Improving EFL students' grammar through gamification: A case study

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ABSTRACT

Gamification is an innovative technological approach that promotes learning in a more enjoyable way by providing a motivating, and engaging environment for students. This study aims to evaluate students' performance of English comparative structures through the integration of technology-mediated gamification in a Spanish primary school context. With a sample of 28 primary students, a control and an experimental group were assessed to compare the traditional method with the technological approach based on gamification. Additionally, students' perceptions of the use of ICT-mediated gamification for learning were explored in the experimental group. Quantitative data were analyzed using descriptive statistics and a t-test which revealed that significant learning took place in both groups. Finally, students in the experimental group offered positive perspectives on the use of technology-mediated gamification in the EFL learning context.

Keywords: Information and Communication Technologies, Computer-Assisted Language Learning, Gamification, English as a Foreign Language, Grammar

RESUMEN

La gamificación es un innovador enfoque tecnológico que fomenta el aprendizaje de una manera más divertida proporcionando un entorno motivador y atractivo para los estudiantes. Este estudio tiene como objetivo evaluar el rendimiento de los estudiantes sobre las estructuras comparativas en inglés, a través de la integración de la gamificación mediada por la tecnología, dentro del contexto de un colegio de primaria español. Con una muestra de 28 alumnos de primaria, se evaluó un grupo de control y otro experimental para comparar el método tradicional con el enfoque tecnológico basado en la gamificación. Además, se examinaron las opiniones de los alumnos del grupo experimental sobre el uso de la gamificación mediada por las TIC para el aprendizaje. Los datos cuantitativos se analizaron mediante estadísticas descriptivas y una prueba t que revelaron que se produjo un aprendizaje significativo en ambos grupos. Por último, los estudiantes del grupo experimental presentaron puntos de vista positivos sobre el uso de la gamificación mediada por la tecnología en el contexto del aprendizaje del inglés como lengua extranjera.

Palabras clave: Tecnologías de la Información y Comunicación, Aprendizaje de Lenguas Asistido por Ordenador, Gamificación, Inglés como Idioma Extranjero, Gramática

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1. Introduction

Ever since the 20th century technology has grown exponentially, gradually becoming integrated into society, which has led us to adopt some drastic but positive changes in our lives. In fact, it could be asserted that nowadays our lives are linked to the use of technologies, and it is quite challenging for us to live without any technological devices. Accordingly, Information and Communication Technologies (ICT henceforth) are an essential part of our lives, and they have evolved to satisfy almost every need we have. In this sense, ICT can be applied in different environments such as work, education, or health, making our lives easier. According to The United Nations Educational, Scientific and Cultural Organization, Institute for Statistics (UNESCO, Institute for Statistics, 2009), ICT refer to a "diverse set of technological tools and resources used to transmit, store, create, share or exchange information" (p. 120), in addition to facilitating communication between people. Among these sets of technological resources or tools, "computers, the Internet . . . , live broadcasting technologies . . . , recorded broadcasting technologies . . . and telephony" (UNESCO, Institute for Statistics, 2009, p. 120) are included in the definition of the term.

Currently, there has been an increase in the use of ICT, especially in the education sector. This has been due to the worldwide COVID-19 pandemic, which has prevented students at all educational levels from attending face-to-face lessons. In Spain, from March 2020 until the end of May 2020, the population was quarantined, and during these months, the use of ICT was the exclusive way of continuing with the lessons. Therefore, extraordinary measures had to be adopted, that opted for online classes mediated by ICT tools. As The Organization for Economic Co-operation and Development (OECD, 2020) stated, "the availability of information and communication technologies (ICT) makes it possible to continue instruction and learning when physical interactions are no longer possible" (p. 2).

In order to explore how ICT have been used during the pandemic, the main objective of this study is to analyze how primary school students in an EFL classroom in a Spanish school used technologies in general, and gamification in particular, to learn comparative structures in English. The study is therefore framed within the fields of English as a Foreign Language (EFL), Computer-Assisted Language Learning (CALL) and gamification. And gamified ICT such as Quizizz (quizizz.com), Wordwall (wordwall.net), and Kahoot! (kahoot.com) were introduced in the classroom to provide a motivating environment that was conducive to learning.

The application of ICT in education is relatively new and goes hand in hand with the growing use of new technologies in society. In fact, it is believed that the incorporation of ICT is one of the greatest challenges facing education in the 21st century despite the fact that they are precisely the fundamental tools needed to modernize the current educational system (Vinagre Laranjeira, 2010, p. 13). Moreover, the integration of ICT has a great impact on the teaching-learning process and requires some crucial changes: from the role of the teacher and student to the design of tasks and projects, to the assessment and evaluation system (Vinagre Laranjeira, 2010). More specifically, within the EFL classroom, ICT can help promote students' language learning in addition to digital literacy. In this respect, "the use of ICT in the language-learning process might, therefore, have an impact well beyond the language classroom, as students not only develop linguistic and sociocultural expertise through ICT, but also acquire ICT-related skills through the target language" (Conacher et al., 2004, p. 10).

In this process of integrating ICT in the classroom, the role of the teachers is essential. Nowadays, most schools are equipped with technologies (e.g., computers, interactive whiteboards, the Internet, etc.), but it seems that not all teachers or educators

integrate these technologies into their teaching methods, perhaps due to the lack of training in how to effectively apply said technologies in their classes. To illustrate this, the OECD *Teaching and Learning International Survey* (TLIS) showed that in Spain, in 2018 only "38% of teachers reported that use of ICT for [educational purposes] . . . was included in their formal education or training" (OECD, 2020, p. 2). This means that the vast majority of teachers and educators in Spain have not received specialized training in how to introduce ICT in their teaching methods. In this context, given that the use of ICT in the classroom was suddenly necessary due to the COVID-19 pandemic it might be assumed that most teachers found it difficult to change or update their teaching methods in such a short time. Given that the use of ICT in the classroom is likely to remain even if students and teachers go back to face-to-face lessons, "it is imperative for teachers to get access to in-service training to continually update their skills in this area" (OECD, 2020, p. 3) since any prior training in ICT-aided teaching may not be sufficient "to ensure effective digital learning" (OECD, 2020, p. 3).

The integration of new technologies in language teaching and learning has evolved greatly over the last thirty years and this can be observed in the expansion of fields such as CALL, which refers to "the development and use of technology applications in language teaching and learning" (Levy & Hubbard, 2005, p. 143). At first, technologies were exclusively incorporated for "word processing and gap-filling exercises" (Dudeney & Hockly, 2012, p. 533), the purpose quite similar to that of the activities in English textbooks. However, this limited use of technologies changed due to "mass access to the internet, the development of Web 2.0 tools and platforms, and the arrival of the social web and mobile technologies [that] now enable teachers and learners to be globally connected, and globally educated" (Dudeney & Hockly, 2012, p. 533). In this regard, CALL prompts the ability to expand the teaching-learning process

not only inside the classroom but also outside of it. Furthermore, CALL enables "teachers to more easily provide the necessary engagement with language that allows learners to improve their [language] skills in ways that have proved very difficult in the past" (Motteram, 2013, p. 117).

With respect to the technological applications (app) that can be used in the foreign language classroom, it is worth highlighting those that integrate gamification. Gamification is defined as "the process of game-thinking and game mechanics to engage users to solve problems" (Ziechermann & Cunningham, 2011, p. XIV), and app games can be played on computers, mobile phones and tablets. ICT-mediated gamified activities can encourage students to participate in the activities (Gee, 2005; Martens, et al., 2004), especially younger students. They also allow for the creation of more interactive, lively and entertaining content for lessons. Gamification also stands for the idea that "learning can be fun if students learn as if they where [*sic*] playing a game" (Simões, et al. 2012, p. 3), which encourages and enhances the use of foreign language in the classroom.

Given the above, in this dissertation we aim to analyze the effects of integrating gamification mediated by ICT to teach two types of comparatives in English. In order to do so, data will be collected from two groups, an experimental group composed of students who will be learning through ICT-mediated gamification and a control group that will be learning without gamification mediated by ICT. Another objective of this study is to examine students' perceptions regarding the use of gamification in the EFL classroom and to provide new pedagogical insights about its use within the EFL classroom to raise awareness of its potential to facilitate learning.

Research questions

In this study, we aim to answer the following research questions:

RQ1: Do students in the experimental group perform better than those in the control group regarding the use of English comparative structures?

RQ2: Are there any differences between the results in the experimental and control groups?

RQ3: What are the students' perceptions regarding the use of gamification in the classroom?

Dissertation structure

This dissertation is organized as follows: Chapter 2 will provide a theoretical background and offer a literature review of previous studies that are relevant to our study. Chapter 3 is dedicated to describing the methodology employed in this study, together with description of class intervention, data collection instruments and both quantitative and qualitative methods for data analysis. In chapter 4, the results from the analysis will be presented and discussed. Finally, this dissertation will close with a chapter that will present the conclusions, the implications, and the limitations of the study.

2. Theoretical Background

This chapter will be divided into different sections in which the theoretical background and literature review relevant for the present study are introduced and discussed. This includes Computer-Assisted Language Learning, Gamification in the foreign language classroom, and studies on Gamification for grammar teaching and learning.

2.1. Computer-Assisted Language Learning (CALL)

Within the realm of Foreign Language (FL), CALL has been integrated apace due to the use of ICT in the classroom. Beatty (2010) defined CALL as "any process in which a learner uses a computer and, as a result, improves his or her language" (p. 7), covering "a broad spectrum of current practice[s] in the teaching and learning of language at the computer" (p. 7). However, nowadays other technologies should be applied in the field of CALL. Garrett (2009) defined CALL in that sense as "the full integration of technology into language learning" (p. 719). Therefore, CALL should not be thought of exclusively as the use of the computer, but preferably as a label that encompasses the inclusive use of all technological tools or ICT for language learning (Levy & Hubbard, 2005).

The origins of CALL date back to the 1960s and 1970s, with the use of CALL evolving alongside the technological developments of the time and gradually becoming integrated in the teaching-learning process. In the 2000s, the move from Web 1.0 to Web 2.0 was one of the major technological innovations in the history of CALL. Web 2.0 "was an attempt to redefine what the Web might potentially achieve or had become" (Davies, et al., 2013, p. 32), shifting from being a tool to search for information to offering a wide availability of online resources to interact, learn and network, among many other things. During the 1990s, Warschauer & Healey (1998) documented the

history of CALL into different stages pertaining to specific levels of technology usage, in addition to their "pedagogical and methodological approaches" (Davies, et al., 2013, p. 30). For Warschauer & Healey (1998) CALL was divided into: *Behaviorist CALL* —where computer was used for drill-and-practice programs—, *Communicative CALL* —with non-drill programs and greater degree of choice, control and interaction on the part of the students— and *Integrative CALL* —being marked by the advent of multimedia and the Internet— (Davies, et al., 2013, p. 30).

However, Bax (2003) called into question Warschauer & Healey's (1998) conceptualization of CALL as it lacked clarity. In consequence, Bax (2003) reevaluated the conceptualization of CALL and proposed three approaches: *Restricted CALL*, *Open CALL* and *Integrative CALL*. *Restricted CALL* (1960s -1980s) was represented by the partial integration of technologies in the syllabus, focusing only on quizzes and closed drills where students had minimal interaction among themselves and were monitored by teachers (Bax, 2003, p. 21). *Open CALL* was used since the late 1980s and is still used today (Bax, 2003, p. 22). In this approach technologies are still not fully integrated in the syllabus, but they are used for simulations, games and Computer-Mediated Communication (CMC), allowing the interaction of students both with computers and occasionally among themselves and the role of the teacher being as monitors or facilitators (Bax, 2003, p. 21). The last approach, *Integrative CALL*, has not been achieved yet in the educational system as it endeavors to be a complete 'normalization' of CALL (Bax, 2003, p. 23).

