Unlocking the locks of learning: an escape room in the EFL classroom to assess impact on memory retention and motivation

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Abstract

The present study aims at analysing the impact of escape rooms on short- and long-term memory retention and on motivation to teach English false friends. The study has been conducted in a private school in Madrid, Spain, and has been implemented in 4th of ESO, where class A has been the control group, which has been taught using a traditional method of teaching; and class B has been the experimental group as they were taught using the escape room. In order to assess the memory retention in both groups, students have taken a pre-, a post- and a follow-up test, and experimental students took a motivation questionnaire to know about their perceptions. The results show that the experimental group got far higher scores than the traditional one in both the post-test and in the follow-up test, so experimental students showed a higher level of memory retention. The questionnaire taken by the experimental students also indicated a high level of motivation and engagement.

Keywords: English language teaching, motivation, memory retention, gamification, escape room, false friends.

1. Introduction

Technology has evolved exponentially in the last few years, and it has become such an important part of our lives that we use it every day to do a great variety of tasks. Technology eases our lives, and we are expanding its use to an increasing number of fields. The teaching field is one of them and, as previously studied by Bautista, Hernández-Carrera, Moreno & López (2020), "the application of information and communication technologies (ICT) for foreign language learning started as a great novelty and has great promise" (p.1).

Nowadays, some classrooms are equipped with digital resources such as interactive whiteboards or computers. These resources are becoming more and more important in education because they contribute not only to the learning of students, but also to their development and motivation (Bautista et. al., 2020).

One of the elements that technology enables to introduce in the foreign language classroom is gamification, which consists of adding game elements into non-game contexts (Deterding, Dixon, Khaled & Nacke, 2011). As studied by Locke (1991) and Bandura (1986), learners feel motivated when they have to achieve specific, moderately difficult, and immediate goals, which are the ones provided by games (Gee, 2008).

Games can also help students get familiar with failure and teach them to overcome it and learn from it through repetition. This is positive in the sense that it gives students the opportunity to improve and to learn something new each time they try (Gee, 2008). In addition, it could also boost students' potential and make them think of school in a more meaningful and interesting way (Lee & Hammer, 2011).

Based on this fact, we consider that gamification can be a useful and powerful asset for teachers to motivate and teach their students. Therefore, the present dissertation intends to contribute to the educational field by testing a gamification element- an escape room- to determine if it has a positive impact on students' motivation and learning.

In order to contribute to research in this field, we have decided to test the validity of escape rooms to teach English false friends at secondary level following a gamified approach. The group where the activity will be tested is 4th ESO- students aged 15 and 16-, since it is the last level of secondary education and thus, they are supposed to have the necessary level of English to understand the topic.

False friends has been the topic chosen given that even though it is part of the curriculum of 4th ESO, in many cases they are learnt as time goes by through error and repetition, so we intend to present an alternative method to avoid the complications and misunderstandings derived from a lack of understanding of false friends.

Regarding the element of gamification, we have chosen to use the app Genially, which is an app where teachers can design their own activities and games to display them using an interactive whiteboard. It offers many possibilities, such as quizzes, memory games, or even the creation of stories that students have to solve through an escape room, which is the feature we have chosen.

Escape rooms in the EFL classroom can be a refreshing and innovative way to teach content since, as stated by Lourido & Moura (2020), it is a new field under study. Escape rooms may not only boost memory retention, but also promote teamwork, a new way to face a challenge, the development of their social skills, time management or engagement (School Break, n.d.), so we consider that these abilities are worth being implemented within the EFL classroom.

With this in mind, the main purpose of this dissertation is to analyse the effects that providing students with a gamified experience has in their short- and long-term memory retention. Another aspect to be explored is the participants' perceptions regarding their motivation after the classroom intervention using the escape room. Therefore, the research questions guiding this study are the following:

1. Are there any the differences in the results from participants in the control and the experimental groups regarding their short-term memory retention when learning false friends?

2. Are there any differences in the results from participants in the control and the experimental group regarding their long-term memory retention when learning false friends?
3. What are the perceptions of the students in the experimental group regarding their motivation when using escape rooms for vocabulary learning?

In order to provide answers to these questions, chapter 2 presents a theoretical framework with the most relevant studies that will help us collect and understand our data. It will be divided into memory and second language acquisition, gamification in second language acquisition- focusing especially on escape rooms-, and memory retention through escape rooms in the foreign language classroom.

Then, in chapter 3, the methodology will be described including the object of study and the research questions, instruments for data collection and the quantitative and qualitative procedures used for data analysis. Chapter 4 will show the results and the discussion of the findings of the study and, finally, chapter 5 will present the conclusions where we will summarize the most important findings from this study.

2. Theoretical framework

This section is divided into three parts that focus on 1) the available information about memory retention and its relation to language acquisition, 2) studies which have already tested any element of gamification in the foreign language classroom and have drawn some conclusions from it to determine its impact and effects, and 3) how escape rooms can be used in the foreign language classroom to favor memory retention.

2.1.Memory and second language acquisition

Memory is, as defined by Cherry (2022b), the process that makes us acquire, store, retain, and retrieve information, and thus it is also an important factor that should be taken into account when it comes to teaching. Even if the teaching process should not be purely based on learning by heart, the fact that memory is necessary is undeniable.

In order to create memories, information must be first captured by the senses, that is, by the sight, smell, taste, hearing, and/ or touch sense. To store that information gathered by the senses, we can make use of visual memory- which is the type of memory associated with the sight sense-, auditory memory- which is the one associated with the hearing sense-, haptic memory- which is associated with the touch sense-, olfactory- the one associated with the smell sense-, and gustatory- which is the one associated with the taste sense. These five types of memory captured by the senses are encompassed in the so-called sensory memory since it provides us with the sensory information about the world (Cherry, 2022b).

Then, that same information captured by the senses can transform into short-term memory if memories last a bit longer (from 20 to 30 seconds), and also can transform into long-term memory if it lasts days, months or years (Cherry, 2022b). Within long-term memory there are several subtypes depending on the type of information it encodes, for instance, episodic, semantic, procedural, associative, non-associative or emotional memory (Camina & Güell, 2017).

Nonetheless, the present study will not review all these subtypes of memory, but will only focus on visual, auditory, episodic, and emotional memory. The rational of the choice is found on the design of the escape room, since these are the four types of memory that are favored in language acquisition, as will be justified in the following sections.

As there are three stages of memory- sensory, short-term and long-term memory-, the present study will explain each one of them as well as how information can pass from one stage to another to finally be stored in the long-term memory. In addition, the study will present to which stage visual, auditory, episodic, and emotional memory belong and will explain their relation to language acquisition.

2.1.1. Sensory memory

Sensory memory is the earliest stage of memory, and it is said to be the shortest type of memory since it only lasts for a few seconds, usually three or even less (Cherry, 2020), and it encompasses all information about how things or events look, sound, feel, smell and taste. Although most details of sensory memory fade quite quickly, if attention is paid, information passes to the next stage, which is short-term memory (Cherry, 2022b). It can also be recorded in the long-term memory, for example, when we recognize a familiar voice (Cowan, 2008).

To put it another way, sensory memory is the first filter our brain uses to organize, classify and process all the information that surrounds us. In order to do that, this type of memory makes use of the five senses, but regarding language acquisition only visual and auditory memory are useful to our study, since the remaining senses are not related to language learning.

2.1.1.1. Visual memory

According to the study conducted by Bautista et al. (2020), visual memory (also called iconic memory) is the one in charge of making us remember images or visual items, as well as their representations. The visual stimuli remain for a short period of time in form of an image and therefore provide the brain with visual information, from eye movements to what we remember from several years ago. It lasts from one-quarter to one-half of a second (Cherry, 2020).

As previously studied and tested by Tahiri (2020), pictures and images provide a more effective foreign language learning than other methods in terms of vocabulary acquisition. It can be applied to all levels of proficiency as the results obtained were gathered in three different groups with different English levels. The study draws the conclusion that the use of images and illustrations is a good and effective technique to associate the target vocabulary and that it worked for students at different levels.

It was also found by KafilUddin and HumayunKabir (2015) that students learn more efficiently and easily when they have some visual support, and these authors also advocate that the use of images and illustrations in classroom for teaching a foreign language makes the class more appealing to students, which in turn helps them acquire the language more easily. As they focus on English second language learning in the Kingdom of Saudi Arabia (KSA), they explain that KSA language teachers do not usually think images are important to teach English, so students consequently may have to face more difficulties to learn this language. For this reason, they suggest that teachers should use the visual aid to link new words to images and this way make the learning process easier, since visual memory and foreign language learning are interrelated, just like auditory memory, as the next section will explain.

2.1.1.2. Auditory memory

According to Sydney Therapy & Co (2017), auditory memory (also called echoic memory) can be defined as "the ability to take in information that is presented orally (out loud), process it, retain it in one's mind, and then recall it" (para. 3). This memory lasts for up to three to four seconds (Cherry, 2020).

Munro (2022) claims that auditory memory is a core element in language learning since it helps us retain sound, verbal language in particular, since we learn a language by listening to it. Storing sounds and words in the brain allows us to later produce them, and

through this repetition we acquire a language. Students with poor auditory memory may face more difficulties in class, for instance, when paying attention or understanding the instructions of an exercise. But this type of memory also has a huge impact on literacy since it influences reading, spelling and writing skills (du Plesis, 2021).

As stated by Benasich, Thomas, Choudhury and Leppänen (2002) "the ability to process two or more rapidly presented, successive, auditory stimuli is believed to underlie successful language acquisition" (p.1), so we can deduce that adding some techniques to help students develop their auditory skills can be an asset to the foreign language classroom.

As it was mentioned at the beginning of this section, these two subtypes of memory (visual and auditory), belong to the sensory memory since thanks to the sight and to the hearing sense we capture the sensory information of the world, and if we pay enough attention to it, then that information transforms into short-term memory and continues its way to the long-term memory.

2.1.2. Short-term memory

Also known as primary or active memory, and according to Cherry (2022), "short-term memory is the capacity to store a small amount of information in the mind and keep it readily available for a short period of time" (para. 1). This type of memory is fundamental to remember daily actions, but has a short duration (usually, the information kept will last from 20 to 30 seconds, but in some cases, it can last for a minute). If no efforts are made to retain the information, it is easily forgotten (Cherry, 2022).

Most psychologists agree that about seven items at a time can be stored in the short-term memory, plus or minus two (Mcleod, 2009). A new concept has been created to expand the functions of short-term memory, which is the term *working memory*. There is quite a

lot of controversy regarding short-term and working memory since, as stated by García (2021), "some authors consider short-term memory to be a subset of working memory, whereas others argue for the inverse relationship, and finally there are those who use both terms interchangeably because they see both as the same memory system" (para. 2). This shows that there is no consensus in this debate, since some researchers explain that it is the same as short-term memory, while others advocate that there are some differences.

As Mcleod (2012) explains, "working memory is short-term memory. However, instead of all information going into one single store, there are different systems for different types of information. Therefore, whereas short-term memory can only hold information, working memory can both retain and process information" (para. 5). In any case, both short-term memory and working memory refer to the type of memory that stores information for a short period of time and that, if stored correctly, can lead to the long-term memory (Cherry, 2022).

2.1.3. Long-term memory

The last stage of memory retention is the long-term memory, which stores information for a very long period of time. Contrary to what may be thought, long-term memory occurs from hours ago (Huizen, 2021), or from a few minutes ago (Mcleod, 2020).

This would mean that remembering events or facts that just occurred some days ago or even some minutes ago can be considered long-term memory. As Cherry (2021) claims, "if you can remember something that happened more than just a few moments ago, whether it occurred just hours ago or decades earlier, then it is a long-term memory, and it can last for a matter of days to as long as many decades" (para. 2). Mcleod (2020) also shares this point of view, as he states, "duration might be a few minutes or a lifetime" (para. 3). He also claims that its capacity can be unlimited, depending on the accessibility to recall.

Usually, long-term memory in divided into two types depending on the conscious or unconsciousness of the subject, being these two types either implicit or explicit memory.

2.1.3.1. Implicit memory

This type of memory occurs unconsciously and thus includes procedural and emotional memory. The first one would be the physical movements that help us do an activity mechanically, e.g., how to ride a bike. The second one would encompass the emotions we felt in a moment and that influenced our behaviour (Perera, 2020).

As the present study focuses on second language learning, we will only be reviewing emotional memory as a type of implicit long-memory retention, since, in this particular case, procedural memory does not take part in learning a language given that it is not a physical activity.

2.1.3.1.1. Emotional memory

Emotional memory is the type of memory that activates when having fun or enjoying a relaxed and safe environment. This occurs because emotional events are evoked in more detail than neutral ones and, as LeDoux (1996) explains, this memory is considered to be the most powerful one in terms of recalling.

Méndez and Peña (2013) explored how emotions can affect language learners and how they related to their motivation. These authors reached the conclusion that "emotions, both negative and positive, contribute to enhancing and diminishing motivation" (p.1). Even negative emotions were found useful for learners, given that both positive and negative emotions helped students regulate their learning and their emotions and thus they could benefit from it. This type of memory has also been studied by authors such as Baumeister, Foroni, Conrad, Rumiati and Winkielman, (2017) who stated that languages and emotions are closely connected.

Kralova, Kamenicka and Tirpakova (2022) found out that foreign language education usually develops in neutral contexts, which means that it does not promote emotional memory, and thus can have negative implications for learning. They state that positive emotional stimuli last longer in memory and are recalled more easily and efficiently, which favors second language learning. Their results demonstrated that emotions led to a "significant increase of declarative vocabulary knowledge and foreign language enjoyment" (p. 1).

2.1.3.2. Explicit memory

Cherry (2021) explains that explicit memory (also called declarative memory) encompasses memories that are available in consciousness and thus can be evoked consciously. This memory type includes episodic memory, which is the one that helps us recall full events and experiences as if it were a film (The Human Memory, 2020).

