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Gamification in learning English as a second language: A methodological framework to improve psychobehavioural factors and speaking fluency.

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To Aran,
the real motivation to complete this thesis.

Education should be radically human
in a world of intelligent machines

- Alfons Cornella –

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Unlike other graduations, a doctoral thesis requires huge amounts of self-motivation, focus, self-direction to seek all the necessary resources, and above all, excitement about research. When I started this doctoral thesis, I would never have imagined how complex it is to be a worker, a mother, a wife, and a researcher at the same time. Yet, I still feel that excitement about research. Achieving such a challenge provides a huge satisfaction that deserves some words of gratitude. This dissertation has not been an individual journey; without even noticing it inevitably ended up involving very important people around me. That is why I would like to show my sincere appreciation to all of them.

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Thank you! Gràcies! ⵜⴰⵎⵎⵓⵔⵜ!

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Acronyms

AM: Academic Motivation
AMS: Academic Motivation Scale
AR: Articulation Rate
CALL: Computer-Assisted Language Learning
CEFR: Common European Framework of Reference for Languages
CG: Control Group
DBR: Design Based research
EG: Experimental Group
ESL: English as a Second Language
FLA: Foreign Language Anxiety
FLCA: Foreign Language Classroom Anxiety
FLCAS: Foreign Language Classroom Anxiety Scale
FPPM: Filled Pauses Per Minute
GBL: Game-Based Learning
L1: First Language (or mother tongue)
L2: Second Language
LFR: Longest Fluent Run
MALL: Mobile-Assisted Language Learning
OLWR: Other Language Word Ratio
SA: Study Abroad programmes
SLA: Second Language Acquisition
SPM: Syllables per Minute
SPPM: Silent Pauses Per Minute
UdA: Universitat d'Andorra
ZDP: Zone of Proximal Development

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ABSTRACT

This thesis aims to provide a comprehensive framework on the use of gamification in Second Language Acquisition (SLA) within Computer-Assisted Language Learning (CALL). In the last decade, gamification has proved to be an efficient strategy to engage people in different fields such as business or health and it seems to have become an attractive motivational resource in education too. However, this technique has been embraced, often without a clear understanding of its psychobehavioural or cognitive affordances.

The general aim of this dissertation is twofold. On the one hand, we explore the effects of gamification on essential psychobehavioural factors in SLA as well as on learning achievement. The variables observed include students' Academic Motivation (AM), Foreign Language Anxiety (FLA), learning achievement in English speaking fluency and students' attitudes towards gamification. On the other hand, we propose a ready-to-use methodological proposal, based on our empirical findings as well as on previous research evidence.

The empirical research comprises a case study conducted at higher education, specifically at the Universitat d'Andorra (UdA). It includes a comparative study between a treatment group that completed a gamified English course on Moodle and a control group that did the same tasks without gamification. A mixed methodology was implemented to measure both affective and cognitive variables as well as students' learning experiences in the gamified course. Data was collected using a pretest-posttest design and semi-structured interviews before and after the course. Then, both quantitative and qualitative results were triangulated together with research evidence from the literature.

Our empirical findings show that the treatment group outperformed the control group in Foreign Language Anxiety (FLA) and Academic Motivation (AM), with significant differences in 'extrinsic motivation from external regulation' and 'intrinsic motivation toward achievement'. As for learning outcomes in speaking fluency, the effects of gamification seem to be inconclusive, in line with what previous authors suggest within the framework of SLA. Consequently, we advocate for further research to explore whether speaking fluency would show different results in longitudinal studies. Additionally, we discuss the role that gamification should be given in education.

Finally, the dissertation concludes with a methodological proposal including a first section where the gamification design is fully described and supported by empirical research and a second section comprising teaching and learning strategies to further enhance speaking fluency.

Keywords: Academic Motivation, CALL, FLA, gamification, SLA, speaking fluency

RESUM

Aquesta tesi té com a objectiu proporcionar un marc exhaustiu sobre l'ús de la gamificació a l'àmbit de l'aprenentatge de segones llengües assistit per ordinador. Al llarg de l'última dècada, la gamificació ha demostrat ser una estratègia eficient per augmentar la participació de les persones en diferents àmbits, com els negocis o la salut. Tanmateix, sembla que s'ha convertit en una tècnica motivacional atractiva per a l'educació. No obstant això, aquesta estratègia s'ha adoptat sovint sense una clara comprensió de les seves implicacions psico-conductuals i cognitives.

L'aportació d'aquesta tesi té una doble vessant. D'una banda, explora els efectes de la gamificació sobre factors psico-conductuals claus en l'adquisició de segones llengües, així com en el progrés en l'aprenentatge. Les variables observades inclouen la motivació acadèmica, l'ansietat en l'aprenentatge de segones llengües, la fluïdesa de la producció oral en anglès i l'actitud dels estudiants cap a la gamificació. D'altra banda, es descriu una proposta metodològica pràctica, basada en les troballes empíriques de la tesi juntament amb les evidències de la literatura.

La recerca empírica comprèn un estudi de cas realitzat en l'ensenyament superior, específicament a la Universitat d'Andorra (UdA). La recerca inclou un estudi comparatiu entre un grup experimental d'un curs d'anglès gamificat a la plataforma Moodle i un grup control que ha realitzat les mateixes tasques sense gamificació. S'ha emprat una metodologia mixta per mesurar tant variables afectives com cognitives així com l'experiència d'aprenentatge dels estudiants en el curs gamificat. S'han recollit les dades utilitzant un disseny pre-test/post-test juntament amb entrevistes semiestructurades abans i després del curs. Finalment, s'han triangulat els resultats quantitatius i qualitatius amb les evidències de la literatura.

Les nostres troballes empíriques mostren que el grup experimental supera el grup control pel que fa a l'ansietat en l'aprenentatge de segones llengües i a la motivació acadèmica, amb diferències significatives en la 'motivació extrínseca per regulació externa' i en la 'motivació intrínseca cap a l'assoliment'. Pel que fa a la progressió de la fluïdesa en la producció oral, els efectes de la Gamificació no semblen ser concloents. Aquest resultat correspon amb allò que altres autors suggereixen en el marc de l'aprenentatge de segones llengües. Conseqüentment, recomanem una recerca més aprofundida per explorar si la fluïdesa de la parla mostraria diferents resultats en estudis longitudinals. Tanmateix, s'aporten orientacions sobre el rol que s'hauria d'atorgar a la Gamificació en l'educació.

Finalment, la tesi conclou amb una proposta metodològica que inclou dues seccions. La primera descriu en detall el disseny de la Gamificació fonamentat en la recerca empírica. I la segona, comprèn estratègies d'ensenyament i aprenentatge per reforçar la fluïdesa de la parla.

Paraules clau: ansietat, aprenentatge de llengües assistit per ordinador, aprenentatge de segones llengües, fluïdesa en l'expressió oral, gamificació, motivació acadèmica

PART 1

Chapter 1

Introduction

1 BACKGROUND

One significant challenge when teaching second languages is keeping students engaged and interested in learning activities (Gardner & Lambert, 1972). In order to have a robust response from learners, teachers should consider psychobehavioural and affective factors such as student motivation, anxiety or self-confidence as key aspects in the learning process (Krashen, 1982; MacIntyre & Gardner, 1994; Xavier, 2020). Recent research avails positive effects on education produced by a mixture of technology-incorporated learning and social constructivism as efficient strategies to accomplishing the targets set by modern educational institutions (Cheong et al., 2014; Xavier, 2020).

In this line, Computer-Assisted Language Learning (CALL) provides a valuable research ground to better explore and incorporate the motivational benefits of digital resources in education (Chapelle, 2009; Levy, 2016). Because of CALL's rapid development, second language researchers and teachers have to deal with student motivation, together with an escalating growth of computer applications (Godwin-Jones, 2015). Along with the proliferation of digital learning resources, new sub-fields of study have been developed such as gamification, a fairly recent pedagogical technique that consists of inserting game elements in non-game contexts to engage people (Deterding et al., 2011). Recent literature in educational technology is bringing forward the assumption that if we pair instructional content with specific game features, we can trigger the power of games to engage students and achieve desired instructional goals (Kapp, 2012). Among the most successful approaches are digital game-like environments because they can potentially create engaging learning experiences for students when coupled with effective pedagogy (Ibañez et al., 2014; Kapp, 2012).

Bearing in mind that game-like tasks in education appear to aid in keeping learners motivated and engaged in studying assignments, it is no surprise that gamification has developed significantly. Its motivational value has resulted in several online tools supporting teaching (*Socrative, Classcraft, ClassDojo*, to name a few) that aid in turning lessons or even entire courses into engaging experiences (Gee, 2003; Kapp, 2016). Digital technologies for educational purposes have multiplied in the last decades both in formal and non-formal education to engage and motivate students in learning (*Quest2Learn, Lego education, Kahoot, Minecraft Education,* etc.). Gamification techniques have been applied in a wide range of disciplines as a result of this expansion in education (Domínguez et al., 2013; Majuri et al., 2018; Sheldon, 2012).

We can also locate a large variety of apps for language learning that include game features and assist users in improving various language skills (*Babbel, Duolingo, Busuu, Memrise, etc.).* Games have always been present in various didactic approaches to language teaching, from the most structuralist to the most communicative approaches (Wright et al., 2006). Game mechanics seem to help students increase interaction with their classmates and get involved in their learning tasks in a more proactive way. They often identify development in their language communicative proficiency when playing

digital games (Peterson, 2012), partially because they are more engaged in game-based education and hence, have greater levels of motivation to engage in their learning process (Squire, 2008). In short, gamification is a catalyst of elements that foster motivation in language classrooms (Kapp, 2012, 2016).

In gamification design, the incorporation of elements that match different player types is a key strategy to include all the students in the game environment, as it happens in SLA settings. Marczewski (2013) defines two types of motivations in game-like environments: intrinsic and extrinsic motivation. Extrinsic motivation occurs when the student wants to reach an external reward, whereas the intrinsic one refers to doing an activity for the inherent satisfaction of completing game challenges successfully. The most well-known theory of intrinsic motivation is the one proposed by Deci and Ryan (2010). These authors defined their Self-Determination Theory (SDT) as "an approach to human motivation and personality that uses traditional empirical methods while employing an organismic metatheory that highlights the importance of humans evolved inner resources for personality development and behavioural self-regulation" (Ryan & Deci, 2000, p.68). These researchers also state that SDT involves human 'competence', 'autonomy' and 'relatedness' as the three basic psychological needs which have direct consequences on learning, performance, personal experience and well-being. Later on, key authors in gamification found links between the SDT and the motivational factors of game elements (J. Hamari et al., 2014; Marczewski, 2019; Zichermann, 2011).

The motivational factor can be linked to what several authors addressed as an essential key to succeeding in Second Language Acquisition (SLA) (Dewaele et al., 2016; Dörnyei & Ryan, 2015; Gardner & Lambert, 1972; Kessler, 2010). Motivation is closely intertwined with anxiety and both can be referred to as basic constructs that can strongly interfere with the willingness to speak a second language (Gardner et al., 1992; Horwitz, 2001; MacIntyre & Gardner, 1994). Anxious states can indeed hinder speaking (M. Liu & Jackson 2008), which is an essential action for language learning (Horwitz, 2010; M. Liu & Jackson, 2008). As such, language anxiety has been widely studied as a common adversity among second language learners for whom speaking tasks seem to be particularly overwhelming (Chen & Hwang, 2020; Zheng & Cheng, 2018).

It is then known that game-like strategies foster motivation and engagement even in academic settings, and thus the fact of incorporating game mechanics and principles to motivate students is nowadays common among teachers (Dichev and Dicheva 2017; Dicheva et al. 2015). Nevertheless, student anxiety has been paid little attention in the use of educational gamification. We found this research gap somehow striking since motivation and anxiety are often intertwined in the sense that high levels of motivation are associated with low levels of anxiety and vice versa (Csikszentmihalyi, 1991).

While the motivational effects of gamification have been widely reported, cognitive affordances are still unclear from a scientific point of view and an increasing number of researchers advocate for more research in the educational field (Hojjat Dehghanzadeh et al., 2019; Dichev & Dicheva, 2017; Dicheva

et al., 2015; Majuri et al., 2018; Plass et al., 2015). This dissertation aims to shed some more light on the topic by exploring both psychobehavioural and cognitive effects of gamification through an empirical inquiry in a real second language educational setting. The following section provides a general picture of the context as well as the main motivation that triggered the present research.

2 RESEARCH MOTIVATION AND CONTEXT

Based on the above-described background, this research intends to investigate the affordances of a gamified second language course on students' psychobehavioural and cognitive factors such as motivation, anxiety, and learning achievement in speaking fluency. In order to explore its practical effects at higher education, the chosen context is the only public university in Andorra, the Universitat d'Andorra (UdA), where English is included in the curriculum of its bachelor's degrees as language courses or a medium of instruction.

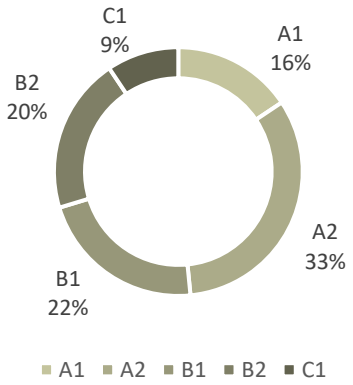
English has increasingly become a global language along with the spread of imperialist economies and politics (Pennycook, 2017). This phenomenon has reshaped learners' second language choices in education. Accordingly, improving English proficiency among students and staff has become one of the main strategies at the UdA to promote internationalisation and mobility. At a larger scale, within the European Higher Education Area (EHEA) framework, promoting multilingualism and internationalisation is also one of the key challenges of the 21st century for educational institutions, while the knowledge-based economy and new technologies are inexorably reshaping previous economic models throughout developed countries (Crosier et al., 2017). When translating this phenomenon in educational contexts such as higher education, learning second languages should be associated with new opportunities to better compete in the global labour market. Thus, becoming proficient in different languages, especially in English as the *lingua franca*, is perceived as an opportunity for higher education students (Bastida et al., 2015). In this line, the UdA's Multilingual Action Plan[1] (MAP) includes several actions to improve English levels among students and staff. In this sense, since September 2017 the required level of language proficiency has been increased (from B1 to B2) along with a progressive integration of English-Medium Instruction (EMI). This is a clearly internationally-oriented challenge that will certainly bring immense benefits to a small state university, but in the meantime, it also requires substantial efforts to fulfil higher academic achievements, especially for undergraduate students.

Yet, language level tests taken by all the undergraduates upon completion of their English courses have shown little improvement for the last few years. In fact, in June 2018 upwards of 70% only

1 UdA's Multilingual Action Plan. Retrieved from: https://bit.ly/3vi7GjR

achieved at maximum a B1 level and less than 30% reached an advanced level, after completing their compulsory English language courses[2]. The following chart shows a general view on posttest results:

Chart 1: Results of English level test at the UdA – June 2018

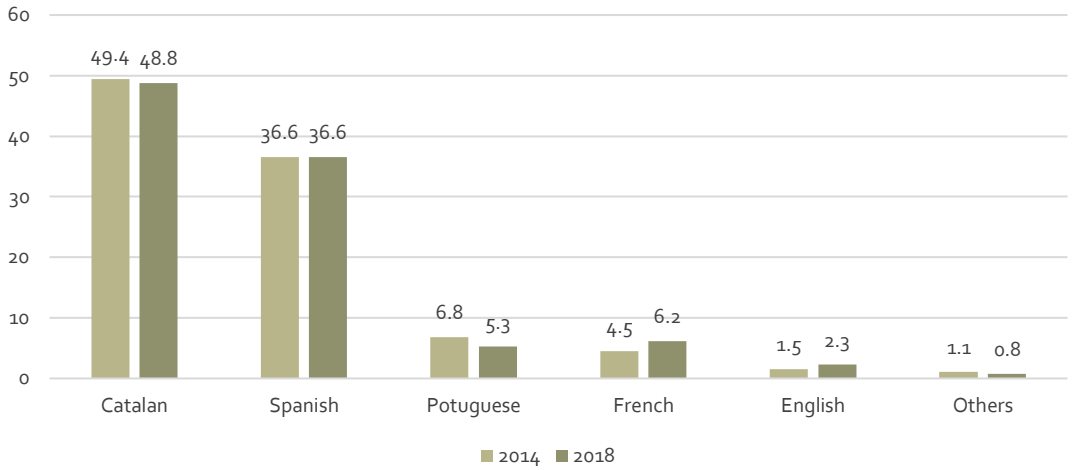


These low results are a major concern for UdA's L2 teachers who also need to deal with their students' emotional struggles in achieving learning goals, especially in speaking situations. Among all speaking skills, fluency is one of the most challenging language dimensions to develop (Gan, 2012; Wang, 2014). It is frequently the primary concern of every second language student because proficiency in communicative skills is generally associated with oral eloquence (Kormos 2006). Such an aspect is linked to the learner's capacity to produce 'fluent' speech, which requires much active participation in communicative tasks (Kormos, 2006; Kormos & Dénes, 2004; Lambert et al., 2017). In other words, without producing output in interactions, students can hardly learn from error nor automatise speaking skills (Gass & Mackey, 2006; Swain, 2000; Swain & Lapkin, 2001). That is why learners cannot produce fluent speech, even though they have adequate knowledge to do so (Wang, 2014). This may be partially because educators tend to talk overly in class, leaving limited chances for learners to be fluent in the target language (Gan 2012; Wang 2014). Additionally, activities that promote fluency improvement are often limited in second language classrooms due to time constraints and limited opportunities for oral practice and individualised feedback. This is an important factor in SLA; if students do not get chances to be immersed in speaking-practice situations, their perception is that they hardly advance in their language proficiency (Dincer & Dariyemez, 2020).

Besides the classroom context, students could develop their language competences by engaging in different real-life activities in the target language (Zoubi, 2018). Nevertheless, in Andorra, the languages people speak regularly in different social settings (work, studies, family and friends) are Catalan (as the official language) and Spanish, followed to a lesser degree by Portuguese and French and finally English, which is a minority language. The following chart shows the general percentages of languages used during the 2014-2018 period.

2 Source: Reports from the Research Group on Languages at the Universitat d'Andorra (2018)

Chart 2: Percentages of languages used in Andorra, 2014-2018



Source: Andorran sociological research centre (Centre de Recerca Sociològica, 2018)

Considering the limited opportunities to practice oral language both in formal and non-formal settings, educational institutions must embrace active methodologies to improve L2 communicative skills among students. Enhancing English learning is indeed a key issue that is impelling UdA's teachers and researchers to find new and creative ways of improving English teaching and learning. Some of these researchers are focusing their work on new technologies and more specifically on Computer-Assisted Language Learning (CALL) and Mobile-Assisted Language Learning (MALL) as valuable allies for educators to motivate students and enhance Second Language Acquisition (SLA) (Chapelle, 2016). They have plainly become very attractive resources to turn traditional classrooms, which do not fit the needs of a 21st century digital generation anymore (Hubbard, 2008; Prensky, 2012), into more attractive and flexible learning settings. Additionally, the increasing incursion of video games in our society is reshaping the way people learn and interact. Prensky (2012) called 'digital natives' the generation born in a society surrounded by computers, the Internet, mobile phones and video games as part of the daily life. Today's learners show new cognitive styles that should be considered as new challenges in teaching. According to Prensky (2012), unlike previous generations, young people can process information much faster, switch easily between single-tasking to multi-tasking, or read hypertext and graphics as natural ways of understanding digital content. They are used to social networking, everything that is web-based, gaming, and blogging, and do not fear assuming or expressing shared or individual visions. Dependent on this knowledge, several instructors who acknowledge the new tendencies in educational technology, including second language teachers, are applying new instructional methods involving game-like learning contexts (Dichev & Dicheva, 2017; Dicheva et al., 2015).

The motivational benefits of using game techniques seem to be generally acknowledged, but there is still little empirical evidence of their cognitive effect (Hojjat Dehghanzadeh et al., 2019; Dichev & Dicheva, 2017; Dicheva et al., 2015; Plass et al., 2015). As a matter of fact, while noted experts claim that gamified environments are effective settings for increasing motivation in SLA, their cognitive

impact has not been extensively explored or empirically supported (Cardoso et al., 2017; Hojjat Dehghanzadeh et al., 2019).

This thesis aims to help fill the knowledge gap on the role gamification should be given in education, and more specifically in SLA. By doing so, we also intend to show the effects on L2 students' learning experience both from an affective and an academic standpoint.

3 RESEARCH GOALS

To achieve the aforementioned aims, the following research goals were set:

General goal: Explore the effects of gamification on L2 students' Academic Motivation and Foreign Language Anxiety as well as their learning achievement in speaking fluency

Specific goals:

- Review gamification design frameworks proposed by previous research
- Define a suitable gamification design to be applied as a treatment in the case study
- Design a research methodology to collect, on the one hand, quantitative data on motivation, anxiety, and speaking fluency achievement and, on the other hand, qualitative data on students' attitudes towards gamification
- Explore if gamification has an effect on Academic Motivation
- Analyse any possible effect of gamification on Foreign Language Anxiety
- Determine if gamification causes any change in speaking fluency achievement
- Explore if there are any correlations between gamification and demographic data
- Observe students' attitudes towards gamification
- Describe how to efficiently apply gamification and strategies to enhance speaking fluency

4 RESEARCH QUESTIONS

Our empirical research was guided by the following research questions (RQ), within the framework of CALL:

- RQ1: Do the gamified ESL materials on Moodle aid in reducing the students' Foreign Language Anxiety?
- RQ2: Do the gamified ESL materials increase Academic Motivation?
- RQ3: Do the gamified ESL materials contribute to improving L2 speaking fluency?
- RQ4: Are there any differences due to individual features?
    - RQ4.1: Is there any correlation with gender?
    - RQ4.2: Is there any correlation with age?
    - RQ4.3: Is there any correlation with the language level of proficiency?
- RQ5: What are the students' attitudes towards gamification on Moodle within higher education?

5 DOCUMENT LAYOUT

Following the current chapter, the main body of this document is divided in two parts and structured as follows:

PART 1

- **Chapter 2** contains a State of the Art of key fields involved in this research, that is, Second Language Acquisition, Computer-Assisted Language Learning and gamification. As a specific subsection, a literature review on the use of gamification in Second Language Acquisition is also provided.

- **Chapter 3** describes a case study conducted at the UdA. Both quantitative and qualitative research are described and discussed by performing a triangulation together with relevant evidence extracted from the theoretical framework of Chapter 2.

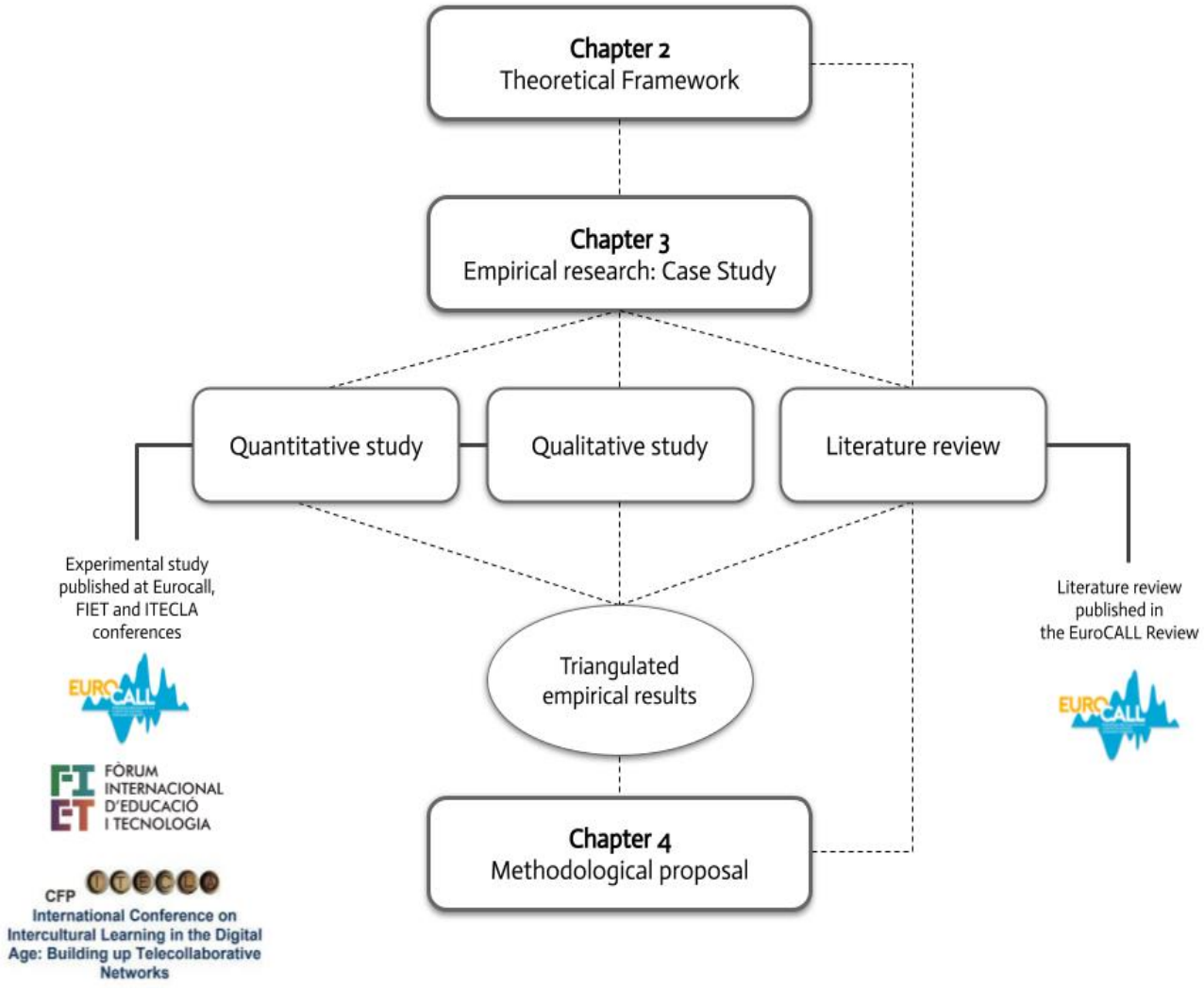
PART 2

- **Chapter 4** provides a double methodological proposal mainly based on the empirical findings from Chapter 3 and a complementary literature review. The proposal is a practical guide on (i) how to gamify a second language course on Moodle and (ii) how to better enhance speaking fluency.

The last sections of the document include: a general conclusion, the list of publications deriving from this doctoral thesis and the bibliographic references. The appendices section contains additional documents such as the literature review tables, formal documents used throughout the thesis and a published article listed in the publications.

The following figure shows an overview of the connections between the three above-described chapters and the publications deriving from specific parts of the dissertation.

Figure 1: Overview of the dissertation main body



Chapter 2

Theoretical Framework

THEORETICAL FRAMEWORK

This chapter presents the theoretical framework in which we embed the proposed research. We begin by providing a historical overview of SLA as well as the affective and cognitive factors involved in speaking fluency. This first introductory part helps understand how L2 teaching and learning has evolved from the most nascent behavioural approaches to the current communicative and interactionist theories. The educational affordances of gamification are then described within CALL, which is considered the technological subfield of SLA. This State of the Art includes the use of game elements at higher education from a general standpoint but also providing a specific focus on the effects of gamification in SLA.

1 SECOND LANGUAGE ACQUISITION: A BIT OF HISTORY

Second Language Acquisition (SLA) as an educational subdiscipline of applied linguistics has become an all-inclusive term to refer to learning any language after the first or the mother tongue. It is common to make a distinction between 'second language' and 'foreign language' depending on the context where the new language is learned (Ellis, 2015). The difference is whether a target language belongs to the speaking community or to a different one (ex: learning English in the UK as a second language vs learning English in China as a foreign language). Despite this dissimilarity, we will be using the term 'second language' or L2, as they have become widely used to refer to both contexts (Ellis, 2015).

Since SLA began to be addressed as a proper research field within applied linguistics in the early 70s (Corder, 1975; Selinker, 1972), there has been much debate on how second languages are acquired and some key processes are still unresolved today. This is probably due to the fact that the way we acquire languages can be considered as one of the most complex intellectual processes of human beings. Thus, an immense variety of theories and approaches coexist in the field of teaching and learning. Nevertheless, all theories consider the complexity associated with SLA which can be influenced by individual differences such as aptitudes, personal motivation or the social context where learning takes place (Gardner, 2006; Gardner & Lambert, 1972; Long, 1981, 1996). Yet, studies on L2 pedagogy and language acquisition efficiency remain limited in some key aspects of SLA such as learner psychology (Sato et al., 2019). Moreover, learning a second language can either come from formal or non-formal means. Formal learning occurs in intentional contexts such as language courses, while non-formal learning involves a learner intentionally picking up the language by participating actively in the society, which is achieved by social interactions, viewing audio-visual content or reading in the second language (Kramsch & Vork Steffensen, 2008; Zoubi, 2018). Consequently, the developing body of studies has nurtured insights into L2 teaching methods applied in a wide variety of language learning settings; thus, causing a paradigm shift in L2 pedagogy among teachers.

Theories of learning and theories of language underpin the L2 pedagogical techniques. Notably, learning theories address the social and psychological dimensions of L2 education, the essential psychological and cognitive resources and social contexts that enhance teaching (Ellis, 2009). These theories' influence manifests in the emergence and fall of various L2 teaching methods. A clear example could be the strongly criticised Audiolingual Method and the Direct Method, built upon a behaviourist learning theory that attributed the language learning process to conditioning mechanisms (Skinner, 1957, 1958). However, the emergence of the cognitive perspective that linked language to the innate and unique capacity of an individual's mind led to these methods' fall. Later, Chomsky's (2003) cognitive perspective of language learning, including the Universal Grammar and the Language Acquisition Device, influenced psycholinguistics and linguistics. His nativist perspective posits human beings as holders of a partially innate capacity to acquire languages; and argues that when designing learning settings this natural process should be considered. Furthermore, research in sociolinguistics also underlined the changes in L2 pedagogical strategies (van Compernolle & Williams, 2013). Accordingly, the emergence of communicative approaches led to a new L2 teaching era. The focus shifted from the structured rules of language to the action mediated by language acquisition (Whong, 2013). The communicative revolution laid the foundations of the Communicative Language Teaching (CLT) technique, which emphasised the communicative aspects of language over the standard language components (Dörnyei, 2014; Whong, 2013). Consequently, CLT fostered teaching methods that leveraged the concept of the naturalistic acquisition of language, comprising Content and Language Integrated Learning (CLIL) (Coyle, 2007), Task-based Learning (TBL) (Ellis, 2009) and sociocultural approaches to language teaching (Sato et al., 2019). Since the emergence of communicative theories (ex: Communicative Language Teaching) aimed at fostering communicative competences, the nature of SLA has been focused on learning by 'using the language' in a natural way rather than simply learning linguistic aspects of the language (Canale & Swain, 1980; Spolsky, 1989). This approach was later adopted by the Council of Europe as part of the theoretical foundations in its Common European Framework of Reference for Languages (CEFR)[3]:

> *The descriptive scheme is based on an analysis of language use in terms of the strategies used by learners to activate general and communicative competences in order to carry out the activities and processes involved in the production and reception of texts and the construction of discourse dealing with particular themes, which enable them to fulfil the tasks facing them under the given conditions and constraints in the situations which arise in the various domains of social existence.*
>
> Council of Europe (2001)

3 Common European Framework of Reference for Languages: Learning, Teaching, Assessment (CEFR)

In a more recent publication of the CEFR, which draws upon the previous version, going beyond the earlier communicative approach, shows how levels can be defined in different sections where learners should perform oral production, always oriented towards real-life communicative goals and in a wide variety of forms[4] (monologues, public announcements, interactions, ...).