Bax (2003, p. 23) asserted that we were approaching the point of achieving a 'normalized' stage of CALL, with the hope that it becomes as common as PALL (Pen Assisted Language Learning), or BALL (Book Assisted Language Learning) are. In this case the term 'normalization' means "the stage when the technology becomes invisible,

embedded in everyday practice and hence 'normalised'" (Bax, 2003, p. 23). However, this 'normalized' use of technologies must go beyond the idea of being used normally by also contributing positively to the language learning process (Bax, 2011, p. 9). Therefore, CALL will be 'normalized' when teachers and students use technological devices for teaching and learning, considering them to be essential language learning tools, as textbooks are now, that contribute positively to the learning process.

That being said, the integration of technologies in the classroom is also accompanied by a change in the roles of teachers and students. Language learning classes are not teacher-centered anymore, favoring a more student-centered language learning environment. In other words, CALL fosters a shift of roles within the classroom where the teacher changes from being the "provider of knowledge" to becoming the "facilitator of learning" (Jager, 2004, p. 35), and the students switch from being "passive receptors of knowledge" (Al-Shehri, 2011, p. 278) to becoming the center of the language learning classes. This highlights their needs in and out the classroom context (Al-Shehri, 2011, p. 279) in addition to making them responsible for their learning (Stockwell, 2015, p. 361). Furthermore, with the implementation of ICT in FL context, both teachers and students should gain some technological competencies in how to produce or employ digital resources for language learning. In other words, they should acquire "digital literacy" (Stockwell, 2015). Technologies fortunately provide several resources to enhance language learning, but "if teachers and learners lack the appropriate digital media literacies to capitalise upon them, then much of this potential can be lost" (Stockwell, 2015, p. 376), making it more complex to bolster language learning.

Now that the field of CALL has been explained, the following section will concentrate on gamification as a technological approach used for FL classes that can promote language learning.

2.2. Gamification in the foreign language classroom

Web 2.0 offers diverse technological teaching and learning resources; however, it could be argued that ICT-based gamification is one of the most engaging approaches to foster language learning. Pelling (2002) was the first to coin the term gamification as "applying game-like accelerated user interface design to make electronic transactions both enjoyable and fast" (as cited in Burke, 2014, p. 5). This first definition of the term was extended to educational contexts, which led to the creation of different technological applications focused on games for learning. Subsequently other researchers such as Kapp (2012) defined gamification as the use of "game-based mechanics, aesthetics and game thinking to engage people, motivate action, promote learning, and solve problems" (p. 10). Furthermore, Wood and Reiners (2015) suggested that gamification "is all about changing the way in which specific activities and processes operate; predominantly for users to have more fun and greater engagement in what they are doing" (p. 3039). Consequently, gamification consists of taking game features and applying them within the context of non-game activities for specific purposes, such as language learning, in which learners must overcome some challenges while still having a good time participating. According to Krisbiantoro (2020), gamification is a learning approach that uses game features to motivate learners by increasing the levels of fun and engagement in the learning process as well as finding out what students are interested in, thus encouraging them to continue learning.

Koster (2005) stated that games should involve an “abstract challenge” to solve, “interactivity” among the learners, and instant “feedback” evoking emotional effects (as cited in Kapp, 2012, p. 7), as well as providing audiovisual content. Therefore, games must depict an abstract challenge to be solved by the students to level up, enhancing the learning process. Games should encourage students’ interaction which might improve their communicative skills. Finally, games should grant immediate feedback for each completed challenge since this feature allows students to learn, regardless of whether they answered correctly or not. Accordingly, Kapp (2012) said that “feedback in learning or playing games is designed to evoke the correct behavior, thoughts, or actions” (p. 36), together with guiding the students through their progress. Furthermore, games must be visually and auditorily engaging to attract the students’ attention, thus facilitating the language learning process.

Nevertheless, gamification does not involve “turning routine activities into a game; but . . . [redesigns] work processes with game mechanisms for a fun and enjoyable experience” (Wood & Reiners, 2015, p. 3039). It does not merely consist of changing current language tasks into games and following the same language learning processes as would a traditional method. Teaching processes should be adapted by integrating games, providing instant feedback and promoting a valuable learning environment that is motivating, engaging, and less stressful for the learner. In that manner, gamification reduces the “students' fear of being wrong, which makes them passive and non-participatory in class” (Alarcón del Amo, 2020, p. 99). Additionally, games foster incidental language learning since students might not realize that they are learning, which results in higher “satisfaction and productivity” (Alarcón del Amo, 2020, p. 99) in class. Consequently, “the goal of incorporating gamification into

education is to present a more engaging, attractive, and effective learning experience for the student" (Anak Yunus & Hua Tan, 2021, p. 105).

Currently, as the integration of technologies in the classroom is gaining ground, technology-mediated gamification seems to be growing rapidly. "Nevertheless, deeply immersed in the digital age as we are today, the use of video games as a common tool in foreign language learning seems to be still an unresolved matter when it comes to methodology" (Osma-Ruiz, et al., 2015, p. 6309). This could be due to two drawbacks that may arise when planning to use ICT-based gamification in FL classes. For one thing, teachers may not have enough support to use games or gamified tools in class (Klopfer, et al., 2009, p. 18). But also, gamification "might absorb teacher resources, or teach students that they should learn only when provided with external rewards" (Lee & Hammer, 2011, p. 4). Underlying these arguments seem to be a lack of digital literacy and training among teachers that often discourages them from trying to implement gamification in their classrooms.

On the other hand, it is believed that gamification can be the ideal approach to apply in EFL contexts. Indeed, it could be said that it might have more potential when applied in EFL lessons than in any other subject's curriculum (Osma-Ruiz et al., 2015, p. 6309). Therefore, gamification ought to be deemed as an innovative approach that can foster learners' language improvement, instead of merely following the traditional classroom method. Other reasons to consider integrating gamification in the EFL classroom are those mentioned by Benini and Thomas (2021) who argued that "gamification . . . offers opportunities for L2 learners and teachers to enhance their language learning/teaching and, at the same time, acquire and foster their digital literacy skills" (p. 11). Figueroa-Flores (2015) also considered applying gamification within L2 contexts to be effective as it positively improves the students' learning experience as

well as increasing their levels of engagement and motivation. Moreover, Rahmani (2020) who performed a qualitative study collecting data from all prior studies concluded that its benefits rely on "improving motivation, promoting positive attitudes and better performances, promoting 21st-century skills and better cognitive achievements, and encouraging social interaction, independencies, and competitive spirits" (Rahmani, 2020, p. 44).

Given the benefits that gamification can have for FL learning, teachers considering integrating gamification in their classrooms can do so by accessing several game-based learning tools that allow them to create gamified activities to supplement their lessons. Some are online platforms and apps that offer templates or tools for gamified content creation. Among these, probably the most well-known are Kahoot!, Socrative, Quizlet, and Quizizz. In the following sections, we will describe the gamified tools that have been used in this study (i.e., Quizizz, Wordwall, and Kahoot!).

2.2.1. Quizizz

Quizizz is a user-friendly, free Web 2.0 app that allows the creation of class content like gamified quizzes or interactive live lessons and is compatible with any technological device (interactive whiteboards, laptops or notebooks, mobile phones, or tablets). This gamified tool was founded by Antik Gupta and Deepak Joy Cheenath, in 2015, and was first adopted in a school in Bengaluru, India (Quizizz, 2021). According to Basuki and Hidayati (2019), "Quizizz is a fun multiplayer game platform or application classroom activity for quiz-games in which students become a controller of their pace on game classroom activity" (Introduction section, para. 3). It also presents game elements such as leaderboards, memes, and quiz reports. In this manner, this game platform creates a live engagement through the use of quizzes, polls, or lessons, thus

providing opportunities for synchronous and asynchronous learning. Lastly, Quizizz provides instant reports or insights about the students' performance; that is, Quizizz "instantly identif[ies] problem areas by participant, class, question, and more" (Quizizz, 2021).

One must register to have access to all resources available on Quizizz. Once you log in, you should select that you are a teacher to design new content or search for already created quizzes or live presentations. Students can access the created content by introducing a pin, or a specific link, without needing to sign up. This game application in its free version allows the teacher to create tasks and activities in the different formats previously mentioned (live sessions, quizzes, or polls). However, this no-charge option only proffers specific resources to create gamified content or live classes. For instance, when choosing the color of the slides, or the background of the quizzes, only one color is available. Despite this limitation, this game-based learning tool can engage students due to all the audiovisual content it has. Quizizz allows users to upload multimedia from their own devices, which means users or teachers can personalize their teaching content by including their own photos, images, videos, or memes, as well as YouTube links.

Since the creation of Quizizz, some studies have been performed to investigate its impact on EFL students. Jiménez-Sánchez and Gargallo-Camarillas (2020) investigated the usage of Quizizz in an EFL classroom in Spain to examine how gamification can affect students' motivation. Results showed that the learners' motivation increased, displaying a positive attitude towards the use of Quizizz in their EFL classes. Additionally, Supraba Lastari, et al., (2020) carried out a study implementing Quizizz in EFL online classes with young learners. Students found Quizizz to be an "interesting, fun and engagement" tool in addition to helping them to learn in a relaxing way (Supraba Lastari, et al., 2020, p. 33).

2.2.2. Wordwall

Wordwall is a Web 2.0 learning app that focuses on creating game-based learning content. Krisbiantoro (2020) mentioned that "with Wordwall we can make custom activities like quizzes, match ups, word games and more for our classroom" (p. 77) either in an online or printable format. This online gamified tool is also compatible with any technological device with Internet access. In 2016, Wordwall was launched, enabling "teachers to create and share resources wherever they were in the world" (Wordwall, n.d). Furthermore, this game-based learning tool fosters both synchronous and asynchronous learning. It can be used in class to promote interaction between the students or as e-learning, employing the gamified content as "stand-alone activities" (Krisbiantoro, 2020, p. 77). Since Wordwall's creation, its use has increased over the years. In fact, as of 2021 100k subscribers have been using this gamified tool for learning purposes (Wordwall, n.d). This online tool requires registration, except for the learners, who only need the specific link of the gamified activity in order to access it. However, teachers should take into consideration the fact that the free version of Wordwall only allows its users to create a maximum of five games. After that, one must pay for unlimited content creation.

Nonetheless, this app holds the advantage of offering a wide range of different gamified templates for teaching-learning content creation. A total of 18 templates are available in Wordwall: match up, quiz, random wheel, open the box, group sort, find the match, random cards, matching pairs, missing words, unjumble, anagram, labeled diagram, gameshow quiz, word search, whack-a-mole, maze chase, true or false and flip tiles. Furthermore, this tool also has the possibility of changing the game template to reinforce the learning process. In other words, if you create a quiz game, you can shift it into another template, such as a gameshow quiz, random wheel, etc. The ability to

change the template of an already created game into at least five different templates is an exclusive characteristic of Wordwall. The final advantage of Wordwall is that it presents the opportunity to add multimedia content (images), either through the game platform itself or by uploading multimedia content from users' devices. Furthermore, while students are playing, the games use exclusive sound content which makes them more attractive. Given its recent creation, no studies to date have been found on its application.

2.2.3. Kahoot!

Kahoot! is a very well-known and user-friendly Web 2.0 app for learning. It was created in 2012 by Morten Versvik, Johan Brand, and Jamie Brooker, but the founders did not launch it until 2013, when it became accessible to the general public (Kahoot!, 2021). According to the Kahoot! webpage, "Kahoot! is a game-based learning platform that makes it easy to create, share and play learning games or trivia quizzes in minutes" (2021). Kahoot! is compatible with any technological device with Internet access. To create entertaining content with Kahoot!, users first must create an account, indicating if they are teachers, students, professionals or simply accessing the platform for personal use. Kahoot! enables the creation of quizzes (multiple-choice or true or false), discussions, and surveys for learning purposes.

To play Kahoot!, learners have two options: playing a game synchronously in class with technological devices, or through a set assignment asynchronously, with a date fixed by the teacher to play the game. In both cases, students need to enter the game pin provided by the teacher in *kahoot.it* to have access and to participate. When creating game content, such as a multiple-choice quiz, teachers can add statements or

questions of their choosing, as well two, three, or four options as possible correct answers. For each option, a particular color and shape (red triangle, blue diamond, green square, and orange circle) are assigned, thus being more visual for the learners while playing. Likewise, Kahoot! also permits the incorporation of multimedia elements, in addition to its own audiovisual content. Additionally, it permits the incorporation of YouTube links.