2.1.3.2.1. Episodic memory

Episodic memory, based on Bautista et al.'s (2020) study, "is the one in charge of storing the events and concrete facts lived throughout life, being able to recover moments through contextual information linked to the spatial and temporal variables related to such events" (p. 6). These authors also claim that episodic memory helps us remember specific personal experiences and that it is linked to mental capacities, being language among them. Thanks to episodic memory, we are able to remember a certain moment of our lives as the brain evokes memories in the form of films or photos, so that we can recall lived episodes.

Studies on episodic memory are scarce, especially in regard to language learning. It is true though that it is difficult to assess and study this type of memory. Within the few studies that focus on episodic memory, we find Kormi-Nouri, Moniri and Nilsson's (2003) study, which tested both episodic and semantic memory in bilingual and

monolingual children, and whose results showed that bilingual children benefited more from this type of memory since they could organize the information in two languages, which shows that the knowledge of two languages provides some advantages regarding memory retention. Their study also provides some methods to test episodic memory in students, which can be useful to replicate the study or to continue with this investigation line.

Their results and conclusions demonstrate that students who learn more than one language can experience an improvement in their cognitive capacities, being memory among them, so this information is useful to understand why learning a second language can boost memory retention.

2.2.Gamification and foreign language learning

Gamification is a field under study, which means that some studies have been published to expand the knowledge on this field, where researchers have tested different methods or elements of gamification to answer questions about its implementation and its impact within classroom contexts.

It is difficult to establish a starting point for gamification in the context of education, however, it was in 1990 when computers were first introduced in classrooms, which led to an advance in gamification techniques since it offered more possibilities to teachers, such as the use of games. But 2010 was the year when the term became popular, and in 2011 the first summit about gamification was held in San Francisco (Lloyd, 2014). From that moment onwards, gamification evolved and has been developed in several ways to fit in the curriculum of the subjects and promote an effective learning.

Gamification does not necessarily include the use of new technologies, since it consists of using game mechanics into non-game contexts, such as classrooms. In this way,

developing a points system or rewarding students after successfully completing an activity can be considered as gamification given that it makes use of game dynamics (in this case, a point-based system and rewards).

Within the implications of gamification in regard to learning, we find teamwork, striving to obtain rewards, learning through repetition after making mistakes, engagement and motivation as a result of competition, instant feedback, and real-world applications. As Carmichael (2020) advocates, gamification can promote teamwork and will make students strive to get rewards since they will want to collaborate and cooperate to achieve a common objective. Being part of a group can also help them develop their personal skills to support the team.

Seeing their effort rewarded also boosts motivation among students and can help them reinforce their self-esteem. As Best (2021) points out, gamification makes students feel less stressed about making mistakes since they can try as many times as they need. In addition, trying over and over again can lead to academic progress as well as to strengthen their resilience for life. This is also possible when gamification acquires a competition look, since it allows students to compete against each other and have the objective to improve so as to outperform their rivals (Mulkeen, 2018).

As this competition is carried out, teachers can also offer instant feedback to help students improve and learn from their errors, which makes the class far more dynamic and offers a new perspective to understand the learning process. And from this, students can also see that what they are learning has a real use that will provide them either with rewards or consequences (Mulkeen, 2018).

Some of these benefits have been studied and tested by researchers to give further insight on the topic. For instance, Bautista et. al. (2020) tested the use of the interactive digital

whiteboard with a computer application called Action Manager- a card game designed to find two equal pairs-, and they found out that the students who participated in the experiment showed a better long-term memory retention of the topic and also a higher level of motivation. Their study does not only provide a new element of gamification and evidence based on the experience of Primary students, but also an extensive review of the different types of memory that intervene in the process of learning through Action Manager.

This study focused on the acquisition of vocabulary in primary school, but other authors studied how gamification could aid learning grammar in secondary school. Thus, Rafiqah, Yunus, Hashim and Nor Pazilah (2019), tested a gamified activity- consisting of using online games to teach English- in a secondary school in Malaysia. The 30 students who participated in the study answered a questionnaire designed to investigate their perceptions of the gamified classroom intervention, and the main findings showed that most students found gamified learning engaging and motivating. In addition, it improved their learning experience and gave them a better understanding of the grammatical concepts studied.

Smiderle, Rigo, Marques, Peçanha De Miranda and Jacques (2020) focused their study on how the effects of gamification can vary depending on the personality traits of the students. 40 programming undergraduate students were assigned either to a control or to an experimental group, being the latest immersed in a gamified environment composed of ranking, points, and badges. Results suggest that the experimental students who were immersed in the gamified environment reacted differently to gamification depending on their personality traits, for instance, introvert students got more points than extrovert students.

Last, another important study published by Sailer, Hense, Mayr and Mandl (2017) highlighted that many different game design elements can have diverse applications, so they should not be treated and studied in a general way. They tested different gamification elements such as badges, leaderboards, avatars etc., and analysed them with regard to the fulfilment of basic psychological needs. Students were immersed in an online simulation environment, and their findings showed that badges, leaderboards, and performance graphs led to positive results regarding competence need satisfaction and also led to an increase in perceived task meaningfulness, since it created meaning at game level.

On the other hand, avatars, meaningful stories, and teammates had an impact on social skills since these students showed a shared goal and feelings of relevance. Based on these results, they advocate that depending on the specific game design elements, students can react differently in terms of motivation and can develop some skills rather than others (Sailer et al., 2017).

In teaching, motivation is a key factor that should be take into account, so researchers have analysed how gamification can boost motivation, as we shall present in the following section.

2.2.1. Motivational impact of gamification

Motivated students will be more willing to learn and thus will learn more efficiently, that is why many studies intend to demonstrate how gamification can boost motivation among students and how teachers can benefit from it. For instance, Alsawaier (2017) reviewed several studies that analysed the relation between gamification and motivation supporting the idea that video games have a positive impact on the levels of engagement of students and therefore enhanced their motivation. He also claims that the use of gamification in pedagogical contexts can offer new perspectives to students given that when gamification is applied, the levels of engagement increase.

Azzouz and Gutiérrez-Colón (2020) published a study about the impact of gamification on motivation within the field of Second Language Acquisition (SLA) in higher education. Their study presents an analysis of recent literature focused on the impact of gamification on motivation, and they state that 11 out of the 15 studies reviewed showed very positive results in regard to motivation and engagement.

Their study provides not only specific literature about motivation and engagement in second language learning through gamification, but also an accurate analysis of all their results, drawing the conclusion that gamification does boost motivation in SLA contexts. Therefore, this study will serve as a basis for research question 3, which intends to determine whether escape rooms- as element of gamification- fosters motivation among students.

Lavoué, Ju, Hallifax and Serna (2020) also conducted a large-scale study where they analysed the relationship between learners' motivation and their behaviors in a gamified learning environment. They identified two types of engagement depending on the type of behaviour: an achievement-oriented engagement (predominant in initially intrinsically motivated learners, or also in high achiever learners), and a perfection-oriented engagement (shown by low achiever learners). Depending on the type of engagement, so vary the learners' levels of motivation during the learning activity. Their study provides a better way to understand the effects of gamification in the different engaged behaviors according to their initial motivation and player profile, which is interesting and useful for the present study, since identifying the types of engagement and motivation of students can help teachers better design the gamification techniques.

The three studies that have been presented in this section focus on motivation among students in the foreign language classroom and thus draw interesting conclusions about how gamification can have positive effects on the students' behaviour. Their conclusions

support and provide evidence that gamification boosts motivation, which benefits our study, especially regarding our research question 3 since it addresses the issue of motivation.

The gamification technique we are focusing on are escape rooms, so after having explained what gamification is, what motivational impact it can have on students and how it relates to our study, we shall introduce how escape rooms work and what research has been conducted about them.

2.2.2. Escape rooms

According to Moura and Lourido's (2020) definition, citing Lamas (2018), educational escape rooms are "a creative learning environment that can be designed for any educational level and uses the design features of escape rooms to which specific educational elements and purposes must be incorporated" (p.180). Traditional escape rooms are games that take place in thematic rooms. A storyteller tells a mystery which participants have to solve by collecting different clues scattered throughout the room. Through these clues, they obtain digits or letters that finally lead participants to escape the room, but they must do so in a limited time usually under an hour.

Regarding educational escape rooms, they use the same dynamics as traditional escape rooms, but their features are adapted to be applicable within classroom contexts, that is, the puzzles or challenges presented throughout the story must be related to the course content, and students should work collaboratively to succeed (Cheryl, Brown, el Houri, Minh, Weber & Buendgens-Kosten, 2021). The design of the escape room can vary depending on the teachers' interests, which means that they can invent any storyline or choose the thematic that best suits their pedagogical needs.

Little research has been conducted about escape rooms in education since it is a highly new and innovative topic, especially in the foreign language classroom. Fostaris and Masoras (2019) claim that, due to its novelty and recent discovery, "there is not a substantial amount of work exploring their tendencies, affordances, and challenges on education" (p.1).

As stated by Veldkamp, van de Grint, Knippels and van Joolingen (2020), there has been an increase in recreational escape rooms that has led to their implementation in educational contexts, however, it is necessary to assess their validity as an activity that can foster learning. Moreover, specific guidelines for successful implementation in the classroom are yet to be developed (Veldkamp et al., 2020). Authors such as Hermanns, Deal, Campbell, Hillhouse, Opella, and Faigle (2017) consider that escape rooms can be especially useful in areas requiring a lot of reading and memorization, since it could help to reinforce students' self-confidence and academic success.

Gómez (2019) believes that escape rooms can involve learners in active learning since it makes easier the retention and application of knowledge after playing the game. Furthermore, it can help students self-regulate their learning process, make them reflect and develop their intrinsic motivation. Along the same lines, Moura and Lourido (2020) suggest that educational escape rooms can boost pedagogical activities since they can apply to any curricular content through challenges, puzzles and instructions. As students can work in teams, it provides a learning setting that enhances collaboration and teamwork as well as learning through errors. In this context, students learn how to solve problems by trying repeatedly until they finally get the answer, which is provided in form of instant feedback. This is extremely useful when it comes to education, since it helps students realize their mistakes instantly, which leads to a quicker understanding of the

topic. In addition, given that there is a time limit, it also helps them control the time and work under pressure (Moura & Lourido, 2020).

Making decisions, proposing hypothesis, and executing ideas contribute to the development of the students' skills that will be useful not only at present, but also in the future as they become adults. These skills include the verbal and social competences, since students have to communicate, exchange ideas and organize themselves to find applicable solutions for the different problems they encounter (Moura & Lourido, 2020).

As reviewed by Gómez (2019), escape rooms are still a new phenomenon that have only been tested in some areas such as Physics, Maths, Biology, or Nursing, and also in English as a foreign language teaching. Regarding this last field, Gómez (2019) used escape rooms at university level with pre-service teachers, and instead of designing an escape room and make students play, she decided that students should create the escape rooms about the course content to teach their classmates. As the author explains, students showed very high levels of engagement during the activity: some students advocated that they had enjoyed learning in a different way and others had felt useful to help the team succeed. Results suggest that escape rooms enhance students' motivation and engagement, as well as teamwork, communication skills and classroom management, which means they are beneficial for students and have positive effects in the foreign language classroom.

Cheryl et al. (2020) conducted a study in the intermediate to advanced EFL classroom and they tested four breakout games to analyse the results obtained, showing that these games provide opportunities for cooperation and collaboration. In addition, they explain that balancing difficulty, encouraging target language use, and dealing with attempts at 'game hacking' are the most challenging parts when designing an escape room and thus,

they make some suggestions to take these factors into account and create a proper escape room.

However, many gaps remain still unsolved regarding escape rooms as, for instance, their impact on memory retention as we shall see in the following section.

2.3.Memory retention through escape rooms in the foreign language classroom

According to SDI Clarity (2017), gamification is an extremely sensory activity, which favors long-term retention since it includes a set of visual and auditory experiences that eases memorization and helps evoke clear memories of the activity. SDI Clarity (2017) also advocates that the enjoyment of an activity leads to paying more attention to it and thus the user becomes more interested in the activity.

Nonetheless, when it comes to explain how gamification methods in general and escape rooms in particular favor memory retention, we find a huge gap that is not covered by the specialised literature. Given that there are no previous studies, in this dissertation we aim to contribute to research in this field by evaluating the effects of using an escape room as pedagogical activity in a classroom intervention to help students learn false friends by triggering their visual, auditory, emotional, and episodic memory retention.

As Tahiri (2020) states, pictures and images lead to a more effective foreign language learning than other methods in terms of vocabulary acquisition, and illustrations are effective to associate the target vocabulary. It was also found by KafilUddin and HumayunKabir (2015) that students learn more efficiently and easily when they have some visual support, so these authors advocate that the use of images and illustrations in the classroom for teaching a foreign language makes the class more appealing to students, which in turn helps them acquire the language more easily.

Based on this, the escape room designed for this study intended to promote visual memory since students are more likely to remember what they see. Thus, some answers are images- since they are easier to remember-, and some others are written in different colours. In addition, especial features have been added to each slide so that every question and answer will be displayed with an effect- such as fading, spinning, moving up and down, etc.- to make the activity more attractive visually.

Likewise, in order to make the most of auditory memory with the use of Genially, the instructions and the whole story have been recorded. Munro (2022) claims that storing sounds and words in the brain allows us to later produce them, and through this repetition we acquire a language, which makes auditory memory a core element in language learning. For this reason, adding some techniques to help foreign language students develop their auditory skills can be beneficial, for instance, recording instructions and using music.

As previously stated by Raypole (2020), music can help students feel less stressed and promotes a more positive mindset, which can make them learn more effectively. Furthermore, following a study published by Sridharan, Levitin, Chafe, Berger, and Menon (2007), classical music helps the brain absorb and interpret new information more easily, which means that it can promote engagement and make us pay more attention to whatever subject we are learning since "music helps stimulate your brain" (Raypole, 2020, para. 26). Consequently, some background music has been added to the escape room so that students can listen to the story while listening to some music with the purpose of increasing their levels of concentration. The music has no lyrics, it is a piano melody that fits the atmosphere of the game and it also aims to promote auditory memory.