> *The methodological message of the CEFR is that language learning should be directed towards enabling learners to act in real-life situations, expressing themselves and accomplishing tasks of different natures.*
>
> Council of Europe (2020)

Measuring L2 acquisition in social interactions is a highly complex process since it implies considering a dynamic interconnection between abilities related to "input" comprehension (Krashen, 1982) as well as to produce "output" (Swain, 2000) and the proficiency in performing both processes by negotiating meaning in social interactions (Long, 1981). The didactic approach adopted in this dissertation contains a combination of these language constructs and would be aligned with what Gass and Mackey (2006) defined as Interaction Approach. According to their framework, L2 students learn by being exposed to others' feedback in the form of "input" that would make them focus on language form and improve their language "output" in a conversation.

2 SPEAKING FLUENCY IN SECOND LANGUAGE ACQUISITION

Speaking is one of the most complex cognitive and behavioural skills in language learning as an intertwined process between thoughts, encoding and production. Making this process automatic requires much practice in using the target language (Kormos, 2006). The act of speaking involves a rapid sequence of cognitive processes that start even before producing speech. First, a mental 'macroplanning' allows a speaker to decide on the communicative intention, for instance negotiating, informing, apologising, among others. The information to be encoded in the form of language needs to be picked and words need to be placed in a specific order through a 'microplanning' (Kormos, 2006).

From a learning perspective, developing speaking requires focusing on three general basic dimensions: (i) sound, (ii) structure as well as (iii) organisation and behaviour (Hughes & Reed, 2016). Language sound involves prosodic elements such as pronunciation and intonation. Regarding structure, morphosyntactic, grammar and lexical aspects are key components while organisation and

behaviour comprise sociolinguistic and pragmatic appropriateness. Unlike in the first language (L1), monitoring these linguistic dimensions requires attentional resources which are limited for second language learners, since they need to concentrate on lexical, syntactic and phonological processes at the same time (Kormos, 2006). Learners can only see to what extent they can manage all these linguistic processes and elements when producing language 'output'. By speaking, they can spot gaps in their communicative skills, meaning what they can or cannot do in the target language (Swain 2000).

The quality and progress in L2 oral production is commonly measured considering three dimensions of language quality: Complexity, Accuracy and Fluency (CAF) (Skehan, 2009). Complexity refers to language construction richness and differs from Accuracy which is connected to correctness, meaning the degree of deviance from linguistic norms. While these two last components of L2 proficiency are associated with rule-based systems, Fluency reflects the general 'ease' and 'smoothness' in oral production (Housen & Kuiken, 2009; Skehan, 2009). Although the three dimensions are often interconnected in SLA research, the association between objective and holistic CAF measures and between overall and specific measures does not seem to be straightforward (Robinson & Ellis, 2008). In fact, fluency can be developed at a different pace since it does not require language acquisition processes needed in complexity and accuracy such as knowledge analyses (Ellis, 2006). Moreover, when performing uncontrolled pair interactions, L2 learners do not develop their skills in CAF homogeneously due to individual differences that come into play (García-Ponce et al., 2018).

However, the lack of accuracy often reflected in major grammar mistakes can hinder communication and thus negatively affect fluency. In fact, when experiencing miscommunication situations, speakers often need to go backwards and repair their speech, which inevitably produces interferences in speaking fluency (Crowther et al., 2015). Housen & Kuiken (2009) also support this argument by stating that "accuracy and fluency do not operate in complete independence from each other" (p.469). To face this challenge, a learner must work on both their accuracy and fluency. As such, the two concepts go hand-in-hand when trying to improve a student's speaking fluency.

Researchers who believe that human attention mechanisms and processing capability are limited also view fluency as a construct of second language production that competes for attentional resources with accuracy, which in turn will compete with complexity (Skehan, 1998; Skehan & Foster, 2008). Students' may knowingly or unknowingly centre on one of the three aspects, which will then have a correctional effect on the two others. However, Robinson (2001, 2003) provides a different viewpoint claiming that students can simultaneously access several and non-competition attentional resources; thus, influencing complexity by increasing the cognitive demand of an assignment can result in simultaneous enhancement of accuracy and fluency.

While the term fluency is commonly used to refer to the overall eloquence in oral proficiency, in linguistics, fluency is treated as a specific measurable dimension of language use (Kormos, 2006). Some language researchers have primarily examined oral productions to determine the exact quantifiable linguistic phenomena of fluency in second language speech (Cucchiarini et al., 2002; Kormos & Dénes, 2004; Lennon, 1990). According to Housen & Kuiken (2009), speech fluency is a multi-componential concept comprising three sub-dimensions: 'repair fluency', which is the number of repetitions and false starts; 'breakdown fluency', which is the distribution, length and number of pauses in speech; and 'speed fluency', which represents the density and rate of delivery.

Interesting research on how to measure speaking fluency can also be found in studies conducted within the context of Study Abroad (SA) programmes (Freed, 1995; Llanes & Muñoz, 2009; Mora & Valls-Ferrer, 2012). What is especially relevant to the present research is their contributions in the development of highly precise measurement methods, based on previous authors who analysed fluency from quantitative and qualitative approaches (Lennon, 1990; Riggenbach, 1991). Regarding the variables observed in the above-mentioned research, Llanes and Muñoz (2009) used a comprehensive temporal measurement method including countable aspects of speech such as: syllables per minute, words in other languages, filled and silent pauses per minute, number of words excluding pauses and the longest fluent language chunks. In order to measure fluency variables, the same method was implemented in this dissertation with some specific speaking productions collected strategically during the course. This procedure is further explained in a later section: Chapter 3 – Quantitative Inquiry.

As for pedagogical approaches to enhance speaking fluency, there is a lack of research investigating the interconnection between speech production theories (Kormos, 2006). What is known from SLA research is that to become fluent within the constraints of real-life communication, learners need to engage in different types of tasks involving cognitive, metacognitive as well as social and affective learning strategies (O'Malley & Chamot, 1990):

- **Cognitive strategies** help learners store and retrieve language content and thus establish connections between already-known concepts and new ideas. Performing tasks such as concept mappings and visual representations are meaningful ways for students to understand and memorise new language (Chen & Hwang, 2020; Novak, 2012).
- **Metacognitive strategies** are actions designed to stimulate students' self-reflection on their own learning process (Haukås et al., 2018; Raoofi et al., 2014). As such, they also stimulate self-directed learning since learners get aware of their progress and the improvements they need to make.
- **Social strategies** in SLA refer to interactions mainly between students and teachers or with their peers. Socialising is a highly beneficial action for second language learning since students are allowed to use the language for real communicative purposes (Swain & Lapkin, 2001).

All the above-described strategies are further developed in the methodological proposal to enhance speaking fluency included in Chapter 4.

3 INDIVIDUAL DIFFERENCES IN SECOND LANGUAGE ACQUISITION

During the second language acquisition process, personal differences comprising age, learning styles, aptitude and intelligence are associated with critical cognitive traits, displaying a straight influence on learning (Lightbrown & Spada, 2013). It has been a collective acceptance that beginning young to acquire a second language makes a substantial dissimilarity in language learning. The Critical Period Hypothesis proposed by (Chomsky, 2011), states that language acquisition is influenced by brain improvement, which closely relates to a Critical Period located in childhood. Therefore, he suggests that the best language learning occurs within the critical period. Hence, younger students are classified as an advantaged group in language learning from the cognitive viewpoint.

However, further research findings show that this is not applicable in every case since more factors influence successful second language acquisition, for instance: motivation and language acquaintance (Ellis, 2015). Dekeyser (2000) states that an association can be identified between second language accomplishment and adult aptitude, which cannot be proved amongst children. Consequently, adults and children's second language acquisition processes and techniques are not parallel because of the diversity of individual factors such as metalinguistic knowledge and cognitive improvement. Children may pick up the spoken language faster, while grownups may be quick learners in written forms of languages (Dekeyser, 2000). Subsequently, suppose there is no adequate language experience. In that case, it might prevent students from accomplishing the process of learning the language. Motivation appears to have a more critical role in the learning procedure than age influence. In this line, Budianto (2011) described further socio-psychological elements in SLA. This author argues that peripheral features such as structures of schools, classroom settings and teachers did not correlate with learning a new language. Budianto (2011) also identified that at least four factors, including motivation, aptitude, attitude and anxiety, do have a more notable influence on language acquisition. Hence, it is hugely significant to promote psychobehavioural factors and give the student a satisfactory language experience right from the beginning of the learning experience irrespective of their age.

3.1 Psychobehavioural factors

The psychobehavioural factors identified by Brown (1994) include motivation and anxiety, among others. Similarly, Krashen (1981) states that second language students are more probable to accomplish better learning results when they are less anxious, highly confident, have a constructive

attitude and are highly motivated. This combination of motivational and anxious states can be found in some studies demonstrating that there is a direct correlation between high levels of anxiety and demotivation in learning English as a second language (M. Liu & Huang, 2011; MacIntyre & Gardner, 1991).

3.1.1 Motivation

Until the 80s, motivation was still a confusing term in the psychological field due to the lack of consensus on its definition. After a comprehensive compilation and categorisation, Kleinginna & Kleinginna (1981) provided a definition comprising a wide range of psychological dimensions:

> *Motivation refers to those energizing/arousing mechanisms with relatively direct access to the final common motor pathways, which have the potential to facilitate and direct some motor circuits while inhibiting others. (p. 355)*

Since the first attempts to theorise on motivation, its conceptualisation has evolved from a purely external set of motivational drives to a highly complex psychological construct. At the beginning of the 20th century, behaviourist approaches focused mainly on extrinsic motivation as a trigger to encourage people to perform desirable behaviour. Early research in this field demonstrated how rewards or punishments, repeated systematically, extinguish or reinforce responses (Pavlov, 1927; Skinner, 1938, 1986). Later in the mid-20th century, Maslow (1943, 1958) posited a hierarchy of human motivational drives from basic needs up to those related to psychological growth, often represented in a pyramid called the Hierarchy of Needs. According to this theory, human motivation can be classified in five main progressive levels where each need has to be fulfilled in order to activate the next: (i) physiological, (ii) safety, (iii) love and belonging, (iv) esteem and (v) self-actualisation. Although Maslow's theory has been academically criticised for being too subjective (Heylighen, 1992), within the educational field his taxonomy has had a considerable effect on understanding why students cannot be in their best conditions to learn when their basic needs are not met (F. A. Freitas & Leonard, 2011).

The distinction between extrinsic and intrinsic motivation in education has caught much attention among noted scholars (Noels et al., 2003; Ryan & Deci, 2000; Vallerand et al., 1994). In their Self-Determination Theory (SDT), Ryan and Deci (2015) defined the main features of intrinsic motivation, which drives to an action for the sake of enjoyment and interest and those of extrinsic motivation, which lie behind an action undertaken towards rewarding outcomes. Similarly, Lepper (1988) argues that if individuals are intrinsically motivated, they have the tendency to carry out an action for their own interest, the satisfaction it comes with, the knowledge it allows or the sensation of accomplishment it induces, whereas if they are extrinsically motivated, they tend to avoid punishment or to get some reward.

If we consider the idea that intrinsic motivation originates from the inside of an individual, this type of motivation can be more sustainable and thus preferable compared to the extrinsic one, which only occurs as long as there is an external reward. Therefore, extrinsic motivation can undermine intrinsic motivation when a person does not get an expected reward, whereas intrinsic motivation can persist even in the absence of external recompenses (Ryan & Deci, 2000). An individual's intrinsic motivation is strongly impacted by two variables: perceived skills and perceived challenges. When both are aligned and sustained in time, people experience a state of Flow that makes them stick to an activity for the only sake of its enjoyment and gratification (Csikszentmihalyi, 1991). The Flow state leads to a complete absorption in a task, resulting in the loss of one's sense of time and space. From a social-cognitive approach, this optimal experience is also due to a sense of self-efficacy which reflects people's beliefs about their achievement capabilities (Bandura, 1982). Therefore, an optimal experience can only occur when there is a balance between the perceived challenge in a specific task and the person's self-perceived skills. Positive outcomes such as self-fulfilment and feeling of achievement can consequently boost and sustain intrinsic motivation (Bandura, 1982; Csikszentmihalyi, 1991; Zichermann, 2011).

3.1.1.1 Motivational affordances in Second Language Acquisition

In second language learning, motivation is also a complex and fast-shifting psychobehavioural construct that drives students to persist in learning a language despite the challenges they might encounter in such a long process (Dörnyei & Ushioda, 2010). Second language motivation could be then considered a vigorously changing state that draws back and flows all through the learning development (Ushioda, 2011). Key authors in SLA have studied motivation for long as an essential affective filter in L2 learning (Dörnyei & Ryan, 2015; Gardner & Lambert, 1972; Krashen, 1982). The common idea that can be drawn from their research is that SLA requires a broader understanding compared to first language acquisition. This latter differs much from the first, in the sense that it intrinsically implies people's motivation as they need their first language or mother tongue to meet their daily interaction needs. Thus, socio-cultural contexts should be considered in order to create motivating learning environments. This principle has been the focus of much reflection among classic theorists such as Gardner & Lambert (1972) who stated that students' attitudes towards the learning context strongly influence their performance. Their Socio-educational Model was a predominant theory that was later criticised and complemented with other approaches stating that students' self-confidence was even more important than socio-contextual aspects in SLA (Clément, 1986).

Several studies identify three important motivations to learn a second language, including 'instrumental', 'integrative' and 'assimilative' motivation. Instrumental motivation denotes interest to learn a language as a way for reaching instrumental targets such as translation, reading practical materials and furthering careers, while integrative motivation occurs when learners wish to incorporate themselves in the second language group's culture and become a part of their society

(Brown, 2000; Gardner & Lambert, 1972). Dörnyei (1990) describes assimilative motivation as the drive to become an indistinguishable member of the target language's community, which always needs prolonged contact with the second language culture.

Dörnyei (2009) proposed a new theory in which the underlying principle in L2 motivation was the student conceiving a future version of his/herself rather than identifying with other speakers of the target language. Aligned with this closer focus on individual factors, Deci and Ryan (2010) also explored the effects of psychological aspects connected to self-confidence in their Self-Determination Theory (SDT). Their framework was built upon a common-sense idea: people feel motivated both by external rewards (grades, positive feedback, ...) and intrinsic ones (satisfaction, fun, ...). These motivational processes emerge from three basic psychological needs: the need to feel (i) 'autonomy' in their actions, the sense of personal (ii) 'competence' while also feeling (iii) 'relatedness' towards a language community.

From a broader scope in learning and following the previous principles, Vallerand et al. (1992) developed a widely referenced tool to measure intrinsic and extrinsic motivation within the academic context: the Academic Motivation Scale (AMS). This scale includes statements reflecting student perceived extrinsic and intrinsic motivation as well as amotivation concerning a key question: "Why do you go to college?" (See Appendix 1). In the present dissertation, the AMS is used as a tool to collect data about students' motivation in the quantitative inquiry we further describe in Chapter 3.

3.1.2 Foreign Language Anxiety

Foreign Language Anxiety is another key individual variable that previous research has established as a direct factor in second language learning progress (Horwitz & Young, 1991). From a psychological perspective, Spielberger (1972) defined anxiety as a "transitory emotional state which consists of feelings of apprehension and tension and heightened activity of the autonomic nervous system" (p.10). He differentiated 'trait anxiety' as a stable personality-based feature from 'state anxiety' which is considered an impermanent reaction resulting from specific threatening situations. The 20th century has witnessed an increasing interest within clinical and psychological research in exploring related concepts to anxiety such as stress, fear or phobias (Spielberger, 1972). Izard and Youngstrom (1996) described it as a reaction deriving from fear, which they considered its basic emotion. Fear of failure has also been associated with anxious states in the educational context due to the social pressure suffered by students at different stages of their academic life (family expectations, academic competition, negative feedback from teachers, frustration of failure, etc.). Consequently, anxiety can prevent many students with academic potential from succeeding in their studies (Zeidner, 2014). From a cognitive approach, several studies have shown the negative effect of anxiety on learning

processes in a wide array of subjects such as mathematics, language, music or sports (Horwitz, 2001; MacIntyre & Gardner, 1994; Zeidner, 2014).

In second language learning, students can feel anxious about the act of speaking, as a spontaneous high-risk action to be produced in limited time constraints (Derakhshan et al., 2016). As a matter of fact, anxiety interferes in essential speaking processes such as encoding and recalling (MacIntyre & Gardner, 1994). In SLA research, anxiety has been studied within different frameworks such as Krashen's (1982) Affective Filter which involves anxiety, self-confidence and motivation as three significant variables that play a crucial role in learning. When emotions or feelings such as embarrassment, fear and anxiety increase, it becomes hard for an individual to learn a second language. When such affective filters are low, learners gain a safe feeling and language acquisition can take place. Recent research conducted by neuroscientists also supports Krashen's theory, by confirming that stress-induced alterations in brain functioning explain how stress appears to prevent the brain from recalling earlier words learned in a stressful context (Schwabe & Wolf, 2010).

Other theories such as Gardner's (2006) Socio-Cultural Model, Dewaele's (2008) theory on personality traits in multilingual contexts or the relation found between Willingness to Communicate and language anxiety by Liu and Jackson (2008), have contributed a deeper understanding of socio-emotional drives in SLA. However, the most common framework used in experimental studies is the one of Horwitz, Horwitz and Cope (1986) who defined the concept of FLA as a type of state anxiety, following Spielberger's (1983) definition.

From an emotional perspective, Foreign Language Anxiety (FLA) is considered to be a key affective factor influencing L2 motivation by Macintyre (1999) who defined it as "the worry and negative emotional reaction aroused when learning or using a second language" (p.27). One might wonder why FLA has been dissociated from other types of general anxious states. Research conducted in this field underpinned the specificities of FLA and thus the need to treat it under a different scope. According to Horwitz et al. (1986), this type of anxiety belongs to the psychological category of 'specific anxiety reactions' that can occur even in individuals who are not generally anxious in a wide variety of situations, and consider FLA to be responsible for students' unsuccessful outcomes in second language learning. These authors identified three main language anxiety dimensions in which L2 adult learners experience a sense of risk and threat to their self-concept and self-competence:

- **Communication apprehension** occurs in interpersonal communicative contexts where the speaker has little control over spontaneous speaking.
- **Fear of negative evaluation** can be produced by perceived negative feedback from teachers or peers in the learning setting.
- **Test anxiety** happens when students feel worried about being evaluated in exams or presentations.

Their research provided a widely-used instrument to measure this specific anxiety: the Foreign Language Classroom Anxiety Scale (FLCAS). Foreign Language Classroom Anxiety (FLCA) is a condition-precise form of anxiety that students encounter as a repetitive specific condition in the second language classroom (Horwitz et al., 1986; MacIntyre, 1999; MacIntyre & Gardner, 1991). Each situation falls from one of the above-described dimensions of language anxiety, namely 'communication apprehension', 'fear of negative evaluation' and 'test anxiety' (See questionnaire in Appendix 2). In Chapter 3, we describe how this tool was used to collect quantitative data about students' anxiety in the English courses where the comparative study was conducted.

Horwitz (2001) also suggests that, although anxiety reactions can vary from one student to another, second language learners can experience highly intense anxiety which leads to postponing second language courses or even changing their studies to avoid them. Moderate anxiety can also have negative effects such as avoiding speaking tasks or sitting in the back rows of the classroom. This is coherent with Krashen's (1982) Affective Filter Hypothesis, which posits emotional factors such as motivation, self-esteem, inhibition and mistake-related anxiety as significant predictors of students' outcomes and effective learning.

Finally, language anxiety has also suggested opposite findings in terms of debilitating and facilitating effects. Alpert and Haber (1960) differentiated between debilitating and facilitating influences of anxiety in their pioneering work on academic achievement and anxiety. For instance, research in sport psychology displays the advantages and effects of anxiety on performance; however, there is limited evidence on the facilitating aspect of language anxiety in applied linguistics. This fact is because of the assumption that facilitating anxiety is linked to cognitively less-demanding assignments (Alpert & Haber, 1960). At the same time, experts view language acquisition as a complex assignment in which anxiety is more probable to obstruct the learning process than to facilitate it (Alpert & Haber, 1960). MacIntyre & Gardner (1994) argue that even when low levels of anxiety might boost achievement, this occurs with students who are aware of their anxious states and compensate by investing more effort in their learning tasks.

4 COMPUTER-ASSISTED LANGUAGE LEARNING AND GAMIFICATION

Although the overall framework of this research is SLA, we will also focus on CALL, which can be considered its technological subfield (Chapelle, 2009). It is a discipline that has been around for more than thirty years and includes the study of design and use of new technologies in language learning (Levy, 2016). Since its first contributions to SLA along with the spread of Internet connectivity in the late 80s, CALL has dramatically increased as a compelling framework in any educational level. More recently, research production in CALL has been showing a growing trend in the literature published by leading international journals dealing with CALL (ex: *CALICO, Computer Assisted Language*

Learning, ReCALL, Language Learning and Technology, …) for the last decade (Sauro, 2016). Successful experiences in research and practice provide even more evidence on how effective CALL can be in SLA such as Computer-Mediated Communication (CMC) promoting pair interaction (Smith, 2008), digital and online games for language learning (Cornillie et al., 2012; Sykes et al., 2010) or m-learning tasks combined in different portable devices (Kukulska-Hulme, 2009). Additionally, Reinders and Stockwell (2017) describe how CALL studies increasingly add to research in second language acquisition. Since the turn of the 21st century, CALL has significantly reshaped our understanding of the second language acquisition process (Reinders & Stockwell, 2017), especially in learning English through technology-mediated strategies (Sauro, 2016).

Gamification is an offshoot of CALL, with the term first being used in 2002 by Nick Pelling, a British game designer. This technique was first adopted by the business field as a marketing strategy to increase customers loyalty. Well-known examples can be found in the application of leading international companies such as Amazon, Starbucks, Ebay, Facebook or Nike, to name a few. Another famous example of persuasive gamification is Volkswagen's campaign consisting of turning a metro staircase into a piano (Peeters et al., 2013). The street experiment was an initiative within the car company's *TheFunTheory*[5] campaign, carried out in Stockholm and became a viral video on social networks. Inspired by these success stories, other fields such as health and education borrowed this technique and adapted it to their users' profiles with the aim to achieve healthy or didactic goals.

Gamification is often associated with Game-Based Learning (GBL) as they are two very close concepts, yet some confusion exists on their functioning. While GBL is the use of actual games to achieve educational goals, gamification would be narrowed to the use of some game elements to promote engagement and motivation in any context, whether it is an educational setting or not. According to the experts' definition, gamification is the use of game-design elements and game mechanics in non-game contexts (Deterding et al., 2011). Similarly, Werbach and Hunter (2012a) defined it as the use of game elements and game design techniques in non-game settings. Figueroa Flores (Figueroa Flores, 2015) added that "basically, any task, assignment, process or theoretical context can be gamified" (2015, p.38). Furthermore, it has also been shown that gamification has the capacity to enhance learning experiences if properly designed in terms of pedagogical approach (Dicheva et al., 2015; Ibañez et al., 2014; Kapp, 2013a; Sailer & Sailer, 2021).

Additionally, gamification is often connected to psychological theories that help to better understand the motivational 'loop' in which players are immersed within a game-like setting (Zichermann, 2011). The Self-Determination Theory, as it has been reinterpreted by Marczewski (2019), suggests that both extrinsic and intrinsic motivation are triggered when the player feels a sense of autonomy, relatedness and competence within the game environment. Marczewski (2013) proposed a model

5 https://www.youtube.com/watch?v=2lXh2noaPyw

called RAMP (Relatedness, Autonomy, Mastery, Purpose) which connects self-determination aspects with gamification elements. Once players are immersed in the gamified environment, what keeps them engaged is what Zichermann and Cunningham (2011) described as the 'engagement loop'. At this stage, players stick to a task for the sake of its enjoyment that is produced by the rewards (positive feedback) they get after each accomplishment. When tasks are sequenced in a way that players always perceive them as challenging but feasible, they get immersed in an optimal experience named Flow arising from a perfect balance between the game challenges and player's perceived skills to face them (Csikszentmihalyi, 1991). In this sense, gamifying activities is a way to incorporate motivating digital game-like learning strategies into the classroom, and provide players (learners) with the sense of engagement, immediate feedback, feeling of self-achievement produced by overcoming challenges (Kapp, 2012).

According to Sailer et al (2013), six principal standpoints exist in motivational research that link gamification to second language learning. These principles comprise emotion, interest, self-determination, cognition, behaviourist learning, and individual traits. Every standpoint has its features that improve motivation for the second language learner. The application of the behaviourist learning perspective towards gamification and a second language avails immediate feedback in negative and positive reinforcement and rewards through the language learning process (Zichermann & Cunningham, 2011). Participants will be motivated if gamification displays achievable and clear goals, highlight the resulting consequences of a purpose and fosters mastery (Sailer et al., 2013).

Two other close affective principles in gamification described by Sailer et al. (2013) are 'interest' and 'emotion'. Researchers view interest as a combination of cognitive and affective processes (Hidi et al., 2004). People can be motivated if gamification reaches the participants' interest and if the setting improves the feeling of Flow by giving direct feedback, providing clear goals and adapting the level of difficulty to an individual's skills (Csikszentmihalyi, 1991; Sailer et al., 2013). Accordingly, learners are likely to be more motivated if gamification reduces destructive feelings such as anger, envy, and fear and provides constructive emotions such as pleasure and satisfaction instead (Sailer et al., 2013).

4.1 Use of gamification at higher education

At higher education, most empirical studies resulted in positive effects mainly on student motivation and engagement (Hojjat Dehghanzadeh et al., 2019; Dichev & Dicheva, 2017; Majuri et al., 2018). The highest concentration of studies exploring the use of gamification can be found in the field of Computer Science (Armstrong & Landers, 2017; Berkling & Thomas, 2013; Buisman & van Eekelen, 2014; Caton & Greenhill, 2015; Figueiredo & García-Peñalvo, 2020; Haaranen et al., 2014; Hakulinen & Auvinen, 2014; Ibañez et al., 2014; Iosup & Epema, 2014; Morales-Trujillo & García-Mireles, 2021; Ntokos, 2019; O'Donovan et al., 2013; Pinter et al., 2020; Pirker et al., 2014; Rojas-López et al., 2019;

Song et al., 2017). This is probably due to the common discipline of computation present both in the academic discipline and the platforms in which gamification is usually developed.

Studies providing a deeper understanding of the affordances of game design show how thoughtful combinations of game elements can enhance learning experiences. For instance, incorporating game fiction together with team competition is considered particularly effective to engage students (Sailer & Homner, 2019). Specific gamification strategies such as narrative might have the effect of wrapping nicely dry learning content, which makes it look more appealing to learners, although it does not necessarily impact their learning achievement (Armstrong & Landers, 2017).

Public rewarding systems serve as motivators, since participants see their efforts publicly and instantly recognised (Domínguez et al., 2013). Accordingly, the publicly visible badges or ranks in a leaderboard earned by different users can function as social markers (Hamari, 2017). Combining competition with students' interaction with their peers is also a very powerful way to increase engagement and create a lively classroom dynamic (Campillo-Ferrer et al., 2020; de Sousa Monteiro et al., 2016; Licorish et al., 2018). Nevertheless, elements producing competition should be included with caution. Competition in educational institutions remains indeed a subject of much debate (Van Nuland, 2014). While competition can be a motivating factor, previous research also warned against turning the classroom into a sandbox (Ejsing-Duun & Skovbjerg, 2014; Hanus & Fox, 2015). Destructive competition might even decrease levels of motivation in the long run (Hanus & Fox, 2015).

The sense of achievement can be produced by elements such as levels, challenges and rewards. To ensure their motivational effect, the difficulty of challenges should be slightly above students' skills. This is a way to avoid the lack of interest or boredom in challenges that can be perceived as too easy (Csikszentmihalyi, 1991; Fitz-Walter et al., 2012). Besides that, tasks should be significant to students, that is, connected to their training content. In this line, a study conducted in a Medicine degree showed that several students noted initial excitement at earning badges, but lost interest over time (Nevin et al., 2014). This effect might be due to the lack of understanding of what was required to earn badges and how much progress they represented.

The lack of qualitative research makes it difficult to find direct correlations between gamification elements and their effect on learning. Much research evidence is purely based on the perceptions of the language learners and not on actual learning as such (Hojjat Dehghanzadeh et al., 2019). Indeed, students' perceptions do not necessarily match the results produced by an objective measurement of the actual learning evidence (Cheong et al., 2013; Hojjat Dehghanzadeh et al., 2019). As a matter of fact, and considering the proliferation of gamification experiences at higher education, when it comes to cognitive effects, only a relatively small number of empirical studies show positive results on learning achievement. Hamari et al. (2014) explored the use of gamification in learning settings including higher education and detected 22% of inconclusive outcomes on learning achievement.

Similarly, Dicheva et al. (2015) argue that the available literature does not provide sufficient evidence to firmly avail cognitive effects of gamification practices in education.

Previous research has shown that while gamification can be used to affect the behaviour and attitudes of learners, not all individuals are affected in the same way (Buckley & Doyle, 2016; Hamari et al., 2014; Herbert et al., 2014). Students with different achievement goal orientation profiles (Kaplan & Maehr, 2007) respond differently to extrinsic stimuli such as badges or leaderboards (Domínguez et al., 2013; Ibañez et al., 2014; A. J. Reid et al., 2015). Besides, some studies argue that external rewards on their own might not be enough to sustain intrinsic motivation over time (Haaranen et al., 2014; Kyewski & Krämer, 2018). Students who do not show a strong intrinsic motivation from the beginning might lose interest in rewarding systems if they perceive them as an exclusive element addressed to high achieving peers (De-Marcos et al., 2017). Another trait difference was investigated by Smiderle et al. (2019) who found that introverted students were more efficiently influenced by the use of gamification. Buckley and Doyle (2016) suggest that gamification is especially efficient with students who are already intrinsically motivated and are especially influenced by 'motivation to know' and 'motivation from external regulation'.

4.2 Critics of gamification

Gamification critics argue that this technique has primarily involved the usage of extrinsic rewards comprising leaderboards, badges and points (Ferrara, 2016; Richter et al., 2015; Robertson, 2010). Bogost (2015) named it "Exploitationware" to describe its indoctrinating effects of marketing in influencing people's consumption habits. When an institution designs gamification for its only self-profit it can be considered meaningless gamification for the user. Conversely, gamification can only be considered meaningful when it is aligned with users' own goals and interests (Nicholson, 2012).

In education, gamification has often been used in the simplest ways and the artificial approach involved would only provide superficial or no advantages (Cheong, Filippou & Cheong, 2014). Because of this superficial tactic, gamification has also been stated as mainly adding points to systems (Richter, Raban & Rafaeli, 2015; Robertson, 2010). Sánchez-Mena and Martí-Parreño (2017) warn against gamification designs including game elements isolated from learning goals, which can be perceived by students as a waste of time.