As mentioned before, Kahoot! is a popular game-based, multi-user learning tool. Since its launch in 2013, many experts have studied its effect on education, and more specifically in FL contexts. Thus, Yürük (2019) performed a study about the use of Kahoot! in the EFL classroom to demonstrate that it can be used as a review activity in addition to investigating students' perceptions of the game. Findings showed that "students were able to engage actively in the lessons and they were able to master the target language effectively and enjoy learning English using games" (Yürük, 2019, p. 89). According to this author, Kahoot! is an effective gamified tool for learning English, that encourages a relaxed class environment and reduces the levels of anxiety students might have (Yürük, 2019). Besides, Kahoot! creates curiosity, ambition, or interest in students, "increasing the level of positive energy, exploration, fun and competition" (Yürük, 2019, p. 99). In another study, Kaur and Naderajan (2019) investigated the students' perceptions and experiences of using Kahoot! in their English language classes. Results showed that most of the students considered Kahoot! as an effective tool to apply in their English classes because it enabled them "to engage and actively participate in their language learning processes, and thus . . . [provided them] a more meaningful and rich language learning experience" (Kaur & Naderajan, 2019, p. 49).

2.3. Studies on gamification for grammar teaching and learning

Grammar is an essential skill to develop while learning English since it enables us to read, write, speak, and understand. However, grammar might be considered a "complex language variable" (Redjeki & Muhajir, 2021, p. 68) or "inherently boring" (Burzynski Bullard & Anderson, 2014, p. 4), which could reinforce difficulties when teaching or learning it. Gamification alleviates those difficulties since it can help enhance learners' grammar skills while learning in an entertaining environment. In this respect, some studies have shown the effectiveness of implementing gamification when teaching or learning EFL grammar. Zarzycka-Piskorz (2016) proved that using Kahoot! promotes effective grammar acquisition in addition to motivating students to learn. Hashim, Rafiq and Yunus (2019) analyzed the use of Socrative, PowerPoint Challenge, and Kahoot! to test the learners' grammar improvement. They concluded that gamification effectively increased students' motivation, confidence, and self-esteem, enhancing grammar learning (Hashim, Rafiq & Yunus, 2019). Krisbiantoro (2020) introduced Quizizz to test its effectiveness when teaching English verb tenses. In his conclusions, he favors the use of gamification over 'conventional teaching methods' to improve English verb tenses, especially for those students with high levels of creativity (Krisbiantoro, 2020). Other authors (Anak Yunus & Hua Tan, 2021) researched Quizizz's impact on the learning of the past tense of English irregular verbs. They concluded that Quizizz was not only effective at improving the teaching and learning of the past tense of English irregular verbs, but it was also a crucial tool for producing higher student interest and enthusiasm to learn English (Anak Yunus & Hua Tan, 2021). Although these studies focus on the impact of gamification on students' learning of different aspects of English grammar, only one study has been found that analyzes its impact on students' learning of comparative structures in English. Thus, Alcántara

López (2020) used the online learning tool *@MyClassGame* to teach English comparatives and superlatives. Results showed that gamification enhanced students' motivation, as well as being effective in improving the teaching and learning processes (Alcántara López, 2020).

Given the scarcity of studies that focus on how gamification may enhance learning comparative structures in English, the current study hopes to contribute further research of this topic.

2.4. Summary of theoretical concepts

This chapter provided the theoretical background and literature review relevant for this study. First, an overview of the field of CALL was presented, with a focus on its development through the years. Currently, the use of CALL has increased in EFL lessons due to the prominent integration of technologies in the classroom. However, CALL has not been fully integrated into educational curricula and it is yet to be normalized across classrooms. Furthermore, by embracing CALL in education a shift in the roles of the participants in the learning process needs to take place. Students' roles need to change from being receivers of knowledge to being active participants in the center of the learning process and teachers become the facilitators of learning. Moreover, to foster the potential technology has to offer in the EFL classroom, both teachers and students need to develop the digital skills required for effective teaching and learning.

Secondly, ICT-mediated gamification was defined as an approach in which games are introduced in the classroom in order to encourage students' language learning, motivation, and digital skills. Then a description of the gamification tools used in this

study was provided (Quizizz, Wordwall, and Kahoot!), and studies that used those tools for EFL learning were reviewed.

Finally, the use of gamification to facilitate learning grammar was discussed. Grammar is perceived as a difficult skill to learn and gamification could be used to make the process more effective, but also entertaining and motivating. In this respect, different studies on the effectiveness of ICT-mediated gamification to reinforce EFL grammar were introduced and discussed.

3. Methodology

3.1. Objective of the study

This study aims to analyze the effects of using ICT to teach an aspect of English grammar (comparative structures) in the EFL classroom. In order to do so we will have two groups: an experimental group where gamified online learning tools will be used to present and learn two grammatical structures, and a control group where only worksheets will be used to the same effect. As regards the grammatical structures, this study focuses on teaching two types of comparative structures, type 1 *adj+-er than; more adj than* comparatives (e.g., I am taller than you/ I am more peaceful than you), and type 2 *as + adjective + as* structure (e.g., I am as young as my sister) to express a comparison of equality. A secondary objective of this study aims to analyze the students' perceptions of the use of gamification mediated by various online tools: Quizizz, Wordwall and Kahoot!.

3.1.1. Research questions

RQ1: Do students in the experimental group perform better than those in the control group regarding the use of English comparative structures?

RQ2: Are there any differences between the results in the experimental and control groups?

RQ3: What are the students' perceptions regarding the use of gamification in the classroom?

To answer these research questions, this chapter covers the following sections. First, the school background will be presented, followed by information about participants. Subsequently, a description of the classroom intervention in both groups, control and experimental, will be provided. Finally, shifting the focus to the research itself, data collection instruments will be presented as will the methods used to analyze the data obtained.

3.2. School background

The school selected to participate in this study was a public school (Centro de Education Infantil y Primaria, CEIP in short) called Concepción Arenal, located in Leganés, in the suburbs of Madrid. As this was a CEIP school it offered two main types of obligatory educational courses: preschool from the age of 3 until the age of 5 or 6, and primary school from the age of 6 until the age of 11 or 12. However, this was not a bilingual school, but they adopted a language program that had the possibility of expanding the teaching hours of English as a Foreign Language (EFL) throughout all five days of school. In order to do this, the school reduced the number of hours of other subjects, and reallocated them as more hours of EFL, as they considered EFL to be more essential to the students' education.

After the appearance of the COVID-19 pandemic, all educational centers adopted diverse health measures to prevent the swift spread of the virus among the students and teachers. Consequently, the CEIP Concepción Arenal suggested various entry and departure times to avoid agglomerations of students. These schedules were programmed depending on the students' year, so each class entered and left the school at different times without interacting with other students. Additionally, the school adopted the measure of separating students of the same year into three groups instead of two, as in

previous years. In this way, there were a limited number of students in each class (around 15 or 16 per class) in order to separate the students' desks to fulfill the security distance measures. What is more, the students of each class could not socialize with other students. In other words, the school created "bubble classes" to prevent the learners' contact with others, so pupils could only socialize with peers of their same group. This health measure was carried out throughout the entire school and also on the playground, restricting specific areas for each group.

3.3. Participants

A total of 28 students participated in the study, 16 males and 12 females. Their ages were between 10 and 11 years old. All of them were in their 5th year of primary education at the CEIP Concepción Arenal school. The 5th year was divided into three different groups due to the COVID-19 pandemic, reducing the number of students per class. It should be noted that the school did distribute the students into groups regardless of their levels, creating a well-balanced environment in each class. For the purpose of this study, only students' data from groups 5A (the control group) and 5C (the experimental group) were analyzed. In addition, it should be mentioned that the selection of these groups was entirely random. The students in both groups had been studying English for seven years, so they had background knowledge of this foreign language. In terms of the grammatical concepts being taught —as previously mentioned— the students had already learned the first type comparatives (*adj+-er than; more adj than*) and what was new for them was the *as + adj + as* structure. Before performing this study, I sent out permission slips to the parents to have their consent for children's participation in this study.

3.3.1. Control group

The control group consisted of 14 students: 7 females, and 7 males, all belonging to the 5A group. This group was varied in terms of their general level of English. It is important to mention that some students seemed to struggle with the English language. For instance, apart from the tasks given, they found it complicated to understand me in English and therefore, encountered general difficulties in their listening, and comprehension of the foreign language. As regards the class intervention, only the blackboard and worksheets were used to explain and practice the grammatical structures to be taught.

While completing the exercises, some students showed an interest in learning and understanding these grammatical structures by asking me questions, while others seemed not to care, thus doing the exercises without thinking or leaving them blank and only writing the correct answers later while checking the tasks. The latter attitude may be connected to those students who were having difficulties understanding the class content and the exercises. They seemed not to show any interest in learning English, in addition to not making an effort to understand me while speaking in English. During the class intervention, most of the students were able to complete the exercises, apart from three students who did not show any interest in the material and therefore did not complete all the activities. All students' data has been analyzed in the study.

3.3.2. Experimental group

The experimental group consisted of 14 students of which 5 are females and 9 are males, all belonging to the 5C group. This group also presented heterogeneity in the different levels of English that the students had. Similar to the learners in the control group, they also struggled to understand me when I spoke in English. For the class

intervention, ICT tools were used, in contrast with the intervention in the control group. In this respect, the interactive whiteboard was the main tool used to teach the grammatical concepts, eschewing the traditional method by leaving aside the English textbook. In addition to the interactive whiteboard, gamification tools such as Quizizz, Wordwall and Kahoot! were used to both introduce the grammatical structures to be taught and to put them into practice by providing a fun and lively environment for learning.

Students in this group worked efficiently during the face-to-face interventions since they were delighted to be learning with ICT-based gamification. As previously mentioned, this was a varied class where the language levels differed among the students. Therefore, some students struggled to understand some of the class content as well as the specific vocabulary used in the games. Despite this difficulty, all students in this group finished the tasks. Concerning the use of ICT-mediated gamification in class, most of the students were excited and willing to play games in order to learn these grammatical concepts.

3.4. Class intervention

The class intervention consisted of three face-to-face sessions with the students to introduce and illustrate English comparative structures. These sessions involved an exposition of comparatives (*adj+-er than; more adj than*) and the *as + adj + as* structure (see section 3.4.1. below), in addition to activities about those grammatical structures. However, the students had already studied the first type of comparatives the previous year (4th grade of primary) through online classes. On the other hand, the *as + adj + as* structure (either in their affirmative or negative form) was taught to students as a completely new grammatical structure.

3.4.1. Procedure description

In both groups the content of the students' textbook was followed (i.e., vocabulary about adventures and animals) for the class intervention. Comparative structures were taught so that the students differentiated each structure and its rules and uses. This included the following:

- The comparative form of the adjectives *adj+-er than; more adj than.*

  Comparatives are used to compare one entity (i.e., things, people or animals) with another one to convey a difference in quality, degree, amount, or number (e.g., Eagles are *smaller than* vultures/ Climbing a mountain is *more difficult than* hiking). Types of comparatives:

  - One or two syllable adjectives (adjective + *-er*/*ier* + than). Examples: old – older, big – bigger (double consonant), happy – happier (change *y* into *i*).
  - More than two syllable adjectives (*more* + adjective + than). Examples: interesting – more interesting, beautiful – more beautiful.
  - Irregular adjectives: good – *better*, bad – *worse* and for far – *further*.

- The *as* + *adjective* + *as* structure either in its positive and negative form. This structure is used to compare entities (i.e., things, people or animals) which are equal in degree, quality, or amount (e.g., My sister is *as young as* me / My sister is *not as young as* me).