Once a student answers a question, a quick explanation about the correct answer is provided, putting special emphasis on the meaning of the word to make sure they can

activate their auditory memory to remember it. Also, the explanations intended to provide as much information as possible and some tricks were included to make students remember the words' meanings more easily. For instance, by putting emphasis on the word 'avocado' and explaining that although it sounds very similar to 'abogado', they are not related.

Through the escape room, we also intend to boost episodic memory given that students can visualize the game as if it were a film and thus remember the topic studied. Bautista et al. (2020) explain that thanks to episodic memory, we are able to remember a certain moment of our lives as the brain evokes memories in the form of films or photos, so that we can recall lived episodes. This is interesting in the sense that through episodic memory students should be able to remember most information about the escape room. For example, if they find the word 'support', they may evoke the escape room and thus remember that is does not mean 'soportar', but 'apoyo' since it was one of the questions, or also, they can remember which student answered which question and whether he/she got it wrong or right.

The escape room intends to be a fun activity designed to ensure enjoyment and to promote motivation and engagement. This can be achieved through emotional memory given that students will remember if they had fun during the class and therefore have clearer memories of the activity. Bautista et al. (2020), however, warned about a possible danger of mixing emotional memory with gamification since, if groups are formed in a competitive climate, it can result into a stressful experience and thus can be recalled in a negative way. Nonetheless, our escape room is designed to boost cooperation and teamwork among students, so even if they answer the questions individually, they must work together to obtain the final code.

Having the choice to ask their classmates may come as a relief since they can think together in case they are uncertain about the answer, which makes the activity less stressful. In addition, it can also make them feel part of a bigger team since through all their answers they will be collecting together the necessary digits to succeed, which favors teamwork.

The complete design and use of the escape room will be fully explained in the next chapter.

3. Methodology

3.1.Object of study

The object of the study is to investigate the impact that introducing escape rooms in the EFL classroom has on vocabulary learning of 4th of ESO students. In order to address this objective, we shall test the students' memory retention 24 hours and 35 days after classroom intervention. A secondary objective is to discover participants' perceptions regarding their level of motivation in this learning environment.

In order to test the validity of escape rooms in terms of memory retention, the study assesses the learning of 19 English false friends. In terms of motivation, the study explores secondary school students' perceptions of escape rooms as a gamified activity.

3.1.1. Research questions

As mentioned above, in this study we aimed to provide students with a gamified learning experience in order to analyse their short- and long-term memory retention and compare the results of two groups, an experimental group (who tested the escape room) and a control group (who followed a traditional method of teaching). In addition, we were also interested in discovering what students in the experimental group thought of the escape room to determine if they felt more motivated in this learning environment than in the

more traditional learning setting they are used to in their English lessons. The research questions guiding this study are the following:

1. Are there any the differences in the results from participants in the control and the experimental groups regarding their short-term memory retention when learning false friends?
2. Are there any differences in the results from participants in the control and the experimental group regarding their long-term memory retention when learning false friends?
3. What are the perceptions of the students in the experimental group regarding their motivation when using escape rooms for vocabulary learning?

As mentioned in the theoretical framework, there are no studies that focus on the impact that escape rooms have on memory retention in foreign language learning, so this dissertation aims to contribute research to this recent field. Students will be tested twice, 24 hours and 35 days after classroom intervention, to see if they are able to remember the false friends they learned both in the short- and long-term, so as to determine how effective this gamified method is in regard to learning.

The third research question can give us some insights about what students think of the escape room as a learning activity to discover whether it contributes to increase their motivation and engagement in the learning process.

3.2.Classroom intervention

3.2.1. School setting

In order to collect our data, we asked the headmaster of a private school for permission to carry out the classroom intervention in order to test our gamified activity. The school,

colegio Zazuar, is located in a middle-class neighborhood in Santa Eugenia, Madrid, where teachers have been teaching for more than 30 years.

The school has the recognition of bilingual school English-Spanish, but only the English classes are taught in English. Recently, the school has invested in modern devices such as large digital and interactive screens wi-fi equipped and high-quality speakers.

Before the pandemic, the school classes were composed of nearly 30 students (no fewer than 26). Nonetheless, at present, the number of students per class is smaller, so the activity could be tested with 19 students per group.

Every grade in the school is divided into two classes: group A and group B, both having four hours of English per week, and the same curriculum, subjects and number of students, so randomly group A became our control group and group B became the experimental one.

3.2.2. Participants

The headmaster of the school gave us permission to test the activity in 4thESO A and B (students aged 15-16). Group A, the control group, was composed of 18 students (eleven female and seven male students), and group B, the experimental group, was composed of 19 students (12 female and seven male students). Since some of them were absent in either the pre-, the post- or the follow-up test, we had 18 students in the experimental group and 15 students in the control group to answer to RQ1, and 16 experimental students and 13 control students to answer to RQ2. The 18 experimental students also helped answer RQ3.

4th ESO students have four hours of English per week and their level of English would be high-intermediate, corresponding to CEFR B2, according to the English teacher of the

school. The have been learning English for approximately 10 years since they began Primary school.

3.2.3. Task description

The task is vocabulary-based and encourages awareness of English false friends and how they are translated and sometimes wrongly used in Spanish. Nordquist (2019) defines false friends as "pairs of words in two languages (or in two dialects of the same language) that look and/or sound the same but have different meanings" (para. 1), and the reason why we decided to focus on this specific vocabulary item is because it is a part of the curriculum of 4ESO that may cause some confusion among students and lead to several misunderstandings when learning English. Therefore, the purpose of the task was to help students learn the correct use of 19 false friends while stimulating teamwork.

3.2.3.1. Experimental group

For the experimental group, Genially was used to create an escape room to engage students in learning false friends. The purpose of the virtual escape room was that students worked in teams to find the code they needed to open a suitcase, as this was the objective of the story we invented to play in the escape room. In this story, a mysterious suitcase appeared in the forest. As it is locked, students have to find clues to obtain the code that allows the suitcase to open and get what there is inside. They only have one hour to solve the mystery and unlock the case, and they have to go through different challenges to get the different clues.

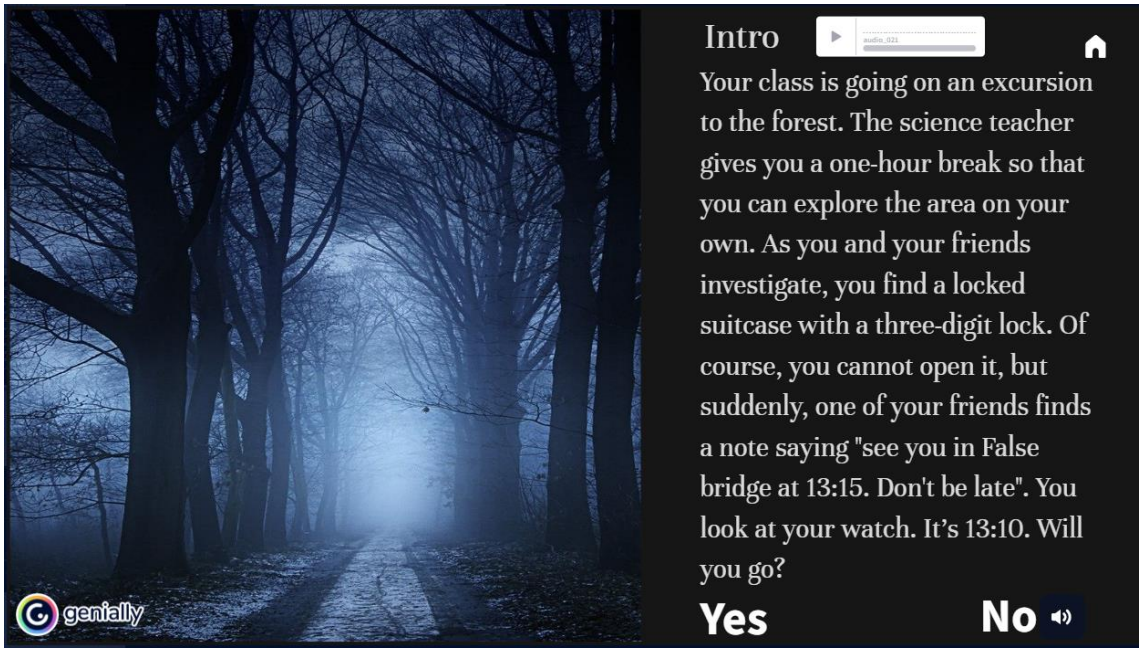

Figure 1. Escape room introduction

To boost their interest, we made it more realistic by taking an actual suitcase that was locked with a three-digit lock to the classroom, so that students had to solve all the challenges in the virtual escape room to open the physical suitcase. It contained a candy bag for each of the students and a box of chocolates for their teacher, but they were not aware of these contents.

In the escape room, every student had to answer one question to assure that everyone participated although they were allowed to ask their classmates to make them feel reassured and promote teamwork. The whole class had to choose the character they wanted to be during the game, so they could be either a biology, music, arts, languages or engineer student.

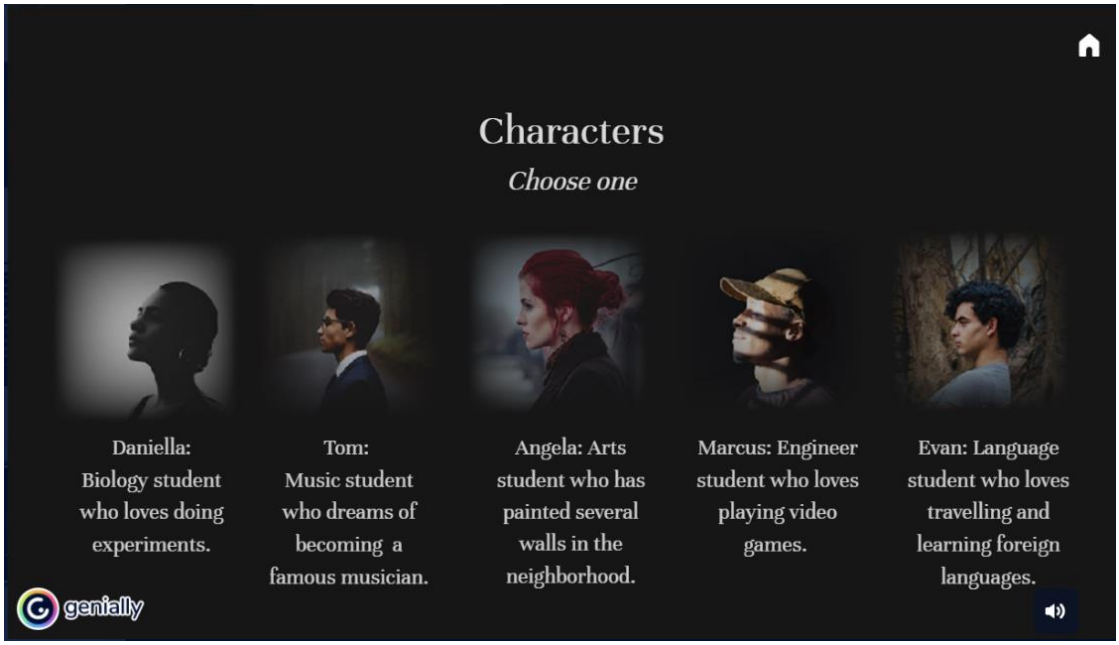

Figure 2. Characters in the escape room

In order to get the final code, the students have had to answer 19 questions related to false friends, where they had to choose the correct meaning among three possible options (see Figure 3). These three options were chosen by the researcher, and they included the correct meaning of the English false friend in Spanish, the Spanish-false friend (for instance, 'lecture' and 'lectura'), and a third option to mislead and make the game more challenging. Another way to ask questions in the escape room was to choose the image that best represented the meaning of the English word, as Figure 4 shows. In both cases, if they chose the correct answer, they moved on to the next question, and if not, they got another chance to try again.

Figure 3. Question in text form

Figure 4. Question in image form.

When they chose the correct answer, an image that represented each false friend was displayed; for instance, if the word was 'assist', the slide showed an image of a boy helping an old lady (see Figure 5). If they chose the wrong answer, it led them to another slide where they had another chance to try again (Figure 6).

Figure 5. Screenshot of image for ‘assist’

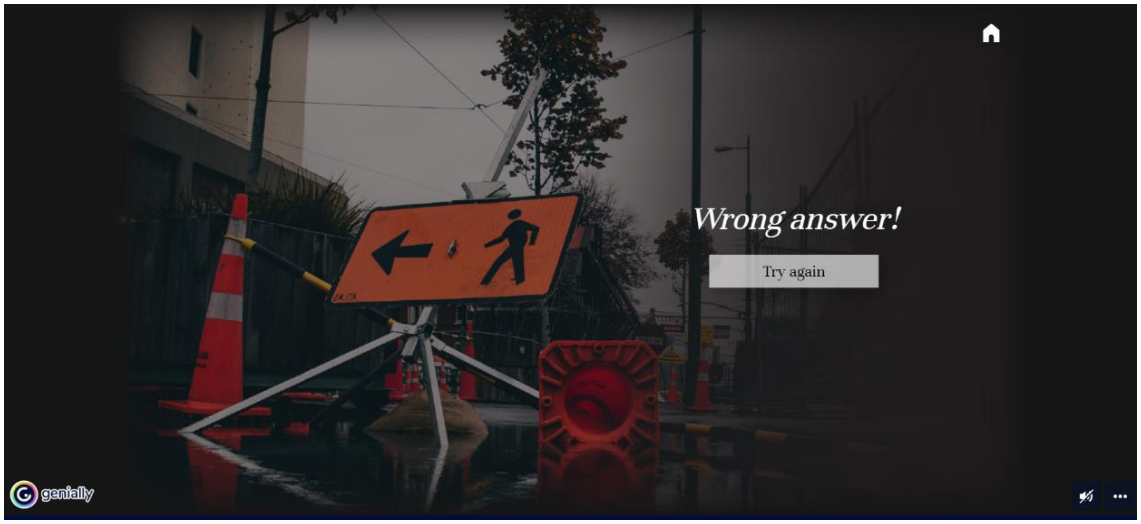

Figure 6. Wrong answer.