From a research standpoint, Seaborn and Fels (2015) established that empirical studies on gamification concerned majorly extrinsic motivation such as leaderboards, rewards, badges and points, and only minor essentials with the possibility of manipulating the intrinsic motivation of the participant were involved, such as feedback, narrative, and accomplishments. Dicheva et al. (2015) also observed that several studies were centred on utilising points, leaderboards, and rewards. Some experts even claim that giving rewards through badges and inspiring social comparison and

competition through a leaderboard can damage motivation (Faiella & Ricciardi, 2015). Similarly, Exton (2017) suggests that 'simple gamification' should be avoided. This type of poor practices refers to superficial game strategies consisting in just adding a points layer (named *Pointsification*) or leaving out essential psychological effects of game elements such as the feelings of self-achievement, self-efficacy, relatedness and autonomy (Deci & Ryan, 2010; J. Hamari et al., 2014; Marczewski, 2019; Zichermann, 2011). It is then no wonder that some researchers have conveyed the necessity for creating gamification systems that develop intrinsic motivation (Richter et al., 2015).

Considering the numerous psychological affordances of gamification, experts in educational gamification advocate for more pedagogical care when designing gamified learning settings. Nicholson (2012) suggests incorporating what he named 'meaningful gamification', which consists of placing the users at the heart of the game design and adapting it to their interests and goals. In the business field, too much attention is paid to company profits and little to users' interests. This is an aspect that seems to be rather developed in educational active methodologies, where learners' interests should always be the cornerstone of pedagogical design (Ausubel & Fitzgerald, 1961). Making learners feel part of the gamified learning setting by including meaningful learning goals or allowing self-created content produces a more sustained motivation.

5 GAMIFICATION IN EMPIRICAL STUDIES ON SECOND LANGUAGE ACQUISITION

5.1 Background

Digital gamification is arguably an enjoyable and fun technique to back learning a second language and to reduce the gap between educational practice and learner's acquisition (Hossein Dehghanzadeh et al., 2016). With the progression of innovative digital technologies, there has been a quick increase concerning the requirement for acquiring English as a second language with students from various nationalities (Jin, 2018; Lin & Lin, 2019; Rosell-Aguilar, 2018). This quick progression calls for a change from traditional to active learning techniques (Prensky, 2006; Renandya & Widodo, 2016). This change is significant because students frequently complain that acquiring English as a second language is stressful, intriguing and complex (Turgut & Irgin, 2009), specifically when it falls to implementing its different capabilities such as listening, reading, writing and speaking in natural life environments (Zoubi, 2018).

Research on gamification is also showing its benefits on students' motivation and engagement in learning English as a second language (Hanus & Fox, 2015; Wu & Huang, 2017). In game-like learning settings, students are offered a safe space to fail without anxiety in their learning process (Clark et al., 2011). Unlike traditional classrooms where failure is a high-stake risk for students, in game-like

environments players can fail as often as they need to achieve a goal without feeling they are risking everything in their actions. In this sense, gamification can lower the stress caused by the fear of failure by providing constructive feedback and encouraging students to stick to their learning activities (Lee & Hammer, 2011; McGonigal, 2011). It is then crucial to put into consideration the students' attitudes and emotions concerning gamification during second language learning with the aim to improve their motivation and learning experiences.

5.2 Methodology

One of the first steps in this dissertation required a review of recent literature focused on higher education, and more specifically the effects of gamification on second language learning. In order to provide accurate results, a meta-analysis methodology was used following the six-step review process proposed by Rickinson and May (2009):

We started by developing a comprehensive search strategy based on a thorough examination of the most relevant literature. The bibliography was compiled from *Web of Science* and *Scopus*, two of the most widely used international databases, to ensure that the research provided in those journals meets high quality standards. We used a keyword search technique that included terms like *gamification, gamif*, "Second Language" Acquisition, "Foreign Language" Learning, ESL, and EFL*. Because gamification has only been researched in SLA in recent years, the time period covered ranges from 2011 to 2019. We eliminated duplicated results after comparing the papers offered by the two databases. The next stage was to find papers that contained empirical studies. We used a set of criteria to eliminate items that met the following criteria:

- were merely conceptual papers
- were game design/engineering studies
- included the word gamification but did not focus on it
- were not performed with higher education or adult learners
- included individuals with disabilities

We found 97 publications in the initial round of our search from which we had to exclude numerous duplicates. In a second round, we chose the most relevant articles from the remaining 68. We ended up synthesising and summarising 15 studies in the third phase that looked into the impacts of gamification on L2 learning. We retrieved key data from all of the studies and organised it into categories (see full details in Appendix 3).

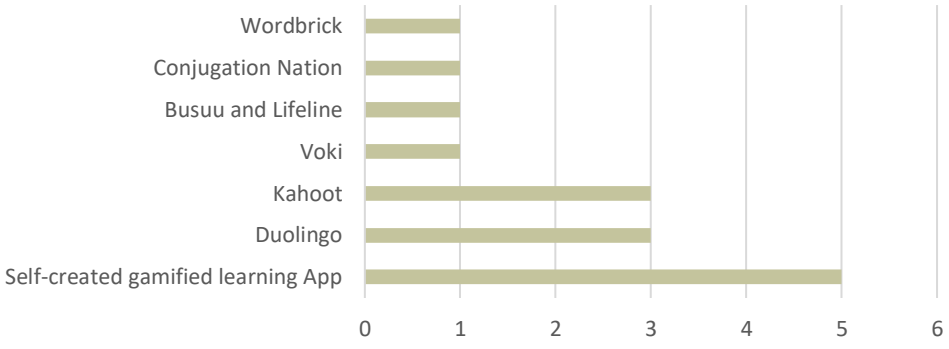
Table 1: Paper selection process

Step	Procedure	Results from Scopus	Results from Web of Science
1	Search applying the Booleans: *gamif*, gamification and "second language", "foreign language", ESL or EFL*	47	50
	Papers found	97	
2	1st selection without duplicates	68	
3	Final selection excluding irrelevant papers	15	

5.3 Results

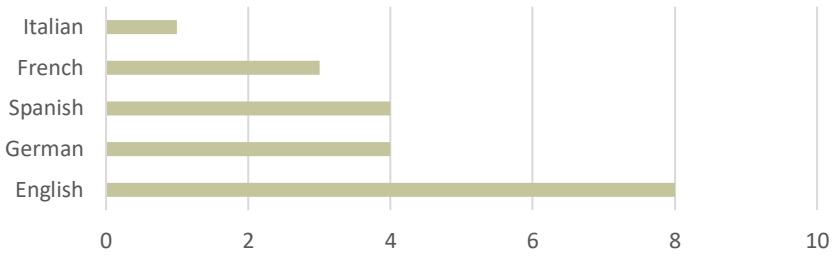
As a first outcome, we could see a very limited number of relevant studies published in leading journals. Most of them explored different combinations of language competences defined by the CEFR, meaning understanding (listening and reading), speaking and writing. All these studies included the use of gamified learning tools in second language courses such as self-created or commercial apps. *Duolingo* and *Kahoot* seem to be the most popular apps (Bustillo et al., 2017; Gafni et al., 2017; Hung, 2017; Iaremenko, 2017; Mateo-Gallego & Ruiz Yepes, 2018; Munday, 2016), while a similar number of experiences were based on applications especially designed for the studies (Berns et al., 2016; Cardoso et al., 2017; Y. Liu et al., 2016; Palomo-Duarte et al., 2016; Perry, 2015).

Chart 3: Gamified tools used in the studies



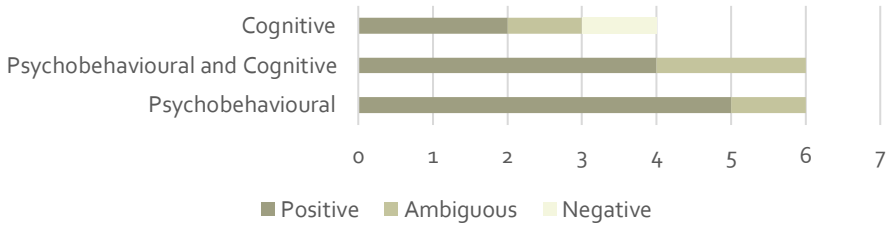
English stands out among the studied second languages. More than half of the investigations were conducted with students of English (8) and the rest mainly in courses of German (4), Spanish (4), French (3) and Italian (1).

Chart 4: Studied languages



Psychobehavioural variables seem to be the main focus. This is probably due to the fact that gamification is often used exactly for that purpose: stimulating psychobehavioural aspects like motivation and engagement. In fact, most studies focused only on psychobehavioural variables such as motivation, engagement or attitudes towards the gamified experience (Barcena & Sanfilippo, 2015; Gafni et al., 2017; Iaremenko, 2017; Y. Liu et al., 2016; Munday, 2016; Perry, 2015). Other similar studies were focused on a combination of psychobehavioural and cognitive effects (Berns et al., 2016; Bustillo et al., 2017; Castañeda & Cho, 2016; Hung, 2017; Kétyi, 2016) and four were centred just on cognitive effects (Cardoso et al., 2017; Mateo-Gallego & Ruiz Yepes, 2018; Palomo-Duarte et al., 2016; Purgina et al., 2019). From a general point of view, most studies showed positive findings with balanced attention on both psychobehavioural and cognitive variables, three were ambiguous and just one showed negative outcomes on learning.

Chart 5: Type of variables observed and results



If we take a deeper look at the findings, we can see that there are several combinations of outcomes, but the most typical would be: (i) positive outcomes in terms of learning and students' attitudes towards gamification (Berns et al., 2016; Bustillo et al., 2017; Castañeda & Cho, 2016; Hung, 2017) and (ii) positive findings on engagement (Iaremenko, 2017; Y. Liu et al., 2016; Perry, 2015)

Two studies reported that participants expressed a sense of fun and challenge using the online app *Kahoot* (Iaremenko, 2017) and a sense of immersion when learning in an Augmented Reality setting (Y. Liu et al., 2016; Perry, 2015). Students of French at the University of Victoria employed a self-designed gamified tool (*Explorez*) in Perry's (2015) study. Her findings show that gaming mechanics

can be effective motivators for students. This author's research is motivated by a challenging question: "What if educators could engage learners in the same manner as video games engage players?"

Bustillo et al. (2017) used *Duolingo* in an A1 English course and found that, on the one hand, students' listening abilities improved significantly and, on the other hand, they had a favourable attitude towards using the tool as a learning aid. L2 students' favourable perceptions on utilising *Duolingo* as a parallel assistance for their language classes were also observed by Gafni et al. (2017). Another gamified app (*Conjugation Nation*) was used by Castañeda and Cho (2016), their gamified conjugation app enhanced students' confidence while also boosting their accuracy in conjugation. Similarly, Berns et al. (2016) found that a gamified tool (*VocabTrainerA1*) had a favourable impact on students' perceptions regarding the app. The participants also showed a high level of perceived learning when using the gamified learning tool, which corresponded to high academic achievements, particularly in grammar and vocabulary.

In a Spanish distance education university (UNED) platform, Barcena and Sanfilippo (2015) used avatars. Their findings indicated a generally positive attitude towards gamification. However, while this strategy made it easier for students to find and understand course-related materials online, some of them found that 'childish' avatars were not associated with a formal university learning environment. Despite the brief duration of the research, students acknowledged a sense of fun with the gamified setting as a learning aid.

In the study conducted by Palomo-Duarte et al. (2016) who employed a self-designed app (*Guess it! Guess it!*) to gamify an A1 German course, positive benefits on vocabulary acquisition were demonstrated. Purgina et al. (2019) also observed positive learning outcomes after employing a gamified digital tool (*Wordbricks*) in an English course to improve grammatical achievement. Kétyi (Kétyi, 2016) used *Busuu* and *Lifeline* to create gamified language classes in four different languages. This author found positive effects on learning and motivation after the trial, but could not prove a link between the two variables.

Inconclusive evidence can be found in some of the reviewed studies. Munday (2016) came to unclear conclusions at the end of her research. In fact, students in a basic L2 level (A1) had a positive view towards *Duolingo*, but not in a more advanced level (B2) since they thought the software was too limiting. Similarly, Mateo-Gallego and Ruiz Yepes (2018) found inconclusive results when they showed that using *Kahoot* in a Spanish course helped students reduce linguistic errors but did not enhance self-reflection on mistakes. The uncertain outcomes in these two last papers could be due to the apps' lack of pedagogical design (Heil et al., 2016).

Clearly negative results on learning achievement can be found in the study of Cardoso et al. (2017) who reported that in an intermediate French course, utilising a gamified tool (*Prêt à Négocier*) did not reveal significant variations in oral skills (comprehensibility and fluency) between a treatment and a control group. The following table shows all the above-mentioned findings, listed by the number of papers in each case:

Table 2: Result details

Number of Papers	Authors	Results
4	(Berns et al., 2016), (Bustillo et al., 2017), (Castañeda & Cho, 2016), (Hung, 2017)	Positive both on learning achievement and attitude towards gamification
3	(Iaremenko, 2017), (Y. Liu et al., 2016), (Perry 2015)	Positive on engagement and motivation
2	(Barcena, & Sanfilippo, 2015), (Gafni et al., 2016)	Positive on attitude towards gamification
2	(Palomo-Duarte et al., 2016), (Purgina et al. 2019)	Positive on learning achievement
1	(Kétyi, 2016)	Positive on learning achievement and motivation but with no correlation
1	(Mateo-Gallego and Ruiz Yepes 2018)	Positive on error correction but negative on students' self-reflections
1	(Munday, 2016)	Positive on attitude towards gamification in level A1 but ambiguous in level B2
1	(Cardoso et al, 2017)	Negative on learning

In this field, mixed approaches integrating quantitative and qualitative research seem to be the most common method (Barcena & Sanfilippo, 2015; Berns et al., 2016; Castañeda & Cho, 2016; Hung, 2017; Kétyi, 2016; Mateo-Gallego & Ruiz Yepes, 2018; Munday, 2016; Perry, 2015). There is also a considerable number of researchers that choose to use only quantitative methods (Bustillo et al., 2017; Cardoso et al., 2017; Gafni et al., 2017; Iaremenko, 2017; Palomo-Duarte et al., 2016; Purgina et al., 2019), while only one study used qualitative research alone (Y. Liu et al., 2016).

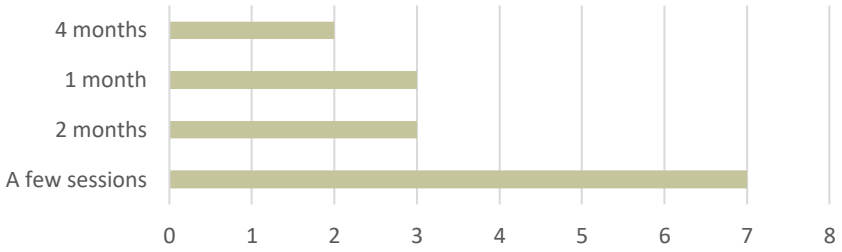
Among those studies including a quantitative methodology, five papers (Cardoso et al., 2017; Hung, 2017; Kétyi, 2016; Mateo-Gallego & Ruiz Yepes, 2018; Purgina et al., 2019) out of fourteen included a comparative study using pre- and post- tests with control and experimental groups.

Table 3: Research methodology used in the studies

Nº Papers	Paper	Methodology	Comparative analysis
8	(Barcena, & Sanfilippo, 2015), (Berns et al., 2016), (Castañeda & Cho, 2016), (Hung, 2017), (Kétyi, 2016), (Mateo-Gallego & Ruiz Yepes, 2018), (Munday, 2016), (Perry, 2015)	Quantitative and qualitative	(Hung, 2017), (Kétyi, 2016), (Mateo-Gallego & Ruiz Yepes, 2018)
6	(Bustillo et al., 2017), (Cardoso et al., 2017), (Gafni et al, 2016), (Iaremenko, 2017), (Palomo-Duarte et al., 2016), (Purgina et al., 2019)	Quantitative	(Cardoso et al., 2017), (Purgina et al., 2019)
1	(Y. Liu et al. 2016)	Qualitative	None

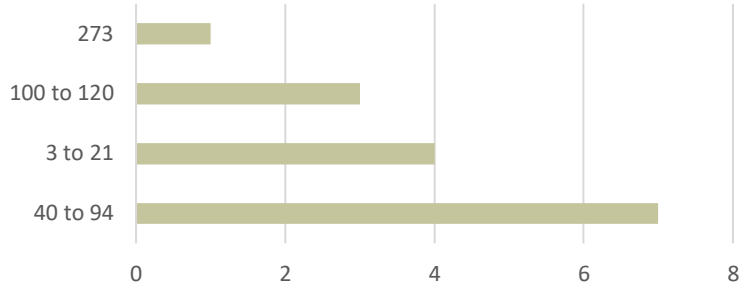
The following graph depicts the length of time and number of participants based on broad criteria. We can only find two papers that covered a course period in terms of time (four months, sixteen weeks or one semester). Three studies lasted two months, while three others lasted one month and the majority of the studies lasted only one or two sessions.

Chart 6: Studies duration



As for the number of participants, we divided them into four categories: small (3-16), medium (40-94), large (100-120), and very big (120+). Nearly half of the studies (7) included a large number of students ranging from 40 to 94. Four studies with 3 to 21 students make up the smallest range. Three papers in the 100-120 range can be identified, with the last one being the largest, involving 273 students.

Chart 7: Number of participants in the studies



5.4 Discussion

We may now summarise aspects from each study that would suggest some form of empirical limitations after analysing all of the articles. Aside from the small number of studies, all of them have some form of research gap. Almost 70% of the studies include a non-longitudinal quantitative study with no control group. There are 54% of quantitative research that lasted less than one month, 31% that reveal a gender imbalance among students or groups (control vs experience), and 23% that comprise small groups of participants. Despite the inconsistencies found in the literature review, overall, the examined literature provides useful information for academics and educators interested in adopting gamification as a motivational tool in second language learning.

As for psychobehavioural variables, the reviewed literature pays much attention to motivational drives. However, considering that anxiety is a crucial affective barrier in second language learning (Dewaele et al., 2016; Horwitz, 2001; Krashen, 1982), little interest has been shown in exploring correlations between students' motivation, anxious states and learning achievement. Moreover, while most studies show learning results on grammar achievement, little research has been focused on measuring speaking performance as one of the most overwhelming tasks for L2 learners (Zheng & Cheng, 2018).

An examination mainly focused on overall findings would show a predominant success in the use of gamification with L2 learners. Nevertheless, considering the research limitations detected in the reviewed papers, we should give the results cautious attention, at least until more research shows clearer results and brings researchers and teachers to reach a general consensus on the role that gamification should be given in learning contexts. Thus, this review adds even more weight to the idea that further research should be undertaken to clear out confusing and ambiguous results.

6 SUMMARY

Recent literature on educational gamification is showing how students' motivation, engagement and performance tend to increase in a broad array of gamified learning disciplines (Subhash & Cudney, 2018). Key authors in SLA consider motivation as a crucial affective booster in second language learning (Dörnyei & Ryan, 2015; Gardner & Lambert, 1972; Krashen, 1982), defined as the Affective Filter, which implies emotional factors such as motivation, self-esteem, inhibition, and mistake-related anxiety. Considering that creating game-like learning contexts is a powerful strategy to keep students engaged and motivated (Kapp, 2016), gamification has been attracting educators and researchers' attention for the last decade.

Majuri et al. (2018) detected a considerable number of studies conducted in a wide number of academic subjects which suggest positive effects of gamification on learning. Yet, they also recommend considering these results with caution since 22% report ambiguous outcomes. Moreover, the lack of unified discourses among researchers also shows the need to dig deeper into the effects of gamification on learning (Majuri et al., 2018). Similarly, other researchers support the idea that more empirical studies need to be undertaken in order to provide solid evidence on learning achievement in the long run (Dichev & Dicheva, 2017; Hew et al., 2016; Sailer & Homner, 2019; Severengiz et al., 2018). In this line, recent experimental studies conducted in the field of SLA, show inconclusive findings, and advocate for more research to confirm the real learning benefits of gamified environments (Cardoso et al., 2017; Rojas-López et al., 2019)

It is then crucial to bear in mind that the use of gamification in educational settings avails no conclusive information concerning effective learning achievement prompted by game design factors (Sailer & Homner, 2019). Although gamification has proved to be an efficient technique to boost engagement and motivation, when it comes to cognitive effects in education, more research will be needed to provide solid evidence of its benefits both on students' affective states and learning outcomes (Dichev & Dicheva, 2017).

The present dissertation is built upon all the above-described affordances of gamification and intends to provide an in-depth understanding of its use in SLA. That is why a mixed-method inquiry was designed to measure both motivational and cognitive effects of gamification in learning a second language, while also observing students' levels of anxiety. We believe that an empirical investigation on the latter variable will shed some more light on an affective filter that has been given little attention in research, compared to motivation and engagement. Moreover, seeing that speaking fluency has been for long neglected in SLA (Kormos, 2006), the empirical study also includes a specific focus on the participants' fluency achievement. Addressing students' learning outcomes in a gamified course also helps fill the knowledge gap on the cognitive effects of gamification. In order to explore all the variables, a gamified didactic treatment was specially designed and inserted in a course Moodle. A full description of the didactic design is included in Chapter 4.

Chapter 3

Empirical research

1 CONTEXT

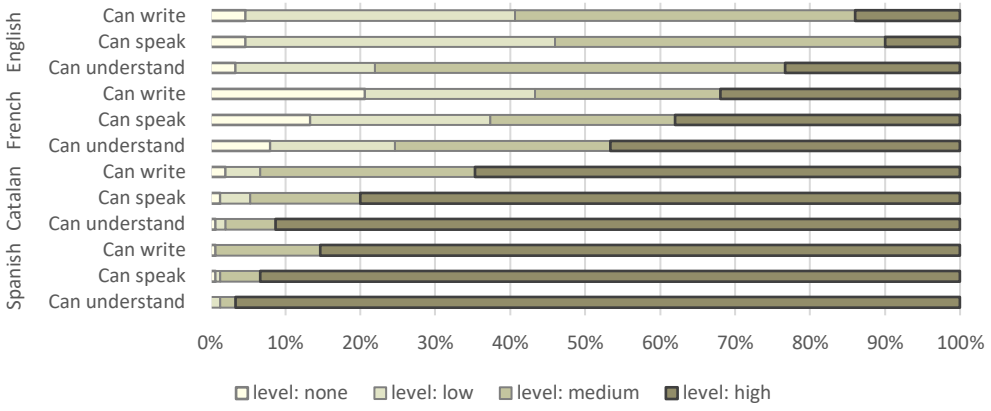
This research focuses on using gamification in SLA at higher education. The chosen context is an English course at the UdA during the fall semester 2018-2019. Although there are different courses delivered in English in different bachelor's degrees, we decided to conduct the present study in a first-year English subject for some key issues, mainly related to organisational constraints. Due to the small size of the UdA, getting several students involved in a research study can be quite challenging. That is why we conducted the study in the first academic semester which has the highest number of students enrolled compared to second or third academic years. Since our target participants would ideally be a mixture of different student profiles, we selected a general English language course taken by undergraduates as a compulsory or free-choice subject in different study programmes (Business Management, Teacher Training, Computer Science, Financial Management). Every year, the number of students registered in this course is high enough to separate them in two parallel groups, which makes it even more convenient for a comparative analysis like the one included in this dissertation.

The gamified learning space was built on Moodle, which is a prevailing learning management system at higher education (Cornella Canals & Estebanell Minguell, 2018). One of the advantages of using this platform is that it is very flexible for teachers to post and structure a wide variety of file formats (any document type, folders, images, audio-visual material, links, etc.). Moodle has been used at the UdA for more than a decade. Since its first implementation, English courses started integrating CALL strategies as part of the tuition (online resources, audio-visual content as learning support, online tasks with individualised feedback). When this study was designed, CALL was already a common practice within all the English courses. Therefore, the comparative study took place between a non-gamified CALL system and a gamified CALL system in which both groups followed exactly the same syllabus (available online). Every English course includes two blocs: face-to-face classes and online tasks on Moodle specifically designed to practice language structures learned in class. We only gamified these tasks on Moodle on purpose, with the aim to keep the treatment away from the classroom setting and avoid the influence of independent variables such as the teachers, the learning space atmosphere or any other classroom distractions.

Face-to-face English courses offered at the UdA start from a B1 level, which is the one chosen for the study. Students take a placement test before they enrol in their study programme to help them choose the most appropriate level. Yet, English classes show a wide diversity of levels ranging from A1 to B1. On the one hand, we observed that in some cases, students who would need to take A1 or A2 preparatory courses, prefer enrolling in a B1 course at the UdA rather than in a private language school. Financial resources often influence students' academic choices. On the other hand, a few higher levels also enrol in B1 courses either because they do not feel confident enough to start a B2 level or this level is offered later in their study programme. In any case, as shown in the introduction section, a high number of students start their undergraduate studies with a relatively low level compared to the initial recommended skills in English. As a matter of fact, the undergraduates'

linguistic profile at the UdA reflects the country's sociolinguistic general features. According to a survey[6] administered to all the students right at the beginning of their studies at the UdA, most of them use Catalan and Spanish on a regular basis. In French, more than a half shows intermediate or advanced levels and English seems to be the least predominant language, especially in the speaking skill where only 10% reported to have a high level. Besides the four languages included in the survey, students could also add other spoken languages. From 18% of students of those who completed this information, 52% also included Portuguese. As an overall picture, this population would mainly be multilingual in romance languages. The following figure shows a more visual idea of the proficiency levels reported in the survey:

Chart 8: Language levels reported by first-year undergraduate students at the UdA (September 2018)



6 Source: Results of a survey administered every year by the Interdisciplinary Research Group in Education at the UdA

2 A CASE STUDY APPROACH

Case studies allow researchers to explore a bounded system (a case) or multiple bounded systems (more than one case) during an extended period of time, by gathering information from a wide variety of sources such as interviews, surveys, audio-visual materials, reports and documents (Creswell et al., 2007; Yin, 2009). In this sense, we observed a group of students within a bounded system in terms of time (an academic semester) and place (English course at the UdA). Besides, we used three main sources of information at different times within the research period: two pre-post questionnaires (on motivation and anxiety), three oral productions from each participant (elicited in different time periods) and pre-post semi-structured interviews.

A case study was considered to be the most convenient approach in this research for two main reasons: (i) This dissertation aims at providing an in-depth understanding of using gamification in SLA that would hardly be possible from a single type of data source and, (ii) the UdA, as the chosen context, shows a limited population where a large statistical study would be hardly applicable. In fact, due to the small size of the UdA, a limited number of students (N=392 in 2018) enrol each year in face-to-face degrees. This is an important conditioning element that drove us to choose a comprehensive research strategy that could be implemented in a small setting. Furthermore, learning processes are highly complex phenomena which require the use of multiple inquiry methods to be properly understood. Thus, it seemed preferable to us to deploy different data sources with the aim to gather a wide range of perspectives during a sustained period of time (Creswell et al., 2007).

Since we were interested in exploring different students' individual experiences in a gamified learning setting, a multiple-case study approach was implemented within the initial case, that is, different individuals (cases) from an English course at the UdA. In order to conduct a deep investigation on how students' learning experience is affected by the use of gamification, this research was framed within a mixed-methods research paradigm, hence we combined both quantitative and qualitative empirical observations to address our research questions (R. B. Johnson & Onwuegbuzie, 2004). The quantitative analysis provided statistical results on all the observed variables, while the qualitative research provides a holistic description of the treatment being studied through analysing the information obtained from interviews with some specific students. Unlike quantitative methods that provide global pictures about general effects of a phenomena within a chosen population, qualitative inquiry helps researchers observe individual reactions to complex phenomena (Stake, 2005). Additionally, the aim of using a mixed-method approach is to reveal the relationships between variables and validate such connections by comparing findings elicited from quantitative and qualitative methods. This process was then completed by a triangulation, considered a beneficious technique using multiple perspectives to clarify meaning and verify the repetition of interpretations (Stake, 2005). In this sense, a triangulation included in the discussion, was performed once the two data sources were analysed together with research-based evidence. As Cohen (2007) puts it, "triangular techniques are a very powerful way to map out, or explain more fully, the richness and

complexity of human behaviour by studying it from more than one standpoint and, in so doing, by making use of both quantitative and qualitative data" (p. 141).

 This visual symbol has been inserted near relevant sections for the sake of clearly showing quantitative and qualitative findings that were triangulated.

Under this approach, we designed the research treatment using the methodology known as Design Based Research (DBR). The aim of DBR is to propose practical solutions to problems that occur in real settings and guide practitioners in making instructional decisions towards improving their students' learning. This is, the proposal of this study is to apply a pedagogical intervention such as new designs, tools and new ways of organising the learning context (Confrey, 2005). In the case of the present research, the pedagogical intervention consisted of including a gamification design in an already existing L2 course.

The research that is now presented follows Rinaudo and Donolo's (2010) principles of the DBR approach:

- The research is placed in the natural context in which the studied phenomena is taking place
- The intentionality of producing specific changes in that context
- The studies deal with variables as interdependent and transactional

These authors also propose three defined stages that have a cyclical nature, and which have been followed in the design of the present study:

- Design preparation defining the learning objectives, describe conditions of the context in which the intervention will take place, define theoretical basis and create instructional design
- Implementation of the design, but making continuous adjustments of the initial design to adapt it to the dynamics and the training context
- Retrospective analysis of the data collected in the various stages and reconstructions of the instructive theory in which the theoretical intentions are reviewed in relation to the results of the analysis

The two first stages were carried out within the empirical research (see Chapter 3), in which we designed and adjusted the gamification strategy implemented in the treatment group. Regarding the third stage, we built the methodological proposal (described in Chapter 4) upon a retrospective analysis of the suggested gamification in the English course.

3 THE GAMIFICATION STRATEGY

In order to answer the research questions, this study required using a gamification strategy to be inserted in the treatment group's Moodle and observing its effects on students. Before the academic semester in which we planned to conduct the study (Fall 2018), we went through an exhaustive search of language learning applications that could be used in SLA. After considering several options we came up to the conclusion that none of the resources matched our research needs for the following reasons:

- The app did not include speaking practice
- When the app offered speaking practice, it did not give room for free production
- The resource required a considerable financial or time cost
- The app did not allow teacher supervision

Therefore, we decided to create our own gamification design using free digital tools (voice recorder, image editors, spreadsheets on Drive, Google Sites, Google maps, etc.). Once the design phase was finished, we shared the gamified course to be reviewed by three experts in SLA or gamification and a young gamer. Their reviews provided very positive feedback as well as some suggestions for improvement that were included in the design (see questionnaire and feedback in Appendix 4).