The content was the same in both groups. What is more, the grammatical explanations and the activities were the same in both classes. In the case of the control group, a document with the grammatical rules was prepared (see appendix A) and a worksheet (see appendix B) with three exercises on which the students had to work with limited time. In these exercises the students had to fill in the gaps in the sentences with

the correct comparative form of the adjectives (*adj+-er than; more adj than*) and the correct form of the *as + adj + as* structure. The last exercise consisted of multiple-choice questions on the two grammatical structures in which only one answer was correct. With the experimental group, the interactive whiteboard was used to display the grammar rules and to project the technology-mediated games. As already mentioned, the gamified applications used were Quizizz, Wordwall, and Kahoot!, and how they were integrated in the classroom will be described in more detail in the following sections.

3.4.2. Timeline

This study was performed over three weeks during the second quarter of the academic year. Beforehand, I arranged a face-to-face meeting with the Head Teacher and the rest of the teaching staff to introduce myself and explain the purpose of this study to them. Furthermore, I was in contact through WhatsApp to inform them about the activities that would be carried out. In consortium with the teachers, I also arranged the grammar concepts to be taught as well as the days I could go to the school. Moreover, before performing the study, I sent the teachers an informative letter about the study to be given to the parents or guardians (see appendix C), along with a permission slip (see appendix D) to authorize their children to participate in this study. The letter and the permission slip highlighted that their children would remain anonymous, and that no personal data would be included in the study. Once all the authorizations were given back to the teachers, the study began. The class intervention process took place over three weeks as outlined below:

- **Wednesday, February 24, 2021** (45 minutes approx.): In this first session, I introduced myself to the students in addition to explaining to them what we would be doing over the next few weeks. After that, I gave them the pre-test (see section 3.6.), having previously explained what they had to do to complete it, and giving them around 15 minutes to do so. Subsequently, I began to introduce the comparative structures. The gamified tool Quizizz was applied with the experimental group to present the grammatical structures, whereas, with the control group, a document with the grammatical rules (appendix A) was used. This first step was completed by both groups.
- **Wednesday, March 3, 2021** (45 minutes approx.): In this second session I continued explaining the comparative structures. Afterwards, I gave the control group (5A) the worksheet with fill in the gaps exercises (appendix B) to complete at that moment. In the case of the experimental group (5C), the students play the games (Wordwall and Kahoot!) about the comparative structures.
- **Wednesday, March 10, 2021** (45 minutes approx.): In this last session, I administered the post-test (see section 3.6.) to the groups, which they had to complete in no more than 15 minutes. Before they started answering the questions, I asked them to reflect on the questions and answers while doing the post-test, avoiding answering randomly as some of them had done with the pre-test. In addition, the experimental group also had to complete a questionnaire with some extra questions (one close-ended and three open-ended, see section 3.6.). Once all the students had finished, I thanked students and teachers for allowing me to perform this study.

3.5. ICT tools for teaching

As previously mentioned, three gamified tools were employed with the experimental group: Quizizz, Wordwall, and Kahoot!. All of them are Web 2.0 apps whose purpose was to facilitate learning the above-mentioned grammatical structures. These tools have been described in detail in the theoretical chapter. In the sections below, we will explain how these gamified tools have been used for this study.

3.5.1. Quizizz

Firstly, we used Quizizz to create a live lesson displaying the rules of the comparative structures. Therefore, a live lesson was designed with a total of 24 slides. Half of the slides were dedicated to depicting the rules of each comparative structure. Thus, I introduced the relevant rules for each grammatical structure, including a written explanation combined with multimedia content, to be more appealing and easier to understand for the students. In the case of the first type of comparative (*adj+-er than; more adj than*), visual tables of its grammatical rules were employed. However, to explain the *as + adj + as* structure, some images were included, being more visual and helpful for the students' understanding. Some quizzes were added inside the live lesson to increase the students' attention, introducing 11 game-based questions. The majority of these quizzes were multiple-choice questions providing images in order to facilitate comprehension of content.

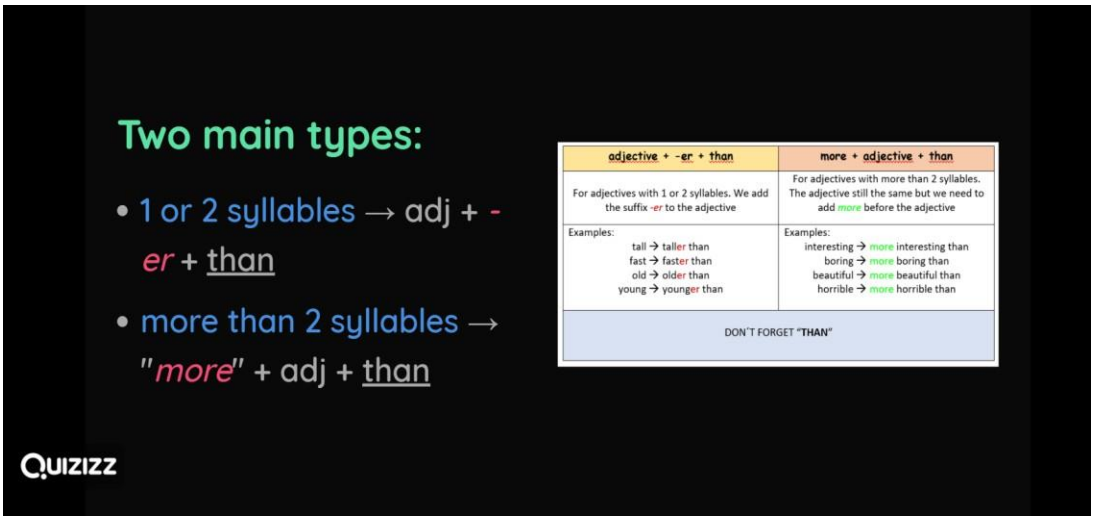

Figure 1. Screenshot of content presented in the live lesson

Figure 2. Screenshot of the content presented in the live lesson

Figure 3. Screenshot of multiple-choice quiz

Figure 4. Screenshot of multiple-choice quiz

3.5.2. Wordwall

Wordwall was used to practice only the *as + adj + as* structure. Since this structure was completely new for the students, this game-based activity was designed exclusively to teach this grammatical structure. Amongst the 18 game templates offered by the tool, the maze chase game template was chosen. As previously mentioned, the game-based activities included the same vocabulary and content of the unit. The maze chase game was composed of eight multiple-choice sentences where the students had to choose the correct answer from two options of the *as + adj + as* structure, one being grammatically incorrect and the other one being the correct one.

This maze-chase game is similar to the famous Pac-Man game, so the instructions to play are the same but with language learning purposes in this case. Students had to guide the little robot to the path where the correct answer is located, avoiding the aliens. The students had to come to the interactive whiteboard to play, as no other technological devices were available. The game ended when the robot was caught by the aliens or when the students chose the wrong answer three times in a row. Despite the

fact that there was a limited time of 10 minutes to complete the whole game, the students finished it without any problem before the time was over.

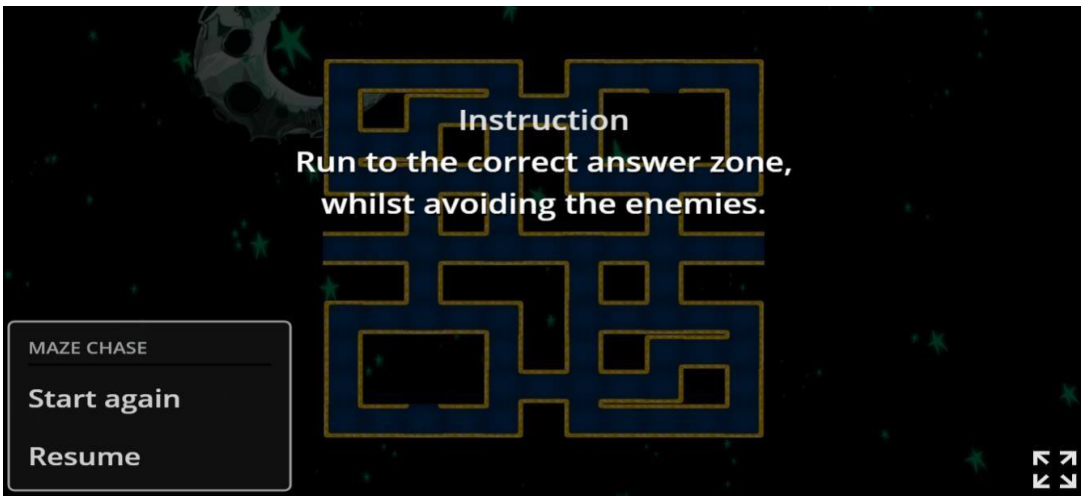

Figure 5. Screenshot of maze-chase instructions

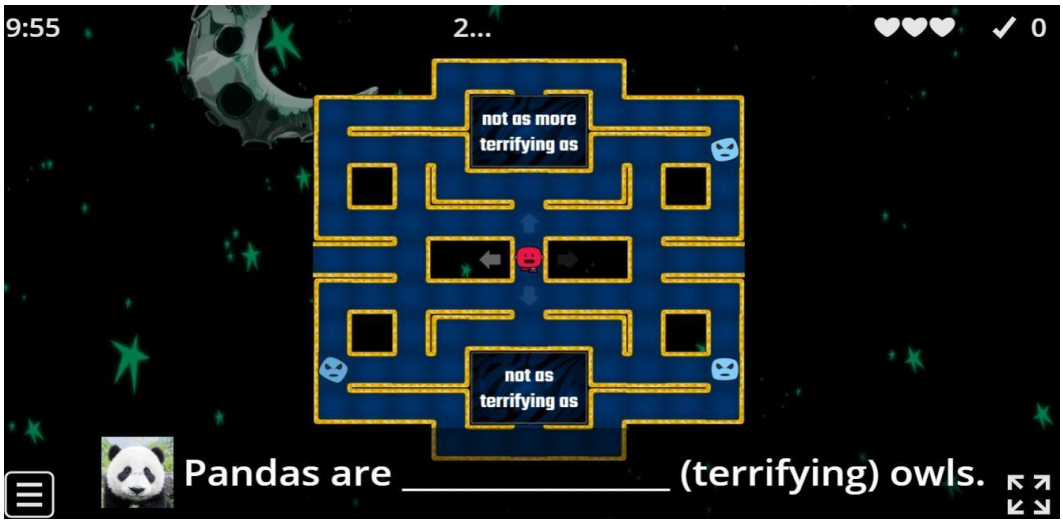

Figure 6. Screenshot of maze-chase game

Figure 7. Screenshot of maze-chase game

3.5.3. Kahoot!

The last game-based learning tool used was Kahoot! which allowed students to play a multiple-choice game composed of 10 sentences about both comparative structures. Since the *as + adj + as* structure was practiced with Wordwall, and the students allegedly had some knowledge about the first type of comparative (*adj+-er than; more adj than*) and had also practiced it with Quizizz, I opted for introducing both structures together. In this way, the students had to distinguish when to use each grammar structure by choosing the correct answer for each of the images displayed. Furthermore, vocabulary about adventures and animals was also used since the students were studying it at the time.

During the development of this gamified activity, students had to select just one answer between four possible options. The students also need to be quick because there was a time limit of 120 seconds per sentence to select the answer. Kahoot! is a game-based learning platform that makes use of different audio-visual content to engage students, thus I decided to introduce images for each sentence in order to facilitate understanding.