There were three scenarios in total (the forest, the city and the bank), and each one had six slides, where each slide contained a question for each student. When they answered the six questions in a scenario, they were given one digit in clue form, as Figure 7 shows. As the story advanced, they moved onto the next scenario and had to answer six new questions to obtain the remaining digits.

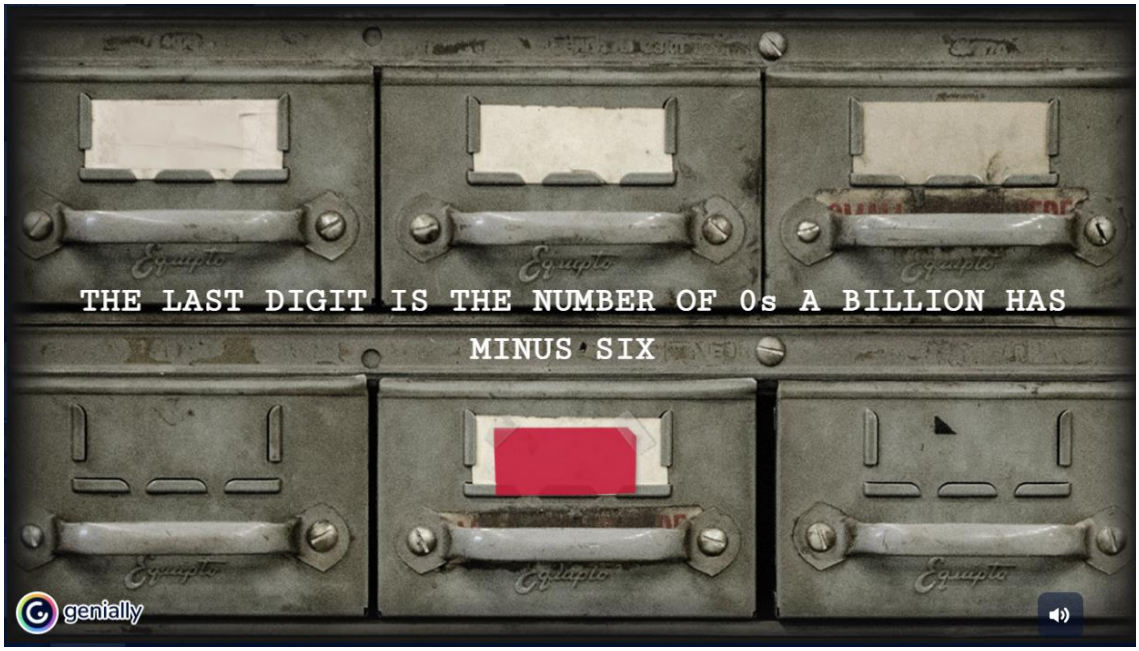

Figure 7. Clue to decipher the last digit of the lock

3.2.3.2. Control group

In the case of the control group, they were taught using a traditional method of teaching, that is, book-based and with no elements of gamification. It consisted of two exercises that were created using a power point presentation so that all students had access to it and it was easier for them to answer the questions.

The first activity was based on a story made up by the researcher that contained the 19 false friends, and each student had to translate one of the sentences into Spanish (Figure 8). If they made a mistake, the whole class was asked if they agreed, and if nobody answered it correctly both the teacher and the researcher explained why it was wrong and what the correct answer was.

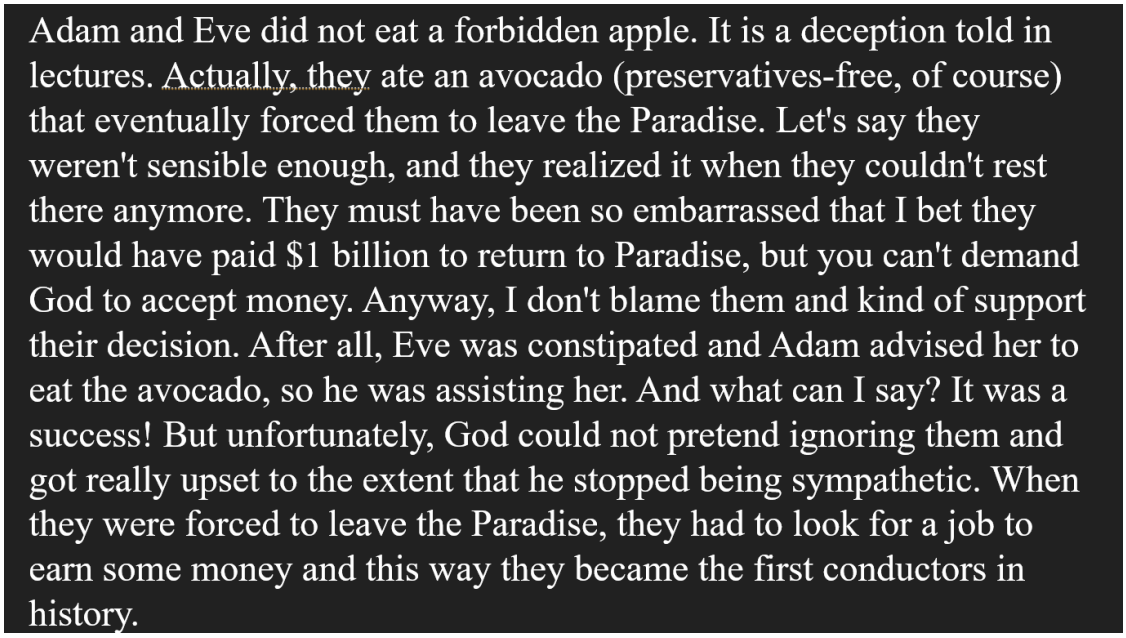

Figure 8. The made-up story

In the second exercise the students were given 19 multiple choice sentences where the students had to choose the correct answer (Figure 9). It followed the same dynamics as the first exercise: the students answered and, if wrong, the whole class was asked to provide the correct answer and then explain why it was not correct at first. Every student had to answer at least one question.

Figure 9. Example of the second exercise

3.2.4. Pedagogical sequence and timeline

This study was carried out over the course of a month and a half. The initial stage involved recruiting the participants for the study and organizing the sessions with the English teacher depending on the slots available in the school. The following stages summarize the whole process carried out during the month and a half, as outlined below:

1. Administer pre-test: the pre-tests were administered on paper. In the case of the experimental group, it took place on March 31 2022, and in the case of the control group, it was administered on April 5 2022.
2. Classroom intervention (55 minutes): in the case of the experimental group, the classroom intervention took place six hours after the pre-test was taken (on March 31 2022), and in the case of the control group it took place the day after the pre-test was taken (on April 6 2022).
3. Administer post-test: the post-tests were administered on paper as well. In the case of the experimental group, on April 1 2022. The experimental group was also given a questionnaire to learn about their perceptions of the escape room. In the case of the control group, they only had the post-test on April 7 2022.
4. Administer follow-up test: the follow-up tests were administered on paper as well. In the case of the experimental group on May 5 (35 days after the class intervention). These students were also given a questionnaire to investigate their memory retention regarding the escape room and what type of memory was strongest in the students. In the case of the control group, it was administered on May 12 (35 days after class intervention).

3.3.Instruments for data collection

There was a total of five data collection instruments: a pre-test, a post-test, a follow-up test, a motivation questionnaire, and a memory retention questionnaire. The instruments are detailed below.

3.3.1. Pre-test, post-test and follow-up test

The three tests consisted of 20 questions about false friends in the form of multiple-choice questions, matching questions and also direct translation questions (see the complete test in appendix A). The tests were answered in paper in class and they were exactly the same for both groups (control and experimental).

The pre-test assessed the participants' knowledge of the false friends prior to the class intervention. The post-tests were administered 24 hours after the class intervention to see what students were able to remember in the short-term. Finally, in order to assess students' memory retention in the long-term, a follow-up test was administered 35 days after the class intervention.

3.3.2. Questionnaires

Two questionnaires were given to the experimental group in order to gather some information about 1) their opinion about the escape room to determine if students had enjoyed or felt motivated during the activity, 2) to see what they were able to remember from the escape room and this way know what type of memory was favored (visual, auditory, episodic, and emotional memory). Both questionnaires were bilingual in order to ensure that each participant understood every question and thus, answers in either English or Spanish were allowed.

The motivation questionnaire (see appendix B and table 1 below) was composed of 10 questions, six of them were closed-ended questions and the remaining four were open-

ended questions. Closed-ended questions intended to quantify how much students had enjoyed the activity, and thus answers were coded numerically from 1-"I did not like it at all" to 5-"I liked it a lot" in a Likert scale. Responses were analyzed using descriptive statistics, where percentages, means and standard deviations were calculated for each question of the questionnaire.

The open-ended questions aimed to provide information about the students' perceptions of the escape room using their own words, and thus it required a qualitative analysis, so answers were coded by marking keywords that described the content of the answer (content analysis). Content analysis is a research method used to identify patterns and code words to later analyse the results provided by data (Luo, 2022). Through this method, positive or negative keywords would be identified in the questionnaires and will be coded to determine if the activity gathered more positive or negative comments. This will allow to find patterns in the students' answers and draw some conclusions about whether they thought they learned in the escape room or not. Questions are detailed in table 1 below:

OPEN-ANSWER QUESTIONS
Did you like this experience? What is your opinion about this "experiment"?
What do you think about using gamification in class? Would you like to have English lessons like this more often?
Do you think you have learnt more efficiently in this session or in a traditional one?
Did you have any problems or difficulties when doing the experiment? What has been the most difficult part?
CLOSED-ANSWER QUESTIONS
How much did you like the class? A lot/ Quite a lot/ Intermediate/ A little/ Nothing

Do you feel motivated after having had the class? A lot/ Quite a lot/ Intermediate/ A little/ Nothing
Do you think you have actually learnt the topic studied? A lot/ Quite a lot/ Intermediate/ A little/ Nothing
How much would you recommend this method of teaching to other teachers? A lot/ Quite a lot/ Intermediate/ A little/ Nothing
Have you felt less stressed about learning English this way? A lot/ Quite a lot/ Intermediate/ A little/ Nothing
In a scale from 0 to 10, I would say that my level of enjoyment has been_____

Table 1. Questions included in the motivation questionnaire

All answers to the open-ended questions in the motivation questionnaire will be included in the next section for the purpose of exemplification and will help answer Research Question 3 (What are the perceptions of the students in the experimental group regarding their motivation when using escape rooms for vocabulary learning?).

In the case of the memory retention questionnaire (see appendix C and table 2 below), it only included six open-ended questions that have provided us with some information about what students could remember of the escape room. The questions have been coded following a content analysis approach and marking the keywords that gave us some insights about the types of memory that were favored by the escape room. Table 2 shows the questions answered by the students:

OPEN-ANSWER QUESTIONS
1. When you think of the escape room, what comes to your memory? Try to write everything you remember: the music, the voice of the speaker, the images, etc.
2. When you were answering the questions of this test, did you think of the moment when the activity was being conducted? Like trying to remember what happened and who answered the questions, watching it as if it was a film to remember the answers.

3.	When you think of the escape room, what do you feel? E.g. happiness, sadness, anxiety, etc. Try to give as much information about your feelings as possible.
4.	What called your attention the most when doing the escape room? E.g., the voice, the colours, the design and images, etc. You can mention anything that called your attention, even anything related to the classroom environment (your classmates behaviour, etc.).
5.	Do you remember some of the translations because of the teacher's explanations? This would mean you are able to remember her words.
6.	Could you please explain how did you try to remember the correct answers of the test? Did you focus on something specific, maybe on some visuals of the escape room or the explanations, or on your feelings?

Table 2. Questions of the memory questionnaire

As we explained in the previous section, the first questionnaire followed the post-test, and the second questionnaire was administered together with the follow-up test (35 days after the class intervention). The results from the qualitative analysis of these questionnaires will be presented in the next chapter together with the results and discussion of the statistical analysis.

3.4. Data analysis

A mixed methods approach to data analysis has been followed in this study and therefore, both quantitative and qualitative data were collected from the five data collection instruments and triangulated. The present section outlines the methodology applied in the analysis of the pre-, post- and follow-up tests as well as the answers to the questionnaires.

3.4.1. Pre-, post- and follow-up tests scores

In order to answer Research Question 1 (Are there any the differences in the results from participants in the control and the experimental groups regarding their short-term memory retention when learning false friends?) the following analyses were performed: 1) A comparison between results from the pre- and post-tests results of the control group, 2) A comparison between results from the pre- and post-tests results of the experimental group,

3) A comparison of the results from the pre-tests of both groups, and 4) A comparison of the results from the post-tests of both groups.

The pre- and post-tests produced quantitative data in the form of test scores, up to 10 points, which were calculated using the program RStudio. The first step in the analysis was to identify if the distribution of the sample was normal and thus, the data collected from both tests were tested for normality using the Shapiro-Wilk test. Normality is dependent on the p-value generated from the test, where $p > 0.05$ indicates a normal distribution and $p < 0.05$ denotes a non-normal distribution. After having tested the results for normality, we run the variance test to see if the data could be compared, and in all cases it could.

The p-value for both the pre- and the post-test results of the control group was 0.76 and 0.09, respectively, and thus the distribution was normal, so a parametric t-test was run to compare the results and determine if there were statistically significant differences between the two tests.

