the effects of technology on English listening comprehension in a EFL context. The study found that technology, including online activities and video materials, can significantly improve learners' listening comprehension abilities. When technology is used, we must care not to leave aside mobile devices. In this regard, Zhang (2016) investigated the impact of mobile technology on EFL listening skills. The study found that mobile technology, such as smartphones and tablets, can be effective in improving listening skills through the use of various mobile apps and multimedia resources.

On the other hand, to solve some controversies regarding the effectiveness of technology-mediated activities on listening skills, in a meta-analysis of 18 studies on the effects of online learning on EFL learners' listening comprehension, Shintani and Wallace (2014) found that online learning, including online activities and other technological resources, can significantly improve listening comprehension abilities. Their results suggest that listening support improves the effectiveness of listening practice, with linguistic support having a larger effect size than contextual support. There were no significant group differences in the timing of listening support or the length of listening practice, but listening practice with student-controlled input had a significantly larger effect size than teacher-controlled input. The study discusses the theoretical and pedagogical implications of these findings.

These studies and others (Helwa, 2021; Megat-Abdul-Rahim, 2021; Mohammed, 2022) provide evidence that the use of online activities and technology can improve listening comprehension skills in language learners. They advocate the idea that integrating technology into language learning can enhance learners' skills and provide a more engaging and interactive learning experience. However, not all students can take advantage of online learning as this may depend on several other variables (de Jong, 2020; Liu, 2014)

As there are several interactive activities to develop listening abilities, the objective of this study is to investigate the effectiveness of different online resources, such as audios, videos, podcasts, quizzes, and H5P activities, on the listening skills of participants at the A1 level of English proficiency. The study aims to evaluate the impact of using online activities to improve the listening comprehension skills of English language learners in an Ecuadorian context.

METHODOLOGY

This study explored the use of online activities to develop the listening skills of EFL learners. The study used a pretest-posttest design to measure the changes in participants' listening comprehension abilities after completing the online activities. The pretest and posttest helped researchers to use outcomes as a point of comparison. Participants received online listening training after the pretest for five weeks from April to May 2022 during which they were exposed to a diversity of online activities to determine if using them would improve their listening skills. In the end, the participants took the posttest. Most importantly was to determine which activities had a major impact on students' listening skills.

The development of the project had three phases: pretest, intervention, and posttest. Hence, we used a Learning Management System (LMS) containing an e-learning classroom divided into four modules. Besides, these modules were designed based on a prior planning and then, numerical data collected from pretest, posttest, and intervention activities to observe the consistency and effectiveness during the investigation.

For the current study, out of the (n = 104) enrolled participants, 100 were considered for the final analysis as they finished all the activities and agreed to participate voluntarily from the very beginning. Most participants were in the age range 11-15 years old (48%), followed by the age range 16-20 (22%), then groups of 31-35 years old (7%), 21 -25 years old (6%), two groups from 46- 50 (4%) and 51 and over (4%), and finally two groups with an age range 26-30 (3%) and another which did not report age (6%). The self-reported data also showed that thirty-five participants were male (35%) and sixty-five females (65%) in different age ranges. Moreover, ninety-one users live in Manta (91%), followed by 3 participants from Jama (3%), 2 from Guayaquil (2%), and the rest of the city reached 1% because of one user per city (See Table 1).

Table 1. *Geographical location of participants*

		Frequency	Percent	Valid Percent	Cumulative Percent
Cities	Guayaquil	2	2,0	2,0	2,00
	Jama	3	3,0	3,0	5,00
	Jipijapa	1	1,0	1,0	6,00
	Manta	91	91,0	91,00	97,00
	Montecristi	1	1,0	1,00	98,00
	Portoviejo	1	1,0	1,00	99,00
	San Vicente	1	1,0	1,00	100,00
	Total	100	100,0	100,0	

As an additional assessment instrument, we applied two versions of the Key English Test (KET) developed by Cambridge ESOL to evaluate before and after the intervention. The platform contained four modules including H5p resources, audio, videos, tests, glossary, infographics, and images. The design of activities was based on the Common European Framework of Reference according to the can-do statements.