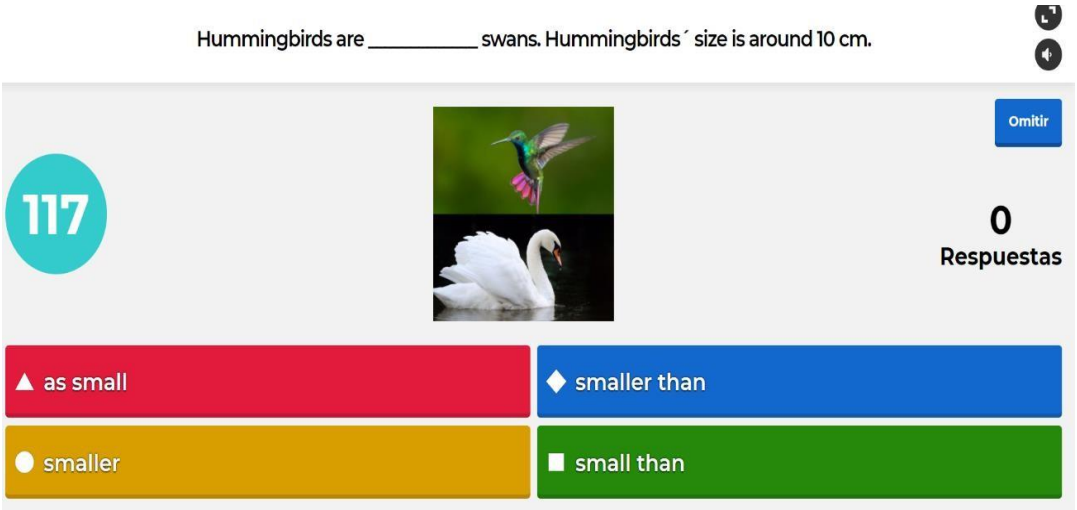

Figure 8. Screenshot Kahoot! question and possible answers (multiple-choice)

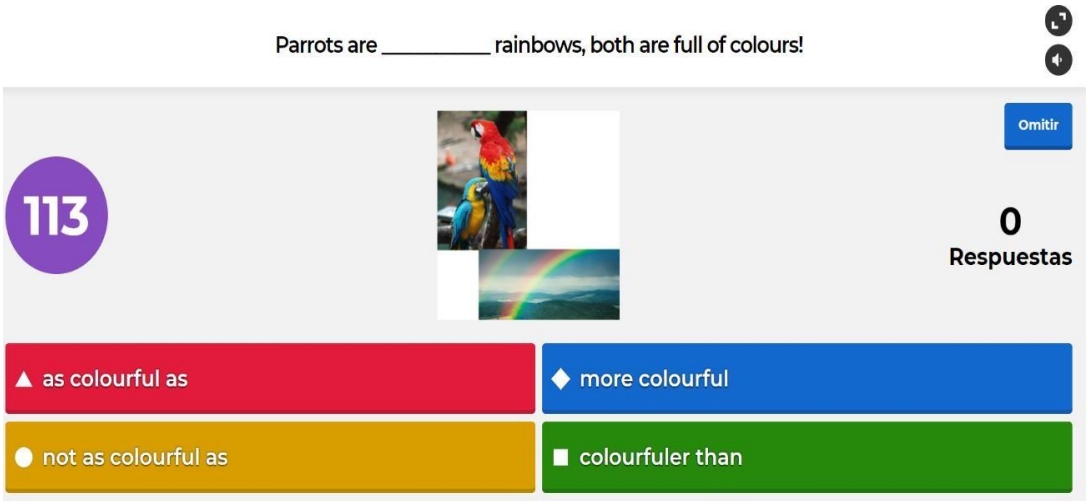

Figure 9. Screenshot Kahoot! question and possible answers (multiple-choice)

3.6. Data collection instruments

During the face-to-face sessions, a pre-test and a post-test were given to students in both groups in order to be able to compare results before and after the class intervention. In order to find out the perceptions of students in the experimental group regarding the use of technology-mediated gamification, we gave them a questionnaire sheet that comprised one closed question and three open-ended questions. These instruments will be described below.

3.6.1. Pre- and Post-test

The first data collection instrument used was the pre-test and post-test (see appendix E). In both cases, the same test was given to the students. The pre-test was distributed before the face-to-face class intervention, and the post-test was administered a week after the class intervention. The pre- and post-test were given to both groups on the same day and in worksheet form and the tests were identical. These tests were composed of 15 multiple-choice sentences where the students had to select just one correct answer out of four choices. With regard to the 15 sentences, seven focused on

the first type of comparatives (*adj+-er than; more adj than*) and eight focused on the *as + adj + as* structure.

3.6.2. Questionnaire

Additionally, a brief questionnaire with a closed question and three open-ended questions was given to the students in the experimental group since we wanted to find out their perceptions regarding the use of gamification in the classroom. The questions are depicted below. Before answering this questionnaire, I explained each sentence to them, first in English and then again in Spanish to ensure clear understanding. I also allowed the students to answer the questions in Spanish since some of them were not able to write complete sentences in English.

Question 1:
How did you feel using ICT-based gamified tools in class to learn these new concepts? 😍 IN LOVE 😄 LIKE THEM 😐 DON'T CARE 😠 DON'T LIKE THEM **Comment briefly why did you feel like this:**
Question 2:
Was it easy or difficult to understand these grammatical concepts with technology-mediated games? Explain why.
Question 3:
Do you prefer to use ICT-based gamification while learning English? Briefly justify your answer.

Table 1. Closed question and open-ended questions in questionnaire

3.7. Data analysis

In order to discover how the students learned comparative structures in English language with or without the use of the technology (gamification), a quantitative analysis of the answers to the pre- and post-tests was carried out first. Thus, we used

descriptive statistics (number, percentages, means and standard deviations). Then, we analyzed the sample distribution (Shapiro-Wilk test, a normality test). This normality is measured according to the p-value where $p > 0.05$ denotes a normal distribution of the data collected and $p < 0.05$ indicates the opposite, a non-normal distribution. In the control group, the p-value of the pre-test was 0.1416 ($p> 0.05$) and for the post-test was 0.6267 ($p> 0.05$) which indicate a normal distribution in both cases. Similarly, in the experimental group, the Shapiro-Wilk test results indicated for the pre- and post-test a p-value of 0.3775 and 0.5916 respectively, thus showing a normal distribution of the data sample ($p> 0.05$). Therefore, in order to establish a comparison between the pre- and post-test results, a parametric paired t-test was used to find out if the results obtained were statistically significant or not ($p< 0.05$).

Then, a qualitative analysis of the open-ended questions in the questionnaire was also performed to see the perception of students in the experimental group regarding the use of technology-based gamification in the classroom. The qualitative analysis was carried out applying Grounded Theory firstly proposed by Glaser and Strauss (1967). Grounded Theory mainly focuses on empirical situations (Glaser & Strauss, 2017, p. 1), consisting "of systematic, yet flexible guidelines for collecting and analyzing qualitative data to construct theories from the data themselves" (Charmaz, 2014, p. 1). In particular, this analysis implements the 'open coding' stage (Strauss & Corbin, 1990) which focus on grasping "the core idea of each part [of the data] and to develop a code to describe it" by comparing, conceptualizing and categorizing the data (Vollstedt & Rezat, 2019, p. 86). Therefore, in this study the open-ended responses were analyzed through data-coding by highlighting keywords to facilitate the process of assigning the content of student's answers into unique categories. First all of the students' responses for the three open-ended questions were segmented into codes of a single word or sequence of

words. For this purpose, several questions were asked in order to find the codes: *"What does the student say about gamification?"*, *"Which aspects of gamification are dealt with?"* and *"Which aspects are more relevant for students?"*. Then, those codes were combined in order to classify them into unique categories that encompassed and explained the students' perceptions about the use of technology-based gamification.

Finally, the results from the quantitative analyses would provide some answers to RQ1 and RQ2 while the results from the qualitative analysis would allow us to answer RQ3.

4. Results and discussion

This chapter presents the results obtained from the class intervention of the control and the experimental groups. We will discuss the findings obtained, beginning with the scores from the pre- and post-tests and following with the data found from the closed and open-ended questions in the questionnaire given to the experimental group.

4.1. Pre- and Post-test results

4.1.1. Control group scores

In the control group, results from the paired t-test revealed a p-value of 0.0074 ($p < 0.05$), meaning that there was a statistically significant variation between the pre- and post-test scores. Therefore, it can be asserted that statistically, significant learning took place with the students in the control group. The mean, the standard deviation, and the t-test results are illustrated in Table 2.

	Pre-test	Post-test
Mean	3.79	6.64
Standard deviation	1.25	3.128
Number of students	14	14
Paired t-test result	0.0074	

Table 2. Descriptive statistics control group

The mean scores between the pre- and post-test results showed an increase from 3.79 to 6.64. Therefore, it could be argued that the mean of the post-test is double that of the pre-test. Additionally, the standard deviation from the post-test (3.128) rose by two points. This increase in value might explain the variability in post-test scores. For instance, Students 2, 3, 6, and 8 scored the lowest (equal or below 4) compared to Students 9, 13, and 14 who achieved the highest scores (equal or above 11). All the scores from the control group are presented in the table below.

Student	Pre-test scores	Post-test scores
1	3	6
2	2	4
3	6	4
4	2	6
5	5	7
6	4	1
7	3	6
8	4	4
9	3	11
10	4	8
11	3	6
12	6	7
13	4	13
14	4	10
TOTAL	**53**	**93**

Table 3. Control group scores

Table 3 shows the students' results in the pre- and post-tests where a noticeable increase can be seen from the pre-test to the post-test. Eleven out of 14 students raised their post-test grades and some by up to 9 points, a considerable increase. In fact, eight students improved their scores by 3 or more points, as displayed in Figure 10.

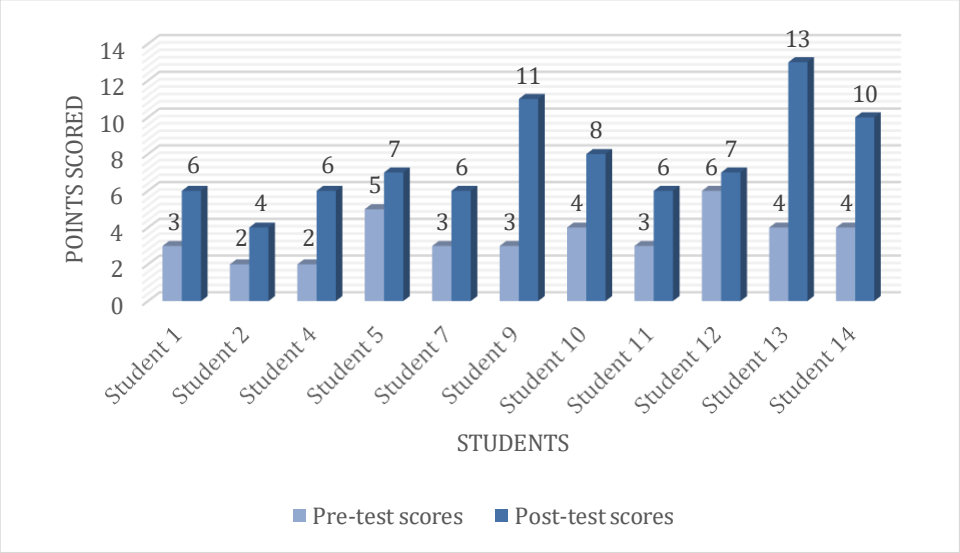

Figure 10: Results of students who improved their scores

The chart presented exhibits how 79% of the students (11 out of 14) increased their scores in the post-test. Among these students, three (Students 9, 13, and 14) increased their grades by more than 5 points. Student 9 improved his/her post-test score by 8

points, Student 13 by 9 points having the highest grade and an almost perfect score, and Student 14 by 6 points. Among the students who improved their results, five of them (Students 1, 4, 7, 10 and 11) raised their scores by 3 or 4 points, and three students improved their scores by 1 or 2 points, which is the case of Students 2, 5, and 12. On the other hand, the remaining 21% of the students did not increase their post-test scores, getting the same grade or lower than the one they received in the pre-test. This is presented in Figure 11.