As regards the comparison between the results from the pre and post-tests in the case of the experimental group, the p-value obtained through the Shapiro test for both the pre- and post-test was 0.46 and 0.0012, respectively, which indicated that the distribution was not normal. Therefore, a non-parametric test was run (a paired Wilcox test), since we were studying the same group and thus it is paired. As we have the same subjects who were tested before and after classroom intervention, the scores are dependent between them. Results from the pre-tests of both groups were also tested for normality with results showing that the distribution was normal ($p=0.76$ in the case of the control group and $p=0.46$ in the case of the experimental group), so a parametric t-test was run as well.

Finally, the comparison of the post-tests from both groups showed a not normal distribution (p=0.09 in the case of the control group and p=0.001 in the case of the experimental group), and therefore the non-parametric t-test run was Mann-Whitley U. This was the chosen test since we had two independent groups and thus are not paired.

In order to answer Research Question 2 (Are there any differences in the results from participants in the control and the experimental group regarding their long-term memory retention when learning false friends?), three analyses were conducted: 1) A comparison between the follow-up test results in both groups, 2) A comparison between the post-test and the follow-up test of the control group, 3) A comparison between the post-test and the follow-up test of the experimental group.

The Shapiro test conducted to test the normality of distribution in the case of the results of the follow-up test showed that the distribution was normal (p=0.43 in the case of the control group and p=0.10 in the case of the experimental group), so a parametric t-test was run to see if there was a statistically significant difference between the two groups.

Regarding the results from the Shapiro test showed that the distribution in the control group was normal with p-values in the post- and the follow-up test of 0.09 and 0.43, respectively. Therefore, a parametric matched t-test was run to determine if there were statistically significant differences between the two tests.

Last, the p-value obtained through the Shapiro test for both the post- and follow-up test for the experimental group was 0.001 and 0.10, respectively, and thus the distribution was not normal, so a non-parametric test (a paired Wilcox test) was run to compare the scores from the post- and follow-up tests since we were studying the same group and thus it is paired. The purpose was to determine if there were a statistically significant differences between the two tests.

In addition, for each test, descriptive statistics were also used to calculate means, percentages and standard deviations of the overall scores, since this information also helped us see differences and similarities between both tests and also between both groups. All results are discussed in the following section.

4. Results and discussion

This chapter introduces the results obtained from the study of both groups, beginning with the scores from the pre- and post-tests followed by the results of the follow-up test and the answers from the memory retention questionnaire. Finally, we will present and discuss on the students' impressions about the gamified method in the motivation questionnaire.

4.1.Answers to Research Question 1

4.1.1. Pre- and post-test results: short-term memory retention

The purpose of the pre- and post-tests was to observe if students' knowledge of false friends improved as a result of the class intervention.

4.1.1.1.Control group results

Regarding the control group, the results from the t-test produced a p-value of 0.04, meaning that there was statistically significant difference between the scores of the pre- and post-test, so it can be said that control students' knowledge of false friends did improve after class intervention.

	Pre-test	**Post-test**
Number of students	15	15
Mean	5.13	6.5
Standard deviation	1.77	1.75
Matched t-test results	0.04	

Table 3. Mean, standard deviation and result of the matched t-test for pre- and post-tests in the control group

In addition, the mistakes made by the control group in both the pre- and post-test have been collected and presented in a chart. Below, Figure 10 shows which words have been

more difficult for most students in each test and which ones have been easier for them. In the case of the pre-test, the false friends with most mistakes made by these students are *constipated* (14 students out of 15 students, 93%, made this mistake), *pretend* (13 students, 86%), *deception* (12 students, 80%), and *eventually* (12 students, 80%). On the other hand, *advice* (two students, 13%), *success* (three students, 20%), *rest* (four students, 26%), and *support* (four students, 26%) have been the false friends with fewer mistakes made by the control group in the pre-test.

Regarding the mistakes made in the post-test, *lectures* (12 students, 80%), *deception* (11 students, 73%) and *demand* (11 students, 73%) are still difficult for students since most of them got them wrong. On the other hand, *billion* (none of the students made this mistake, 0%), *preservatives* (only two students, 13%) and *sympathy* (only one student, 6%) seemed to be easier for students.

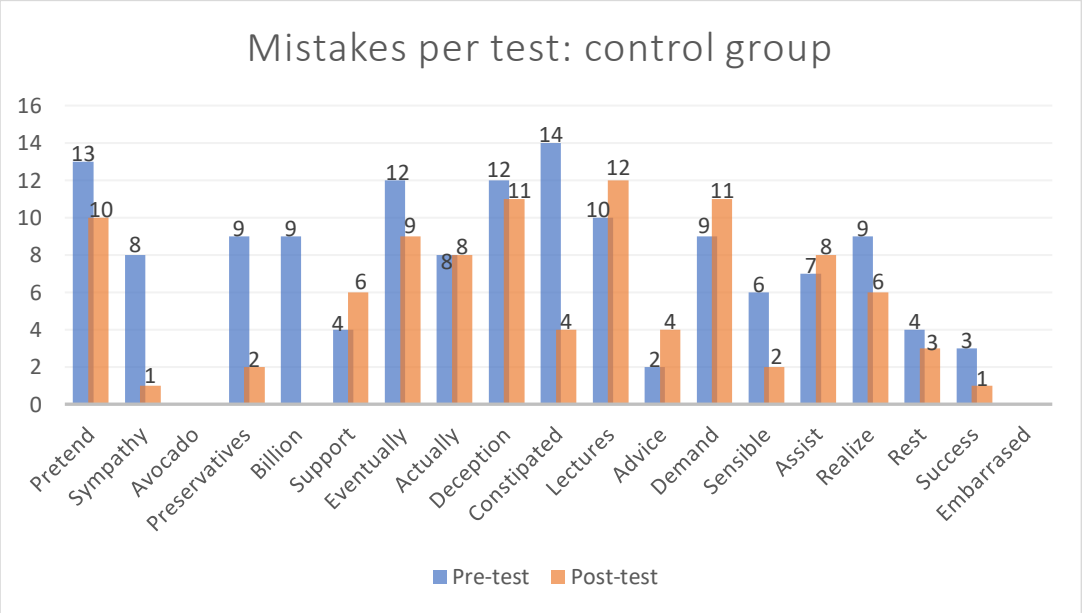

Figure 10. Number of students who made mistakes in the pre-, and post- tests (control group)

According to the information provided by data, we can state that control students raised their grades after class intervention and there was an improvement in the mistakes made in the post-test. However, this improvement was moderate, and the mean of the group

only increased by 1.37 points, which suggests a slight improvement in the class performance.

4.1.1.2.Experimental group results

Results from the Wilcox test showed that there was a highly significant difference (p=0.0002), which means that the gamified classroom intervention led to a very significant improvement in the students' knowledge of false friends after learning in the escape room.

	Pre-test	**Post-test**
Number of students	18	18
Mean	3.69	8.86
Standard deviation	1.57	1.18
Matched t-test results	0.0002	

Table 4. Mean, standard deviation and result of the t-test for pre- and post-tests in the experimental group

The mistakes made by the experimental group in both the pre- and post-test have also been collected and presented in Figure 11, which shows the most difficult words for most students in each test and the easier ones for them, depending on the number of students who made the mistakes. In the case of the pre-test, the false friends with most mistakes made by these students are *sympathy* (17 out of 18 students, 94%, made this mistake), *deception* (17 students, 94%), and *eventually* (17 students, 94%). On the other hand, the easiest ones are *avocado* (one student, 5%), *rest* (four students, 22%) and *embarrassed* (four students, 22%) since these are the false friends with fewer mistakes made by the experimental group in the pre-test.

Regarding the mistakes made in the post-test, *actually* (eight students, 44%), and *pretend* (five students, 27%) are still difficult for experimental students since most of them got them wrong, although in the case of *pretend*, fewer students made this mistake compared to the pre-test. On the other hand, *avocado*, *sympathy*, *billion*, *advice*, *assist*, *rest*, *success* and *embarrassed* seemed to be easier for students after the activity was conducted since

none of the experimental students made these mistakes in the post-test.

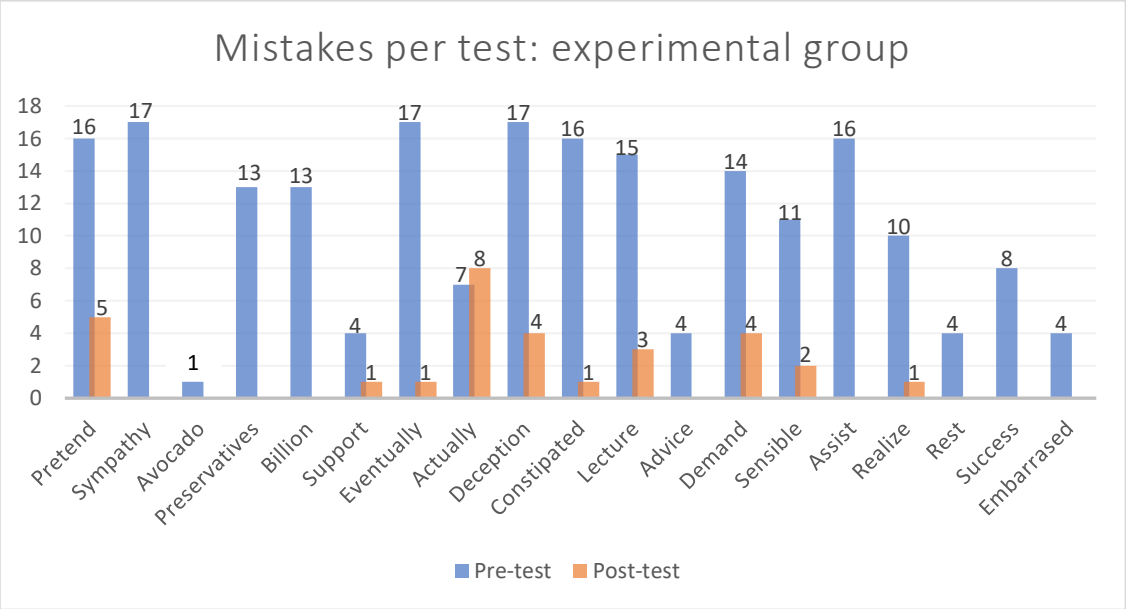

Figure 11. Number of students in the experimental group who made mistakes in the pre-, and post- tests (experimental group)

According to the information provided by data, we can state that experimental students raised their grades after class intervention and there was an improvement in the mistakes made in the post-test. The mean of the group increased by 5.17 points and as Figure 11 shows, the mistakes made in the post-test are less numerous than the mistakes made in the pre-test, which suggests an outstanding improvement in the class performance.

4.1.1.3.Comparison of the results of the control and experimental group

Regarding the comparison of both groups in terms of the results of the pre-test, results from the parametric t-test showed that there were statistically significant (p=0.02) differences between both groups. The mean also indicates that students in the control group performed better than those in the experimental group. See Table 5 below:

	Control	Experimental
Number of students	15	18
Mean	5.13	3.69
Standard deviation	1.77	1.57
Matched t-test results	0.02	

Table 5. Mean, standard deviation and t-test results of the pre-test in both groups

As regards results from the Mann-Whitley U test run to compare results of the post-tests from both groups these were statistically highly significant (p=0.0004). The mean has also increased noticeably in the experimental group when compared to the control group. This indicates that the scores obtained by students in the experimental group performed far better than their counterparts in the control group after classroom intervention. See Table 6.

	Control	Experimental
Number of students	15	18
Mean	6.5	8.86
Standard deviation	1.75	1.18
Matched t-test results	0.0004	

Table 6. Mean, standard deviation and t-test results of the post-test in both groups

As we have seen in the tables above, the control group, despite having higher scores in the pre-test, which indicated that their knowledge of false friends was better than that of the experimental group before the classroom intervention, performed worse than the experimental group. This last group clearly outperformed the control group in the post-test, raising their mean by 5.17. This means that the experimental students' learning of false friends in a gamified setting produced clearly better results, and their short-term memory retention was better than those of students in the control group, which raised their mean by 1.35 in the post test.

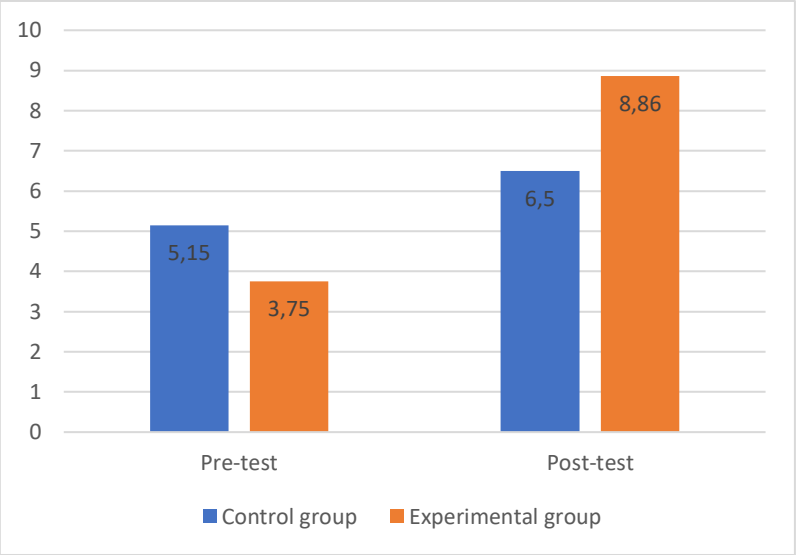

Figure 12. Mean of pre- and post-tests in both groups

In addition to the students in the experimental group improving their results, some of them also obtained outstanding grades. For instance, student 11 raised his/her grade up to 7.5 points, just like student 15 (see Table 7). The two lowest grades belong to students 4 and 16, but they also even managed to raise their grades 3.5 points and two points, respectively. In addition, as we can see in the table below, 13 out of 18 students failed the pre-test, however, none of them failed the post-test, and three students got a perfect score. Red-coloured cells represent the failing grades (below 5 points), while the green-coloured ones represent the passing grades (above 5 points).