3.1 The gamified environment: general description

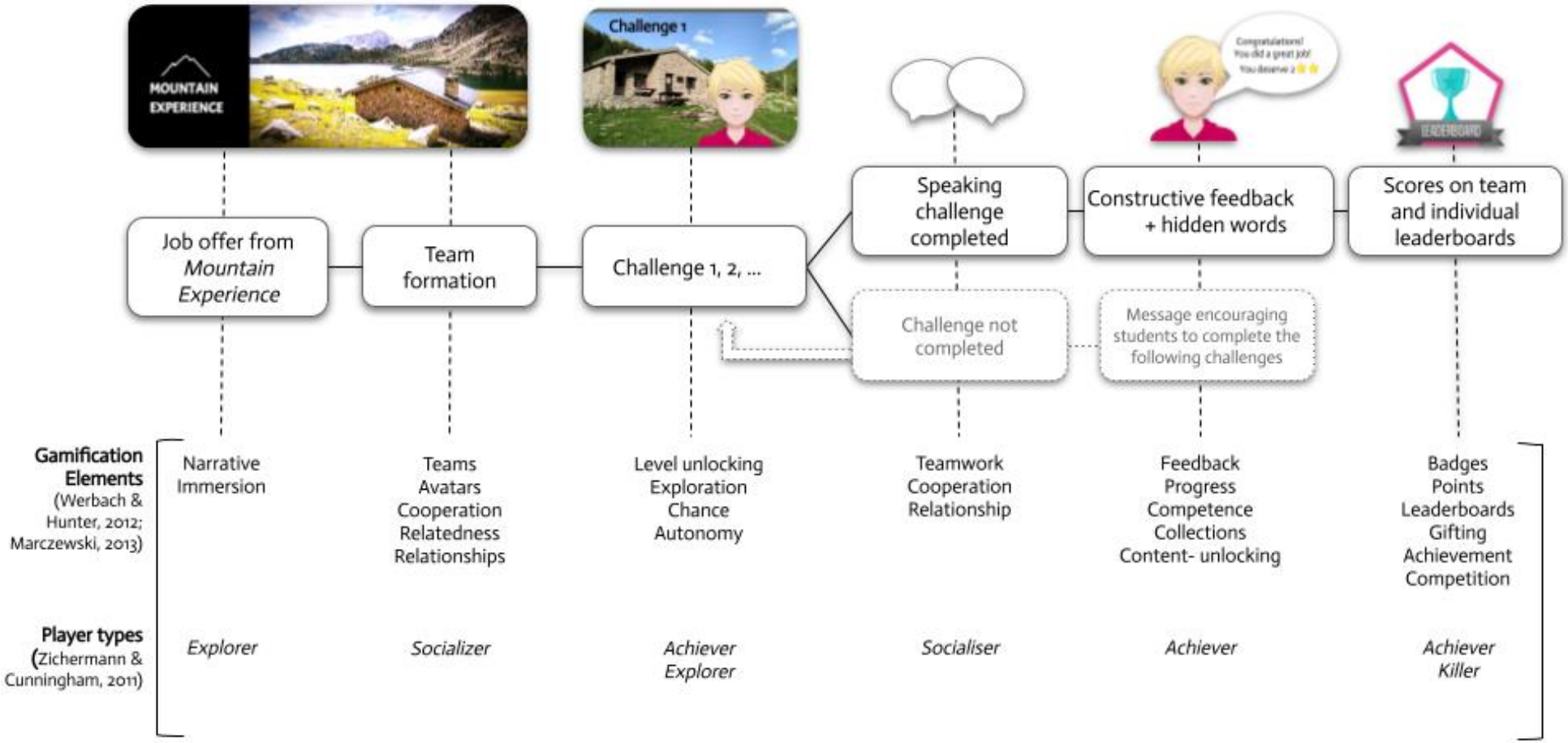
The gamified environment was called Mountain Experience, a company of tourist services offering tours to Andorran mountain huts. The company contacts the students registered in the treatment group to hire new English-speaking guides. Consequently, the course on Moodle was transformed into a professional competition where candidates (students) have to show their best communicative skills in English to get a job position at Mountain Experience. Throughout the selection process, they were asked to travel around the country's most popular huts while guiding English-speaking tourists. Every week, a hint posted on Moodle takes the candidates to a different hut (on a digital map) where they can find a challenge consisting of individual practice and speaking tasks to be carried out in pairs. After submitting the assignments, each student is sent constructive feedback and points via Moodle from Alice, Mountain Experience's manager (the researcher). Altogether, twelve tasks are included in the journey. Additionally, they would also be given words in each challenge which have to be put in the right order to build a secret message. Those completing the whole process obtain a final recognition on the leaderboard (a digital trophy).

When designing the gamified environment, we considered a hierarchical layout of game elements as described by Werbach and Hunter (2012b, 2012a). We also ensured that all types of 'players' would find their most motivating elements on Moodle. The most common player types defined by key authors in game design include: Socialisers, Achievers, Explorers and Killers (Bartle, 1996;

Zichermann & Cunningham, 2011). As suggested by Marczewski (2013, 2019) in his RAMP framework, taking player types into account ensures the stimulation of different emotional aspects related to self-determination (Deci & Ryan, 2010), that is, Relatedness, Autonomy, Mastery and Purpose. A full description of the gamification design including these frameworks can be found in the methodological proposal included in Chapter 4.

The following diagram helps conceive a visual overview of the gamified environment.

Figure 2: Gamification design diagram (see virtual tour on Moodle **here**: bit.ly/2S7M9wO)



3.2 General procedure

Once students registered in the course, they were given access to the corresponding Moodle shared with the researcher. The gamification elements were included in weekly online tasks posted on the Moodle space where the experimental group was registered. The control group had access to a plain Moodle where they could find the same tasks with no gamification (on pdf files).

The researcher visited both groups during one of their initial sessions to inform about the study and encourage them to participate. They were all well-informed about the affordances of their participation as well as the UdA's privacy policy, which included data treatment that was completely confidential. To that aim, they were handed a consent document that included all this information (see Appendix 8).

Throughout the academic semester, students from both groups could submit weekly online tasks that were aimed at reinforcing language content (based on a course book) they learned in their two weekly face-to-face classes. The tasks covered all the language competences from the CEFR (reading, listening, writing and speaking), although our analysis was only focused on fluency achievement measured in students' oral interactions. The following table shows the main differences between the non-gamified and the gamified Moodle.

Table 4: Differences between the non-gamified and the gamified Moodle

	Non-gamified Moodle	**Gamified Moodle**
General aspect	Plain platform	Platform filled with game narrative elements (audio-visual material)
Weekly online tasks	PDF files uploaded every week to be submitted through a submission point on the platform	Challenges posted every week including: pictures of huts with Alice guessing riddles + link to an interactive map which includes a 2nd link to the challenge + submission point
Speaking tasks	Role playing based on the course grammar content	Role playing based on the course grammar content but with instructions adapted to the story
Assessment feedback	Task corrections + grade out of 10	Task corrections + grade out of 10 + virtual rewards + secret word + leaderboard

4 QUANTITATIVE INQUIRY

In this section a full description of the quantitative inquiry is presented. In the results subsection, the correlations found between the research variables are described. The analysed variables include: students' demographic data, foreign language anxiety, academic motivation and speaking fluency compared between the pretest and the posttest. The main quantitative findings are then triangulated with qualitative results and previous research evidence in the Discussion section.

4.1 Research design

This quantitative research follows a pretest-posttest non-equivalent group design, considered as "one of the most common quasi experimental designs used in educational research" (Cohen et al., 2007). The basic principle of pretest–posttest designs consists of gathering a previous measure of the studied variables prior to administering any treatment, followed by a posttest on the same measure after the treatment (Salkind, 2010). This is, measurements on language anxiety and motivation were performed both before and after treatment. As for speaking fluency, a repeated measure was applied using a pretest-midtest-posttest approach, with the aim to detect any eventual alterations in the learning process within the course.

4.2 Participants and sampling

This study targeted a population comprising undergraduates at the UdA from different face-to-face bachelor's degrees who take English courses (N=392), within or out of their study programmes. A convenience sampling was performed, considering potential respondents' availability (Bisquerra & Alzina, 2004; Cohen et al., 2007), from which we could get two heterogeneous groups formed by a balanced number of males and females from different degrees (Business Management, Teacher Training, Computer Science, Financial Management). By doing so, we intended to avoid as many biases as possible in the results by distributing student profiles evenly. Accordingly, a representative sample of participants could be used in the research.

Although most students were willing to participate in the study, some of them did not submit the speaking tasks or the questionnaires and had to be dismissed. Altogether 23 undergraduate students (14 females, 9 males) from different degrees could be included in the study. They were divided into a treatment group (n=13) that carried out gamified learning activities and a control group (n=10) that did the same tasks without gamification. That is, the experimental group received instruction with the use of online gamified tasks, while the control group received regular online instruction.

4.3 Data collection tools

Quantitative data was collected both from the treatment group and the control group, by administering validated research tools such as questionnaires on language anxiety and motivation and extracting specific students' oral productions from the course.

Foreign Language Classroom Anxiety

The Foreign Language Classroom Anxiety Scale (Horwitz, 2001) is a 5-point Likert scale including 33 items that describe anxiety states from three different dimensions: 'communication apprehension', 'fear of negative evaluation' and 'test anxiety'. Each item included in the scale refers to common situations that occur mainly in a second language classroom (see Appendix 2). The possible answers to each item range from 'strongly agree' to 'strongly disagree'.

Considering that the FLCAS is one of the most widely used scales to explore anxiety levels in second language classrooms, this instrument was deemed to be especially adequate for our research. Since the pioneering work of Horwitz et al. (1986), the FLCAS has been repeatedly used and validated for more than thirty years as a prevalent instrument to measure students' attitudes towards learning a second language. As such, it allows to explore their apprehension to speak in class (ex: item 27: "I get nervous and confused when I'm speaking in my language class."), their fear to be negatively judged (ex: item 19: "I'm afraid that my teacher is ready to correct every mistake I make."), and their aversion to language tests (ex: item 10: "I worry about the consequences of failing my foreign language class.").

In order to ensure students' full comprehension, we used the questionnaire in Catalan which was translated from the English version through an inverted and reviewed translation (further details on the procedure are provided in the section Ethical considerations).

Academic Motivation

Motivation was measured through the Academic Motivation Scale (Vallerand et al., 1992), a 7-point Likert scale which covers 28 items based on intrinsic motivation, extrinsic motivation and amotivation (see Appendix 1). The underlying approach of AMS is mainly based on the Self-Determination Theory (Deci & Ryan, 2010), which is highly consistent with the study of gamification in the educational field (Marczewski, 2019). It was therefore considered a pertinent operative instrument for our quantitative inquiry, since it gathers useful data to better understand the degree of motivation students show in learning within and academic context.

A direct translation was made from the Spanish validated scale (Núñez et al. 2010) into Catalan (see further details in the section Ethical considerations).

Speaking fluency

Speaking fluency was extracted from three speaking productions of every student posted on Moodle (podcasts and videos), at three different stages of the semester: beginning, middle and end of term. Altogether, more than 50 minutes of 69 speaking productions were fully transcribed and analysed (see link to the transcriptions in Appendix 5). The detailed list of results including all the fluency rates is available in Appendix 6.

4.4 Data analysis

Data about language anxiety and motivation was selected from those students who completed both the pre- and post-questionnaires. Once the statistical treatments were applied, results from both variables were grouped and displayed according to the dimensions and their corresponding items.

Foreign Language Anxiety:

- Communication apprehension (items 1, 4, 9, 14, 15, 18, 24, 27, 29, 30, 32)
- Fear of evaluation by peers and teachers (items 2, 7, 13, 19, 23, 31, 33)
- Fear of language tests (items 3, 5, 6, 8, 10, 11, 12, 16, 17, 20, 21, 22, 25, 26, 28)

Academic Motivation:

- Intrinsic motivation - to know (items 2, 9, 16, 23)
- Intrinsic motivation - toward accomplishment (items 6, 13, 20, 27)
- Intrinsic motivation - to experience stimulation (items 4, 11, 18, 25)
- Extrinsic motivation - identified (items 3, 10, 17, 24)
- Extrinsic motivation - introjected (items 7, 14, 21, 28)
- Extrinsic motivation - external regulation (items 1, 8, 15, 22)
- Amotivation (items 5, 12, 19, 26)

As for speaking fluency, we made sure that the above-mentioned students also submitted the minimum oral productions required for the study. Then, we applied an analytical system based on temporal and hesitation phenomena, previously used by other relevant scholars (Lennon, 1990; Riggenbach, 1991). Oral fluency refers to aspects of speaking performance having to do with the fluidity or "smoothness" of language use (Freed, 1995). In order to measure speaking fluency, this construct was operationalised in six measures and a comprehensive analysis was performed following an adaptation of Llanes and Muñoz's (2009) system, including the following formulae:

- Syllables per Minute (SPM): adding all the syllables produced per minute (including pauses)
- Other Language Word Ratio (OLWR): dividing the number of words in other languages by the total number of words

- Filled Pauses Per Minute (FPPM): dividing filled pauses (Uhm, err, ...) by the total time of speech
- Silent Pauses Per Minute (SPPM): dividing silent pauses (lasting more than 0.04 seconds) by the total time of speech
- Articulation Rate (AR): subtracting the total duration of silent pauses from the total time of speech, then dividing the total number of words by the result obtained from this subtraction
- Longest Fluent Run (LFR): number of words in the longest uninterrupted chunk of speech (with no silent nor filled pauses)

To ensure accurate measurements, a digital tool was used to extract highly precise temporal data from each speech transcript (*listenbycode.com*). Once we performed all the preliminary treatments on the raw data, they were merged in a single database, classified and 'cleaned'. Then, we used the tool SPSS to perform statistical analyses first from a correlational standpoint, using Kendall Tau (bivariate) coefficient due to the qualitative nature of gender, level and group variables. After that, we studied the differences in Gains (difference between pretest and posttest results) both for Control and Experimental groups (control group -CG- and experimental group -EG-) through a non-parametric test U Mann-Whitney. The Mann-Whitney U test was used to compare differences between the two independent groups due to the limited size of the sample, and also because these variables were ordinal (Likert scale) and not normally distributed.

4.5 Quantitative results

The following subsections present the results in two different parts: On the one hand, the correlation analysis shows the intercorrelations between demographic data and the main variables observed: anxiety, motivation and fluency, as well as other significant differences observed between the two groups. On the other hand, the statistical gains are also explained for each of the above-mentioned variables.

4.5.1 Correlation analysis

Some interesting correlations were found between gender, level or age and some other variables. The level of proficiency correlates positively and significantly with the three aspects of anxiety (see table 5). As it was expected, the three dimensions of anxiety are also highly and positively correlated. Finally, there are no gender differences observed in our sample, and age only correlates positively with 'communication apprehension', this means that older students have more communication apprehension than youngsters.

Table 5: Intercorrelation for Anxiety Scale and demographic data

Measure	Age	Gender	Level	Group	1	2	3
Age	1,000	-,028	.100	-.163	.366*	.308	.149
Gender		1,000	-.121	.195	.006	.029	.313
Level			1,000	-.215	.386*	.548**	.374*
Group				1,000	-.263	-.234	-.123
1.Communication apprehension					1,000	.418**	.578**
2.Fear of negative evaluation						1,000	.452**
3-Fear of language tests							1,000

Note: *p < .05. ** p < .01

Concerning the dimensions of the motivation variable (Table 6), there is a significant and positive correlation (EG higher than CG) between groups and two dimensions: 'Intrinsic motivation towards accomplishment' and 'Extrinsic motivation from external regulation'. No significant correlations among gender, age or level of proficiency and motivation were found.

Table 6: Intercorrelation for Academic Motivation Scale and demographic data

Measure	Age	Gender	Level	Group	1	2	3	4	5	6	7
Age	1.000	-.028	.100	-.163	-.324	-.147	-.005	.159	.000	-.127	-.115
Gender		1.000	-.121	.195	.110	.053	-.081	.118	-.011	-.152	-.024
Level			1,000	-.215	.124	-.138	.110	.265	.044	.276	.087
Group				1,000	.069	.450*	.057	.087	.146	.361*	.041
1. Intrinsic Motivation - to know					1,000	.231	.359*	.030	.109	.269	-.062
2. Intrinsic motivation - toward accomplishment						1,000	.140	.087	.551**	.361*	-.133
3. Intrinsic motivation - to experience stimulation							1,000	.176	.075	.178	.035
4. Extrinsic motivation - identified								1,000	.343*	.307	-.129
5. Extrinsic motivation - introjected									1,000	.319*	-.013
6. Extrinsic motivation - external regulation										1,000	-.182
7. Amotivation											1,000

Note: *p < .05. ** p < .01

Regarding fluency rates and demographic data (Table 7), we found negative correlations between age and the Filled Pauses Per Minute gain (FPPM): the younger, the less amount of FPPM. Regarding gender, there are two significant differences in the results: the gain of Syllables Per Minute (SPM) and the Articulation Rate (AR) is higher in female participants than in male participants. Finally, the indicator Syllables Per Minute (SPM) gain correlates positively with the Articulation (AR) gain (this is, the number of words per minute correlates with the number of syllables) and the Other Language Word Ratio (OLWR) correlates negatively with the Articulation Rate gain, meaning the number of words in any other language than English decreases as the speed of the speech increases.

Table 7: Intercorrelation for Fluency and demographic data

Measure	Age	Gender	Level	Group	1	2	3	4	5	6
Age	1,000	-,028	,100	-,163	,107	,146	-,364*	-,192	,049	,079
Gender		1,000	-,121	,195	-,414*	,084	-,034	-,151	-,358*	-,107
Level			1,000	-,215	-,111	,027	-,039	-,120	-,145	-,009
Group				1,000	-,055	,141	-,079	,298	-,033	-,084
1.SPM Gain					1,000	-,253	,081	,144	,739**	,279
2.OLWR Gain						1,000	-,073	-,114	-,346*	,077
3.FPPM Gain							1,000	-,105	-,065	-,143
4.SPPM Gain								1,000	,267	-,054
5. Art Gain									1,000	,152
6.LFR Gain										1,000

Note: *p < .05. ** p < .01

4.5.2 Foreign Language Anxiety gains

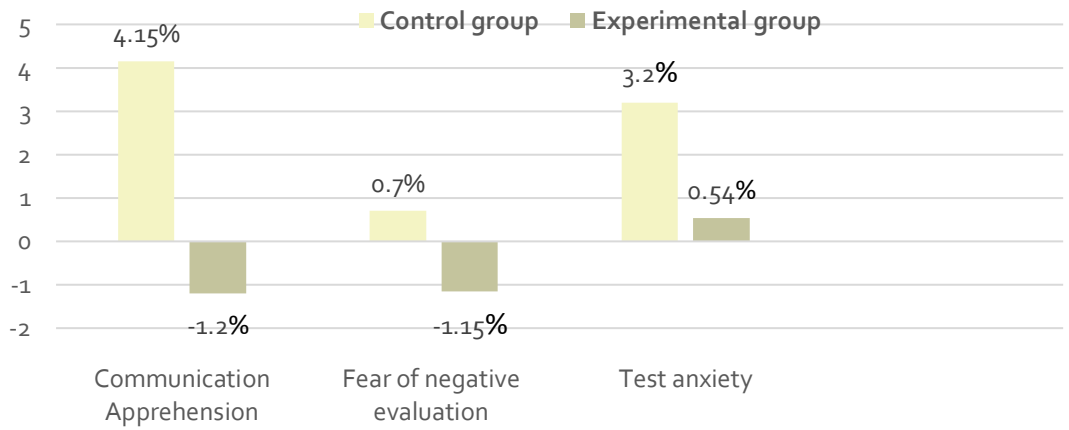
According to the results shown in Table 8 and Chart 9, the total level of anxiety decreases after the experiment is conducted: 'communication apprehension' decreases in a higher percentage in the EG: 1.20% in the CG and 4.15% in the EG. The 'fear of negative evaluation' increases in the CG (0.70%) and decreases in the EG (-1.15%). Finally, the 'fear of language tests' increases in both groups, but in the CG the fear is much higher than in the EG (3.20% vs. 0.54%). Thus, we can affirm that the variable

FLCA lowers after the experiment in the EG. Nevertheless, Mann Whitney results showed in Table 8 confirm a non-significant difference between groups.

Table 8: Significance of gains. Foreign Language Anxiety. Mean ranks and Mann-Whitney's U

	Control Group		Experimental Group			
	n	Mean Rank	n	Mean Rank	U	p
Communication apprehension	10	14.35	13	10.19	41.50	0.148
Fear of negative evaluation	10	14.05	13	10.42	44.50	0.208
Fear of language tests	10	13.10	13	11.15	54.00	0.522

Chart 9: Significance of gains. Foreign Language Anxiety in %



4.5.3 Academic Motivation gains

Significant differences could be found between the two groups, most of all in motivation, that we further analyse with the mean ranks difference test (U Mann Witney):

According to the results shown in Table 9 and Chart 10, all the motivation items clearly increase in the experimental group, except internal 'motivation to know' that decreases in both groups.

In general terms, the results show that the intrinsic motivation decreases by -4.8% in the CG and increases by 0.3% in the EG. Extrinsic motivation decreases by 4.5% in the CG and experiment an

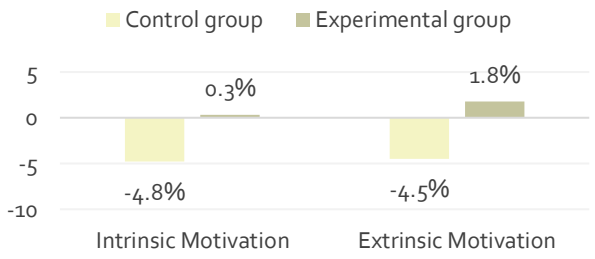
increase of 1.8% in the EG. If we analyse the results in detail, we can see that from the 7 particular motivational aspects analysed in this study, 6 are positive for the EG, while only 1 for the CG. Moreover, two of the results show significant differences when Mann Whitney U test is applied: U (IMA = 26.00, p = .015); U (ER = 33.00, p = .049). Table 9 is a representation of the following data:

From all the results shown, 'intrinsic motivation toward accomplishment' and the parameter of 'extrinsic motivation from external regulation' show significant results. The other results (except the parameter of 'intrinsic motivation to know') show to be clearly positive for the EG.

Table 9: Significance of gains. Academic Motivation. Mean ranks and Mann-Whitney's U

Intrinsic Motivation (IM) **Extrinsic Motivation (EM)**	**Control Group**		**Experimental Group**			
	n	**Mean Rank**	**n**	**Mean Rank**	**U**	**p**
IM to know	10	10.35	13	13.27	48.50	0.313
IM toward accomplishment	10	8.10	13	15.00	26.00	0.015*
IM to experience stimulation	10	13.25	13	11.04	52.50	0.446
EM identified	10	9.65	13	13.81	41.50	0.148
EM introjected	10	9.65	13	13.81	41.50	0.148
EM from external regulation	10	8.80	13	14.46	33.00	0.049*
Amotivation	10	12.55	13	11.58	59.50	0.738

Chart 10: Significance of gains. Academic Motivation in %



4.5.4 Fluency gains

As shown in Table 10 and Chart 11, results in fluency differences do not show a clear trend. In fact, some fluency rates show better outcomes in the CG than in the EG:

- SPM (Syllables Per Minute) Gain: The CG increases the speed of speech (there is a gain of 8.3%) while the speech of the EG has slowed down (gain of -0.8%).
- OLWR (Other Language Word ratio) Gain: Both groups show a decrease of the number of foreign words in the English speech, which is a positive result. Nevertheless, the CG produces slightly less foreign words (-77.5%) than the EG (-62.1%).
- FPPM (Filled Pauses Per Minute) Gain: In this case, the EG reduces the number of filled pauses by 87.9%, while the CG decreases by 19.7%.
- SPPM (Silent Pauses Per Minute) Gain: in the case of pauses without any sound, the CG reduces these pauses by 72.4% while the EG increases them by 58.9%.
- AR (Articulation Rate or number of words per minute) Gain: The CG increases the number of words per minute (there is a gain of 2.8%) while the EG decreases the production (there is a negative gain of 1.1%).
- LFR (Longest Fluent Run) Gain: In this case, both groups improve, but the CG overtakes the EG, since the CG has a gain of 43.6% while the EG shows a gain of 18.5%.

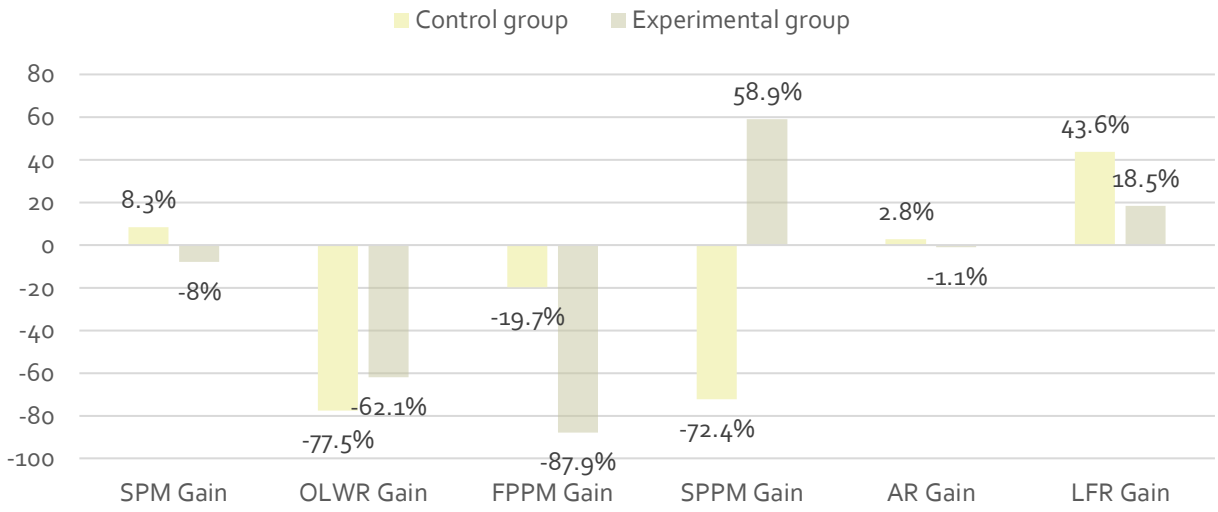
Table 10: Significance of gains. Fluency. Mean ranks and Mann-Whitney's U

	Control Group		Experimental Group			
	n	Mean Rank	n	Mean Rank	U	p
SPM Gain	10	12.50	13	11.62	60.00	0.784
OLWR Gain	10	10.80	13	12.92	53.00	0.483
FPPM Gain	10	12.70	13	11.46	58.00	0.663
SPPM Gain	10	9.40	13	14.00	39.00	0.115
AR Gain	10	12.30	13	11.77	62.00	0.879
LFR Gain	10	12.75	13	11.42	57.50	0.648

Albeit the differences observed among groups in %, the results of the Mann-Whitney test show no significant differences between groups (columns 3 and 4 in Table 10); only a clear tendency in SPPM

stands out. These ambiguous results suggest that more research is needed on the topic.

Chart 11: Significance of gains. Fluency in %



5 QUALITATIVE INQUIRY

Within the case study described in above sections, this inquiry provides one of our three triangulation pillars (together with quantitative information and theories), that is, the qualitative data source produced by interviews. The purpose of this qualitative research is to explore students' experience in a gamified course which would be then used as a complementary perspective gathered from the other data sources. We were specifically interested in understanding:

1. Students' attitudes towards a gamified course on Moodle
2. Students' perceptions on learning English

To do so, we held face-to-face semi-structured interviews before and after the course with each of the students recruited at the beginning of the term. According to Merriam and Tisdell (2015), interviewing is an essential step to clearly observe feelings and personal experiences that cannot be captured otherwise or past events which would be impossible to reproduce. Semi-structured interviews are a very rich technique to collect intangible information about individuals' perceptions and beliefs within a delimited study (Cohen et al., 2007). This type of interview is built upon a pre-established outline that allows researchers to keep a focus on the research interests, while allowing open-ended questions to capture nuances in participants' individual experiences (Bisquerra & Alzina, 2004; Stake, 2005).

5.1 Research design

The present qualitative research procedure consists of 5 phases proposed by Stake (2005, p.433):

Phase 1 *Planning*

In this 1st phase, we detected key aspects to be observed before and after the course in order to gather as much details as possible about students' perceptions on learning English on a gamified Moodle. After making a list of relevant issues to be discussed with participants, we defined a set of helpful questions to guide the interviews. Within the planning process, the researcher also defined the criteria to perform a purposive sampling and made a list of 'interesting informants' from the treatment group (see further details in the Participants and sampling section).

Phase 2 *Accessing data*

Altogether six students were invited to hold interviews before and after the course. One student dropped out of the studies and had to be dismissed, thus we could complete the process including 5 participants. The researcher checked each students' academic schedule and suggested strategic

moments in which students would have enough time for the interview and wouldn't need to rush to class. Moreover, a comfortable and quiet place was booked to avoid distractions and background noise.

Phase 3 *Collecting data*

Individual meetings were arranged and sometimes rescheduled in order to better adapt them to students' academic availability. In order to repeatedly retrieve key information from their speeches, the sessions were fully audiotaped using a computer recorder. This is an important step to be planned with proper technological resources since it provides an accurate rendition of the interviews (Yin, 2009). Right after each interview, the researcher took some notes on relevant information that was not predicted in the questions and that would yield important data to better focus the analysis (ex: there seems to be a recurrent concern about negative past experiences in English courses instructed in L1).

Phase 4 Analysing data

All the recordings were transcribed following a unified format and ensuring respondent's anonymity by coding their names (Merriam & Tisdell, 2015). Altogether, we transcribed about two and a half hours, including pre- and post-interviews (see link to full transcript in Appendix 5). The final transcript was then processed in a commonly used computer qualitative data analysis software (Atlas-ti). A sequenced analysis was conducted following Saldaña's (2021) codes-to-theory model (see full explanation in the Data analysis section).

Phase 5 *Writing-up and reporting*

This last phase was performed with the help of a mind map that we generated from the qualitative analysis, where the hierarchical connections between the themes can be clearly observed. It was in fact a visual guideline to report the findings in a sequenced and logical way. The content included in the report serves as the qualitative dimension in the triangulation that is later developed in the Discussion section.

5.2 Participants and sampling

The type of sampling used was a non-probabilistic purposive sampling through which the researcher handpicked some cases showing specific characteristics of interest for the study, allowing a 'maximum variation' sampling, meaning a selection of cases as diverse as possible (Cohen et al., 2007). The selection was based on different individual variables such as gender, study programmes and language levels. Altogether, 5 participant students were recruited as described above,

considering feasibility factors to conduct interviews with them such as expenses, time or accessibility (Cohen et al., 2007).

Table 12: List of students' features

Student	Gender	Study programme	English level
1	male	Business Management	A1
2	female	Computer Science	B1
3	male	Management and Finance	A1
4	female	Management and Finance	B1
5	male	Teacher Training	A2

5.3 Data collection tool

In semi-structured interviews, researchers need to find a balance between keeping the focus on their object of study while giving room for unexpected data that could eventually reshape previous perceptions. Yin (2009) suggests preparing a detailed plan in advance to avoid losing track of the object of study. However, Stake (2005) advocates for openness and building the story as one advances in data collection through interviews, with the aim not to miss relevant individual experiences that could shed more light on the studied topic.