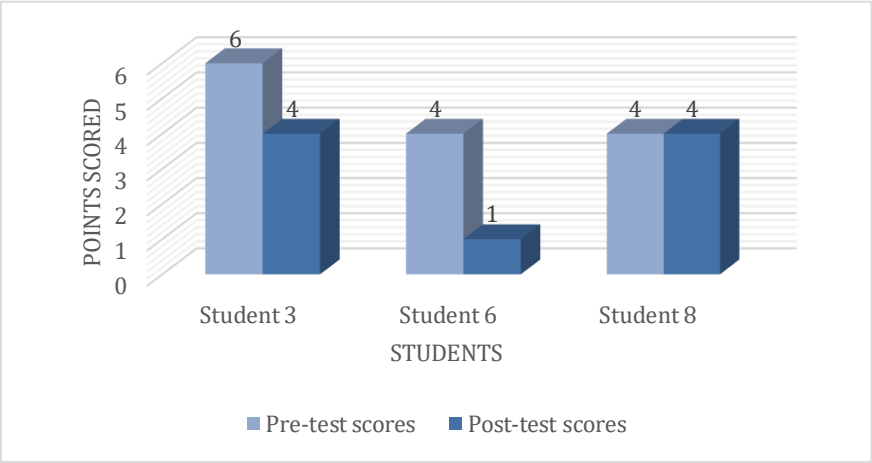

Figure 11: Results of students who did not improve their scores

As the above chart exemplifies, three students did not show an improvement in their post-test scores. Students 3 and 6 obtained a lower score in the post-test by 2 or 3 points, whereas Student 8 had the same score in both tests.

The above data offers a general overview of the students in the control group's performance. Now results concerning each type of comparative structure will be presented. Figure 12 shows results regarding the comparative structure type 1 (*adj+-er than; more adj than*). As can be seen, 43% of the students obtained lower results in the post-test than in the pre-test with a difference of 1, 2, or 3 points, whereas 36% improved their scores by 1 or 2 points, and the remaining three students (21%) scored the same in both tests. Although the students had studied this grammatical concept

previously, it appears that they did not remember it, nor did they improve their results after the class intervention.

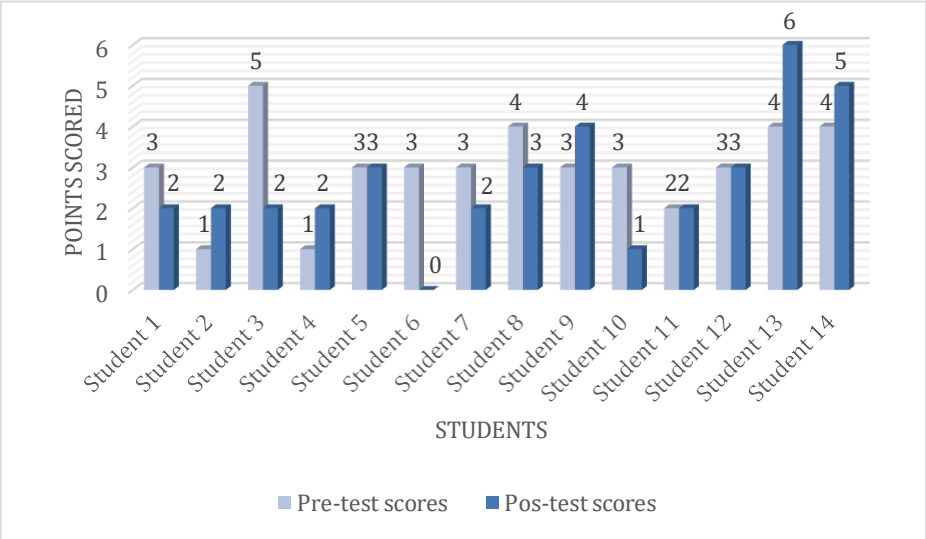

Figure 12: Results comparative structure type 1

In contrast, as Figure 13 shows, 93% of the students (13 out of 14) improved their scores regarding comparative structure type 2 (*as + adj + as*) by an average of 4 points. Only Student 6 obtained the same score, not showing any improvement. The difference between the pre- and post-test results is significantly large, with post-test results quintupling those of the pre-test. This enhancement suggests that students' understanding of this new grammatical structure was in general outstanding.

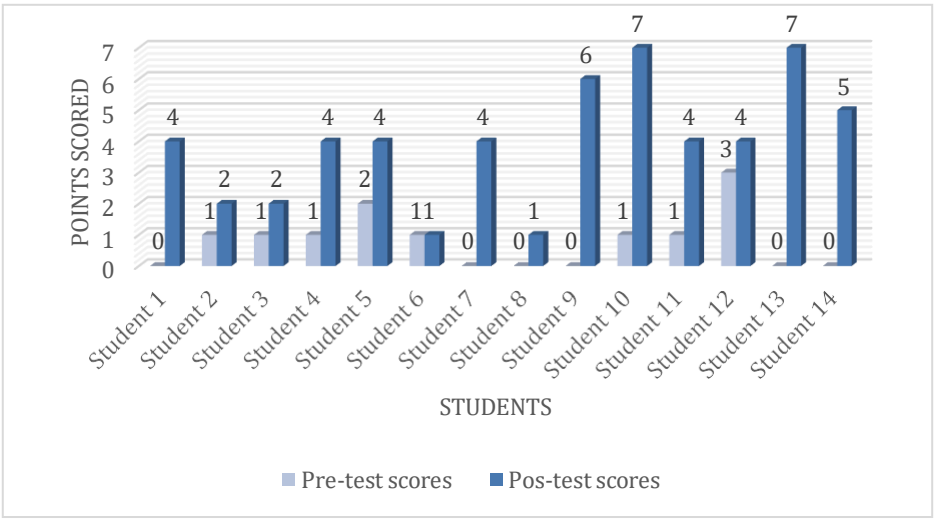

Figure 13: Results comparative structure type 2

4.1.2. Experimental group scores

The results of the paired t-test in experimental group indicate a p-value of 0.0018 ($p < 0.05$) implying a statistically significant difference between the pre- and post-test scores of the students who composed the experimental group. The mean, the standard deviation, and the t-test results are displayed in Table 4.

	Pre-test	Post-test
Mean	3.36	6.57
Standard deviation	1.34	2.50
Number of students	14	14
Paired t-test result	0.0018	

Table 4. Descriptive statistics experimental group

The mean scores between the pre- and post-test results of the experimental group reveal a difference of 3.21 points, results from the post-test almost doubling those of the pre-test. Furthermore, the standard deviation of the post-test shows a rise as well with a difference of 1.16 points when compared to the pre-test. This change in the standard deviation might express the variability of the scores in the post-test. For instance, Students 6, 10, 12, and 13 had the highest scores achieved in the experimental group, whereas Students 2, 4, 5, and 7 had the lowest scores. All of the students' scores are exhibited in Table 5.

Student	Pre-test scores	Post-test scores
1	3	7
2	5	4
3	4	6
4	3	3
5	4	4
6	3	9
7	3	4
8	5	8
9	6	7
10	3	12
11	3	6
12	1	9
13	2	8
14	2	5
TOTAL	**47**	**92**

Table 5. Experimental group scores

Table 5 depicts the students' scores from the pre- and post-tests. A considerable increase in the students' performance can be observed in the post-test results, compared to those obtained from the pre-test. 79% of the students (11 out of 14) improved their knowledge of comparative structures as the post-test results portrayed, with some of them noticeably raising their scores, as can be observed in Figure 14.

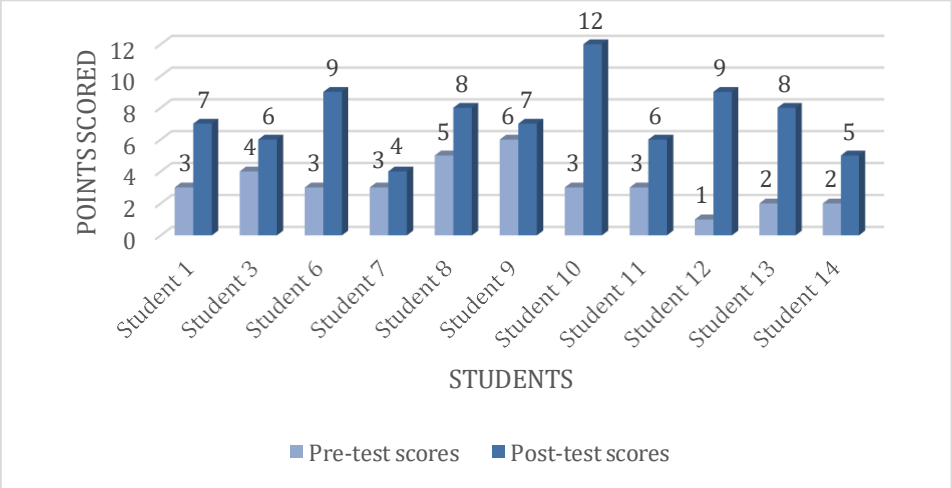

Figure 14: Results of students who improved their scores

As the illustrated chart shows, among the students who improved their scores in relation to their pre-test scores, four of them made considerable improvement. Student 10 showed the highest score achieved with a difference of 9 points between the pre- and

post-test scores. Student 12 showed another of the most significant scores, improving by 8 points. And Students 6 and 13 raised their scores by 6 points. Among 79% of the students who improved, four students (Students 1, 8, 11 and 14) raised their scores by 3 or 4 points, and three students increased their scores by 1 or 2 points, as was the case of Students 3, 7, and 9. In contrast with those who achieved the highest grades or increased their scores, others did not show any improvement, as can be seen in Figure 15.

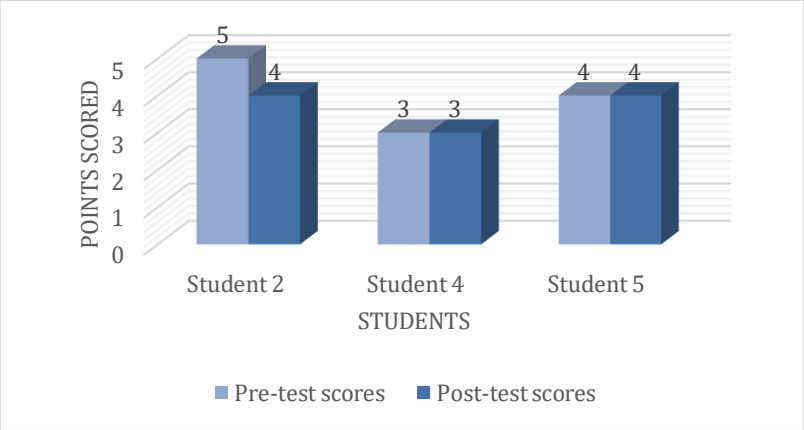

Figure 15: Results of students who did not improve their scores

This graph shows three out of 14 students (21%) who did not improve their scores after the class intervention. For example, Students 4 and 5 did not show any progress, getting the same score as in the pre-test, and Student 2 achieved a lower score than in the pre-test results by 1 point.

After introducing an overview of the results in the experimental group, results per each comparative structure are shown below. Figure 16 shows the pre- and post-test results related to comparative structure type 1 (*adj+-er than; more adj than*). 43% of the students showed an improvement in the post-test by 1, 3, or 4 points, (see Students 6, 10, 11, 12, 13, and 14). More specifically, Student 10 achieved a perfect score (7 points). However, another 43% of the students lowered their scores in the post-test by 1 or 2, with two students (14%) (Students 5 and 8) achieving the same score in both tests.

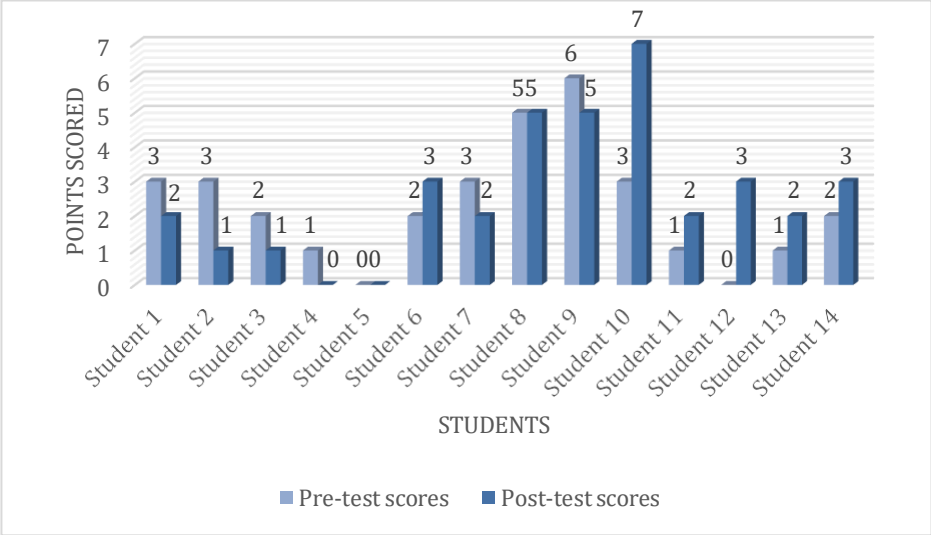

Figure 16: Results comparative structure type 1

On the other hand, Figure 17 exhibits the students' scores concerning comparative type 2 (*as + adj + as*). Thirteen out of 14 students (93%) increased their scores by 1, 2, 3, or 5 points, and only Student 5 obtained the same results as in the pre-test. This increase in the post-test scores indicates that most of the students from the experimental group achieved a good understanding of this comparative structure.