The investigation required to create an e-learning classroom where activities and resources were selected based on the literature about how to increase the listening comprehension of young learners. After creating the course on the Moodle platform, this was advertised it by using an online flier with a link to join it. The participants enrolled and accepted to participate voluntarily by completing a survey to collect the relevant information. At the end, they received an email with their username and password.

One hundred participants took the KET test for the listening section. Additionally, learners received five synchronous sessions which took place in the afternoon over four weeks using Zoom platform. Each session had a 40 min-length in which listening comprehension was reinforced. Finally, after completing the four modules, students took the posttest using another version of the same test to determine if there was a relevant change.

Statistical analysis

Data were analyzed to compare listening skills progress before and after using the online listening activities and resources. To this end, LMS logs were used to run descriptive and inferential analyses with the aid of SPSS. Firstly, given that the sample was higher than required, the Kolmogorov-Smirnov test was used to compare the pretest and posttest scores of 100 participants as shown in Table 2.

Table 2. *Normality Test*

	Kolmogorov – Smirnov[a]		
	Statistic	**df**	**Sig.**
Pretest	.068	100	.200*
Postest	.113	100	.003

* This is a lower limit of true significance.

a. Lilliefors Significance Correction

Table 3. *Wilcoxon Test*

		N	**df**	**Sig.**
Pretest- Postest	Negative Range	3[a]	8,00	24,00
	Positive Range	93[b]	49,81	4632,00
	Ties	4[c]		
	Total	100		

a. Postest<Prestest

b. Postest>Pretest

c. Postest=Pretest

	Postest-Pretest
Z	−8,424[b]
Sig. asin. (bilateral)	<0,001

a. Wilcoxon signed-rank test

b. Base on negative ranges

The Kolmogorov-Smirnov test was used due to the number of participants. The result was 0,003. It concluded that the distribution was not normal (See Table 2) along with the Wilcoxon test to determine a significance level which was <0.001 (See Table 3). These results suggest that the treatment of virtual activities produced significant changes in the strengthening of listening skills based on numerical data, with a reliability of 95%. Also, the test identified 93 positive scores, 4 ties, and 3 negative scores.

RESULTS AND DISCUSSION

From Moodle, we obtained the result logs of virtual activities and grades. The listening abilities were examined by applying the pretest and posttest on relevant information such as short and long conservations and monologues distributed in five subsections to test listening sub-skills, and thus measuring the listening comprehension ability of the participants.

Online activities

The four modules included different activities to improve students' knowledge and listening abilities by using audios, videos, podcasts, quizzes, and H5P activities to engage participants within the English training for A1 level. Implementation of all modules was intended to detect the consistency of the treatment and measure learners´ listening skills through online learning.

Every single activity was completed by all participants (see Figure 1). Moreover, as seen in **¡Error! No se encuentra el origen de la referencia.**, the activity which obtained the highest grade was '*my neighborhood'* (x = 92.45) followed by *'Listen to a song'* (x = 90.95), '*Meet Manju quiz'* (x = 89.16), '*giving directions'* (x = 80.14), and '*teachers' instruction quiz'* (x = 79.70). The activity named '*What time is it?'* obtained the lowest score (x = 78.20). This may have happened because it had less interactive content, it only contained audio without graphics. Contrarily, the activity with the highest scores used H5P because it added different resources in the same activities.