This would mean that the gamified method of teaching through an escape room did have a considerable impact on short-term memory retention that helped students better remember the vocabulary items taught.

Student	Pre-test	Post-test	Points gained
1	3	10	+7
2	7	9	+2
3	3	9.5	+6.5
4	3	6.5	+3.5
5	5	9	+4
6	4	9.5	+5.5
7	3.5	9.5	+6.5

8	3	9	+6
9	5.5	9.5	+4.5
10	1.5	8.5	+7
11	1.5	9	+7.5
12	5.5	9.5	+4.5
13	3	8.5	+5.5
14	5.5	10	+5.5
15	3.5	10	+7.5
16	4	6	+2
17	1	7	+8
18	4	9.5	+5.5

Table 7. Comparative pre- and post-tests scores in the experimental group

By contrast, although the control group also improved their scores, results were not as high when compared to those of the experimental group (see Table 8). Most of them raised their grades up to two points, and only one of them managed to raise his/her grade up to three points (student 8). This would mean that their short-term memory retention was less favored by the more traditional approach and vocabulary items were more difficult to remember. To illustrate this, we have used the same colour code (red-coloured cells represent the failing grades, while the green-coloured ones represent the passing grades) in the control group table below:

Student	Pre-test	Post-test	Points gained
1	4.5	5.5	+1
2	3	5	+2
3	5.5	4.5	+1
4	3.5	5.5	+2
5	4	5	+1
6	7	9	+2
7	7.5	9.5	+2
8	4	7	+3
9	5.5	6.5	+1
10	6	7	+1
11	4	4.5	+0.5
12	5	7	+2
13	6	8	+2
14	2.5	4.5	+2
15	9	9	0

Table 8. Comparative pre and post-tests scores in the control group

As can be seen above, the experimental group performed better than the control group in terms of grades since they obtained better results, which, as already mentioned, suggests that the escape room led to a better short-term memory retention. The results regarding long-term memory retention will be discussed in the next section.

4.2.Answer to Research Question 2

4.2.1. Follow-up test results: long-term memory retention

The purpose of the follow-up tests was to observe if students' knowledge of false friends varied 35 days after the class intervention. In order to investigate this, results from the post-test and the follow-up test were compared.

4.2.1.1.Comparison of the follow-up tests in both groups

The results of the parametric t-test are significant (p=0.04) and the mean of the experimental group is clearly higher than the mean of the control group, which indicates that experimental students performed better than those in the control group. This shows that experimental students' long-term memory retention was better. The standard deviation of the control group is higher than the one of the experimental group, which indicates that experimental students' grades are closer to the mean and thus there is not a big difference among the students' grades, but rather all of them obtained similar scores in the follow-up test.

	Control group	**Experimental group**
Number of students	13	16
Mean	5.96	7.59
Standard deviation	2.33	1.57
T-test results	0.04	

Table 9. Mean, standard deviation and result of the follow-up test in both groups

Focusing on the mistakes still made by the control and by the experimental group in the follow-up test, the information collected and presented in Figure 13 shows that the control group made more mistakes than the experimental group. *Deception* was the false friend

that most students got wrong in both groups (12 control students out of 13, 92%, and 10 experimental students out of 16, 62%) but *pretend* (nine control students, 69%, and seven experimental students, 43%), *sympathy* (nine control students, 69%, and six experimental students, 37%) and *demand* (nine control students, 69%, and six experimental students, 37%) were also difficult for most students in the control group and for some of them in the experimental group. On the other hand, *avocado* seems to be the easier one since none of the students got it wrong, together with *support* and *preservatives*, since in both words only two control students (15%) and one experimental student (6%)- in the case of *support*- got it wrong.

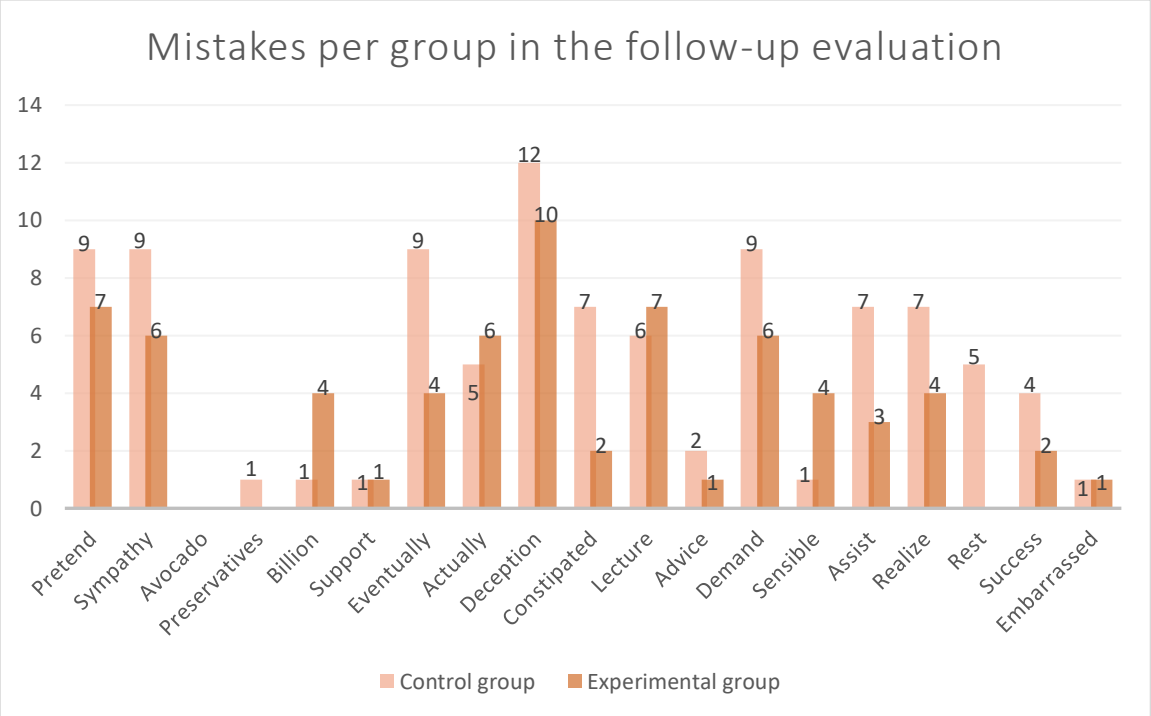

Figure 13. Comparison of the mistakes made by the control and the experimental group in the follow-up evaluation

According to the information provided by data, we can state that experimental students performed better than control students in the follow-up test.

4.2.1.2.Follow-up evaluation: control group

Regarding the results from the control group, the parametric matched t-test run showed that there was not a statistically significant difference (p=0.50), so students' grades and

thus knowledge of false friends taught barely changed in the course of 35 days. However, the mean was lower in the follow up test (which indicates that control students obtained worse results 35 days after class intervention) and the standard deviation was higher, which indicates that there was a higher variation in the grades (that is, control students' grades were more dispersed from each other since some students obtained very high grades while others obtained very low grades, as table 10 shows).

	Post-test	Follow-up test
Number of students	15	13
Mean	6.5	5.96
Standard deviation	1.75	2.33
T-test results	0.50	

Table 10. Mean, standard deviation and result of the t-test for pre-test, post-test and follow-up test (Control group)

Most students (10 out of 13 students, 76%) lost points in the follow-up test in contrast to the post-test. Five students (38%) failed the follow-up test, but two students (student 9 and 11, 15%) managed to rise their grades up to 0.5 points. However, four students (30%) lost 0.5 points, and one student lost three points (student 1), so most grades only varied a little, which shows that the students' knowledge of false friends slightly worsened. See table below, where green-coloured cells represent the passing grades, and the red-coloured cells represent the failing grades:

Student	Post-test	Follow-up test	Points
1	5.5	2.5	-3
2	5	3.5	-1.5
3	5.5	4.5	-1
4	5	4.5	-0.5
5	9	8.5	-0.5
6	9.5	9.5	0
7	7	6	-1
8	7	7	-1
9	4.5	5	+0.5
10	7	65	-0.5
11	8	8.5	+0.5
12	4.5	3	-1.5

13	9	8.5	-0.5

Table 11. Comparative post- and follow-up tests scores in the control group

4.2.1.3.Follow-up evaluation: experimental group

Regarding the results of the experimental group, Wilcox test was run and the results showed that there was a highly significant difference (p=0.005), which means that the gamified activity led to a significant change in the long-term memory retention. However, experimental students' mean decreased by 1.27 points, which indicates that although experimental students obtained a considerable high grade 35 days after class intervention, they also performed worse than in the post-test. In addition, the standard deviation is also higher, which means that there was a higher variation in the grades (that is, experimental students' grades were more dispersed from each other, as table 12 shows).

	Post-test	**Follow-up test**
Number of students	18	16
Mean	8.86	7.59
Standard deviation	1.18	1.57
Matched t-test results	0.005	

Table 12. Mean, standard deviation and result of the t-test for pre-test, post-test and follow-up test (Experimental group)

In the case of the experimental group, 13 out of 16 students (81%) lost points in the follow-up test compared to the post-test. However, three students (18%) only lost 0.5 points, and only one student (7%, student 6) lost up to four points in the follow-up test. In addition, none of the students failed the follow-up test, and two students (15%, students 1 and 8) managed to rise their grades up to 0.5 points. This shows that, although experimental students' grades dropped in the follow-up test, they still could recall most of the false friends and obtained better results than control students. See Table 13, where green-coloured cells represent the passing grades, and the red-coloured cells represent the failing grades:

Student	Post-test	Follow-up test	Points
1	9	9.5	+0.5
2	9.5	6.5	-3
3	6.5	5.5	-1
4	9	7.5	-1.5
5	9.5	7.5	-2
6	9.5	5.5	-4
7	9	8.5	-0.5
8	9.5	10	+0.5
9	9	6.5	-2.5
10	9.5	9	-0.5
11	8.5	6	-1.5
12	10	9.5	-0.5
13	10	8	-2
14	6	6.5	-0.5
15	7	6	-1
16	9.5	9.5	0

Table 13. Comparative post- and follow-up tests scores in the experimental group

4.2.2. Results from the qualitative analysis

In addition to the follow-up test, the experimental group was given a questionnaire (see appendix C) to see what they were able to remember from the escape room. We wanted to know if there was a specific type of memory that was triggered by their experience in this setting, and thus students answered the following open-ended questions: 1) When you think of the escape room, what comes to your memory? 2) When you were answering the questions of this test, did you think of the moment when the activity was being conducted? 3) When you think of the escape room, what do you feel? 4) What called your attention the most when doing the escape room? 5) Do you remember some of the translations because of the teacher's explanations? 6) Could you please explain how did you try to remember the correct answers of the test?

Five out of 16 students (31%) stated that they remembered the escape room because of the explanations of the teacher or because of the voice of the speaker, so in their cases the escape room seems to have fostered their auditory memory:

"I found most interesting the voice of the speaker; it is the first thing that comes to my mind when thinking about the escape room"- student 8.

"I can remember some answers because of the teacher's explanations. Also, the speaker was very good, she is perfect to practice the pronunciation"- student 12.

"The first thing that comes to my mind is the voice of the speaker"- student 13.

"I remember the words because of the explanations"- student 14.

"I especially remember the voice of the speaker and the explanations"- student 15.

However, it also fostered episodic memory for five out of 16 students (31%), since they claimed that they were able to remember the whole escape room as if it was a film, recalling who answered which question and whether it was right or wrong.

"To remember the correct answers, I only had to think of the moment when we were in class doing the escape room"- student 1.

"I have associated each question with the person that answered it and with the jokes the teacher made about each false friend, that's why it is easier to remember"- student 2.

"I tried to remember the situation to recall the false friends"- student 6.

"I tried to remember the activity and I thought that the answers most similar to Spanish were not the correct ones"- student 10.

"I tried to go back to the moment when the activity was being conducted, so I remembered the three possible answers with their colours and where the correct one was situated"- student 11.

Some others claimed that they remembered the images, which means that for three out of 16 students (19%) the escape room fostered their visual memory:

"I especially remember the colors and the images of the escape room. To answer this test, I tried to remember the images"- student 3.

"I tried to remember the images and the person who answered each question. I especially remember the words 'sensible' and 'sensitive' because of the image of Lisa Simpson to explain the meaning. I will never forget that"- student 4.

"I especially remember the images"- student 7.

Finally, three out of 16 students (19%) showed a stronger emotional memory since they were able to remember the escape room because of the emotions and feelings they had in that moment:

"I felt happiness when evoking the memories of the escape room because we had never done such an activity. I remember the images because they made me laugh and I did not expect it at all, it was a funny surprise. In addition, the voice of the speaker made me feel nervous and excited about the mystery"- student 5.

"The atmosphere especially caught my attention: it seemed that we were somewhere else when we lowered the shutters and the mysterious voice started speaking. I also remember the dark background of the escape room because it was mysterious"- student 9.

"I felt very intrigued to know what there was inside the suitcase and I felt very happy when we answered correctly. I know it is not a big thing, but I felt really excited when we passed on to the next question"- student 16.

Taking into account these answers to the open-ended questions and also the results obtained by the experimental group, we can conclude that the escape room created for the classroom intervention boosted memory retention in both the short- and long-term, and that it also promoted different types of memory that include auditory, episodic, visual and emotional memory, according to the students' answers. See Figure 14 below.