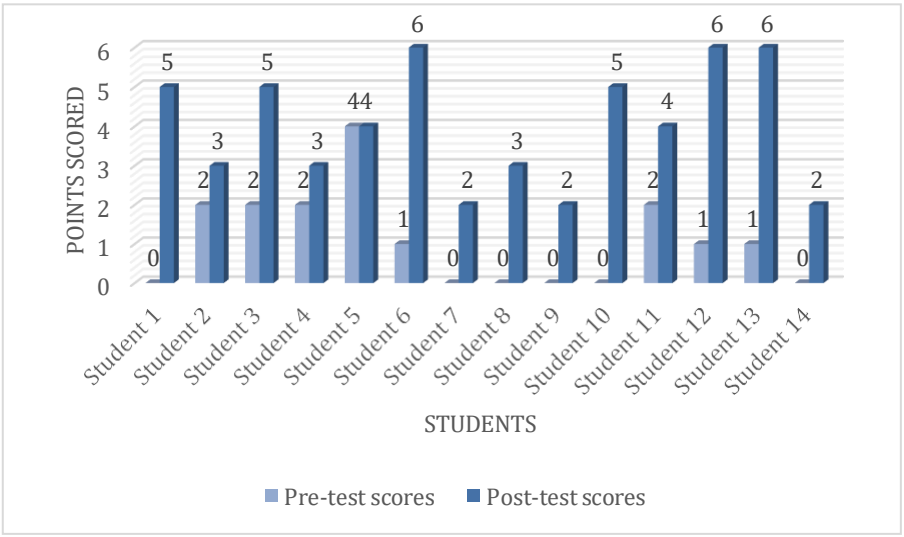

Figure 17: Results of comparative structure type 2

4.1.3. Pre- and Post-test findings and discussion

Students in both the control and experimental groups improved their knowledge with regard to type 1 and 2 comparative structures. That is to say, by following both the traditional and the technology-mediated approaches, students showed an improvement in the acquisition of these grammatical structures. Nevertheless, in general, the experimental group exhibited a more remarkable improvement than the control group, this being more noticeable in the results of the post-test for comparative structure type 1. Consequently, to answer RQ1 (Do students in the experimental group perform better than those in the control group regarding the use of English comparative structures?), and RQ2 (Are there any differences between the results in the experimental and control groups?) general results indicate that there was more improvement in the experimental than in the control group, with a higher increase in mean and lower standard deviation. Results for each type of comparative structure show that the students in the experimental group performed better than the students in the control group regarding comparative type 1 and obtained the same results regarding comparative type 2. Therefore, although both groups improved, it can be stated that technology-based gamification encouraged the students in the experimental group to improve their knowledge of comparative structures. Thus, this finding supports Benini & Thomas' (2020), Figueroa-Flores' (2015) and Rahmani's (2020) studies in which ICT-based gamification positively enhanced language learning. In particular, this finding suggests that the use of gamification apps (in this case Quizizz, Wordwall and Kahoot!) can improve the students' grammatical competencies as the studies by Anak Yunus & Hua Tan (2021), Hashim, Rafiq & Yunus (2019), Krisbiantoro (2020) and Zarzycka-Piskorz (2016) have shown.

4.2. Questionnaire results

In this final section we will present and discuss the results obtained from the questionnaire in order to provide answers to RQ3 (What are the students' perceptions regarding the use of gamification in the classroom?). Results from the close-ended question that was introduced to investigate the students' feelings towards using gamification can be seen in Figure 18.

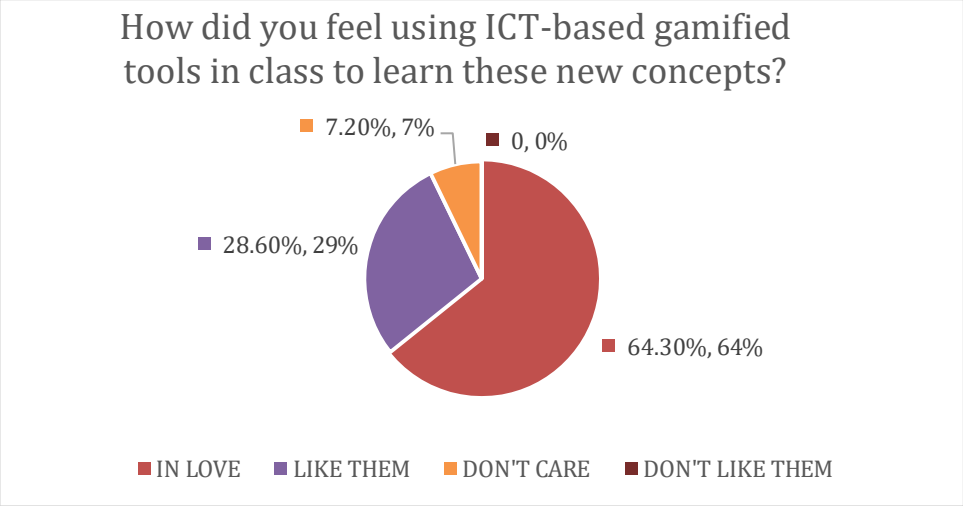

Figure 18: Students' answers to close-ended question

64% of the students (9 out of 14) stated that they loved the application of gamified tools to learn the comparative structures, while 29% of the students (4 out of 14) claimed to just like them. Thus, 93% of the students had positive feelings and embraced gamification in the EFL class easily. However, one of the students considered the implementation of gamification in the classroom irrelevant for him/her.

The qualitative data collected from the three open-ended questions in the questionnaire was analyzed using open coding, as previously explained in the Methodology chapter. Two main themes emerged from this analysis: the fun factor in gamification and gamification for learning engagement. These two themes will be discussed below.

1) The fun factor in gamification

One of the open-ended questions (question #2) asked the students whether they considered it easy or difficult to understand the comparative structures when using gamification in the class intervention, to which most students responded that the structures were easier to understand with gamification. 79% of the students (11 out of 14) recognized that it was easier to learn by incorporating gamified apps in the classroom. On the other hand, 14% of them (Students 2 and 11) did not specify whether it was easy or difficult; they wrote "more or less," meaning that it was neither easy nor challenging. And just one student said that it was difficult for him/her to understand grammatical concepts with gamification (Student 7). The reasons learners provided to explain why they considered gamification made it easy or difficult to understand English comparatives varied, but the majority can be categorized under the theme "fun". See excerpts from the students' answers below:

"Easy because it is fun (Easy porque es divertido)" (Student 5 response to question #2).

"Easy because of the games and the fun (Easy por los juegos y la diversion)" (Student 3 response to question #2).

The responses from Students 5 and 3 express that the incorporation of gamification made the process of understanding these specific grammatical concepts easier due to the enjoyment that games can provide in the classroom. Students 9 and 1 mentioned some additional points of view concerning the fun factor, in this case, about the feelings of excitement and encouragement:

"Easy because it is exciting (Easy porque es emocionante)" (Student 9 response to question #2).

"Easy because it encourages you to play and it is interesting" (Easy porque te anima a jugar y es interesante)" (Student 1 response to question #2).

Both of these responses convey the learners' positive feelings towards gamification, mainly due to the fun factor which positively encourages them. Therefore, the role of fun does not only involve entertainment but also the emergence of excitement and encouragement among the students, creating a more appealing atmosphere for them to learn in. Finally, Student 14 acknowledged that gamification ensures easier comprehension but also that gamification links the fun factor to EFL learning:

"Easy because it is easier to understand with games and you have fun while learning (Easy porque es facil de comprender con los juegos, te diviertes aprendiendo)" (Student 14 response to question #2).

Thus, according to the students' perceptions, gamification helps students understand English comparatives in an easier way, in addition to being an appealing approach that can enhance learning due to the fun, exciting, and encouraging environment that it provides in the classroom. These results are supported by previous studies which suggest that the introduction of technology-mediated gamification in EFL is a learning experience that encourages students to experience high levels of fun (Alarcón del Amo, 2020; Anak Yunus & Hua Tan, 2021; Krisbiantoro, 2020).

2) Gamification for learning engagement

The last open-ended question (question #3) directly asked the students if they preferred ICT-based gamification to learn English, to which 100% of the students responded "yes". Students perceived the benefits of applying gamification in terms of creating an engaging atmosphere that was conducive to learning. For instance, the students mentioned the following:

"Yes because we learn with the games (Yes porque aprendemos con los juegos)" (Student 12 response to question #3).

"Yes, because is easy to learn the lesson if you play" (Student 10 response to question #3).

"Yes it is more comprehensive and it helps more to understand it (Yes es más comprensivo y ayuda más a entenderlo)" (Student 3 response to question #3).

"Yes because a picture says more than a thousand words (Yes but una imagen dice más que mil palabras)" (Student 8 response to question #3).

Thus, the students remarked on the connection between gamification and making learning easy. These comments emphasize the idea that, according to the students' perceptions, gamification is a valuable approach for EFL learning. Students considered that through gamification, it is more likely that they will learn the concepts being taught more easily. Furthermore, Student 6 compares the use of gamification to the traditional method while making manifest the students' preference for gamification over the more traditional approach:

"Easy because it is easier for me to learn with games than with the books" (Easy para mi es mas facil aprender con juegos que con libros)" (Student 6 response to question #2).

As can be seen in the students' answers above, they felt encouraged because they enjoyed using gamification as a way to learn English. Therefore, to answer RQ3, the students' perceptions were extremely positive concerning the effects of ICT-mediated gamification in their learning. Most of the students were pleased with the inclusion of gamification for two main reasons: the fun factor and learning engagement, and most of them perceived ICT-based gamification as an entertaining approach that positively encouraged them to learn in a more motivating manner that also helped them achieve better results.

5. Conclusion

This dissertation has focused on the implementation of technology-based gamification to teach comparative structures in English to primary school students in a Spanish school. During the course of this study, data resulting from two groups of students (an experimental group that used technology-based gamification and a control group that used worksheets) were analyzed and discussed. This study concluded that both groups enhanced their knowledge of comparative structures, although statistically the experimental group showed greater improvement (as seen in t-test results, mean and standard deviation). In fact, both groups showed great improvement with respect to comparative structure type 2, while with type 1 the experimental group showed a better performance. Furthermore, the findings revealed that the students in the experimental group expressed positive feelings and perceptions after using gamification in the class intervention since they felt that they learned in a more enjoyable way when gamification apps were used. The main findings of this study also corroborate some of the findings in the literature review, especially those that mention how technology-based gamification can increase the students' performance in the target language by engaging and motivating them throughout their learning process (Anak Yunus & Hua Tan, 2021; Benini & Thomas, 2021; Figueroa-Flores, 2015; Rahmani, 2020).

5.1. Limitations

This study is not without its limitations. One of these limitations refers to the sample size which was very small (14 students in each group). Even though quantitative data analysis revealed some statistically significant results, these results should not be generalized to all students in the same context (5th Spanish primary school students). Another limitation relates to time constraints. Due to the COVID-19 pandemic, class

intervention was limited to three sessions, and it was not possible to extend it beyond those sessions, which meant that no further activities were carried out in both groups to check whether learning remained in the medium term.

5.2. Pedagogical implications

During the months of quarantine due to the COVID-19 pandemic, the use of ICT has made it possible to continue with educational instruction, and it is likely that these technologies will continue to be used in face-to-face lessons. This study has provided evidence on the potential benefits of incorporating technology-mediated gamification through the use of three online applications (Quizizz, Wordwall and Kahoot!).