Figure 1. *Percentage of completion per participant*

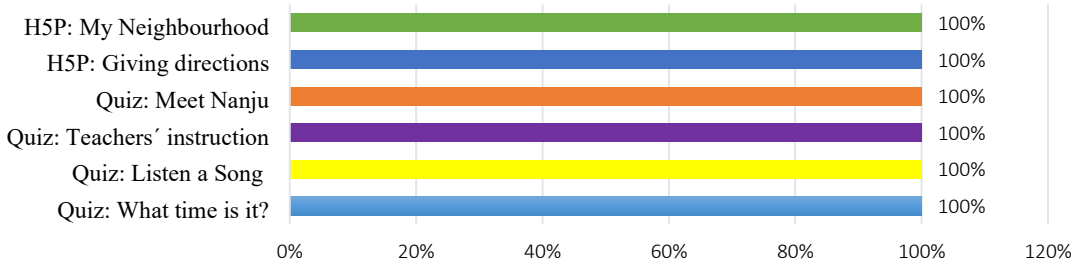
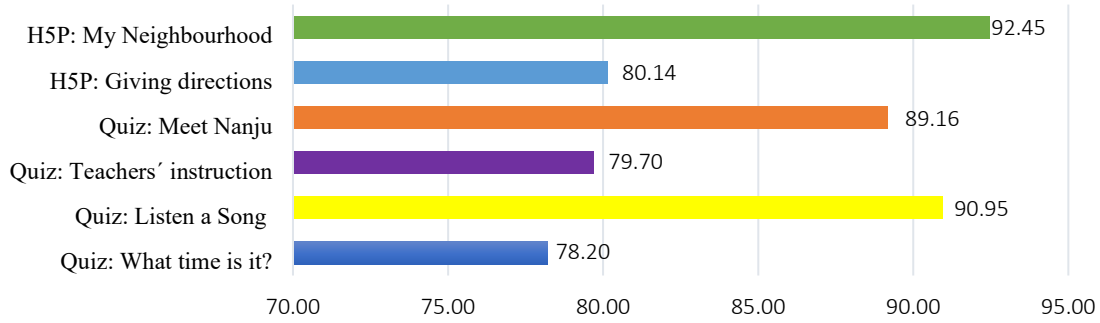


Figure 2. *Average scores per task*



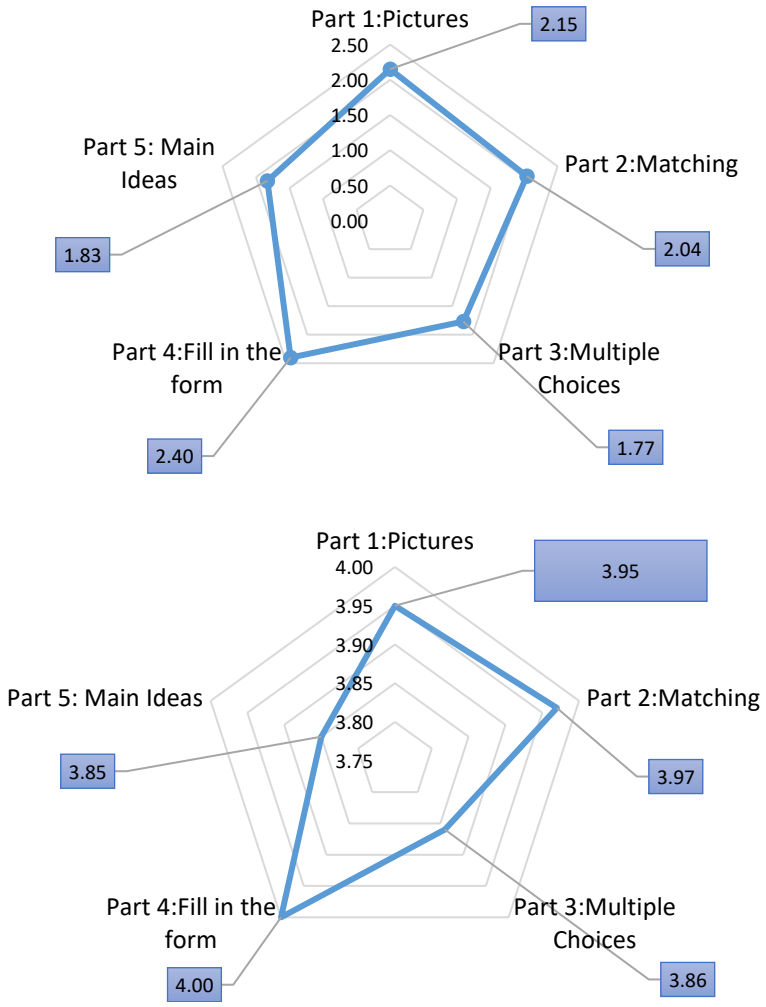
As mentioned earlier, participants attended synchronous sessions on the Zoom platform as a way to keep track of, and motivate them to complete the activities. In addition, all the participants joined a WhatsApp group to help them be in contact, clarify any doubts about the course, misunderstandings or share extra activities to encourage them to practice their English.