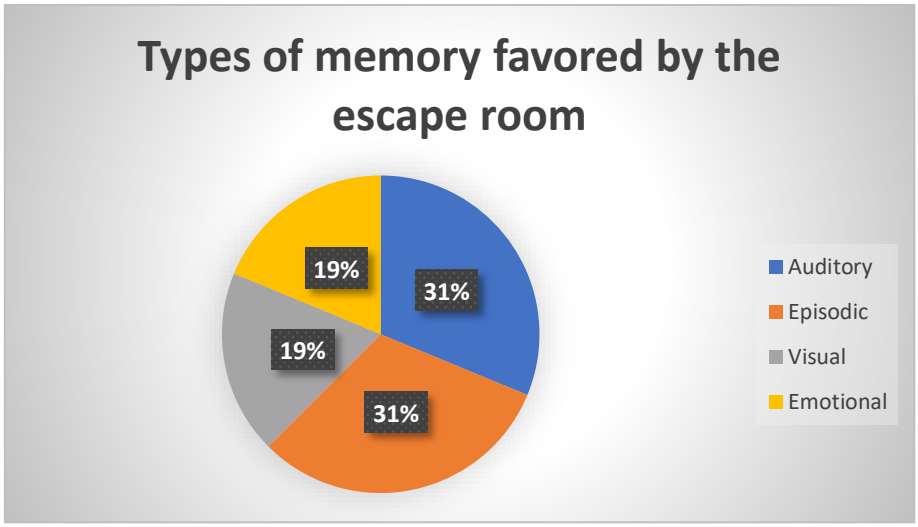

Figure 14. Types of memory

According to the answers provided, episodic memory (31% of students) and auditory memory (31% of students) were the most favored ones since most students claimed to remember the answers and the escape room because of the speaker's voice and the teacher's explanations, or because they could recall the whole activity as a film. On the other hand, visual memory (19%) and emotional memory (19%) were less favored, but yet made an impact on students' memory retention since they could remember the feelings they had during the activity as well as some of the images.

Next section will discuss the answers to the motivation questionnaire answered by the students, providing answers to Research Question 3.

4.3. Answers to Research Question 3

4.3.1. Results from the Motivation questionnaire of the experimental group

Students belonging to the experimental group answered a simple questionnaire composed of six closed-ended questions and four open-ended questions (see appendix B) to assess the level of engagement they had during the activity.

Regarding the closed-ended questions, each experimental student had to evaluate if they liked the class, if they felt motivated, if they think they had learnt the topic studied, if they would recommend the activity to other teachers, and if they felt less stressed about

learning English this way. They were asked to answer depending on how much they had enjoyed the activity (a lot, quite, intermediate, a little or nothing, values 5 to 1 in a Likert scale).

The results of their levels of engagement showed that the experimental group actually was highly engaged and enjoyed the class: 13 out of 18 students, 72%, claimed to have enjoyed the class a lot, and the remaining five, 28% claimed to have enjoyed it quite a lot, as Figure 15 shows:

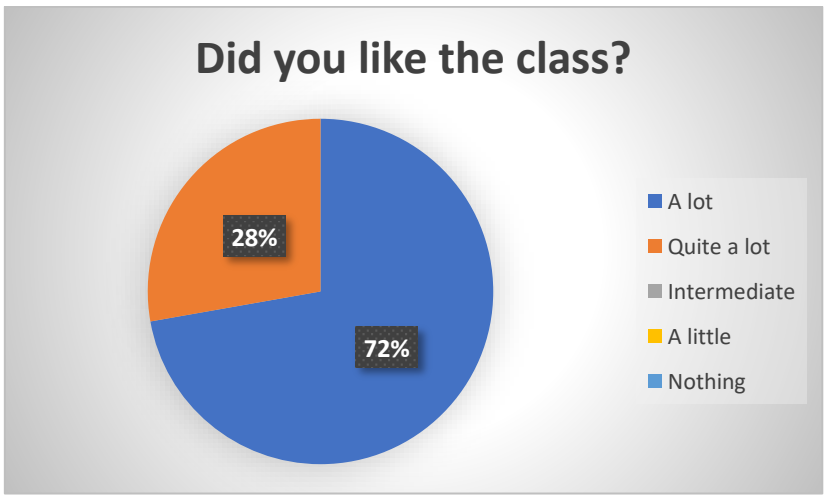

Figure 15. Answers to the motivation questionnaire (question 1)

Students were also asked to evaluate if they felt motivated after having had the class, where six out of 18 students, 32%, claimed to feel a lot motivated, eight students, 42%, claimed to feel quite a lot motivated, and five students, 26%, claimed to feel motivated in an intermediate level. See Figure 16:

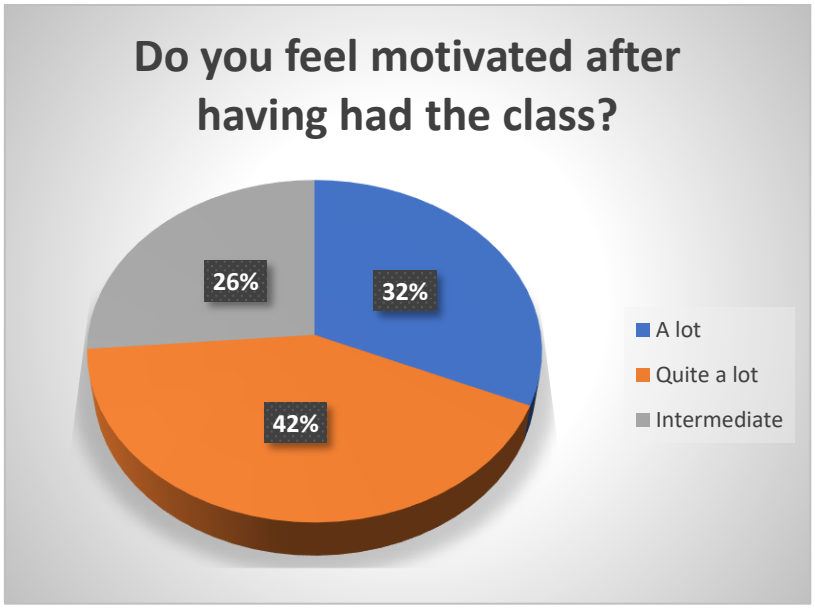

Figure 16. Answers to the motivation questionnaire (question 2)

In regard to whether they felt they had learnt more efficiently through the escape room, five out of 18 students, 26%, claimed to have learnt a lot more efficiently, 13 students, 69%, claimed to have learnt quite a lot more efficiently and only one student, 5%, claimed to have learnt more efficiently in an intermediate level, as Figure 17 shows:

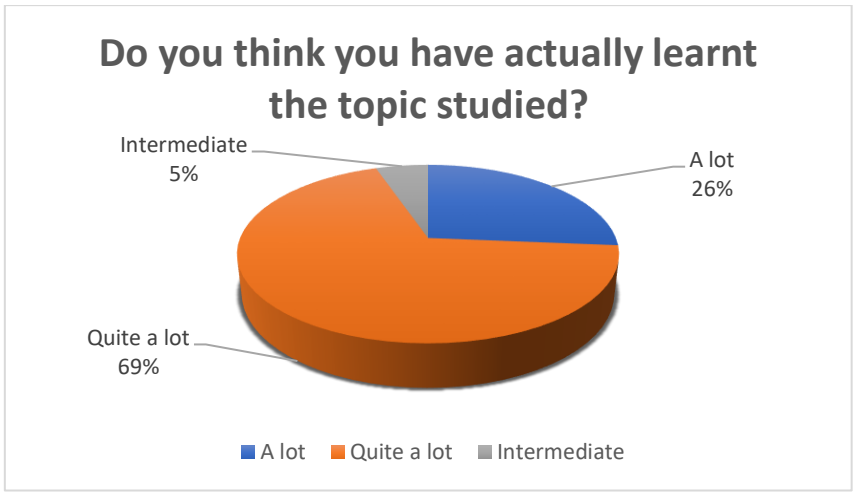

Figure 17. Answers to the motivation questionnaire (question 3)

In order to know if students would like to do escape rooms in other subjects, they were asked if they would recommend this activity to other teachers, where 11 out of 18 students, 58%, claimed that they would recommend escape rooms a lot, and eight students, 42%, claimed that they would recommend it quite a lot. See Figure 18:

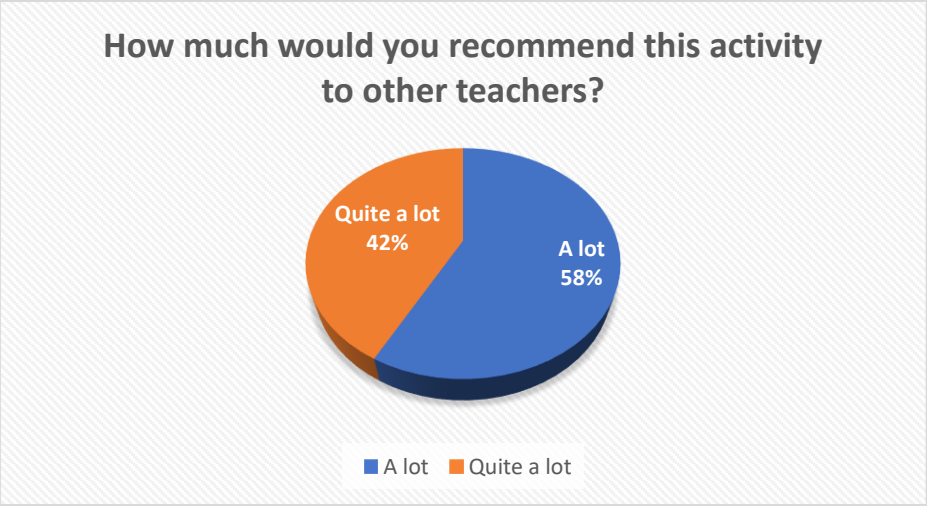

Figure 18. Answers to the motivation questionnaire (question 4)

To evaluate their levels of stress when playing the escape room, students were also asked if they felt less stress learning through this activity. 11 out of 18 students, 58%, claimed to have felt a lot less stressed learning this way, six students, 32%, claimed to have felt quite a lot less stresses and only two students, 10%, claimed to have felt less stressed in an intermediate level, as Figure 19 shows:

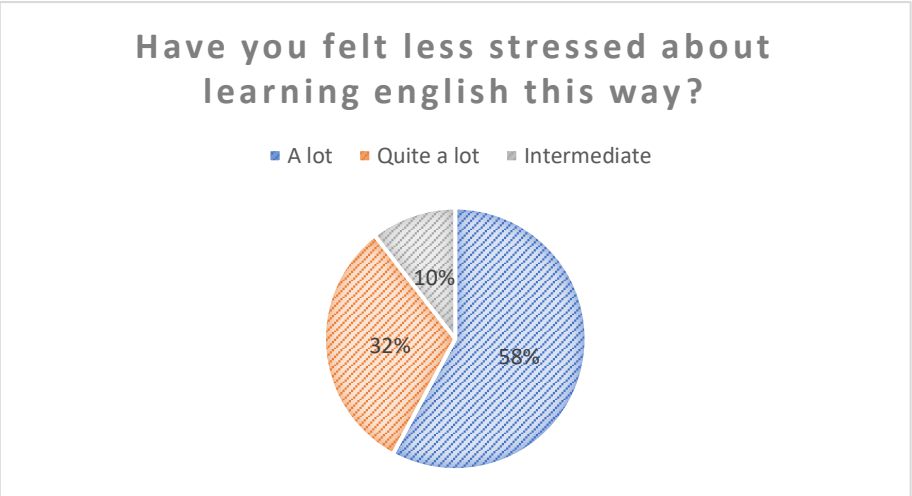

Figure 19. Answers to the motivation questionnaire (question 5)

At the end of the questionnaire, they were asked to assess their level of engagement during the class and provide a grade from 0 to 10. The mean was 8.9, which indicates that all of them actually were highly engaged and enjoyed the activity.

Regarding the open-ended questions provided by the experimental group, all of them (18 students) made positive comments about their experience in any of the four questions (Did you like this experience? What do you think about using gamification in class? Do you think you have learnt more efficiently in this session? Did you have any problems or difficulties when doing the experiment?):

"I would like English classes to be like this"-student 1.

"I think we can learn in a more entertaining way following this method"-student 2.

"I think we have learnt more efficiently following this method because you don't realize you are learning"-student 3.

"The experiment has been interesting and entertaining"-student 4.

"I think it has been a very fun activity in which all of us have paid attention. It has been a very fun activity and I would like to do it again"-student 5.

"It has been a more dynamic way to learn false friends and I would like English classes to be like this more often"-student 6.

"I paid more attention in this class than in the traditional one"-student 7.

"If boring classes were like this, we would better remember the topic because images are engraved in your memory and, besides having fun, you learn"-student 8.

"It has been such a great project. It was very funny and entertaining. I loved it so much and I have learnt so many words in this language"-student 9.

"I think this method should be more used because this way we would understand more things"-student 10.

"I like this activity and I think it helps a lot to learn false friends"-student 11.

"I absolutely love this new method of teaching since it is the most dynamic and easiest way to learn and remember new words"-student 12.

"I like this activity because it has been unusual and I think we should do it more often"-student 13.

"This method is good to learn and remember the concepts. I'm sure I won't forget these false friends"-student 14.

"I think using these games makes us learn better"-student 15.

"This class has captured our attention more than the traditional one and I would love to have English classes like this. I am able to remember most words thanks to the images"-student 16.

"This is a more fun method that in addition makes you remember the words"-student 17.

"I think it's an interesting experience, also it feels better than the traditional methods to learn. I would like teachers to make this in class more often"-student 18.

It is important to highlight that 13 out of 18 students (72%) claimed not only to have enjoyed the class, but also to have learnt more efficiently, for instance, thanks to the images that appeared after each correct answer. All of them felt motivated after having had the class and they all claimed that using this activity could help them learn more words and better understand some topics. As student 14 explains, it is unusual and makes them pay more attention and this way they can learn more.

These findings show that the introduction of this gamified activity had a highly positive effect on the students' level of engagement and motivation that it can help teachers make their classes more motivating and conducive to effective learning.