In the present qualitative study, we planned a list of possible questions, some very precise to remain within the boundaries of the research goals, and some others much more open or spontaneous to gather nuances completing the main questions. While defining the questions, we ensured they would provide enough data to answer our initial research questions and understand the "how" and "why" in students' experiences (Yin, 2009), they could be formulated in a flexible way or asked in different orders, the language used was clear for respondents (Merriam & Tisdell, 2015), and that they would give enough freedom for participants to provide further details that could result in a deeper understanding of the discussed issues (Stake, 2005). The full list of guiding questions is available in Appendix 7. The following table shows key issues we considered relevant to be discussed during the interviews:

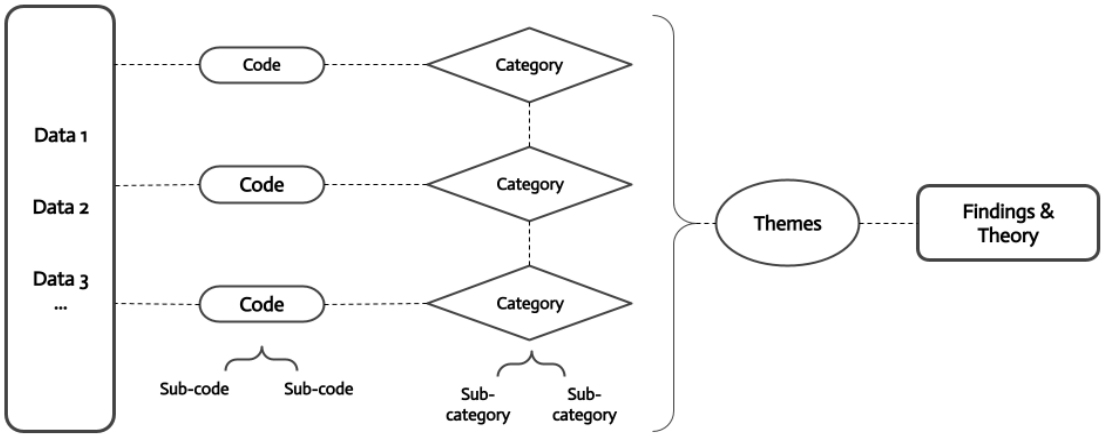
Table 13: Outline of the main issues addressed

Pre-interview	Post-interview
Main issues: Previous experience and knowledge about games and gamification, individual experiences and challenges in learning/using English, possible ways to help overcome these challenges, opinion on gamification, opinion on gamification at university	**Main issues:** Individual learning experience during the course, perception on learning in different language skills, gamification elements: those valued and those not valued by students, possible improvements in the gamified course

5.4 Data analyses

Our qualitative data analysis basically consisted of performing an in-depth scrutiny of each transcript section where relevant issues of study were detected, and building connections from which we could report the findings (Saldaña, 2021). This process is inherently dynamic and requires switching back and forth from the very particular aspects to abstract theories. Since the research focused on a multiple-case, that is, a group of 5 interviewees selected from the general case (an English course at the UdA), a double level analysis was implemented. We performed a 'within case analysis' followed by a 'cross-case analysis' through which we compared individual data to each other in order to draw similarities, differences and common patterns (Merriam & Tisdell, 2015). In the within case analysis, each participant's speech was treated as a stand-alone element. In this first phase, we could observe each individual's experience in detail without external influences from other cases. Once they were all analysed, the cross analysis allowed us to establish interconnexions between these cases, considering common perceptions and patterns.

Figure 3: Codes-to-theory model



Source: Adapted from Saldaña (2021)

Coding

Coding in qualitative inquiry simply consists of tagging bits of data that are potentially responsive to the research questions so they can be classified and retrieved easily (Merriam & Tisdell, 2015). This process can become quite challenging and complex if the researchers lose track of the research goals as they advance in the analysis (Yin, 2009). Following some strategic steps can avoid getting lost in the journey. Firstly, a reading throughout the document allowed us to note down an initial list of ideas emerging from the students' perceptions and compare it to our initial list of aspects to be observed as well as spontaneous post-interview notes. Merriam (2002) suggests starting with a holistic view on the transcript and proceeding to an 'open coding', which consists of freely noting down first impressions on the document, keeping in mind that preliminary 'jottings' will be redefined after further readings (Saldaña, 2021).

Detailed readings were then performed to build a more extensive list of codes on all the content relating to the studied issues. Codes and sub-codes were associated with units of data, meaning the smallest bit of information standing by itself (Merriam & Tisdell, 2015). Codes were then refined and grouped under common categories and sub-categories. The resulting groupings were then reorganised in emerging themes and key concepts which Saldaña (2021) defines as an "outcome of coding, categorisation or analytical reflection" (p.19). Once the structure was clear, a mind map was generated by the app (Atlas-ti) based on the set of connections between the different themes. Finally, the network layout was presented in a way that it clearly showed the hierarchical relations between all the items.

Synthetising and reporting

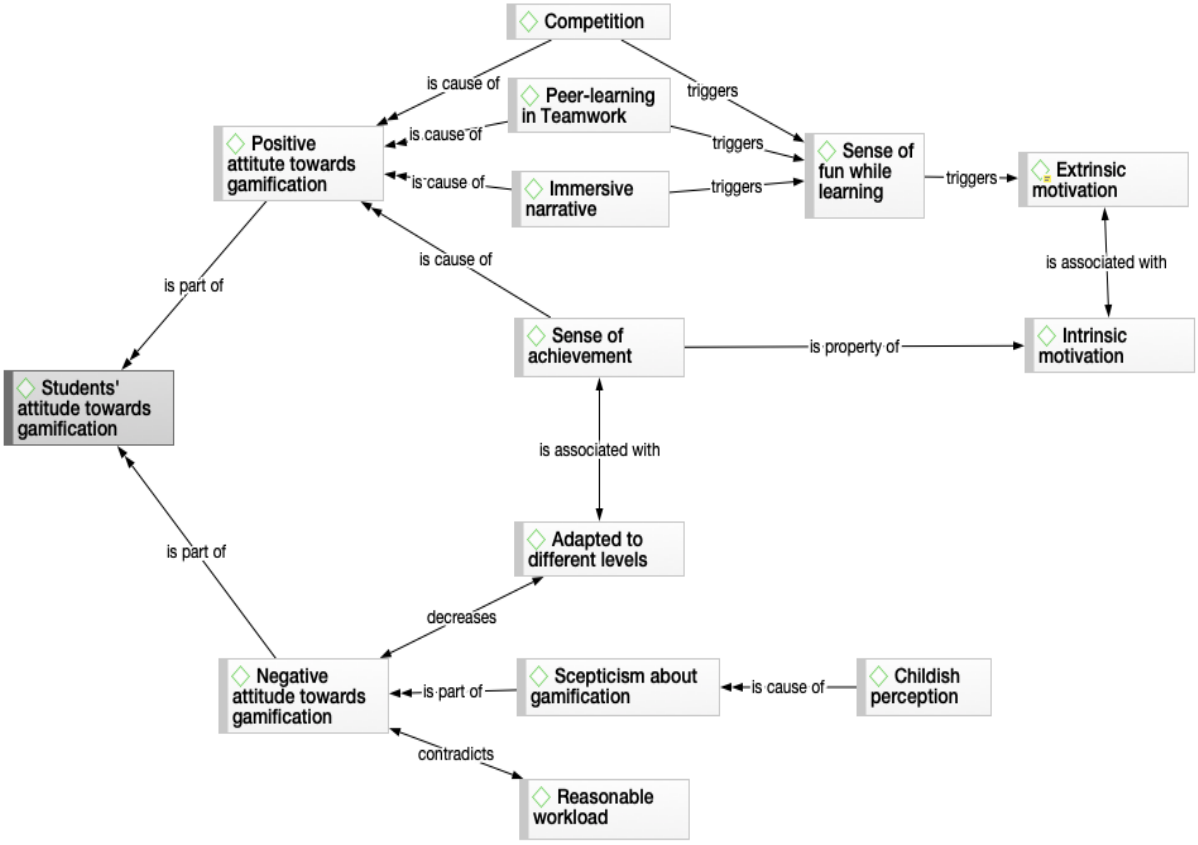
The final qualitative findings were written in a logical sequence, following the mind map and including chunks of transcripts to support every observation. Next to each relevant content, the triangulation symbol was inserted (), to show that that specific section would be then incorporated together with the matching quantitative results and supporting evidence from the literature review in the Discussion section.

5.5 Qualitative results

This section presents the outcomes in two subsections reporting the findings on (i) students' attitudes towards gamification and (ii) their perceptions on learning English. Both parts include the mind map followed by a detailed description of each box supported by relevant quotations.

5.5.1 Findings on students' attitudes towards gamification

Figure 4: Thematic network of students' attitudes towards gamification



Source: Researcher's mind map built on Atlas-ti

During the pre-interviews, the idea of including gamification in an English course raised rather favourable reactions. Most participants started making connections between game settings and engagement. Student 2 points out the appropriateness of such a technique in the current digital era while students 3 and 5 associate gamification with better learning experiences.

"...Em sembla molt bé perquè com la nostra era utilitza molt l'electrònica i el joc i tot això, és una molt bona idea per fer estudiar la gent, vull dir, amb jocs, vídeos, i coses així." ["... I think it is very good since in our era we use many electronic devices and games and all that, it is a good idea to make people study with games, videos and things like that."]

"Nosaltres fèiem un joc amb preguntes i coses així de gestió d'empreses...la gent com que s'incitava més al joc i feia més respostes gràcies al joc i participava més." ["We once made a game with questions and things like that in Business Management ...people were like more motivated in the game and provided more answers thanks to the game and participated more."]

(Pre-interview 09/2018, Student 2)

"Fer jocs dona un vocabulari més ample i sense donar-te compte aprens." ["Games provide more vocabulary and you learn without noticing."]

(Pre-interview 09/2018, Student 3)

"Jo conec moltes experiències de gent que a partir d'així han pogut aprendre o han millorat el seu saber d'anglès. I penso que es pot aprendre així." ["I know about several experiences of people that could learn or improve their English by doing so (playing games) "]

(Pre-interview 09/2018, Student 5)

After the course, students 1, 3, 4 and 5 reported a special interest in competition-related elements such as points, ranking or weekly progress. They also added that when competing in teams, they engaged or were engaged by their teammates to perform more and better in every challenge.

"Mm... o sigui, jo anava mirant cada setmana, o sigui, els resultats de, bueno el d'equip i el individual i doncs bueno més o menys jo crec que... sí això també m'ha anat una mica diguéssim motivant, o sigui perquè havíem començat, o sigui més o menys regular i al final hem anat pujant, jo crec i doncs... ha estat bé." ["Mm.. I mean, I would check every week, I mean, the results of, well the team and the individual ones and well, I think that it kind of... yes, this also motivated me somehow, I mean we started like so-so, and in the end we progressed, then I think... it was good."]

"Sí, bueno el rànking i tot això, sí també, et fa en plan com motivar, t'incita doncs a fer el treball i ser el millor diguéssim." ["Yes, well the leaderboard and all that, yes, it also… it is like it motivates you, it pushes you to work and to be the best, to say so."]

(Post-interview 01/2019, Student 1)

"Com que la gent està fent el treball… i veus que la gent que té estrelles i tot això, doncs sempre segueixes el ritme dels altres." ["As people were doing the tasks… you see how the others get stars and all that, so you try to follow the others' pace."]

(Post-interview 01/2019, Student 3)

"…vaig veure que estaven en quarta posició, però després, en veure les puntuacions pel grup, pues també me va motivar…" ["I saw we were in the fourth position but then, when I saw the team's score, this also motivated me…"]

"Pues dic si aquí tothom va a competència, pues jo també!" ["So, I said if everybody competes here, I'll do too!"]

"Dic, ostres, mira, si estic més o menys com una altra, mira que bé, saps?" ["I said, wow, look, I am more or less in the same position as this other one, how nice, you know?"]

"Dic, si fem bé el vídeo, igual ens puntuen… i ella també que s'ha motivat al final." ["I said if we make a good video, we may get points… and she (the teammate) also got motivated in the end."]

(Post-interview 01/2019, Student 4)

"Per exemple, amb la meva companya li donàvem molta importància a això… la competència, a lo "nosaltres, per arribar a ser a la part de dalt del rànking, hem de… hem de mostrar tot el potencial." ["For example, my teammate and I paid special attention to that… competition, like we have to show all our potential to be at the top of the leaderboard."]

"Realment a mi i amb la S., ens ha servit bastant. A lo: Ah, no podem quedar-nos a baix, hem de pujar, hem de pujar!" ["It was really helpful for S. and myself. It said: Ah, we cannot stay down there, we must move up, we must move up!"]

(Post-interview 01/2019, Student 5)

Socialising in gamification seemed to be a regular emerging motivational element among students. They enjoyed sharing learning experiences with teammates and learning from each other. In fact, we could observe this perception both in pre-interviews and post-interviews with students 1, 2, 3 and 4.

"...Em sembla molt bé la veritat, així també poses en relació altra gent amb tu i doncs és cooperatiu, diguéssim." ["I think it is very good really, this way you are in contact with other people and it is cooperative, to say so."]

(Pre-interview 09/2018, Student 1)

"O sigui, m'ha ajudat bastant a aprendre anglès i doncs també a compartir amb altres persones". ["I mean, it pretty much helped me to learn English and also to share with other people."]

(Post-interview 01/2019, Student 1)

"... Crec que estava bé perquè, no sé, com estàs amb companys i tot, tens una mica d'ajuda, pots ajudar-te una mica d' internet i tot i ho trobes tot fàcilment." ["... I think it was good because, I don't know, as you are with your classmates and all that, you get some help, and you can find everything easily on the Internet."]

"La cosa és el fet de fer-ho en equip, tenir la foto per dir-ho així, un nom, les estrelles, els premis..." ["The thing is about doing it in teams, having your picture, to say so, a name, the stars, the rewards...]

"Quan estàs en un diàleg i saps que l'altra persona et pot corregir o tu la pots corregir, que és lo que em passava a mi, que jo corregia a vergades algun accent o així als meus companys. Això et dona el èmfasis de seguir, de dir: se'm dona bé, els puc ajudar i m'ajuden a practicar l'idioma que m'agrada. I és això el que em va agradar." ["When you are working on a dialog and you know that the other person can correct you and you can correct her, which is actually what happened to me, sometimes I corrected some of my teammates' accents. This engages you in going on and saying: I am good at this; I can help them and they can help me practice the language I like. And that is what I liked."]

"El contacte amb els companys parlant anglès va ser molt beneficiós." ["The contact with my teammates speaking in English was very beneficial."]

"... I fer vídeos, àudios i tot això en grup és molt...com et quedes molt a gust quan veus la nota i veus que t'ha sortit bé. ["... and making videos, audios and all that in teams is very... it is like you feel satisfied when you see the result and that you did a good job."]

(Post-interview 01/2019, Student 2)

"Sí, la veritat és que aniria molt bé, sobretot en treballs en grup i tot." ["Yes, it would actually be very helpful, especially when working in teams and all that."]

(Pre-interview 09/2018, Student 3)

"Sí, molt bé perquè crec que al final és divertit, una altra forma d'estudiar i el passes amb els companys..." ["Yes, it was very good because I think it is fun in the end, a different way of studying and doing it with the classmates."]

(Post-interview 01/2019, Student 3)

"També, bueno, hem avançat les dues perquè si una deia una cosa i no la deia bé, l'altra la corregia. Ens hem ajudat també a corregir-nos en la pronunciació perquè potser amb dues sents millor." ["And then, well, we both progressed because if one said something wrong, the other one corrected it. We also helped each other correct our pronunciation because the two of us could listen more."]

(Post-interview 01/2019, Student 4)

Regarding the gamification narrative, students 1, 4 and 5 reported a sense of immersion in the story, where pretending to be mountain guides seemed close to their reality. Student 5 stated it could actually be a real professional situation where using English made sense.

"... o sigui, a mi m'ha agradat també, o sigui, era com una història i tu doncs ja anaves...anaves, eres com un personatge tu també." ["... I mean, I also liked it, I mean, it was like a story and so you would... you would also be like a character."]

(Post-interview 01/2019, Student 1)

"I bueno sí, és que també lo del tema dels refugis, com que a mi m'agrada la muntanya també m'agrada ja des del principi el tema." ["So yes, since I am fond of mountains, I liked the theme of mountain huts from the beginning."]

"És situació de feina, és el que m'ha agradat també. Que te poses en una situació de feina, en la que pot ser real que tinguis gent que parla anglès i tu hagis de portar-los a refugis o tu hagis de portar persones en grup. Han estat situacions que es poden donar també en una feina." ["It is a working situation; this is what I also liked. You put yourself in a real-life working situation where you can take groups of English-speaking people to mountain huts. They were situations that can also be found in a real job."]

(Post-interview 01/2019, Student 4)

Sí, és clar, et fet de que... si és molt repetitiu això de la guia, doncs realment et fa ficar-te dins del paper i realment, quan comences a fer el rècord, penses que... dius: Uou, això realment no... realment ho podria fer, si fora així, realment podria parlar amb una conversa i poder guiar a certes persones que també parlen al mateix idioma. ["Yes, of course, the fact that... if the guiding tasks are very repetitive, then you really put yourself in the role and when you actually start completing challenges you say: Wow, this is something that... I could really do, if it was so, I could really hold a conversation and guide specific people who speak the same language."]

(Post-interview 01/2019, Student 5)

The strategic combination of a wide variety of elements in the gamification design and in tasks included in the weekly challenges seemed to respond to different student interests. Student 2 mentioned some aesthetic elements and rewards and students 5 highlighted the diversity in learning tasks.

"Crec que és una molt bona idea, i que es pot seguir utilitzant perquè la veritat m'ha ajudat molt... La cosa és el fet de fer-ho en equip, tenir la foto per dir-ho així, un nom, les estrelles, els premis... Tot això com un mini-joc, com que et donava la il·lusió de dir: Ai, qué graciós, saps?... I lo que deixaria és tot, no trauria res perquè està molt complet i està molt ben fet."

["I think it is a very good idea, and that it can be used again because it really helped me... The thing is about doing it in teams, having your picture, to say so, a name, the stars, the rewards... all this is like a mini-game, it is like it makes you feel excited and say: Hey, how funny, you know?... And what I would leave is everything, I wouldn't take anything off. "]

(Post-interview 01/2019, Student 2)

"…penso que és una mica variat i hi ha una part d'escrit, una part d'exercicis, penso que està bastant complet." ["…I think it is varied and there is a written part, a part with exercises, I think it is quite comprehensive."]

(Post-interview 01/2019, Student 5)

Most respondents expressed motivation produced by self-achievement during the course. We could associate this attitude with all the constructive feedback students could see on Moodle as they completed their weekly challenges, especially the one shown on the leaderboards. Their motivation was both resulting from individual and team progress.

"…com et quedes molt a gust quan veus la nota i veus que t'ha sortit bé." ["… It is like you feel satisfied when you see the mark and that you did a good job."]

(Post-interview 01/2019, Student 2)

"Sí, més per auto-superació. Intentes cada setmana, com intentar treure més de lo que havies tret la setmana passada." ["Yes, it is more about self-achievement. You try every week, like try to get further than the previous week."]

(Post-interview 01/2019, Student 3)

"Jo estic contenta, a més que animava a la P. dient "mira, mira, hem pujat." ["I am pleased, and I also encouraged P. , saying: look, look, we moved up."]

"I quan veus que vas entenen la classe i vas seguint, pues sí, t'anima." ["And when you see you understand and follow the class, then yes, it is encouraging."]

(Post-interview 01/2019, Student 4)

"…O sigui perquè havíem començat, o sigui més o menys regular i al final hem anat pujant, jo crec i doncs… ha estat bé. Si, no sé…m'ha agradat bastant." ["… I mean, since we had

started like so-so and in the end, we moved up, so I think it was good. Yes, I don't know, I pretty much like it."]

"Uh…penso que més que res, lo que em motivava més era la part dels… quan teníem que fer un rècord. Suposo que això era lo que més motivava perquè dius realment… quan tu començaves a realitzar les teves pròpies frases per realitzar un guió amb la, amb el teu company, doncs suposo que allà és quan… jo penso que és on més aprens, et motiva i dius Ui, això no ho sabia. ["Uh… I think what motivated me the most was when we had to score points. I guess that was the most motivating thing because you really say… when you started to make your own sentences to produce the script with the teammate, I suppose it was then when I thought I learned more, that is motivating and you say: wow, I didn't know that."]

(Post-interview 01/2019, Student 5)

When discussing possible improvements respondents would make in the course, from the viewpoint of students 2 and 5, challenges should consider different difficulty levels. They both reported that at some point the challenges were too easy for their perceived skills.

"Sí com que era simple, però com que m'esperava una mica més de dificultat. Sí, potser és per el nivell en sí perquè ho entenc i em vaig posar en aquest nivell per voluntat pròpia. Però si fan el mateix (?) per dir-ho així, per als nivells superiors, ho posaria més difícil." ["Yes, it was like simple, I kind of expected something a bit more difficult. Yes, it may be due to the actual level because I understand it and I adapted to that level willingly. But if it has to be done for higher levels, I would make it more difficult."]

(Post-interview 01/2019, Student 2)

"Eh… en principi bastant bé, tot i que hi havien coses que als challenge vèiem que dins del que cap eren molt més fàcil del que apreníem a classe, saps? I era com que en ves de forçar, bueno reforçar el que ja sabíem, era com més fàcil del que ens havia ensenyat." ["Eh… it was ok, although we saw things in the challenges that were much easier than what we learned in the classroom, you know? And it was like, instead of reinforcing what we already knew, it was like easier than what we were taught."]

(Post-interview 01/2019, Student 5)

A common impression observed in students 2, 4 and 5 is their concern about workload. They believed a less demanding course in terms of number of tasks or submission regularity, would allow a higher participation. Apparently, this perception is related to specific academic periods in which students have peak workloads from other subjects.

> *"La veritat, ho faria de dos en dos setmanes per la cosa que ens doni temps a fer-ho bé i que ens doni temps a fer les altres coses." ["Honestly, I would do it once every two weeks so we have enough time to do it well and still have time for other duties."]*
>
> (Post-interview 01/2019, Student 2)

> *"Jo crec que faria el challenge cada dos setmana perquè se'ns fa molt just. Això és lo que he vist, que el temps és molt... Sí perquè totes les assignatures treuen temps, no?" ["I think I would do the challenge every two weeks because it is too tight. This is what I saw, that deadlines are tight... Yes, because all the subjects require time, don't they?"]*
>
> *"És el comentari general, no? que he sentit als companys: Cada setmana costa molt que ens hem de ficar al challenge". ["This is the general comment I have heard from the classmates: It is very hard to complete a challenge every week."]*
>
> (Post-interview 01/2019, Student 4)

> *"Bueno, lo de tindre un treball, o sigui, cada cap de setmana i tal, sí que et fa que estiguis més...estudiant, més atent a anglès i tal, però també al final, o sigui, és fa pesat diguéssim. Vas dient: Ostia, cada setmana un treball tal... i al final pues..." ["Well, having an assignment, I mean, every week and so, it did require that you studied more, paid more attention to English and all that, but in the end, I mean, it was like tiring. You would say: Gosh, every week an assignment and all that... and in the end, you know..."]*
>
> (Post-interview 01/2019, Student 5)

Finally, a sceptical perception was also included as we believed it showed an interesting counterpart that we think should also be considered although it is an isolated individual experience. In this case, student 4 did not seem very receptive when introduced to the research project. Before the gamified experience, this participant associated the technique with child-like contexts rather than with grownups. However, by the end of the course, the students' attitude turned out to be rather favourable.

"Sí, sí…bueno, el que passa és que s'utilitzava més amb nens, perquè els nens aprenguin. (…) Però per una altra banda, penso: Està bé, no? Però quan surts a treballar, no te premien." ["Yes, yes… well, the fact is that it is used with kids to make them learn (…). But on the other hand, I think that when you are out there working, they do not reward you for that. "]

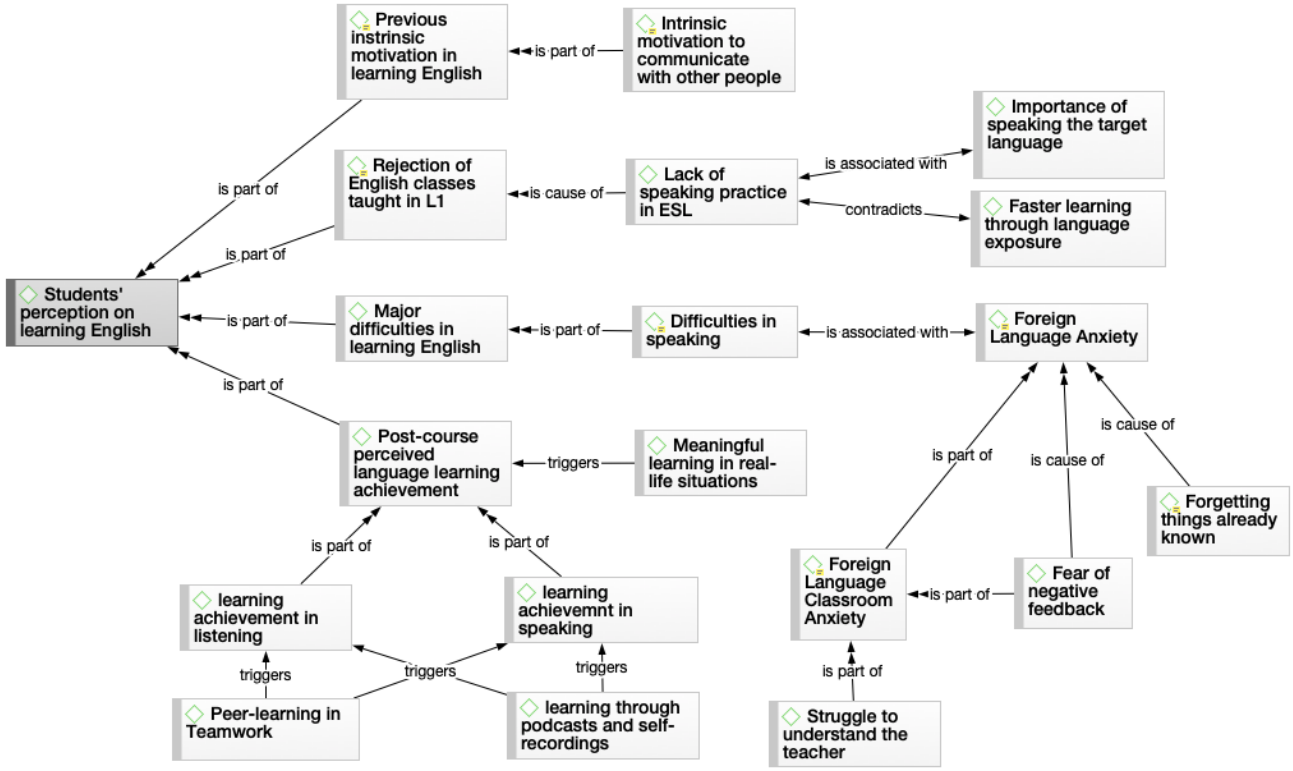
(Pre-interview 09/2018, Student 4)

"Home està bé com a experiència. Jo pensava que era… com que al principi es va plantejar com un joc i jo et deia: va, però si la vida no és un joc, i tal. ["Well, it is good as an experience. I thought it was… since at the beginning you presented that as a game and I said: "Come on, life is not a game, and all that. "]

(Post-interview 01/2019, Student 5)

5.5.2 Findings on students' perception on learning English

Figure 5: Thematic network of students' perception on learning English



Source: Researcher's mind map built on Atlas-ti

Participant students consider English as a language they wish to learn beyond academic requirements. The reasons were mostly related to communicating with foreign people and accessing information on the Internet or in real international settings.

> *"Bueno, pues per poder-me comunicar amb altra gent, per exemple." ["Well, to be able to communicate with other people, for example. "]*
>
> (Pre-interview 09/2018, Student 1)

> *"... crec que tot el món hauria de saber perquè seria molt més fàcil parlar." ["... I think everybody should speak it since it would be much easier to communicate."]*
>
> (Pre-interview 09/2018, Student 2)

"Ho faig servir per informàtica per exemple, per quan estàs a internet i tot, per navegar hi ha molta cosa a internet que és en anglès." ["I use it in computer science for example, when I am on the Internet and all that, to surf the net there is much content in English."]

"... si algun dia viatges per països anglès pues parlar i, com informar-te de tot." ["... if you ever travel to English-speaking countries, you use it to communicate and get information about everything."]

(Pre-interview 09/2018, Student 3)

"... també crec que és pràctic a nivell internacional, a nivell mundial si no tens l'anglès no pots fer molt. I és l'idioma que tothom manega." ["... I also think it is practical at the international level, at a world-wide level if you don't speak English, you cannot do much. And this is the language everybody uses."]

(Pre-interview 09/2018, Student 5)

In the pre-interviews, three students pointed out that they appreciated classes of English taught in the target language. We did not expect such answers, since we took for granted the fact that students had previous language training totally instructed in English. However, it seems that some schools allow the L1 as a language of instruction or translation-based learning.

"... em feia una mica de por que els professors no sàpiguen ensenyar perquè com vinc del (...) no m'agradava gens com ensenyaven l'anglès." ["... I was a bit afraid that the teachers wouldn't know how to teach because I come from the (...) *, and I didn't like the way they taught English."]*

"I el fet de que parli solament anglès i no parli ni català ni ningun altre idioma ens ajuda també molt a nosaltres, i això m'agrada." ["And the fact that (the teacher) only speaks English, and not Catalan nor any other language also helps us very much, and I like that."]

(Pre-interview 09/2018, Student 2)

"La veritat és que ara, aquí a la universitat se m'està donant una mica millor perquè sí que farem... estem sembla parlant en anglès i tot mentre que quan estava al (...) era més*

traduir al moment i ja està, per fer una frase i la tradueixes tu i tot això. Ara com solament parlem en anglès és, o entens o et quedes a darrere, llavors fas un pas bastant gran, així." ["The truth is that now, here at the university, I can manage a bit better because we will... it seems that we are speaking English and all that, while when I was at (...) it was just about making direct translations and that was all, making a sentence and translating it yourself, and all that. Now we only speak English, either you understand it or you are left behind, so you progress quite a lot this way."]*

(Pre-interview 09/2018, Student 3)

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**The name of the school was deliberately hidden for ethical reasons (see details in the section Ethical considerations)*

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"La veritat és que m'agrada molt perquè fa la classe molt dinàmica i no parlar en res, ni en català ni en espanyol." ["Honestly, I like it very much because the classes are dynamic and (the teacher) doesn't speak anything but English, nor Catalan nor Spanish."]

(Pre-interview 09/2018, Student 4)

Increasing speaking opportunities, especially at university, seemed a possible solution to advance in learning English. According to student 5, oral practice also depends on personal initiative outside the university context.

"Parlar molt oral ... en context universitari." ["Much oral practice... in the university context."]

(Pre-interview 09/2018, Student 3)

"Practicar, molt, escoltar molt i estudiar també." ["Much practice, much listening and studying as well."]

(Pre-interview 09/2018, Student 4)

"Pues amb anglès, jo crec que em faltaria relacionar-me més amb persones així, que parlin anglès i així poder millorar la meva forma de parlar l'anglès." ["In English, I think I would need to be with people who speak English so that I can improve my way of speaking English."]

"... bueno em vaig ficar un propòsit de parlar amb el meu pare en anglès, perquè ja que tinc els pares que tenen coneixement d'anglès, vaig dir: Pues aprofitaré aquest element que tinc a favor. I clar, el fet de que cada dia vaig aprenent coses i ho vaig aplicant mentres parlo amb el meu pare, doncs veig que a l'hora de parlar amb el meu pare, cada vegada és més com que no tinc tanta dificultat com abans que tenia que pensar la frase abans i després dir-la, ara com que és més fluid. ["...well, I set the goal of speaking English with my father, because my parents speak English and I said to myself: I will take advantage of that. And of course, the fact of learning things every day and applying them while speaking with my father, makes me realise that when speaking with my father it is like less difficult than before, when I had to think about the sentence and then say it. Now it is like more fluent."]