Despite its benefits, gamification can also be challenging for teachers. As mentioned in this study, its integration in the classroom implies changes in the role of teachers and students, and acquiring digital skills becomes essential (Stockwell, 2015). This is also emphasized by authors such as Hashim, Rafiq & Yunus (2019) who mentioned that "it is crucial for teachers to effectively integrate technology in aiding their lessons for an efficient learning outcome" (p. 46). In order to facilitate this integration and overcome the above-mentioned challenges, Sánchez-Mena & Martí-Parreño (2017) suggest that teachers need "special Teacher Training Programmes focused on the use of gamification in education" (p. 441) to effectively incorporate it into their classrooms.

5.3. Further research

Despite its important growth in the last ten years, further research in the field of technology-mediated gamification is needed. More especially, it is imperative to investigate its usefulness for foreign language learning and teaching. In a recent study, Benini and Thomas (2021) state that "empirical research is still limited when it comes to analysing the effectiveness of gamification in educational and SLA settings and practices" (p. 31). Thus, future research should focus on analyzing how different foreign language skills (writing, reading, listening and speaking) can be developed through gamification. In addition, individual factors such as students' anxiety in gamification should be further investigated. Finally, and in connection with the previous section, it would also be interesting to investigate how teachers should be trained in order to provide them with the required knowledge and skills to effectively integrate gamification in their teaching.

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7. Appendix:

Appendix A: Grammatical rules

COMPARATIVE STRUCTURES

- We use the **comparative** (*adj + -er + than/ more + adj + than*) structure to compare qualities or characteristics of two (or more) people, things, animals, or actions.

Grammar rules:

1/ 2 syllable adjective	**1 syllable adjective (C + V + C)**	**2 syllable adjective "-y"**	**+ 2 syllable adjectives**
Add "**-er**" to the adjective + **than**	Add "**-er**" to the adjective and double the last consonant + **than**	Add the **"-er"** to the adjective and change the *"-y"* into *"-i"* **+ than**	Add "**more**" before the adjective "**more**" + adjective + **than**
old > old**er** than young > young**er** than fast > fast**er** than small > small**er** than	big > big**ger** than sad > sad**der** than thin > thin**ner** than	happy > happ**ier** than easy > eas**ier** than ugly > ugl**ier** than	interesting > **more** interesting than beautiful > **more** beautiful than dangerous > **more** dangerous than boring > **more** boring than

BE CAREFUL!!!!!!

The adjectives ***good***, ***bad,*** and ***far*** don't follow these rules, they are irregular adjectives.

Good > **better** than **Bad** > **worse** than **Far** > **further** than

Examples:

My bike is **bigger than** yours.
My dog is **taller than** my sister's dog.
Practicing a sport is **better than** lying on the sofa.
My cousin´s house is **noisier than** my house.

- We use ***as…..as*** **structure** to compare two (or more) people, animals, things, or actions that <u>share</u> quality or feature, THEY ARE EQUAL.

Grammar rule:

I	am		ugly		you
You/We/They	are		beautiful		me
He/ She /It	is		big		a gorilla
A parrot	is	**(not) as**	tall	**as**	a hummingbird
A mouse	is		noisy		a clock
An elephant	is		clever		a chimpanzee

Examples:

(My sister is 23 years old, and I am 10 years old)
My sister is **<u>not as young as</u>** me.

(My teacher and my father have the same height)
My teacher is **<u>as tall as</u>** my father.

(Vultures and eagles are big)
Vultures are **<u>as big as</u>** eagles.

(Jellyfishes and spiders are dangerous)
Jellyfishes are **<u>as dangerous as</u>** spiders.

(Walking on the moon is funnier than exploring a cave)
Exploring a cave is **<u>not as funny as</u>** walking on the moon.

Appendix B: Control group exercises

Exercise 1. Complete the sentences with the comparative form of the adjectives (*adj + -er + than/more + adj + than*). Please, don't forget THAN.

1. Rhinos are _____(strong) zebras.
2. Vultures' eyes are _____(terrifying) cats' eyes.
3. My cat is _____(hungry) yours.
4. Travelling on a cruise ship is _____(good) sailing in a sailboat.
5. Katie is _____(sad) John because her bird is sick.
6. Orangutans are _____(fat) monkeys.

Exercise 2. Complete the sentences with *(not) as …… as* structure.

1) Pandas are _____(+ cute) dogs.
2) Pandas are _____(+ heavy) seals.
3) Pandas are _____(x strong) anacondas.
4) Pandas are_____(x terrifying) owls.
5) Pandas are _____(+ lazy) koalas.
6) Pandas are _____(x dangerous) lions.

Exercise 3. Circle the correct option for each sentence (A, B, or C).

1. Climbing a volcano is _____exploring an island.

a) as dangerous than b) dangerous c) more dangerous than

2. Parrots are _____rainbows. Both have lots of colours.

a) colourful as b) as colourful as c) not as colourful as

3. Hummingbirds are _____ swans. Hummingbirds are just 10 cm tall.

a) as small as b) smaller than c) not small as

4. Vultures are _____ hyenas. They don't have a pretty face.

a) uglier than b) as ugly as c) ugly as

5. Peacocks are _____pigeon. Peacocks' feathers are lovely.

a) as beautiful as b) more beautiful than c) beautifuler than

6. Diving near a coral reef is _____exploring the jungle.

a) as entertained as b) entertaining c) as entertaining as

Appendix C: Informative letter to the parents

Estimadas familias de los alumnos del curso de 5º:

En primer lugar, me gustaría presentarme, me llamo Brenda Pérez, estudiante del máster de Lingüística Aplicada al Inglés de la Universidad Autónoma de Madrid. Les escribía esta carta con la intención de comunicarles mi interés en realizar una investigación con los alumnos del curso de 5º en la clase de inglés para llevar a cabo mi Trabajo de Fin de Máster.

Dicha investigación está destinada al estudio de: como un aspecto gramatical de la lengua inglesa es enseñada a través de dos metodologías distintas, la adquisición de ese rasgo gramatical en ambos contextos, y la opinión de los alumnos sobre el uso de una de las metodologías. Este estudio se centra en tareas basadas en un aspecto gramatical del libro de inglés de sus hijos/as, por lo que los alumnos seguirán con el temario de la clase de inglés. En cuanto a las metodologías a emplear para este estudio son:

1- Una metodología orientada exclusivamente al uso de las tecnologías en clase. En este caso, se impartirá la clase con los dispositivos tecnológicos disponibles en el aula y a través de aplicaciones destinadas al aprendizaje de la lengua (ej. Kahoot, Quizlet, Genial.ly, Socrative, Quizizz, Wordwall, etc). De esta forma sus hijos descubrirán nuevas aplicaciones que les puedan servir para el aprendizaje de la lengua de una forma más lúdica y amena a través de las tecnologías.

2- La otra metodología que se usaría sería la opuesta a la anteriormente nombrada, es decir, impartir la clase de inglés sin el uso de tecnologías y por lo tanto emplear una metodología más "tradicional".

Sólo se usará una metodología por clase, es decir, dos clases se impartirán con un uso exclusivo de las tecnologías y la otra clase con un método más tradicional. En ambos contextos los alumnos recibirán el mismo contenido y actividades. La duración de este estudio se estima en unos 4 días como máximo, en concreto unos 3 días, pero por si fuese necesario asistir un día más por algún impedimento.

En cuanto a la elaboración de este estudio consiste en que yo presente una o dos clases sobre el tema usando las dos metodologías anteriormente mencionadas y el reparto de dos pruebas sobre dicho aspecto gramatical, una al principio del estudio y la otra al final. En estas dos pruebas se les pedirá a los alumnos que escriban su nombre para así contrastar los resultados obtenidos y solo dichos resultados serán los datos que se emplearán en el estudio. **No obstante, en la elaboración de esta investigación se mantendrá la identidad del alumno de forma privada por lo que en el estudio final no aparecerán sus nombres, sino que se les asignará un número.**

Si desean más información sobre este estudio, por favor no duden en contactar conmigo: brenda.perez@estudiante.uam.es

Asimismo, se requiere su autorización para desarrollar esta investigación universitaria y por lo tanto contar con la colaboración de sus hijos/as. En último lugar, les agradezco su atención y consideración.

Atentamente, *Brenda Pérez Estudiante del máster de "Lingüística Aplicada al Inglés" Universidad Autónoma de Madrid*

Appendix D: Permission slip

D/Dña_____como padre/madre o tutor del alumno _____ del grupo _____ **SI** ☐ **NO** ☐ autorizo su participación en esta investigación universitaria que será llevado a cabo por todos los alumnos del curso de 5º del CEIP Concepción Arenal. El estudio estará dirigido por Brenda Pérez, estudiante del máster de Lingüística Aplicada al Inglés de la Universidad Autónoma de Madrid, en colaboración con los profesores de inglés de los alumnos de 5º.

Es preciso informarles de que durante la realización de este estudio **no se usará ningún dato personal sobre su hijo/a** salvo aquellos datos relevantes para este estudio como son los resultados obtenidos en las dos pruebas.

En Leganés, a _____de Febrero de 2021.

Firmado:

_____

Appendix E: Pre- and Post-test

Name:

_____

Multiple-choice exercise: Read the sentences and **CIRCLE** the best choice (**A**, **B**, **C,** or **D**) for each one. Only **ONE** answer is correct for each sentence. There are a total of 15 questions. Don´t panic, this is not an exam.

1. My garden is _____this park because my garden has more flowers.
   a) colourful than
   b) much colourful than
   c) colourfuler than
   d) more colouful than

2. Lucy's result in the test was _____mine. Next time I will study more!
   a) good than
   b) better than
   c) more good than
   d) godder than

3. This computer is _____the mobile phone, they cost 500€.
   a) more cheap than
   b) as cheap than
   c) as cheap as
   d) cheaper than

4. Our geography teacher said that London is _____Madrid. It's 27 times the size of Madrid.
   a) bigger as
   b) more big than
   c) bigger than
   d) biger than

5. Susana is _____Mario, they're 14 years old.
   a) as young as
   b) as young than
   c) younger than
   d) young

6. Mick and Dorothy are _____Edward. Mick and Dorothy are always watching TV.
   a) lazy as
   b) as lazy as
   c) lazier than
   d) more lazy than

7. Your alarm is _____a rooster. Their sounds are annoying!
   a) noisy as
   b) noisier than
   c) as noisy than
   d) as noisy as

8. Cactuses are _____roses. Roses are lovely and cactuses aren't.
   a) more beautiful than
   b) beautifuler than
   c) not as beautiful as
   d) not as beautiful

9. Mary is _____Amanda. Mary is 180 cm tall, and Amanda is 160 cm tall.
   a) taller than
   b) as tall as
   c) more tall than
   d) taller as

10. Jackie is _____Jane, we don't know anything about their lives.
   a) as mysterious as
   b) as mysteriouser as
   c) more mysterious than
   d) as mysterious than

11. The film was _____the book, I enjoyed more reading the book than watching the film.
   a) interesting
   b) more interesting than
   c) not interesting as
   d) not as interesting as

12. Fast food is _____healthy food for your health.
   a) badder than
   b) worse than
   c) more bad than
   d) worse as

13. The desk of my room is _____yours.
   a) long than
   b) longer as
   c) longer than
   d) longger than

14. You're _____a dolphin.
   a) as intelligent as
   b) as intelligenter as
   c) as intelligent
   d) intelligent as

15. Danny's dog is _____mine.
   a) funny as
   b) not as funny as
   c) not funny as
   d) not as funnier as

Appendix F: Questionnaire

Question 1. How did you feel using ICT-based gamified tools in class to learn these new concepts? Comment briefly why did you feel like this:

😍 IN LOVE 😄 LIKE THEM 😐 DON'T CARE 😠 DON'T LIKE THEM

Question 2. Was it easy or difficult to understand these grammatical concepts with technology-mediated games? Explain why.

Question 3. Do you prefer to use ICT-based gamification while learning English? Briefly justify your answer.