Listening Skills

A pretest (applied at the beginning) and a posttest (applied in the end) both contained five subsections with questions. Each subsection assessed a specific listening subskill as seen in figures 3 and 4. In the first subsection, participants heard five short recordings and selected the correct picture out of three options. The second subsection was a matching activity. The third subsection contained a multiple-choice question where participants listened to a long conversation and selected the correct answer. The fourth subsection was a monologue to fill in the blanks and, in the fifth subsection, the participants listened to a short audio to recognize the main ideas of the text.

Figure 3. Pretest scores per each subsection

Figure 4. *Posttest scores per each subsection*



Data obtained from the KET test listening section (pretest and posttest) evaluates the level of each candidate to understand announcements and other spoken messages at a slow speed.

As seen in Figure 3, results from the pretest were low and then increased in the posttest, as can be seen in Figure 4. The numerical data presented in the posttest figure showed that students improved their listening skills significantly after they were subject to specific online skills, albeit in different degrees. The ability about "*understanding announcement"* was evaluated by using two questions: selecting the correct picture at the beginning with an average of (2,15) it improved in the posttest (3,95), and fill in the form question with an average of (2,40) in the pretest, and an average of (x=4,00) in the posttest. Also, this test evaluated the ability to understand spoken language at a slow speed by using three

questions: the matching question has an average of (x=2,04) in the pretest and increased with an average of (x=3,97) in the posttest, the multiple choices question started with an average of (x=1,77) and ended with an average of (x=3,86) in the posttest and to understand the main idea with an average of (x=1,83) and finished with an increase of (3,85) in the posttest. All these results indicated an improvement in the posttest overall averages in participants attributed by integration technology in the learning process.

The data collected from the pretest and posttest obtained lower results specially to understand the main ideas of the spoken language and multiple choices (See Fig. 3 and 4). This may be due to the existing learning process in schools as this is focused on grammar and vocabulary instead of helping learners understand the main ideas of the text and spoken language. These findings are concomitant with past studies regarding the benefits of ICT resources on EFL (Bal, 2019; Conrad & Donaldson, 2004; Cook & Babon, 2017; Oliver, 1999; Bin-Hady & Al-Tamimi, 2021; Yumnam, 2021) .

It is vital to incorporate comprehensible input to produce meaningful output in the learning process as ICT tools may not equally level all four language skills (Georg, 2014). Our results are also coherent with previous research which used learning analytics approaches (e.g. Ocaña et al., 2019; Wise et.al., 2014) in that they identified different clusters of users while we could identify preferred activities by groups of students, and above all, the enhancement of their listening skills. However, poor or deficient use of ICT may hinder the potential it brings to education, especially in developing countries (Ejigu, 2015).

CONCLUSIONS

This research evaluated the results of how the development of virtual activities increased the basic listening skills of the participants, using an online platform and ICT tools. These resources had been studied due to their importance as other studies suggest the use of a virtual learning environment and other pedagogical resources to help learners develop communication skills, motivation, and vocational preparedness.

From the psychological this method is based on a concept of cognitive learning. The application of rules and memorization, which plays a determining role in the learning process. The use of the audiovisual method is based on the predominant styles of learning focus on images and audio to improve the ability of retention.

The results of the current study provides insights into the effectiveness of integrating technology and online activities to enhance listening comprehension skills in English language learners, which can inform future instructional practices in language learning.

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