(Pre-interview 09/2018, Student 5)

The main struggles students reported in learning English were related to oral skills. Some clearly stated that speaking would be the most difficult aspect. Forgetting words or failing to build correct sentences seemed to cause a sense of frustration.

"Sobretot al parlar, sí que trobo bastanta dificultat." ["It is mainly speaking that I find pretty difficult."]

(Pre-interview 09/2018, Student 1)

"A l'anglès a mi em costa molt és parlar-lo, i m'oblido moltes paraules, al moment de parlar sobretot. Quan estic parlant jo, em costa molt. Entendre, encara el vaig entendre una mica i he fet alguns anys al (...) l'anglès, però ara com que em costa una mica encara parlar." ["I struggle much with speaking English, and I forget many words, especially when I speak. When I am the one speaking, I struggle a lot. As for understanding, I can manage a little and I studied English for some years at the (...)*, but now it is like it is still difficult for me to speak."]*

(Pre-interview 09/2018, Student 3)

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**The name of the school was deliberately hidden for ethical reasons (see details in the section Ethical considerations)*

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"Pues jo penso que els problemes que veig a l'hora de parlar són més a l'hora de saber el vocabulari. Per exemple, jo saber fer una frase, la puc fer i tal. Però per exemple, quan necessito una paraula que és clau i no la sé, pues allà és quan falla i perd la força aquella frase. A vegades també em lio, saps? (...) si és escrit, pues encara pots pensar, però parlar-lo pues com ho penses així ràpid, pues a vegades estructuro malament la frase..." ["Well, I think that the problems I see when speaking are more about knowing the vocabulary. For example, I can make a sentence and all that. But, for example, when I need a key word and I do not know it, then the sentence loses its strength. Sometimes I get confused, you know? (...) if it is written you can think, but when speaking you have to think fast, so sometimes I fail in structuring the sentence..."]

(Pre-interview 09/2018, Student 5)

At the beginning of the course, speaking in the classroom was seen as a source of stress. The fear of not being able to understand the teacher seemed to cause nervousness and unusual reactions such as forgetting what to say.

"O sigui, em poso una miqueta més nerviós i doncs em costa després dir coses i tal que potser sí que sabria dir. Sobretot a classe, que et poses més nerviós i el profe et diu no sé què i potser no ho entens bé i llavors ja no saps ben bé què contestar i tal. Sobretot aquí." ["I mean, I get a bit nervous and so it is hard to say things that I would actually know how to say. Especially in the classroom, you get more nervous when the teacher says whatever that you do not understand properly and then you do not know what to answer and all that. It is mainly that."]

(Pre-interview 09/2018, Student 1)

Students do not feel comfortable in situations where they are suddenly asked to speak in English in front of other people due to the fear of negative feedback. One of them even described this type of situation as "intimidating". Making mistakes in front of their classmates also underlies the fear to answer questions in the classroom. However, performing speaking practice tasks within the gamified course made students feel more confident since they did not feel observed.

"És el fet de donar confiança als alumnes perquè quan estàs parlant amb anglès, no sempre tens la confiança, de dir: Ah, si m'equivoco, es riuran de mi...Tindríem de tenir alguna manera perquè els alumnes es sentissin a gust parlant anglès i sense tenir problemes d'equivocar-se. Perquè ho he notat a classe també que quan algú té que respondre, tots ens quedem mirant i com que això afecta a la persona perquè se sent intimidada." ["The thing is about making students feel confident because when you are speaking in English, you do not always feel safe, like: Ah, If I get it wrong, they will laugh at me... We should find a way to make students feel comfortable when speaking English without worrying about making mistakes. Because I also noticed that when someone has to answer in the classroom, we all stare at him/her and it somehow affects the student because he/she feels intimidated."]

(Pre-interview 09/2018, Student 2)

"...hi han persones que tenen més dificultats a l'hora d'aprendre l'anglès, doncs a l'hora de fer exercicis és com que a vegades ens fa por respondre, de que no estem segurs amb nosaltres mateixos si realment em entès i si quedarem malament davant dels altres companys." ["There are people who encounter more difficulties when learning English, so when we need to complete exercises, we are afraid of answering, and we do not feel confident to see if you actually understood or if we will make a bad impression on our classmates."]

(Post-interview 01/2019, Student 2)

"... però parlar-lo pues com ho penses així ràpid... pues a vegades estructuro malament la frase i a vegades no hi penses però clar, l'altra persona et diu: Ui, ho has pronunciat malament la frase i tal. ["... when speaking you have to think fast, so sometimes I fail in structuring the sentence and sometimes you don't think about it but in fact, the other one says: Oh, your pronunciation is wrong, and all that..."]

(Pre-interview 09/2018, Student 5)

"Per exemple el fet de fer-ho amb les online tasks es com que et sents més segur perquè no veus a ningú, ho fas amb més seguretat. Però clar, quan has de respondre exercicis és com que tens la tensió de...Uah, no sé si ho he fet malament, si estarà bé." ["For example, the fact of completing online tasks makes you feel like more confident because you don't see

anyone, you feel safer when doing it. But, of course, when you have to answer exercises, it is like you feel tense and think… Wow, I don't know if I did it wrong or if it is correct."]

(Post-interview 01/2019, Student 5)

Finally, all the students reported a perceived improvement in oral skills by the end of the course, that is, feeling more confident in speaking and listening tasks. This improvement was often associated with the regular speaking practice included in each challenge. Using podcasts and videos was also perceived as helpful as it allowed enough time to rehearse the dialogues before they were recorded and self-correction of speaking mistakes such as mispronunciations.

"O sigui, sí, jo crec que m'ha, o sigui, m'ha afectat positivament, o sigui, m'ha millorat diguéssim el parlar, el comunicar-me i també l'entendre l'anglès, sí. Sí, pues jo bastant millor, sí que a principi d'any. O sigui, jo crec que ha sigut bastant positiu, sí." ["I mean, yes, I think it…, I mean, it had a positive effect on me, I mean, it helped me improve my speaking skills, communicating but also understanding English, yes. Yes, well I think I is quite better now than the beginning of the year. I mean, I think it has been pretty positive, yes."]

(Post-interview 01/2019, Student 1)

A mi… ja m'agradava parlar l'anglès però crec que fent diàlegs i tot això m'ha ajudat una mica més, perquè no solia gravar-me, fer àudios o així o presentar alguna cosa en anglès. Sempre era allò de fer un oral amb el professor i els escrits i això de tenir que fer el treball via àudio o alguna cosa així i tenir que gravar-lo vàries vegades o practicar-lo i… el contacte amb els companys parlant anglès va ser molt beneficiós. ["I already liked speaking English but I think that practicing conversations and all that has helped me a little more, because I was not used to recording myself, making podcasts or things like that, or presenting something in English. Before, it was always like doing oral activities with the teacher and also writings, but doing the tasks through podcasts, recording them several times and repeating them and… speaking English with the classmates was very beneficial."]

(Post-interview 01/2019, Student 2)

"com que parlàvem una mica, ja milloro perquè abans lo que em costava molt era parlar. " ["… as we had to speak a little, I am improving because I struggled quite a lot in speaking before."]

(Post-interview 01/2019, Student 3)

"I al principi, me costava molt d'entendre-ho i tal, no? però després vas agafant més oïda. I al parlar-lo a les feines, doncs també m'he adonat que sí que podia... que el podia parlar." ["And at the beginning I struggled much in understanding it, you know? But then you start improving the listening skill. And, as we had to speak in the tasks, then I realised I could indeed do it... that I could speak English."]

(Post-interview 01/2019, Student 4)

"... lo que m'ha agradat més és que he après molt com pronunciar les paraules, per exemple el "the", que molta gent el pronuncia malament." ["... what I liked the most was that I learnt how to pronounce words, for example "the", which many people pronounce the wrong way."]

(Post-interview 01/2019, Student 5)

The following table shows a summary of the most relevant perceptions that each participant reported both in the pre-interview and in the post-interview on key research issues: motivation, foreign language anxiety and language learning.

Table 14: Overview on individual results

Student	Motivation	Foreign Language Anxiety	Language learning
S1	**Pre-interview** • Showed a special interest in socialising within game-like environments **Post-interview** • Reported motivation produced by the competition effect of leaderboards and the sense of achievement • Felt like a character in the narrative	**Pre-interview** • Felt nervous about speaking and forgetting things already known • Feared to be called out by the teacher in the classroom • Feared negative evaluation from the teacher **Post-interview** • Expressed confidence in speaking tasks performed with a teammate	**Pre-interview** • Reported major difficulties in speaking **Post-interview** • Perceived learning achievement enhanced by peer-learning contexts • Perceived notable improvement in speaking and listening
S2	**Pre-interview** • Showed personal interest in gaming and had a previous motivating experience in learning through gamification • Reported a high level of previous intrinsic motivation to learn English **Post-interview** • Showed motivation produced by different game elements: teamwork, avatar, stars (points), rewards • Reported a sense of self-achievement and satisfaction after successfully recording podcasts and videos	**Pre-interview** • According to previous experiences, considered speaking in the classroom an intimidating experience **Post-interview** • Felt more confident in online speaking tasks performed in Mountain Experience, without being observed in class	**Pre-interview** • Did not report any specific difficulty since the individual academic level was already very high • Associated better learning with courses totally taught in the target language **Post-interview** • Had a beneficial experience speaking English with the classmates and enjoyed learning through podcasts.

Student	Motivation	Foreign Language Anxiety	Language learning
S3	**Pre-interview** • Showed a special motivation to learn in peer-learning contexts **Post-interview** • Felt motivation produced by the competition effect of leaderboards • Reported a sense of fun in gamified learning and socialising • Expressed self-achievement in the desire to perform better every week	**Pre-interview** • Reported difficulties such as getting nervous when speaking English with other people and forgetting words already known **Post-interview** • Expressed more confidence in peer-learning contexts	**Pre-interview** • Associated poor learning in the past due to English classes taught in L1 • Expressed the need for practice in speaking **Post-interview** • Perceived speaking achievement associated with practicing English in interactions
S4	**Pre-interview** • Reported a high level of previous intrinsic motivation to learn English • Felt sceptical about gamification due to preconceptions or childish connotations **Post-interview** • Reported a sense of immersion in the story • Expressed special interest in real-life situations as meaningful contexts to practice English • The narrative topic was also attractive • Reported motivations from individual and team achievement • Felt motivation produced by the competition effect of leaderboards	**Pre-interview** • Did not report any specific type of anxiety **Post-interview** • Did not report any specific type of anxiety	**Pre-interview** • Associated better learning with courses totally taught in the target language • Expressed the need to practice much more speaking and listening **Post-interview** • Perceived speaking achievement associated with peer-learning • Perceived listening achievement associated with the speaking online tasks

Student	Motivation	Foreign Language Anxiety	Language learning
S5	**Pre-interview** • Reported a high level of previous intrinsic motivation to learn English **Post-interview** • Reported a sense of immersion in the narrative and perceived the story as a meaningful learning context • Felt motivation produced by the competition effect of leaderboards • Reported motivations from individual and team achievement • Expressed self-achievement in the desire to perform better in every challenge	**Pre-interview** • Reported anxiety caused by the fear of negative feedback • Felt language anxiety when speaking in class **Post-interview** • Felt more confident in online speaking tasks performed in Mountain Experience, without being observed in class.	**Pre-interview** • Expressed the need of practice in speaking and learning vocabulary **Post-interview** • Perceived achievement in speaking pronunciation associated with peer-learning

6 DISCUSSION

This section describes the overall empirical findings in the form of a triangulation analysis. The content is structured by thematic sections, considering what students reported during the interviews and their nearest connections to the quantitative results as well as how the emerging outcomes are aligned with the available literature.

Students' attitudes towards gamification

In general, the qualitative findings suggest that students showed overall positive attitudes towards gamification before and after the course, the same way it has been reported by previous studies in the field (Barcena & Sanfilippo, 2015; Hojjat Dehghanzadeh et al., 2019; Dichev & Dicheva, 2017; Dicheva et al., 2015; Gafni et al., 2017; Majuri et al., 2018; Munday, 2016). During the pre-interviews, we could indeed observe how students showed mostly positive expectations towards including gamification in their English course at the university. From a CALL perspective, students' favourable opinions reflect the repeatedly evidenced benefits of using technology-assisted learning resources in creating low-stress learning environments (Chapelle, 2009; MacIntyre, 1999). However, some negative insights should be considered in further gamification courses, by fostering the lack of adaptable levels within a same course and too much workload. Similarly, Rojas et al. (2019) suggest designing the challenges and the workload carefully in order not to decrease student participation.

While the overall gamification design was perceived as appealing compared to traditional learning settings, some game elements associated to social relations (Aldemir et al., 2018; Barata et al., 2014; Tan & Hew, 2016) and self-achievement (Aldemir et al., 2018; Hakulinen & Auvinen, 2014) outstand as powerful boosters of both extrinsic and intrinsic motivation. Related research has repeatedly shown that it is essential to integrate and keep a balance of different gamification elements so as to stimulate both extrinsic motivation and factors belonging to intrinsic motivation (Dicheva et al., 2015; Richter et al., 2015). Accordingly, gamification designs like Mountain Experience would avoid detracting ideas about gamification, arguing that poor game elements based on limited external rewards such as points or badges might produce poor effect on learning experiences (Seaborn & Fels, 2015). As a matter of fact, the gamified environment was designed keeping in mind unsuccessful practices in gamification that should be avoided. Following Exton (2017), we considered some of the most inconsistent practices revealed by previous research such as:

- too simple gamification through *Pointsification*[7]

7 Pointsification: Inserting badges and leaderboards onto a system, without considering their underlying usefulness (Exton, 2017)

- the lack of understanding of psychological impact (Deci & Ryan, 2010; Marczewski, 2019)
- the lack of good game design (Hamari et al., 2014)

In fact, after the course, students highlighted some motivating gamification elements such as competition, peer-learning in teamwork, and immersion in the narrative (Aldemir et al., 2018; Sailer et al., 2017; Werbach & Hunter, 2012b). Besides, it seems that the combination of these different elements in Mountain Experience was seen as a fairly comprehensive learning environment. As a strategic design strategy, combining competition with students' interaction with their peers is a very powerful way to increase engagement and create a lively learning dynamic (Barata et al., 2013; de Sousa Monteiro et al., 2016; Licorish et al., 2018). Indeed, social relations and teamwork where students can interact and learn with their peers is a very efficient way to increase engagement (de Sousa Monteiro et al., 2016; Licorish et al., 2018). In gamification, peer-learning in teamwork is often reported as a clearly leading element in terms of student motivation and engagement (Perry, 2015).

When asked about improvements they would include in Mountain Experience, most students reported they would reduce the workload or even leave some more time in between the weekly challenges so they could fulfil the requirements of all their academic subjects properly. In other words, the workload should be perceived as reasonably balanced (Rojas-López et al., 2019). Despite sceptical attitudes related to childish connotations that gamification might raise among adult learners (Barcena & Sanfilippo, 2015), by the end of the course all the students showed an overall acceptance of gamification in their learning context.

Gamification effects on motivation

Students seemed to prefer academic tasks wrapped in a story rather than traditional formats of exercises, that is PDF files posted on Moodle. This is in line with previous studies showing that adding a story to dry academic tasks makes them more engaging and appealing for students (Aldemir et al., 2018; Armstrong & Landers, 2017; Natvig et al., 2004). When designing the gamification environment, we decided to include fictional features such as the company name or its manager, while keeping some grounding in reality (Kapp, 2013a). Guiding English-speaking people through mountain routes seemed plausible to students since it is one of the tourist landmark attractions in the country (see Andorran official tourist website). Respondents' reported experiences revealed that some students felt immersed in their roles of tourist guides. This is probably a direct effect produced by the alignment of game elements into students' learning goals, which is coherent with what Nicholson (2012) describes as a 'meaningful gamification' that places the user at the centre of the game design. Moreover, immersive narrative helps simulate real-life situations in which using English becomes a significant task for students (Council of Europe, 2020; Zoubi, 2018).

The gamification elements described so far seem to trigger a sense of fun among students compared to traditional instruction (Kapp, 2012; Whitton & Langan, 2019). It is worth mentioning that all these elements including competition, teamwork and narrative could be linked to extrinsic motivation

produced by stimuli coming from outside the individual (Deci and Ryan 2010). These findings are also in line with our quantitative study where a significant positive outcome could be observed among students from the treatment group as for their extrinsic motivation 'from external regulations'.

Regarding intrinsic motivation, and considering relevant research about the topic, we also observed that students seemed intrinsically motivated by elements related to goal achievement (Hakulinen & Auvinen, 2014; Heyman & Dweck, 1992). The sense of achievement produced by social gamification (Chapman & Rich, 2018; Krause et al., 2015) was reported by students as one of the most powerful boosters of their motivation. This phenomenon can be associated with key motivational theories, especially the SDT which posits intrinsic motivation as preferable compared to extrinsic motivation, since the first persists even in the absence of external rewards (Ryan & Deci, 2000). Students' perceptions correspond to the findings of the quantitative analysis which shows significantly better intrinsic motivation 'towards accomplishment' in the experimental group. It is worth noting that peer-learning helps sustain intrinsic motivation when students encourage and praise each other as they complete challenges successfully. As described by Zichermann (2011), a sustained motivation in game-like contexts is often produced by an engagement 'loop' resulting from positive recognition after achieving challenges, which at the same time nurtures people's intrinsic motivation as well as their self-efficacy (Bandura, 1982; Csikszentmihalyi, 1991) and pushes them to stick to a desired activity.

According to key motivational theories, the sense of achievement is produced by successfully completing tasks whose difficulty level is aligned with the perceived personal competence and efficacy (Bandura, 1982; Csikszentmihalyi, 1991; Ryan & Deci, 2000). However, some students pointed out that the level of difficulty was not always perceived as matching their individual capacities. Accordingly, they showed a negative attitude towards the fact that the tasks were the same for all the students and suggested that at some points they would prefer a higher level. To ensure motivation, the difficulty of challenges should be adaptative and slightly above students' skills (Sailer et al., 2017). This is a way to avoid a lack of interest or boredom in challenges that can be perceived as too easy (Csikszentmihalyi, 1991; Fitz-Walter et al., 2012).

Gamification effects on anxiety

As for FLA, when students were asked about the major difficulties in using English, most of them highlighted the struggles they go through when facing speaking situations (Horwitz, 2010; Zheng & Cheng, 2018). Before the course, students shared interesting thoughts and perceptions narrowly connected to FLA. Their answers indicate a fearful anticipation of situations where they might get negative evaluation, especially from their peers. These situations would typically occur in the classroom setting, when the teacher asks students to answer a question in front of the whole class without previous notice. Thus, public exposure could produce high levels of communication

apprehension due to the fear of being negatively judged (M. Liu & Huang, 2011), which can be perceived as a threat for the individual's self-esteem and self-efficacy (Bandura, 1982).

After the course, they expressed lower levels of anxiety in FLCA, especially in 'communication apprehension' and 'fear of negative evaluation'. When comparing significant results of Academic Motivation, two strong connections can be drawn between 'intrinsic motivation toward accomplishment' and 'extrinsic motivation from external regulation' produced by gamification. If we have a look at the findings resulting from the pretest and posttest on FLCA, we can clearly see that these perceptions match positive alterations in the two dimensions of FLCA ('fear of negative evaluation' and 'communication apprehension') by the end of the course. In effect, the treatment group showed significantly better results in communication apprehension levels.

As a matter of fact, the fear of being unable to fulfil language expectations is also associated with another dimension of FLCA we observed: 'test anxiety' (Horwitz et al., 1986). Our quantitative analysis shows how this type of anxiety was relatively moderate in the treatment group compared to the control group, even after administering the FLCA posttest right before the end of the course, which is a period in which students logically feel higher levels of test anxiety.

Students' attitudes towards learning English

Most students were somehow intrinsically motivated by learning English before starting the course. Their answers to warming-up questions such as *"What do you think about learning English? What does 'learning English' mean to you?"* suggest they perceive learning this target language as an unquestionable way to successfully interact with other people or access information and opportunities in international settings (Bastida et al., 2015). Gardner and Lambert (1972) named this type of intrinsic motivations 'instrumental' and 'integrative' motivation, which occur when people are interested in using the second language to meet their practical needs (ex: accessing information or furthering studies) and also when they see in it the benefit to understand and communicate with other people.

When asked about their previous individual experience in learning English, some were surprisingly pleased to have an English course delivered entirely in the target language. This revealed that they used to have classes taught in the first language at earlier educational stages. That might remind the methods used back in the 60s to teach second languages through strongly criticised practices such as the out-dated Grammar Translation which do not lead to active communicative skills (Ellis, 2015). Nowadays, one might believe that naturalist and communicative approaches in second language acquisition (Krashen, 1982; Richards, 2005) have been widely embraced by most practitioners and that students learn the target language by using it. However, as we can witness through some students' individual experiences, it seems that this assumption cannot be easily generalised.

When discussing efficient ways to overcome difficulties in learning English, students referred to the importance of getting more opportunities to practice the target language either in the learning setting or in real-life situations (Dincer & Dariyemez, 2020; Zoubi, 2018). Language learning can certainly be speeded up through language exposure both in formal and informal settings (Zoubi, 2018).

Another key aspect discussed with students were the struggles they usually encounter when learning or using English. In line with the language profiles described in our research context, they reported common issues in oral skills. This is probably due to the fact that, unlike other skills, they require a balanced mastery of input and output to both understand and produce fluent language (Canale & Swain, 1980; Swain, 2000; Swain & Lapkin, 2001). Consequently, speaking seems to be the skill where most students see they need to improve.

However, after the course, what students pointed out was their perceived improvement in oral skills, especially in speaking interactions and listening. This is coherent with the type of activities they completed in their online tasks, where the implementation of speaking practice cannot be isolated from listening tasks (Blake, 2016; Swain, 2000). According to their contributions, they perceived that technology-driven tasks such as making podcasts or posting videos enriched their learning process since they could prepare their production in advance and self-correct their oral productions (Blake, 2016; Kay, 2012). Using technology-based learning tools has been proved to engage students in communicative tasks (Reinders & Wattana, 2011, 2014), especially when learners are allowed to choose their own recording devices and perform out-of-class speaking tasks (Kessler, 2010).

Gamification effects on learning achievement

Although students reported an overall satisfaction with their improvement in oral skills, our quantitative findings do not show any conclusive evidence on fluency achievement. These results confirm previous inconclusive evidence revealed in recent studies about the cognitive effects of gamification (Cardoso et al., 2017; Rojas-López et al., 2019). Tan and Hew (2016) argue that gamification seems to be more effective for practical abilities more than factual competences; this idea suggests that fluency would not benefit from direct effects of gamification due to the highly cognitive processes it involves (Kormos, 2006).

Our negative findings on fluency achievement could also be due to the long and complex process learners need to go through in order to achieve adequate fluency in their expected academic level. This observation is consistent with what Bui and Skehan (2018) argue in their contribution to CAF theories:

> *Familiar information, and information which only requires retrieval from long-term memory rather than transformation or manipulation, also have a positive influence on accuracy.*

> *Essentially the same influences also exist with fluency, and so, once again, structured tasks, and familiar, retrievable information raise the fluency in performance. (p. 6)*

Therefore, such assertion suggests that performing learning tasks involving active participation from the student in repetition and automatisation activities can help speed up fluency achievement (Arevart & Nation, 1991; Ellis, 2006; Molina & Briesmaster, 2017; Nation, 1989). Similarly, Kormos (2006) argues that fluency, as a capacity to produce smooth speech that requires a long-run and complex process, is what learners ultimately pursue in learning a second language. However, automatising their language use is a key aspect to improve fluency that has been neglected for long in SLA. Furthermore, crucial cognitive processes in automatising speaking fluency such as encoding and recalling can be hindered by language anxiety (MacIntyre & Gardner, 1994). FLA has indeed proved to be a persistent affective filter throughout a language learning process.

All the above-mentioned ideas indicate that further research is needed in speaking fluency achievement, especially through longitudinal studies that would provide valuable insights to L2 teachers who might get frustrated in their attempts to promote fast development in fluency.

7 CONCLUSIONS

This research investigates the effects in learning a second language on motivation, anxiety and achievement in speaking fluency within a Moodle gamified course. Five main research questions were addressed: RQ1: Do the gamified ESL materials on Moodle aid in reducing the students' Foreign Language Anxiety? RQ2: Do the gamified ESL materials increase Academic Motivation? RQ3: Do the gamified ESL materials contribute to improving L2 speaking fluency? RQ4: Are there any differences due to individual features? RQ5: What are the students' attitudes towards gamification on Moodle within higher education?

In relation to the first research question (*Do the gamified ESL materials on Moodle aid in reducing the students' Foreign Language Anxiety?*), our findings show that anxiety decreased after the gamification treatment with a clear drop in 'communication apprehension' and 'fear of negative evaluation' in the treatment group. The element 'test anxiety' increased in both groups, although the increase was higher in the control group. These results concur with existing research examining different techniques to help learners reduce communication anxiety, for example engaging in teamwork activities (Dörnyei & Kormos, 2000), and using technology as a medium of communication (Reinders & Wattana, 2011, 2014).

The answer to the second research question (*Do the gamified ESL materials increase Academic Motivation?*) is positive: gamification increases both extrinsic and intrinsic motivation. The results of this case study coincide with previous research on the use of game-like settings to improve learning experiences, by adding an appealing wrap to traditional instruction (Hakulinen & Auvinen, 2014; Heyman & Dweck, 1992; Kapp, 2012; Whitton & Langan, 2019). Furthermore, the results show that both types of motivation decreased in the control group.

Regarding the third research question (*Do the gamified ESL materials contribute to improving L2 speaking fluency?*), the answer is negative, in line with similar research which also provides inconclusive or negative findings (Armstrong & Landers, 2017; Cardoso et al., 2017; Majuri et al., 2018; Rojas-López et al., 2019). On the one hand, the quantitative results do not show any improvement in L2 fluency for the experimental group other than as regards 'filled pauses per minute', where the experimental group did show a reduction in the number of filled pauses, whereas there was an increased number in the control group. In respect of 'other languages word ratio' and the 'longest fluent run', both groups showed improvement (using fewer words in a foreign language and producing a higher number of longer sentences). On the other hand, in the qualitative inquiry interviewees showed a general perception of improvement in oral skills. This inconsistency with the quantitative findings could be due to the very complex phenomenon of speaking and especially in SLA. Key authors argue that improvement in fluency is a long-run process which requires a huge amount of practice, repetition and automatisation tasks (Kormos, 2006; Nation, 1989).

As for individual differences (RQ4), some correlations are also shown in the results of this study, for example: the younger the learner, the less 'filled pauses per minute', such pauses being indicative of hesitation and disjointed speech (Corley & Stewart, 2008; Kormos, 2006). Female participants had a higher gain of 'syllables per minute' and a higher gain in the 'articulation rate', meaning that gamified courses stimulate much faster speech in women. Regarding proficiency levels, a significant and positive correlation has been detected between more proficient students and all the categories of anxious states, which is to say that learners showing higher language levels feel less anxious (MacIntyre & Gardner, 1994). This study also reports other correlations which may be obvious and not related to our experiment: the gain of number of words per minute correlates with the gain in the number of syllables per minute; the number of foreign language words decreases as the articulation gain increases, and finally, that older students show a higher communication apprehension than youngsters.

As regards students' attitudes towards the proposed gamification (RQ5), they showed an overall positive attitude towards the implementation of game-like learning settings in higher education. According to their perceptions, some game elements such as narrative, competition and socialising seem to be outstanding powerful boosters of motivation (Aldemir et al., 2018; Nicholson, 2012; Sailer et al., 2017; Werbach & Hunter, 2012b). Students also expressed their satisfaction towards the meaningful gamification design which seems to confirm that a good design should include a pedagogical and balanced use of different game elements (Exton, 2017; Nicholson, 2012).

Summing up, gamification as it is implemented in the present research has proved to be an efficient strategy to improve learner's motivation and engagement in learning English as well as their anxiety levels, especially towards speaking the second language. However, we cannot confirm any cognitive benefit since the learning achievement did not show conclusive results. The control group even outperformed the treatment group in some variables.

These conclusions are in line with the caution other researchers advise about using gamification in education. According to the available research evidence added to our empirical findings, we believe gamification should be given a complementary role in SLA. In other words, improving learning should always be assigned to the teacher's efficient pedagogical design rather than to game elements. Therefore, gamification should then only be used, once a solid pedagogical design is well established in order to guarantee that students enjoy the learning process but they ultimately achieve real learning beyond subjective perceptions (Hojjat Dehghanzadeh et al., 2019; Dichev & Dicheva, 2017; Sailer & Sailer, 2021).

After this concluding section of PART 1, the following sections in PART 2 describe the full methodological proposal including practical guidelines for teachers on how to implement a meaningful gamification design on Moodle and how to enhance speaking fluency in the classroom.

PART 2

Chapter 4

Methodological proposal

1 HOW TO GAMIFY A SECOND LANGUAGE COURSE ON MOODLE

This section provides a full step-by-step guide on how to gamify a second language course on Moodle, following Mountain Experience's framework. The methodological proposal was built upon a specific literature review on educational gamification research published in the last decade and the findings from our empirical studies. The introductory section shows the methodology we followed to build the proposed gamification design of Mountain Experience. The main body of the proposal is composed by a comprehensive description of how we gamified the English course on Moodle. Each step includes a group of gamification strategies which we named 'clusters of game elements'. In every design description, we also provide matching results found both in the literature and in our empirical research.

1.1 Methodology

Specific literature review

One of the major weaknesses in the literature produced on the use of gamification in education is the lack of correlations between specific game elements and their subsequent effects on learning (Chapman & Rich, 2018; Strmecki et al., 2015). That is why building this methodological proposal required a specific literature review providing a clear understanding of how specific game elements can influence learners' experiences. This previous scanning contributes to a better conception of a gamification design's psychobehavioural and cognitive affordances, hence an empirical support for our gamification design proposal.

The literature was retrieved from leading databases (*Scopus, ERIC and Web of Science*) using different combinations of strategic keywords such as: *gamification, elements, mechanics, higher education*. The first filter excluded duplicates and papers which did not include empirical studies on the use of gamification at higher education. The first selection provided 217 papers on which we performed a second filter consisting of keeping only empirical studies focused on the use of game elements at higher education and their direct correlations with learning experience. Several papers had to be dismissed due to the lack of clear links between game elements and psychobehavioural factors or learning achievement. Altogether 47 papers were selected for the final analysis.

Database and analysis

As we retrieved valid papers, we classified them in a database according to the game elements they used and their empirical results on motivation, engagement and anxiety as well as on learning achievement. For each paper we added: the academic discipline in which the gamification was

implemented, the results on the variables (positive, negative or ambiguous), the samples, the research method and if the experiment included a control group.

Main findings

At the end of the process, we could observe four common clusters of game elements frequently used in experimental studies. This is how we established the actual structure of the present methodological proposal, that is, using these same four clusters to describe our gamification design:

1. Narrative and immersion (fictional setting, story, characters)
2. Competition (ranking systems, leaderboards)
3. Achievement (rewards, feedback, points, badges, challenges)
4. Socialising (teamwork, cooperation, community interactions)

When comparing the empirical studies found in the literature review to our qualitative results, the clusters of game elements showed to be in line with students' perceptions. As a matter of fact, students expressed signs of extrinsic motivation from external stimuli in Mountain Experience such as the gamification narrative, the rewards and the group competition as well as intrinsic motivation resulting from the sense of self-achievement or socialising in peer-learning activities.