The next chapter conveys the conclusions reached upon interpretation of the main findings of the study and how they are relevant to education.

5. Conclusion

The present study has explored the effects that an escape room has in ESO students' memory retention and motivation when learning vocabulary items and more specifically false friends.

Escape rooms are a new and recent learning activity that has not been researched in the field of gamification given its novelty. In the EFL classroom, although some studies have been found that explored its efficacy in teaching vocabulary items, no research has been carried out to assess its efficacy in regard to memory retention and motivation.

In order to study the validity of escape rooms in terms of memory retention and motivation, the following three research questions have been answered: 1) are there any differences in the results from participants in the control and the experimental groups regarding their short-term memory retention when learning false friends? 2) are there any differences in the results from participants in the control and the experimental group regarding their long-term memory retention when learning false friends? 3) What are the perceptions of the students in the experimental group regarding their motivation when using escape rooms for vocabulary learning?

The study analysed results from two groups of students, one was the control group and the other the experimental group. In the case of the control group, the activities designed to teach false friends were based on a traditional method of teaching that included the

translation of a text containing the 19 false friends and a second exercise in the form of multiple-choice questions, where students had to choose one of the three possible answers to complete a sentence. The experimental group had to solve an escape room that was designed to teach 19 false friends through a made-up story of a locked suitcase that appears in the forest. In order to obtain the three digits of the final code that would open the lock of the suitcase, they had to choose the correct translation of the 19 false friends by working in team.

To assess the control and the experimental students' short memory retention (Research Question 1), both groups were given a pre-test before any of the activities were conducted. 24 hours after class intervention, a post-test was administered to both groups so as to analyse their short-term memory retention. Results show that although experimental students' pre-tests grades were lower than control students' grades (3.69 and 5.13, respectively), experimental students far exceeded control students in regard to the post-test results (8.86 and 6.5, respectively), which suggests that the escape room led to an improvement in the experimental group's grades and thus it favored their short-term memory retention.

Regarding long-term memory retention (Research Question 2), both groups were given a follow-up test 35 days after class intervention. The results obtained show that the experimental group exceeded the control group regarding the grades (7.59 and 5.96), which suggests that experimental students were able to better remember the false friends in the long-term. In addition, the experimental group answered a simple questionnaire to know about what they were able to remember from the class intervention and this way understand which types of memory were favored by the escape room.

Most students claimed that they especially remembered the voice of the speaker and the explanations, others stated that they remembered the images and the colours of the escape

room, others said they were able to remember the escape room as if it were a film, so they could recall which students answered which questions. Last, a smaller group of students remembered the escape room because of the emotions and feelings they had while the activity was conducted, which suggests that the most favored types of memory were visual, auditory, episodic, and emotional.

Finally, in order to know about the students' perceptions of the escape room (Research Question 3), experimental students had to answer a simple questionnaire consisting of five open-answer questions and five close-answer questions. As they provided a grade from 0-10 with regard to how much they had enjoyed the activity, the mean of their level of enjoyment was 8.9, which indicates that all of them had fun during the activity. Furthermore, all students made positive comments in the open-answer questions about their impressions, and they all expressed their desire to repeat the activity, to incorporate it in regular classes and to have learnt more efficiently, apart from having felt more motivated and eager to learn.

The answers to the three questions have shed some light on the validity of escape rooms in terms of memory retention and motivation, which may provide a starting point for further research on the area, given that no previous studies have focused on the matter and thus it was an unexplored topic. The study also has pedagogical implications that can be implemented in the EFL classroom, as the next section summarizes.

5.1.Pedagogical implications

According to the information above, we can suggest that teaching English topics through escape rooms has some important benefits regarding memory retention and motivation. As experimental students' results regarding learning false friends have improved throughout this study and they also showed a better performance than the control group, we could consider that the implementation of this gamified learning activity can be an

asset for English teachers not only to improve students' learning of false friends, but also to boost their motivation, which is, as reviewed by Vero and Puka (2017) "probably the most important factor that educators can target in order to improve learning" (p.58).

Making them feel motivated and enthusiastic about innovative ways to learn can also lead to important changes in their perspectives regarding the classroom environment. It can awaken a thirst for knowing and for improving so as to exceed not only their classmates, but also themselves to make things faster, better and more efficiently (Moura & Lourido, 2020). According to students' answers to Research Question 3, the escape room made them feel part of the group and they were excited every time they answered correctly since they considered it a challenge, which suggests that the activity boosted engagement among students.

As positive results were also reached regarding short- and long-term memory retention, teachers could evaluate the possibility of including this activity in their classrooms when teaching false friends (or other similar vocabulary items) since the present study has demonstrated that teaching English false friends through escape rooms can work.

Hermanns et al. (2017) consider that escape rooms can be especially useful in areas requiring a lot of reading and memorization, so teaching vocabulary items that need to be learnt by heart, such as false friends, can benefit from escape rooms since they favor visual, auditory, episodic and emotional memory. In this way, this study could inspire teachers to use a new and more innovative way to teach false friends.

5.2.Limitations

Despite the encouraging findings, this study is not without the limitations. Thus, higher number of participants from other educational backgrounds and contexts need to be included for results to be significant.

Also, escape rooms need to be designed for other EFL purposes including teaching challenging aspects of grammar, semantics and pragmatics to see if their effectiveness in the students' short- and long-term memory retention remains.

5.3.Further research

Given that research in gamification that uses escape rooms for teaching purposes is still scarce, it would be beneficial if future studies included using escape rooms to teach not only other aspects of EFL as mentioned above, but also other knowledge areas (i.e. philosophy, science, geography, maths, etc.). In addition, replicating this study to further explore the impact that escape rooms have in students' memory retention and motivation to see if the findings in this study hold would also be highly encouraging for the field.

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Appendix

Appendix A: Pre-test, Post-test and Follow-up test

Nombre:_____

Please, answer the following questions by selecting the correct answer. Each individual question is worth one point, and as the test has 20 questions, it is worth 20 points in total. Good luck! Por favor, responde a las preguntas eligiendo la respuesta correcta. Cada pregunta individual vale un punto y, dado que el test tiene 20 preguntas, vale 20 puntos en total. ¡Buena suerte!

Matching questions (10)

Match each word with its meaning and thus its possible translation. But be careful, there are more definitions and translations that needed! Une cada palabra con su definición y, por tanto, con su posible traducción. Pero presta atención, ¡hay más definiciones y traducciones de las necesarias!

Word		Translation		Definition
		Asistir		1,000,000,000,000
		Preservativos		Be nice to someone.
		Apoyar		To go somewhere, maybe to a conference or a meeting.
		Fingir		Methods used to avoid having a baby.
		Simpatía		An event.
1. Sympathy		Mil millones		To accept something unpleasant.
2. (to) Pretend		Restar		To become pregnant to have a baby.
3. Preservatives		Pretender		To suddenly understand a situation.
4. Assist		(estar) Embarazada		To have the intention to do something.
5. (to) Support		(estar) Avergonzado/a		To stop being active for a period of time.
6. Success		Conservantes		To help someone.
7. Billion		Ayudar		1,000,000,000
8. (to) Realize		Soportar		To give encouragement to someone.
9. (be) Embarrased		Darse cuenta		To be ashamed of something.
10. (to) Rest		Compasión		To behave as if something is true when you know that it is not.
		Un billón		To remove a number from another number.
		Realizar		To do something.
		Éxito		Understanding and caring for someone else's suffering.
		Suceso		Chemicals used to help food last longer.
		Descansar		Positive results.

Direct translation questions (5)

Translate the words in bold into Spanish. Traduce las palabras en negrita al español.

-**Eventually**, I got a 5 in the exam.

-She is a **sensible** person: she always thinks about the consequences of her acts.

- He always uses **deception** to achieve his goals.

-He **pretended** to go to work, but instead went shopping.

-Every time I get **constipated**, I feel horrible for a couple of days.

Multiple-choice questions (5)

Fill in the gaps of the following sentences with one of three options from a) to c). Completa los huecos de las siguientes oraciones con una de las tres opciones, de a) a c).

- _____ are green and have one single big brown pit inside. They are used to make guacamole.

a) Kiwis

b) Limes

c) Avocados

-_____, I am going to visit her today, not her mother.

a) actually

b) currently

c) in reality

-I need some _____ on which computer I should buy.

a) warning

b) order

c) advice

-When her son disobeyed her, she _____ an explanation.

a) claimed

b) demanded

c) processed

-Online _____ are boring for many people because it is difficult to pay attention to the speaker all the time.

a) lectures

b) readings

c) games

Appendix B: Questionnaire about gamification

QUESTIONNAIRE ABOUT THE ACTIVITY

Please, answer the questions honestly about your thoughts and feelings regarding the activities seen in class. At the bottom of the sheet, you will be asked to assess your level of amusement and enjoyment, so feel free to give a number from 0 to 10. Por favor, responde a las preguntas honestamente acerca de tus pensamientos y sensaciones sobre las actividades vistas en clase. Al final de hoja se te pedirá que evalúes tu nivel de disfrute y entretenimiento, así que puntúa del 0 al 10 según te parezca.

1. Did you like this experience? Answer honestly, no worries about my feelings: what is your opinion about this "experiment"? ¿Te ha gustado esta experiencia? Responde con sinceridad, no tengas miedo de herir mis sentimientos: ¿qué piensas de este «experimento»?

2. What do you think about using gamification in class? Would you like to have English lessons like this more often? ¿Qué piensas de usar la gamificación en clase? ¿Te gustaría tener clases de inglés como esta más a menudo?

3. Do you think you have learnt more efficiently in this session or in a traditional one? ¿Crees que has aprendido de forma más eficiente en esta clase o en las clases habituales?

4. Last question: did you have any problems or difficulties when doing the experiment? What has been the most difficult part? Última pregunta: ¿has tenido algún problema o dificultad al hacer el experimento? ¿Qué ha sido lo más complicado?

5. How much did you like the class? ¿Cuánto te ha gustado la clase?

A lot/ Mucho	**Quite a lot/ Bastante**	**Intermediate/ intermedio**	**Little/ Poco**	**Nothing at all/ nada**

6. Do you feel motivated after having had the class? ¿Sientes motivación tras haber tenido la clase?

A lot/ Mucho	**Quite a lot/ Bastante**	**Intermediate/ intermedio**	**Little/ Poco**	**Nothing at all/ nada**

7. Do you think you have actually learnt the topic studied? ¿Crees que realmente has entendido el tema estudiado?

A lot/ Mucho	**Quite a lot/ Bastante**	**Intermediate/ intermedio**	**Little/ Poco**	**Nothing at all/ nada**

8. How much would you recommend this method of teaching to other teachers? ¿Cuánto recomendarías este método de enseñanza a otros profesores?

A lot/ Mucho	**Quite a lot/ Bastante**	**Intermediate/ intermedio**	**Little/ Poco**	**Nothing at all/ nada**

9. Have you felt less stressed about learning English this way? ¿Has sentido menos estrés al estudiar inglés de esta forma?

A lot/ Mucho	**Quite a lot/ Bastante**	**Intermediate/ intermedio**	**Little/ Poco**	**Nothing at all/ nada**

In a scale from 0 to 10, I would say that my level of enjoyment and amusement has been_____

En una escala del 0 al 10, diría que mi nivel de disfrute y diversión ha sido un_____

Appendix C: Memory questionnaire

QUESTIONNAIRE ABOUT MEMORY (FOLLOW-UP)

Please, answer the following questions honestly and try to remember the activity conducted last month (in which we used Genially to make an escape room game). There are no right or wrong answers, so do not worry about it, just be honest. Por favor, responde a las siguientes preguntas honestamente e intenta recordar la actividad realizada el mes pasado (en la que usamos Genially para hacer una escape room). No hay respuestas correctas o erróneas, simplemente responde con honestidad.

1. When you think of the escape room, what comes to your memory? Try to write everything you remember: the music, the voice of the speaker, the images, etc. Cuando piensas en la escape room, ¿qué se te viene a la mente? Intenta escribir todo lo que recuerdes: la música, la voz de la narradora, las imágenes, etc.

2. When you were answering the questions of this test, did you think of the moment when the activity was being conducted? Like trying to remember what happened and who answered the questions, watching it as if it was a film to remember the answers. Mientras respondías a estas preguntas sobre conceptos, ¿pensabas en el momento en el que estábamos realizando la actividad? Como intentando recordar lo que pasó y quién respondió a qué pregunta, como si fuese una película para recordar las respuestas.

3. When you think of the escape room, what do you feel? E.g. happiness, sadness, anxiety, etc. Try to give as much information about your feelings as possible. Cuando piensas en la escape room, ¿qué sientes? Ej. felicidad, tristeza, ansiedad, etc. Intenta dar tanta información sobre tus sentimientos como sea posible.

4. What called your attention the most when doing the escape room? E.g., the voice, the colours, the design and images, etc. You can mention anything that called your attention, even anything related to the classroom environment (your classmates behaviour, etc.). ¿Qué fue lo que más te llamó la atención al hacer la escape room? Ej., la voz, los colores, el ambiente y las imágenes, etc. Puedes mencionar cualquier cosa que te llamase la atención, incluso cualquier cosa relacionada con el ambiente de clase (el comportamiento de tus compañeros, etc.).

5. Do you remember some of the translations because of the teacher's explanations? This would mean you are able to remember her words. ¿Recuerdas algunas de las traducciones por las explicaciones de la profesora? Esto significaría que eres capaz de recordar sus palabras.

6. Could you please explain how did you try to remember the correct answers of the test? Did you focus on something specific, maybe on some visuals of the escape room or the explanations, or on your feelings? Por favor ¿podrías explicar cómo has intentado recordar

las respuestas correctas del test? ¿Te has centrado en algo específico, tal vez en algunas imágenes de la escape room, o en las explicaciones o en tus sentimientos?