The findings resulting from the literature review are included in the gamification design description to support each positive effect in Mountain Experience (see full document in Appendix 3). The following table shows an overview of all the papers' details and the game elements involved in their studies as well as their findings on psychobehavioural factors and learning achievement. Effects on learning achievement were only entered in the table when the results came from direct measurement rather than students' perceptions. As it can be observed, there is a clear overall consensus on the fact that gamification is a powerful influencer on motivation and engagement. It is worth noting that only two papers reported direct effects of gamification on students' anxiety. Furthermore, learning achievement is still not sufficiently supported or even inconclusive. This general mapping confirms what previous authors as well as our empirical findings suggest. A cautious attention should be paid to the use of gamification when it comes to promote learning achievement (Dichev & Dicheva, 2017; Hew et al., 2016; Majuri et al., 2018; Sailer & Homner, 2019). Therefore, the findings used to support our methodological proposal are mainly those showing efficient effects of gamification on students psychobehavioural aspects.

Table 15: Overview of the literature review results

		Cluster of game elements				Positive	Ambiguous	Negative			
		Narrative(N)/Competition(C) Achievement (A)/ Socialising (S)				Results					
Paper	**Discipline**	**N**	**C**	**A**	**S**	Motivation/ Engagement	Learning achievement	Anxiety	**Sample**	**Research method**	**Comparative study**
(Aldemir et al., 2018)	Education Sciences						-	-	118	Qualitative	No
(Almanza-Arjona et al, 2020)	Chemical/ biotechnology engineering							-	74	Mixed	Yes
(Armstrong & Landers, 2017)	Computer Science							-	273	Quantitative	No
(Berkling & Thomas, 2013)	Computer Science						-	-	59	Mixed	No
(Forndran & Zacharias, 2019)	Physics engineering						-	-	45	Quantitative	No
(O'Donovan et al., 2013)	ICT							-	34	Quantitative	Yes
(Xiang et al., 2014)	Communication Technology							-	30	Mixed	No
(Aldemir et al., 2018)	Education Sciences						-	-	118	Qualitative	No
(Buckley & Doyle, 2016)	Economics						-	-	132	Quantitative	No
(Buisman, van Eekelen, 2014)	Computer Science							-	57	Quantitative	Yes
(Çakıroğlu et al., 2017)	ICT							-	37	Mixed	No
(Fernandez-Reyes et al., 2018)	Computer Science							-	71	Quantitative	No
(Forndran & Zacharias, 2019)	Physics engineering						-	-	45	Quantitative	No
(Krause et al., 2015)	Computer Science/ Psychology							-	206	Quantitative	Yes
(Landers & Landers, 2014)	Psychology							-	64	Quantitative	Yes
(Leaning, 2015)	Media							-	125	Mixed	Yes
(Morales-Trujillo & García-Mireles, 2020)	Computer Science								115	Mixed	Yes
(Nevin et al., 2014)	Medicine						-	-	17	Qualitative	No

(Ntokos, 2019)	Computer Science						-	-	34	Mixed	No
(O'Donovan et al., 2013)	ICT							-	200	Quantitative	Yes
(Pechenkina, 2017)	Accounting and Science							-	394	Quantitative	Yes
(Rojas-López et al., 2019)	Computer Science							-	60	Mixed	Yes
(Sailer & Sailer, 2021)	Not specified							-	250	Quantitative	No
(Van Nuland, 2014)	Health							-	67	Mixed	Yes
(Aldemir et al., 2018)	Education Sciences						-	-	118	Qualitative	No
(Barata et al., 2013)	Engineering							-	35	Mixed	Yes
(Barrio et al., 2015)	Sociology/ Telecommunications Engineering						-	-	131	Quantitative	Yes
(Basal & Kaynak, 2020)	Education Sciences						-	-	79	Mixed	No
(Betts, Bal, Jay, Alan (2013)	Business and Management							-	33	Quantitative	No
(Çakıroğlu et al., 2017)	ICT							-	37	Mixed	No
(Caton & Greenhill, 2014)	Computer Science							-	140	Quantitative	Yes
(Daubenfeld & Zenker, 2015)	Physical chemistry							-	30	Mixed	Yes
(Delello et al., 2018)	Education, Engineering, Human resource, Nursing						-	-	90	Mixed	No
(Denny, 2013)	Medicine						-	-	1031	Quantitative	Yes
(Figueiredo & Garcia-Penalvo, 2020)	Computer Science						-		154	Mixed	Yes
(Goelhe, 2013)	Mathematics							-	60	Mixed	No
(Haaranen et al., 2014)	Computer Science						-	-	162	Mixed	No
(Hakulinen & Auvinen, 2014)	Computer Science						-	-	278	Quantitative	No
(Hakulinen et al., 2015)	Computer Science						-	-	281	Quantitative	Yes
(Hasegawa et al. 2015)	SLA						-	-	53	Quantitative	No
(Huang & Hew, 2018)	Library and Information Management						-	-	80	Quantitative	Yes
(Ibañez et al., 2014)	Computer Science						-	-	22	Mixed	No
(Osipovskaya & Miakotnikova, 2019)	Public relations							-	64	Mixed	Yes
(Pinter et al., 2020)	Computer Science						-	-	570	Quantitative	Yes

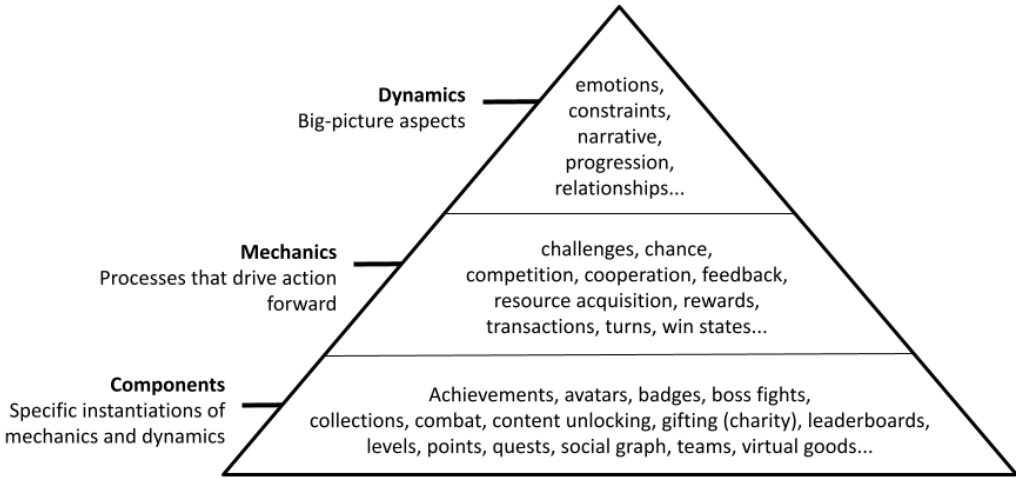
(Reid et al., 2015)	English (L1)						-	-	53	Quantitative	Yes
(Sánchez-Martín et al., 2017)	Education Sciences							-	33	Quantitative	No
(Song et al., 2017)	Computer Science						-	-	50	Quantitative	No
(Tan & Hew, 2016)	Research methods							-	22	Mixed	Yes
(Venter & Swart, 2019)	IT						-	-	192	Quantitative	No
(Aldemir et al., 2018)	Education Sciences						-	-	118	Qualitative	No
(Huang & Hew, 2018)	Library and Information Management						-	-	80	Quantitative	Yes
(Ibañez et al., 2014)	Computer Science						-	-	22	Mixed	No
(Iosup & Epema, 2014)	Computer Science							-	450	Quantitative	No
(Kim, 2015)	Undergraduates/ not specified						-	-	52	Quantitative	No
(Pirker et al.,2014)	Computer Science						-	-	21	Mixed	No

1.2 Gamification framework

The design principles we adopted belong to different authors we consider especially relevant to meaningful gamification. Meaningful gamification is the type of design that meets users' interests. In other words, it follows a user-centred framework which considers individuals' motivational affordances, self-produced content within the gamified environment (Nicholson, 2012) and psychological affordances resulting from strategical combinations of game elements (Exton, 2017; Hamari et al., 2014; Marczewski, 2019). Students feel more engaged in an activity when they feel a sense of control and personal choice, for instance in tasks they can perform at their own pace (Trivett, 2014).

The gamification design on Moodle was inspired by some key references in gamification design. First, we considered the framework proposed by Werbach and Hunter (2012b) who defined key elements of gamification, namely 'components', 'mechanics' and 'dynamics'. The authors argue that game elements coexist in a hierarchy. The following figure shows the pyramid of elements where components such as avatars, badges and levels drive a higher scaffold which is made by mechanics. On top, dynamics trigger action forward and produce emotional states in the player:

Figure 6: Game elements pyramid adapted from Werbach & Hunter (2012b)



Along these elements we also considered Marczewski's (2019) RAMP framework (meaning Relatedness, Autonomy, Mastery and Purpose) which integrates the Self-Determination Theory (SDT) (Deci & Ryan, 2010) and shows how to motivate different types of players using game elements.

In this regard, the gamified course also aims to meet the different player types' needs proposed by Zichermann & Cunningham (2011), following Bartle's (1996) model:

- *Achievers* enjoy taking part in an integral competition environment and achieving goals. A suitable gamified environment for this player type would allow them to see their progress throughout different stages.
- *Explorers* are keen on finding out things by themselves. Providing tasks which require exploring and discovering solutions might be a suitable gaming element.
- *Socialisers* need to feel part of a community where they can interact with others. They also enjoy helping other players and contributing to the social interaction. A good element to keep these players engaged is a common space within the gamified environment, where they can chat and share experiences with their peers.
- *Killers* are interested in winning, defeating competitors and being socially recognised for that. Seeing their names on a leaderboard keeps them engaged and motivates them to remain on the highest-ranking positions.

The following table shows how we intertwined the above-described principles of gamification design with the elements included in Mountain Experience:

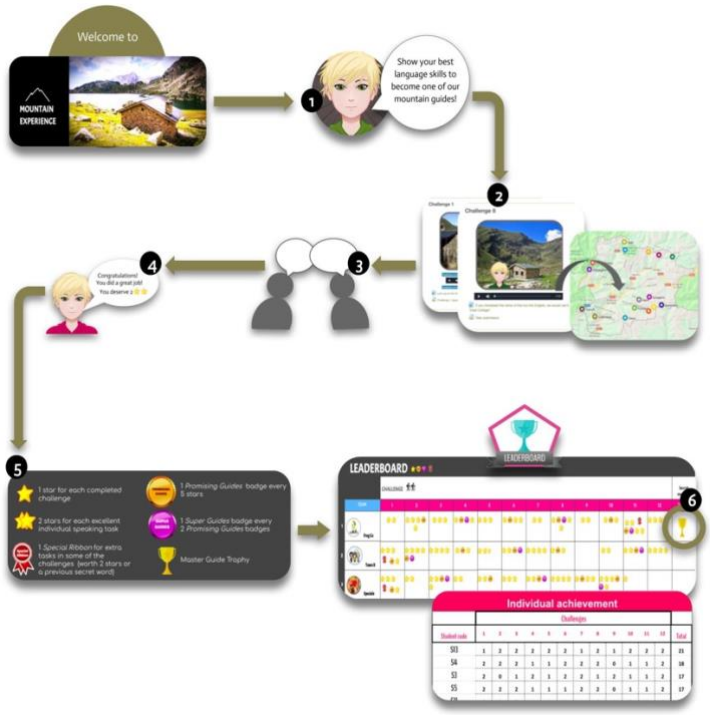
Table 16: Connections between gamification design principles and Mountain Experience

RAMP Framework (Marczewski, 2013)	**Player types (Marczewski, 2013)**	**Player types (Zichermann & Cunningham, 2011)**	**Related game elements in Mountain Experience**
Relatedness	Socialiser: needs social connections and interactions in the game	Socialiser	Team interactions, avatars, messages from the narrative character
Autonomy	Free spirit: enjoys adventure and exploration	Explorer	Level unlocking, map search, guessing
Mastery	Achiever: seeks for challenges to overcome	Achiever- Killer	Rewards, levels, challenges, leaderboard
Purpose	Philanthropist: feels fulfilled by helping and enriching others	Socialiser	Cooperation, peer-learning

1.3 Mountain Experience design

In this section, a full analysis of our gamification design is presented together with research-based evidence. The following table shows the visual sequenced procedure through which students encounter the different clusters of game elements on the gamified Moodle:

Table 17: Game design overview

Game trajectory	Description
	**Narrative and immersion** 1) Introduction to the game narrative **Achievement** 2) Students complete weekly challenges by finding the right hut and practicing different language skills individually. **Socialising** 3) Within the challenge, students produce podcasts and videos in teams. They record their speaking tasks and upload them on Moodle. **Achievement** 4) Alice (Mountain Experience's manager) provides constructive feedback on Moodle by giving rewards according to the individual performance. 5) Individual rewards are provided according to the task quality. **Socialising & Competition** 6) Each student's points are updated on the individual leaderboard and rewards earned in each challenge are summed to the team scores and placed on the team leaderboard.

1.3.1 Narrative and immersion

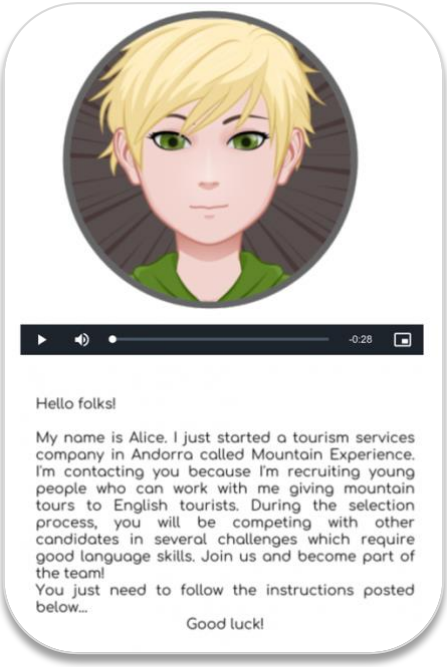
As defined by Toledo Palomino et al. (2019) "The Gamification narrative element can be understood as the process in which the user builds his own experience through a given content, exercising their freedom of choice in a given space and period of time, bounded by the system's logic" (p.99).

In the gamified course, the chosen story allowed students to freely create their language content following specific instructions connected to the context of mountain huts. The fictional story in Mountain Experience has a clear grounding in reality, since it is related to a distinctive feature of Andorra: its mountain huts. Kapp (2013a) argues that keeping some links to the user's closest reality helps connect them to the gamified environment. The storyline involved guided tours in English which was considered meaningful for the gamified course as well as for students who often spend their summers working in the tourist field.

When they start the academic year, students are introduced to the story by providing clear information about the fictional setting: Mountain Experience, a company of tourist services that has just settled in Andorra, is searching for new young guides who can give mountain tours in English. Students who wish to participate in the experience become candidates in the job selection process. The main characters in the narrative are Alice (Mountain Experience's Manager) and the candidates (students) who compete in teams to get a job position as mountain guides.

Alice is in charge of informing the candidates throughout the process about the instructions they need to follow in the job selection process as well as the feedback on their progress. Candidates are encouraged to work in teams (pairs or threes), and show their best communicative skills in English by role playing typical conversations that could occur during a tour (ex: the guide asks questions to know more about the tourists they take to a mountain hut). The mountain tours are designed to find out about the most popular mountain huts across the country.

Figure 7: Immersion and narrative elements in Mountain Experience



Welcome message from Alice: the company's manager

Instructions for the job selection process

All the messages and pictures were self-created using an image editor and copying the files on Moodle

What is known from empirical research?

The study of the immersive effect of gamification is not new to research. Natvig et al. (2004) examined the impact of gamification on motivation; their study concluded that students considered their gamified narrative called *Age of Computers (AoC)* as more motivating than traditional exercises. Xiang et al. (2014) agree with the idea that adding a story theme to dry academic contents makes them more appealing for students in an immersive manner. Moreover, a game narrative that takes students' real context into account can make them feel a deeper sense of immersion, just like the one perceived by the interviewees of our qualitative study:

> *"It is a working situation; this is what I also liked. You put yourself in a real-life working situation where you can take groups of English-speaking people to mountain huts. They were situations that can also be found in a real job."*
>
> (Post-interview 01/2019, Student 4)

> *"I mean, I also liked it, I mean, it was like a story and so you would… you would also be like a character."*
>
> (Post-interview 01/2019, Student 1)

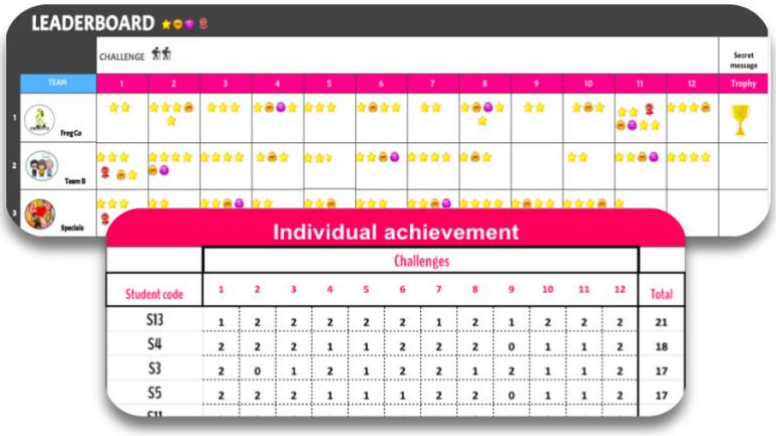
Similar findings were reported by Aldemir et al. (2018) who suggest that using relevant narratives and characters seems to produce a sense of immersion in the game-like learning environment. During the experiment, the researchers found that students felt that the use of a meaningful context created an environment that made them feel like part of the game. The following qualitative result also reflects how students felt immersed in the role of a guide.

> *"…then you really put yourself in the role and when you actually start completing challenges you say: Wow, this is something that… I could really do, if it was so, I could really hold a conversation and guide specific people who speak the same language."*
>
> (Post-interview 01/2019, Student 5)

Armstrong & Landers (2017) also concluded that narrative had a positive effect on students' engagement making the instruction more attractive. However, Berkling and Thomas (2013) arrived at an ambiguous conclusion, arguing that although students prefer learning instructions presented as a story, they might find narrative unnecessary if it lacks aesthetics in the gamified platform. Creative visual design is essential to catch students' attention. Indeed, students are more likely to use an educational tool when it is visually appealing (A. de Freitas & de Freitas, 2013). That is why the designer's creative task is to make the game environment attractive enough to catch the eye of users.

O'Donovan et al. (2013) concluded that a narrative can be improved by aligning it with the students' learning setting in order to make the story more meaningful. As for learning perceptions from students, a storyline can help them understand complex concepts that might be too abstract when presented through traditional instruction (Almanza-Arjona et al., 2020). Finally, regarding the benefits of language practice, a game narrative allows teachers to incorporate real-life communication tasks in which students are pushed to use the language for its very purpose, communicating with others beyond the classroom setting (Council of Europe, 2020; Zoubi, 2018).

1.3.2 Competition



Competition is considered a mechanic produced by components such as virtual fights, leaderboards, social charts (Werbach & Hunter, 2012b) and other types of ranking systems which allow individuals to be publicly recognised for their effort. Pure competition makes sense when one wins and others lose. This is the main drive for a killer-player type who enjoys feeling better than anyone else (Zichermann & Cunningham, 2011). However, competition can also be given a cooperative approach in which users play together with their team to beat other teams. Social competition is seen as a preferable booster of motivation since it is more inclusive than individual competition and engages even the least achieving students (Rojas-López et al., 2019; Sailer & Sailer, 2021).

In Mountain Experience, participants could collect rewards for their teams (based on their weekly speaking performance) to be ranked on a team leaderboard (see screenshots above). At the same time, they were also classified in an individual leaderboard using student codes, so no one could be identified by their real names if they did not wish so. The anonymity promotes personal achievement rather than showing status among peers (Denny, 2013). Using these two different leaderboards also ensures students to keep up in the competition, although their teammates did not complete the weekly challenge.

The leaderboards were built using Drive spreadsheets and inserting this direct link on Moodle.

What is known from empirical research?

Social gamification produced by elements such as leaderboards increases students' participation in interactions and promotes more effort in their learning tasks (Fernandez-Reyes et al., 2018; Krause et al., 2015; Leaning, 2015; Pechenkina et al., 2017; Sailer & Sailer, 2021). Similarly, Landers and Landers (2014) showed how students in a gamified group participated 30 times more than those in the non-gamified version of the course.

In the study of Van Nuland (2015), most students enjoyed taking part in virtual tournaments and found it to be an engaging and enjoyable game-like experience. When asked about specific motivating elements, participants explicitly reported motivation produced by the competitive effect of leaderboards (Aldemir et al., 2018; O'Donovan et al., 2013). According to Çakıroğlu et al. (2017), one of the prominent factors for engaging students in the activities was the use of a leaderboard. Similarly, Buisman and van Eekelen (2014) found that students who receive points on a public online ranking can compare their score to others and show significantly more participation in learning activities than those who have no public recognition. Just receiving points apparently, is not enough. Similar results were extracted from our qualitative inquiry:

> *"Mm… I mean, I would check every week, I mean, the results of, well the team and the individual ones and well, I think that it kind of… yes, this also motivated me somehow, I mean we started like so-so, and in the end we progressed, then I think… it was good."*
>
> *"Yes, well the leaderboard and all that, yes, it also… it is like it motivates you, it pushes you to work and to be the best, to say so."*
>
> (Post-interview 01/2019, Student 1)

> *"As people were doing the tasks… you see how the others get stars and all that, so you try to follow the others' pace."*
>
> (Post-interview 01/2019, Student 3)

> *"I saw we were in the fourth position but then, when I saw the team's score, this also motivated me…"*
>
> *"I said, wow, look, I am more or less in the same position as this other one, how nice, you know?"*
>
> (Post-interview 01/2019, Student 4)

> *"It was really helpful for S. and myself. It said: Ah, we cannot stay down there, we must move up, we must move up!"*
>
> (Post-interview 01/2019, Student 5)

Ntokos (2019) detected that those students who were less motivated in class happened to be among the most engaged by competitive gamification. In the use of competition elements, some studies also focused on the increase in students' attendance as a clearly measurable sign of interest in the course (Barata et al., 2013; Ntokos, 2019; O'Donovan et al., 2013; Osipovskaya & Miakotnikova, 2018; Pinter et al., 2020; Sansó & Manresa-Yee, 2016). The competitive spirit was also reported by Buckley and Doyle (2016), and added that competitions are especially effective for learners who are intrinsically motivated, particularly either by a 'motivation to know' or a 'motivation from external stimulation'. As regards our quantitative findings, the extrinsic motivation resulting 'from external regulations' was also found to be a significant difference between the gamified and the non-gamified courses.

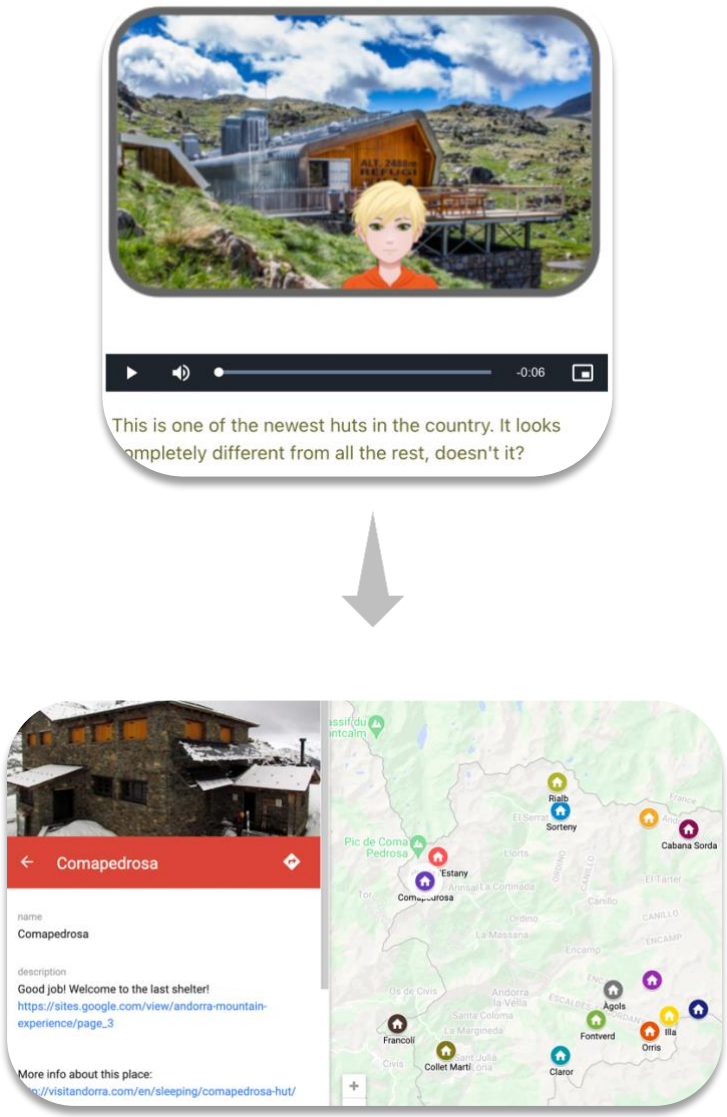
Nevin et al. (2014) also highlighted leaderboards as highly motivating when they used gamification in a Medicine course. Nevertheless, while no participant perceived that competition in itself was de-motivating, it could be discouraging for those students who would see themselves at the bottom of a ranking system (Venter & Swart, 2019). While competition can enhance engagement produced by public recognition on a leaderboard, it can also increase levels of anxiety (Figueiredo & García-Peñalvo, 2020; Morales-Trujillo & García-Mireles, 2021). That is why, these authors recommend using strategies to avoid bad-side effects of competition such as publishing only the highest scores or using different leaderboards. Another negative effect of leaderboards occurs when students who stay behind for too long feel it is too late to make up for the lost time and do not even try again, which makes them feel a lack of self-efficacy (Bandura, 1982). Therefore, providing frequent chances to improve can avoid leaving students behind.

Finally, an interesting and practical evidence for instructors is that competition can be turned into a more inclusive environment by making students compete in teams. Empirical research suggests that students prefer competing in groups and solve challenges by cooperating with their classmates (Aldemir et al., 2018; Rojas-López et al., 2019). Sailer and Sailer (2021) also recommend considering a constructive culture of competition and ensuring it by including teamwork in competitive activities. This strategy promotes students' interactions and social relatedness (Deci & Ryan, 2010; Marczewski, 2019). This is a consistent observation with the qualitative findings of Mountain Experience in which the student repeatedly expressed positive attitudes towards competing in teams (see reported quotations above).

1.3.3 Achievement

The learning tasks were presented under the form of challenges including some practice on the grammar content learned in the face-to-face classes and speaking tasks that were adapted to Mountain Experience's narrative. In this sense, we performed both a 'structural' and 'content' gamification (Kapp, 2013b). The former means that we included game elements in the actual course structure (stars, badges, leaderboard, etc.) while content gamification involves changing the course content to align it to the game story. In this case, we changed the speaking tasks' instructions to frame them within mountain tours.

The first thing students have to do is guessing the mountain hut where the weekly challenge is hidden. To do so, Alice posts a clue on Moodle (in written and audio format). When clicking on the text, an interactive map opens up and students have to go to the right hut to see the challenge.



The pictures were self-edited and posted on Moodle together with a text and a recorded audio file containing the same message. The clue was linked to a map built on Google, where we tagged the huts. Every week, the old challenge was erased and the new one was copied in the corresponding hut.

The challenges were based on the course content which is structured in a progressive difficulty sequence. This is not a trivial aspect when including learning material within a gamified system, since the different levels to be achieved need to be properly scaffolded in order to ensure a logical progression in learning.

Examples of speaking instructions are as follows:

Challenge 1

The first step in a job interview is to introduce yourself and make a good impression!

Ask each other the following questions: Can you please introduce yourself? What makes you a good candidate for this job?

Add some funny captions (text) in your video and you'll get a Special Ribbon! 

Here's a useful video lesson: https://www.youtube.com/watch?v=xoYQX7gGkQs

Challenge 5

When you get to the shelter, you show one of your favourite photos hiking a mountain. One of you will be the guide, and the other one will be the guest who asks the same questions as in the 1st activity about the photo. Then swap roles. Make it sound real!

Ex: You're from Birmingham?! Last week I had a couple of guests from Birmingham too. Look, I have a nice picture of us…

After completing a challenge, each student gets individual feedback on Moodle from Alice who rewards speaking productions using stars and points that would later be translated into individual or team positions on the leaderboards. In addition to the feedback, for each completed challenge, students obtain a secret word. At the end of the course, they have to put all the words collected in the right order and guess a secret message. In this extra language task, students could also practice word order in English. The rewarding system also includes a special prize for the candidates who complete all the tasks by the end of the course: the Master guide trophy. In a traditional grading system, this type of special recognition would be an equivalent of an honours distinction for excellent academic work.

The rewards were created using an image editor and inserted every week in the leaderboards on Drive, according to each student's performance

What is known from empirical research?

External rewards such as points and badges are considered to be particularly motivating and engage students in setting higher goals and completing more learning tasks (Barrio et al., 2015; Çakıroğlu et al., 2017; Goehle, 2013; Haaranen et al., 2014; Huang & Hew, 2018; Ibañez et al., 2014; Tan & Hew, 2016). Displaying rewards in a visual way makes students clearly see their progress and feel recognised for their effort. This idea is also supported by Huang and Hew (2018) who argue that external rewards such as points and badges provide constructive feedback to students to set higher goals and complete more tasks. The recognition for their efforts can lead students to choose challenges with higher difficulty and put more effort in out-of-class learning tasks.

Hasegawa (2015) described rewards such as badges as a potential reason for students to persist in learning more and better. This effect can be an example of the 'engagement loop' described by Zichermann (2011) as a cyclic process in which players stick to a game for the sake of getting positive feedback over and over. In Mountain Experience, students also reported high feelings of motivation resulting from a sense of self-achievement as they successfully completed challenges and saw their progress through the rewards they obtained:

> *"It is like you feel satisfied when you see the mark and that you did a good job."*
>
> (Post-interview 01/2019, Student 2)

> *"Yes, it is more about self-achievement. You try every week, like try to get further than the previous week."*
>
> (Post-interview 01/2019, Student 3)

"I am pleased, and I also encouraged P. , saying: look, look, we moved up."

(Post-interview 01/2019, Student 4)

"... I mean, since we had started like so-so and in the end, we moved up, so I think it was good. Yes, I don't know, I pretty much like it."
"Uh... I think what motivated me the most was when we had to score points. I guess that was the most motivating thing because you really say... when you started to make your own sentences to produce the script with the teammate, I suppose it was then when I thought I learned more, that is motivating and you say: wow, I didn't know that."

(Post-interview 01/2019, Student 5)

Increasing their participation often appears to be a common behaviour change observed in learners who take gamified courses with a rewarding system (Barrio et al., 2015; Betts et al., 2013; Denny, 2013; Sánchez-Martín et al., 2017). The desire to collect new rewards seems to be a powerful external stimulation. It also promotes students' participation in discussions with other classmates as well as better attendance rates (Barata et al., 2013; Caton & Greenhill, 2015; Figueiredo & García-Peñalvo, 2020; Osipovskaya & Miakotnikova, 2018). These arguments are in line with the findings of our quantitative research; when comparing significant results of Academic Motivation, two strong connections can be drawn between 'intrinsic motivation toward accomplishment' and 'extrinsic motivation from external regulation' produced by gamification.

Researchers who go beyond a unique gamification proposal for all, and adapt their research setting to different student profiles, acknowledge that game elements affect students in very different ways depending on their achievement goals. As Hakulinen and Auvinen (2014) ague, students with higher mastery-intrinsic and mastery-extrinsic orientation, and lower avoidance-orientation show more motivation produced by badges. These same authors also observed that students reporting high interest in badges were already high-performing before the badges were introduced. However, not all high-performing students were motivated by the badges. Reid (2015) showed how badges on their own are not considered the main driver of academic motivation by students but rather a complement to check their progress. These authors also found that badges enhance intrinsic motivation only among high expectancy-value students. Expectancy-value indicates the level of learners' intrinsic interest in learning, which is considered an essential attitude to succeed in academic studies (Bandura, 2012). As for the shiest students, a points system implemented by Song et al. (2017) was found to be particularly efficient to engage them in social interactions and peer-learning. Thus, rewarding systems can help teachers get onboard those students who tend to avoid participation in class.

In the study conducted by Delello et al. (2018), most students appreciated getting badges as an extra recognition for their effort. However, they did not see badges as the main drivers of their motivation to learn. Academic grades or content learned were seen as more important factors, which suggests that badges would gain motivational influence if they were integrated in the course content and the assessment system (Goehle, 2013). In a similar line, Basal and Kaynak (2020) explored the perceptions of pre-service teachers on badges and found they reported positive feelings towards digital badges as a recognition for their effort. Nevertheless, they also recommend including different types of badges so all the students can get access to some kind of recognition, even the lowest achievers who often feel demotivated or excluded from rewarding systems.

Finally, it is worth noting the practical recommendations such as the ones provided by Haaranen et al. (2014) who state that when designing badges, instructors should add a touch of fun and creativity. Badges can be associated to some features of the narrative (ex: superpowers) or even to real life (ex: special badges awarded in a specific time of the year such as the last classes before Christmas). Considering that not all the students will necessarily be motivated by badges, there should always be an opt-out option for them to use anytime.

1.3.4 Socialising

The weekly challenges included in Mountain Experience comprise individual extra practice on different language skills (listening, reading, writing) as well as team speaking practice, aimed at reinforcing grammar structures learned in the face-to-face classes. At the end of the challenge instructions, students would always find a speaking task to be completed preferably in pairs or threes. Throughout the gamified course, they have to perform role plays related to mountain tours and record themselves. The podcasts and videos they submit can get rewards according to the quality of their language productions. Each member gets individual stars, but they also contribute them to their team scores. As they collect more stars by completing challenges, their team also gets special badges. In order to get heterogeneous groups and promote peer-learning, participant students were grouped by mixing levels[8] in a way that they would be slightly different but not too much to avoid extreme levels in the same team. This strategy follows the cooperative grouping principle described by Kagan (2009) who recommends not to put the highest and the lowest achievers together, since it is detrimental for learning, especially for highest achievers who might lose patience easily.

Before the 1st challenge, students were encouraged to create their own team picture. Creating their own distinctive logo or avatar probably reinforced their relatedness, promoting a sense of self-identity within their teams. Venter and Swart (2019) argue that this game strategy they named 'self-expression' is particularly engaging among students since they are given freedom to express their identity. That is also a clear example of meaningful gamification where participants can feel part of the game by creating their own content (Nicholson, 2012).

8 The entry levels were extracted from the placement test all students take before they first enroll in their correspondent degree.

The avatars sent by the different teams were placed in the team leaderboard

What is known from empirical research?

Including teamwork in a gamified environment helps engage students in peer-learning, especially the shiest and more distracted learners (Song et al., 2017). Even in competitive activities, students enjoy working together with their team to compete against other groups (Aldemir et al., 2018; Pirker et al., 2014; Rojas-López et al., 2019). In fact, combining competition with social interactions in which students can learn with their classmates is a very efficient way to promote engagement (Campillo-Ferrer et al., 2020; de Sousa Monteiro et al., 2016; Licorish et al., 2018). Indeed, peer-learning in teamwork is often reported as a clearly leading element in terms of student motivation and engagement in gamification (Perry 2015a).

Allowing participants to interact with their peers in the gamified setting is also a pedagogically powerful strategy to promote cooperative learning (Kagan, 2009) and give the opportunity to construct knowledge together within their Zone of Proximal Development (Vygotsky, 1978). Huang and Hew (2018) argue that making students provide constructive feedback on their peer's work was seen as one of the most engaging aspects of their gamification proposal. This is probably due to the fact that students generally enjoy learning from and helping their peers (Iosup & Epema, 2014). This idea can be connected to the player types described by Marczewski (2013) and Zichermann (2011), specifically 'Socialisers' and 'Philanthropists' who enjoy the contact with other players and collaborate to reach common goals. Similarly, Ibañez et al. (2014) found that social activities such as providing peer-feedback on other students' posts seems to engage learners beyond their academic compulsory tasks. Focus on learning to review the course content can also be enhanced when learners propose questions or challenges to be solved by their classmates (S. Kim, 2014).

The findings of our empirical research are also aligned with the available evidence in the literature. During the individual interviews, students reported higher levels of interest produced by peer-learning in teamwork and socialising with their classmates:

> *"I think it is very good really, this way you are in contact with other people and it is cooperative, to say so."*
>
> *(Pre-interview 09/2018, Student 1)*

"When you are working on a dialog and you know that the other person can correct you and you can correct her, which is actually what happened to me, sometimes I corrected some of my teammates' accents. This engages you in going on and saying: I am good at this; I can help them and they can help me practice the language I like. And that is what I liked."
"The contact with my teammates speaking in English was very beneficial. (…) and making videos, audios and all that in teams is very… it is like you feel satisfied when you see the result and that you did a good job."

(Post-interview 01/2019, Student 2)

The quantitative findings show a general improvement in motivation in the treatment group. We observed that students repeatedly expressed their motivation in learning through socialising. This phenomenon can be connected to a sense of Relatedness, which is one of the intrinsic motivation components defined by Deci and Ryan (2010) in their Self-Determination Theory.

As for student anxiety, little evidence could be found in the available research. Our literature review provided only a couple of findings suggesting that promoting peer-learning in teamwork can help reduce students' anxiety towards failure or public exposure of low results (particularly on leaderboards). Figueiredo and García-Peñalvo (2020) observed that low achievers can feel stressed by being left behind in individual competitions. Similarly, Morales-Trujillo and García-Mireles (2021) found that high levels of anxiety could be produced by competition in which low performing students might see it like a threat to their self-efficacy.

In SLA, working with classmates can help students feel 'safer' since they feel more confident when interacting with their peers, far from being publicly exposed. This is a relevant finding from our qualitative research. As a matter of fact, in Mountain Experience, participants reported more confidence when practicing their speaking skills with their teammates.

"I mean, it pretty much helped me to learn English and also to share with other people."

(Post-interview 01/2019, Student 1)

"The contact with my teammates speaking in English was very beneficial."
"There are people who encounter more difficulties when learning English, so when we need to complete exercises, we are afraid of answering, and we do not feel confident to see if you actually understood or if we will make a bad impression on our classmates."

(Post-interview 01/2019, Student 2)

Yes, it was very good because I think it is fun in the end, a different way of studying and doing it with the classmates."

(Post-interview 01/2019, Student 3)

"And then, well, we both progressed because if one said something wrong, the other one corrected it. We also helped each other correct our pronunciation because the two of us could listen more."

(Post-interview 01/2019, Student 4)

"…when you started to make your own sentences to produce the script with the teammate, I suppose it was then when I thought I learned more, that is motivating and you say: wow, I didn't know that."

(Post-interview 01/2019, Student 5)

As for the quantitative results, the treatment group showed lower Foreign Language Anxiety levels after the course. Considerable differences were found in 'communication apprehension' and 'fear of negative evaluation', which can be associated with the confidence that students perceived when performing the gamified activities in teams.

2 ENHANCING SPEAKING FLUENCY

As evidenced by research, to improve fluency students must be given opportunities to use the target language in real-life communication situations (Council of Europe, 2020; Ellis, 2009; Swain & Lapkin, 2001). By doing so, they are 'pushed' to produce output, which allows them to become aware of their knowledge gaps and automatise the speaking process (Swain, 2000). From a teaching perspective, some specific tasks can help train key cognitive processes involved in producing fluent speech such as retrieving linguistic forms, encoding language and adapting it to a speaking situation (Kormos, 2006). Nation (1989), Ellis and Yuan (2004) suggest that language fluency can be enhanced through repetition tasks, planned interactions with peer learners and task-based learning activities.

This methodological proposal explores different cognitive, metacognitive and social learning strategies (O'Malley & Chamot, 1990), as well as theoretical approaches educators can use to improve speaking fluency in SLA among their students. Most proposed strategies are already included in the gamified course (Mountain Experience) and some others are presented as additional resources to enhance fluency practice.

2.1 Cognitive Strategies

Cognitive strategies refer to mental processes involved in storing, retrieving and structuring language (O'Malley & Chamot, 1990). These processes require practical tasks such as analysing, transforming and synthetising linguistic content. Some of the strategies to engage students in such learning processes include concept mapping, visualisation, repetition and rehearsal.

Table 18: Overview of how cognitive strategies improve speaking fluency

Cognitive Strategies	How they stimulate the brain	How they contribute to speaking fluency
Concept Mapping and Visualisation	• Organise and memorise complex ideas • Make meaning connection between thoughts and ideas	• Enhance an individual's understanding meaning of words and their connection with previous knowledge • The memorised words and ideas are interpreted to create a link between cognition and reality
Repetition and Rehearsal	• Familiarise with words and new language patterns • Help store information in the long-term memory	• Help automatising speaking processes by recalling language content faster • Improve the understanding and pronunciation of new words

2.1.1 Concept Mapping and Visualisation

Improving speaking fluency in SLA requires the students to organise the ideas they have in mind and make something meaningful out of them by creating a link between their main thoughts and the ideas they formulate (Kormos, 2006). Concept mapping can help them visualise the concepts in the shape of words, which enhances their ability to organise concepts and develop new ideas (Chen & Hwang, 2020). This technique involves activities such as brainstorming and using graphic representations to map different concepts (Novak, 2012). Considering the complexity associated with second language comprehension, concept mapping makes it easier for students to understand new words and texts because the complex ideas are represented and visually organised in a way that the students can easily understand (Novak, 2012). In the classroom, the strategy can be effectively implemented for students learning a second language to help them bring together ideas, map and memorise them to enhance their comprehension of the language. By getting more acquainted with new language content before using it in a speaking task, students feel more confident and consequently less anxious (Chen & Hwang, 2020).

When presenting new language to students, it has been shown that using visualisation is an effective way to increase learner's retention (Ghaedi & Shahrokhi, 2016). When individuals can create a mind picture of what they learn, they can understand new words in a meaningful way. According to (Halwani, 2017), visual aids allow not only acquiring new content easily but also making students more participative in the classroom, since they feel more confident once they understand novel language structures. Visuals also stimulate sensorial and emotional responses, which makes language learning occur through different channels and thus benefit different learning styles in the classroom (Fleming & Baume, 2006). Presenting a visual support together with new words is generally beneficious and even more so for visual-style learners who develop their recall capacity through graphic representations such as pictures, diagrams or graphs.

2.1.2 Repetition and Rehearsal

When exposed to new language content, an L2 learner does not have enough cognitive resources to manage accuracy, complexity and fluency processes at the same time. According to Nation (1989), language speaking tasks provide an ideal opportunity to develop fluency. Each language has distinct mechanics, including grammar. When students practice these mechanics over and over, they memorise rule-based content and they can focus on producing them more fluently (Kormos 2006). In other words, making students repeat the same speaking task, helps increase command on accuracy and complexity and thus leaves more attentional resources to improve fluency (Skehan & Foster, 2008). As argued by Skehan (2009), any skilled behaviour is perfected through repetition. For instance, skills such as driving cars or playing musical instruments are perfected and improved by constantly practicing them. Practicing such skills means repeating the same tasks over and over again, and the same concept can be applied to language learning.

According to Nation (1989), second language speaking fluency is measured by how many words one knows in the second language, and how smoothly one can express those words. This means that repetition places learners in a position where they are able to learn and practice new words. The more words they know, the more likely they are to speak fluently in the second language. It is clear that such a behavioural-like technique can be seen as isolated from real communicative skills. Therefore, this strategy must be integrated as a complementary drilling resource, to later incorporate the structures in communication tasks. This makes students encounter the new language content as often as it might take for permanent acquisition. Lambert et al. (2017), argue that students can repeat from three to four times a similar speaking task, in order to see the beneficial effects of repetition without feeling boredom.

Arevart and Nation (1991) also argue that rehearsal improves speaking fluency by helping in the retention of long-term memory. As part of the learning process of a second language, retention of information in the long-term memory is integral in speaking fluency. Nation (1989) states that rehearsing a task or information provides an individual with a chance to develop a better understanding of the language. It is in itself a repetition task because an individual reproduces the same or similar chunks of language to ensure they understand the different language patterns, the meaning of words and phrases, and how to pronounce them. In other words, rehearsals familiarise an individual with new language patterns. A practical example of a commonly used technique in research is the *4,3,2 technique* (Maurice, 1983; Nation, 1989). This speaking task consists of passing the same message in 4 minutes, then in 3 minutes and finally in 2 minutes to different interlocutors. As students reproduce the speech, they use more accurate and fluent language.

2.1.3 Cognitive strategies used in Mountain Experience

Visualisation

Some speaking tasks involved describing pictures to a teammate. The learning benefit in this case was mutual since the speaker would practice vocabulary by naming the different visual elements while the interlocutor could listen to the language produced by the speaking partner referring to different elements in the picture. Then they would swap roles to practice with a different visual material.

Repetition and rehearsal

Each weekly challenge included a speaking interaction within the narrative context, meaning a conversation while guiding tourists in the mountain. Before they record their speeches, students can rehearse as often as they need. Unlike spontaneous speaking in the classroom without previous notice, students feel more confident and satisfied with their podcasts because they have time to plan and prepare them properly:

"Before, it was always like doing oral activities with the teacher and also writings, but doing the tasks though podcasts, recording them several times and repeating them and… speaking English with the classmates was very beneficial."

"… and making videos, audios and all that in teams is very… it is like you feel satisfied when you see the result and that you did a good job."

(Post-interview 01/2019, Student 2)

2.2 Metacognitive Strategies

Metacognition can be considered a highly sophisticated human mental process through which an individual can understand his/her own thinking processes[9]. This type of strategies can be used in the classroom to help students understand the way they learn. As opposed to cognitive processes, metacognitive strategies are mainly concerned with the procedures designed to assist students to think about their learning process rather than focus on language (Raoofi et al., 2014). For instance, meta-cognitive strategies help in the evaluation of one's thinking and how one can use thinking strategies to help understand a second language. As Haukås et al. (2018) put it, metacognition is "an awareness of and reflections about one's knowledge, experiences, emotions and learning" (p.15). For the purpose of this research, we further describe metacognitive strategies including the stimulation of Learning styles, Metalinguistic reflections and Self-questioning. The table below shows a summary of relevant benefits from using metacognitive strategies in student self-assessment and speaking fluency improvement.

Table 19: Overview of how metacognitive strategies improve speaking fluency

Metacognitive Strategies	How they enhance student assessment	How they improve speaking fluency
Stimulating learning styles	• Identify the own learning abilities and preferences	• Enhance motivation and active attitudes • Allow the implementation of appropriate learning style
Metalinguistic reflections and Self-questioning	• Focus on the own learning performance • Engage in discussions with teachers and peers • Help question the own abilities	• Enhance the comprehension of new words • Promote responsibility and confidence

9 Adapted definition from Cambridge dictionary: https://dictionary.cambridge.org/dictionary/english/metacognition

2.2.1 Stimulating learning styles

Considering that every individual's brain functions differently, we can assume that each student shows different abilities in the classroom, and this affects his/her comprehension of different subjects and learning materials (Fleming & Baume, 2006; Raoofi et al., 2014). The differences in learning abilities and skills make it difficult for educators to implement the same styles or strategies for learning. The first step in a metacognitive learning strategy is identifying the needs and abilities of each student to understand the individual strengths and weaknesses. Identifying each student's learning style allows teachers to understand their different preferences (Fleming & Baume, 2006). For instance, some students prefer to learn through visuals, others prefer using auditory material, while others prefer learning using kinaesthetic style. In this regard, they will be more comfortable and motivated to learn the new content in the second language, thus increasing their chances of improving their speaking fluency.

Oxford (2003) also highlights the importance of learning style assessment. Apart from the differences in their abilities, students also have different attitudes, perceptions and motivations. That is why a teacher cannot force a student to learn something he or she does not feel like learning. Reid (1987) summarises learning styles in English as a Second Language (ESL) as four big learning channels and associated tasks:

1. Visual learning: reading, picture descriptions, analysing charts and diagrams
2. Auditory learning: listening to lectures, music or audiotaped material
3. Kinesthetic learning: movements and physical actions mediated by language
4. Tactile learning: "hands-on" tasks, arts and crafts

Students who prefer using visual learning channels acquire language faster when they see it in the form of written texts, images or charts. Auditory styles of learning will respond positively when tape recordings are used in the learning process. These types of students also enjoy learning the language through audio-visual material such as songs of films. Kinaesthetic learners prefer being physically involved in the lessons and thus learning by associating language to movement, and take frequent breaks between learning lessons. Students who enjoy tactile learning learn better while touching materials related to language content (ex: touching different objects to learn vocabulary such as 'soft' or 'raspy'). All these learning styles can only be implemented by teachers if they understand the attitudes, motivations, and abilities of their students (Dörnyei & Ryan, 2015; Haukås et al., 2018).

2.2.2 Metalinguistic reflections and self-questioning

As stated by Haukås et al. (2018), metalinguistic tasks mainly emphasise the process learners undergo to analyse their own use of the target language. Promoting active metalinguistic awareness among students helps enhance their motivation to learn, since they engage in self-assessing their own

communicative performance (Dörnyei, 2001). In this line, meta-discussions can be promoted in the classroom between teachers and students as well as among students. Teachers can stimulate students' self-correction by drawing their attention to specific aspects of their oral productions. Ideally, students should detect their own weaknesses and suggest improvements (ex: *I usually say "…", but I should rather say* "…."). Moreover, teachers may ask students questions such as *"Why do you use this word instead of this one?".* These questions stimulate the students' thinking process in a way they can highlight their capabilities and weaknesses in their second language acquisition such as words they find hard to understand or pronounce. As such, a teacher can easily focus on improving their understanding and pronunciation of those particular words.

Particularly, in a meta-discussion, teachers can help students with questions regarding how they comprehend a word or a text, how they can assess their learning progress and adjustments, how to enrich their strategies and skills to improve their learning and speaking fluency, and how they can plan their learning tasks to align with their needs. Anderson (2012) argues that students with superficial metacognitive awareness tend to overestimate their language skills and do not feel interest in learning tasks, while those students who are highly demanding tend to be excessively critical with their language performance. Thus, promoting metacognition can help adjust students' self-efficacy in second language acquisition and increase their self-confidence in speaking fluency. In this regard, teachers must leave room for students to develop their comprehension abilities without providing immediate responses. By pushing the students towards self-questioning, teachers also allow them to take control over their learning process. As such, they are able to assess their learning strategies, progress, and understand what they must improve to enhance their second language comprehension. In other words, self-questioning is effective in helping students assess their progress and identify linguistic aspects that need improvement.

Some practical tasks that can be performed in the L2 classroom to promote self-questioning are as follows:

- **Individual silent reading** of written material before discussing a topic with the whole class. This way, students can spot the unknown language, predict and check the meaning
- Giving time to **plan speaking interactions**, where learners are pushed to wonder how they can convey specific messages in the target language, using available resources (dictionaries, teacher, classmates, etc.)
- Asking students to **paraphrase** a message using their own words
- Asking students to **summarise what they can say** in the target language after completion of a learning unit

2.2.3 Metacognitive strategies used in Mountain Experience

Stimulating learning styles

In the gamified tasks (challenges), students were introduced to learning material in different forms with the aim to match different students' learning styles. Each weekly challenge included both written and oral instructions as well as audio-visuals to support learning. The following list shows the type of material matching especially the *visual* and *auditory* learning styles:

- Written instructions on Moodle
- Pictures of mountain huts
- Map with digital pop-ups
- Pictures to be described
- Listening comprehension tasks
- Recorded messages from Alice (narrative character)
- Video lessons

Metalinguistic reflections and Self-questioning

Before recording their speaking tasks in pairs, students are advised to prepare their speech by writing a script, rehearsing it and then performing the final version with their teammates. This process engages them in metacognitive strategies since they need to search for the most suitable language structures to express their thoughts.

During the individual interviews held after the gamified course, we could observe the use of metalinguistic reflections and self-questioning. Besides, these students reported having improved their speaking skills by listening to their podcasts or viewing their dialogues in the videos. They also engaged in spontaneous peer-corrections, especially in pronunciation:

> *"And then, well, we both progressed because if one said something wrong, the other one corrected it. We also helped each other correct our pronunciation because the two of us could listen more."*
>
> (Post-interview 01/2019, Student 4)

"... what I liked the most was that I learnt how to pronounce words, for example "the", which many people pronounce the wrong way."

"... when you started to make your own sentences to produce the script with the teammate, I suppose it was then when I thought I learned more, that is motivating and you say: wow, I didn't know that."

(Post-interview 01/2019, Student 5)

2.3 Social Strategies

Unlike cognitive or metacognitive strategies, social strategies focus on increasing learners' interaction with their peers or teachers, which can also help in improving their language acquisition. From a sociocultural approach, Swain (2000) argues that producing 'output' in interactions allows self-reflection on learning to occur. This process is a key step for a learner to get aware of what s/he can do and cannot do, and thus trigger learning motivation to fill the language gaps.

Social strategies in SLA follow the same principles as the Sociocultural theory of learning, which posits individuals' learning as a result of interacting with others (Sato et al., 2019; Vygotsky, 1978). When engaging in teamwork, students can benefit from peer-learning when they interact within their Zone of Proximal Development (ZDP) (Vygotsky, 1978). The ZDP would be in between what students already know and what they can learn with the help of a peer or a teacher. In second language acquisition, this zone would correspond to a similar principle defined by Krashen (1982) in his Input Hypothesis. According to this principle, language acquisition occurs when the task difficulty is one scaffold above the learner's previous knowledge, which is also known as I + 1, meaning just one level above (+1) the students' interlanguage competence (I). Such learning processes are more effective when interacting with peers since they have the opportunity to construct meaning together using their own communicative strategies (Kagan, 2009).

Even though teachers have a responsibility to implement effective peer-interactions in the classroom, learners must be willing to engage these strategies to improve their speaking fluency in SLA. That is why designing motivating activities is essential to engage students in speaking (Dörnyei & Kormos, 2000).The most common and effective social strategies include Teamwork, Task-based learning, and Role-playing.

Table 20: Overview of how social strategies improve speaking fluency

Social Strategies	How it enhances student engagement	How it improves speaking fluency
Teamwork	• Increase participation in class • Increases cooperation in interactions among students	• Raise confidence • Promote peer-learning • Improve social skills by enhancing communication in class
Task-based learning	• Increase interaction among students • Promote cooperation with other students to complete tasks	• Familiarise with second language mechanics • Understand the meaning of new words and texts
Role-playing	• Increase interaction between the teacher and students • Build a more creative learning environment	• Enhance motivation to produce students' own speech • Enhances comprehension of the second language

2.3.1 Teamwork and cooperation

Teamwork involves working together to achieve a common goal (D. W. Johnson & Johnson, 2017; Kagan, 2009). As such, in the pedagogical design of teamwork activities, teachers should include a common communicative goal to be reached by all the team members (ex: interacting at least … times in a planned conversation). Within the cooperative learning framework, some principles must be considered to design efficient teamwork. Kagan (2009) argues that for real cooperative work to occur in a team, the following four basic principles should be guaranteed:

1. **Positive interdependence:** all the team members depend on each other to reach a common goal. In other words, low-achieving students do not get the chance to hide behind high-achievers when they are all assigned to produce something in the team.
2. **Individual accountability:** each member is responsible for his/her own academic results (ex: points awarded individually after a team task).
3. **Equal participation:** the team task requires participation from all the team members to be successfully completed (ex: a dialogue necessarily requires the participation from both partners).
4. **Simultaneous interaction:** face-to-face interactions allow simultaneous actions from all members such as active listening while a teammate is speaking.

Johnson and Johnson (1985, 2017) posit cooperative learning as a more effective method than individual learning to engage students, especially when they are grouped in heterogeneous teams. Considering that learning is based on mutual help, the group members can identify and help students who need assistance in completing their respective assignments. High achievers can help low achievers understand new learning material while also increasing their own achievement resulting

from teaching others (Kagan, 2009). Unlike in teacher-student interactions, teamwork allows participation of all the students, since they can all be given turns to speak within their teams. They also feel more confident to share their ideas in the second language because they feel less 'exposed' to the whole class observation. This is especially applicable for shy and low achieving-students (D. W. Johnson & Johnson, 1985; Kagan, 2009).

As regards cognitive effects, students show better academic results in tasks performed in teams such as verbal problem solving, guessing and predicting meaning (D. W. Johnson & Johnson, 1985). These are very valuable processes in speaking practice, since they allow students to engage in active negotiation of meaning. Pedagogical and psycholinguistic research also avail teamwork as a powerful learning strategy to enhance second language learning, due to the comprehensive input produced by peer-interaction and the negotiation of meaning or 'interlanguage' processes (Long & Porter, 1985).

2.3.2 Task-Based Learning

According to Ellis (2009), in Task-Based Learning (TBL) "all tasks are designed to instigate the same kind of interactional processes that arise in naturally occurring use" (p.227). This means that task-based learning is premised on interaction between the students, in real-life situations. For SLA, interactions in task-based learning are intended to help students overcome their speaking problems including language fluency, by acquiring more vocabulary and grammar structures. For example, Ellis (2009) indicates that students who have a better comprehension of the second language can assist other students understand the mechanics of the language. Therefore, as a social strategy, TBL is an effective way of improving speaking fluency, especially because it emphasises interaction between students.

TBL strategies can be used to promote dynamics in which learners use language as if they would use it outside the classroom (Ellis, 2009; Long & Crookes, 1992). This allows students to get acquainted with the language mechanics, increases their level of confidence, and ensures they are able to express themselves using the second language for practical purposes. In other words, Ellis (2009) argues that TBL improves students' speaking fluency by enhancing interactions between them, and allowing the use of the second language to focus on linguistic forms. It ensures that they understand the fundamental concepts of the language while also improving their comprehension of different linguistic aspects.

Albino (2017) also highlights the importance of using interactive sessions to develop a person's understanding of a language. These interactions can be efficiently designed through TBL in which learners are assigned to use the target language for a specific goal. According to Albino (2017), TBL makes students face the challenge of memorising words that they are unfamiliar with and improve different mechanics such as accuracy and grammar. Some of the communicative tasks proposed by

this author in his research comprise picture descriptions, shopping, ordering a meal or booking a hotel. His study indicates that after using TBL, students showed gains in speed of speech but also in accuracy and comprehensibility in their utterances.

As for affective benefits of TBL, other studies show that students feel more confident while developing their communication strategies (Kessler, 2010; Rohani, 2011). When using TBL in CALL, students also benefit from low-anxiety learning environments offered by technology-based tools. As a matter of fact, when performing speaking tasks such as self-recording personal experiences, students feel more confident and show higher levels of fluency (Kessler, 2010).

When designing TBL, teachers must ensure that students can pay attention to language form and self-regulate their learning by correcting grammar mistakes that can hinder comprehensibility (Housen & Kuiken, 2009). Crowther et al. (2015) argue that some grammatical errors do not impede communication. The most important aspect of speaking fluency is letting the audience understand what one is saying. That means that some individuals may ignore the grammatical errors when they can understand the message the speaker is trying to put across. However, students must be pushed to focus on grammar when making mistakes that can hinder comprehensibility and thus their speaking fluency.

2.3.3 Role playing

Littlewood (1975) describes role playing in SLA as interaction activities ranging from controlled dialogues to spontaneous and improvised conversations. They stimulate imagination and self-directed learning among students, since they engage in creative thinking to build their own language content and perform it as if they were in real contexts. Role playing in second language teaching involves proposing fictional situations in which students are encouraged to create their own speeches in the target language. Although the task is based on fiction, role playing is a middle ground between students' imaginary and their real world (Shapiro & Leopold, 2012).

The pedagogical design of role plays should consider some specific phases in order to guarantee successful learning. Saphiro and Leopold (2012) recommend starting by selecting a meaningful context for students to perform the task. For instance, a speaking situation of some friends planning a weekend away might be a more suitable task for youngsters than for kids. Another key step is providing the linguistic resources that learners will need to perform the role play (ex: telling an anecdote will probably require previous practice on different past tenses). If the role playing is performed in the classroom, teachers can walk around and take notes while students speak without interrupting them, unless the conversation needs the teacher's help to keep going. The notes will be very helpful to provide feedback and discuss students' strengths and weaknesses after the task (Larocque, 1986).

Questioning and answering can also be used as a role-playing strategy to improve students' communication abilities and speaking fluency (Wahyudi, 2017). This strategy helps students practice their input comprehension while also developing output strategies when interacting with the teachers or their peers. In such interactions, Long (1981) argues that students construct meaning together in face-to-face communication, which makes them adapt their speech to produce comprehensible input and output. When students understand the meaning, it means they can comfortably communicate in the language and become more fluent while doing so. In order to guarantee equal participation in pair or group interactions, students should swap roles and perform both as interviewers and interviewees.

2.3.4 Social strategies used in Mountain Experience

Regarding motivational affordances in gamification, socialising and cooperation have shown to be efficient elements to engage students in learning tasks (Aldemir et al., 2018; Barata et al., 2013; de Sousa Monteiro et al., 2016; Huang & Hew, 2018; Perry, 2015). Barata (2013) showed how students are more engaged in learning when there is socialising involved in the proposed tasks. In teamwork, the effect of socialising produces a positive effect on learners since they enjoy sharing knowledge with their peers (Huang & Hew, 2018; Iosup & Epema, 2014; B. Kim, 2015). Cooperation has also shown to be a motivational element. Students show higher levels of satisfaction in earning rewards for their team when completing a common learning goal together (D. W. Johnson & Johnson, 2017; Pirker et al., 2014). It is worth noting that motivational strategies in teamwork are especially beneficial in L2 learning, considering that affective filters such as motivation are essential predictors of language acquisition (Gardner & Lambert, 1972; Krashen, 1981; MacIntyre, 2002).

In the gamified course, students have to cooperate with their teams to perform speaking tasks and show good communication skills in order to become tourist guides in Mountain Experience. As such, they need to build dialogues together following TBL instructions. The dialogues have to be performed in the form of a role play, in which they would pretend to be mountain guides and tourists. In each speaking challenge, they were asked to swap roles so each student had the opportunity to perform different tasks such as asking questions, answering questions, making a description of telling anecdotes to each other.

After the gamified course, students expressed high levels of engagement in teamwork and cooperative learning. They highlighted the fact of feeling more confident when performing speaking tasks with their peers. This way, they did not feel as anxious as they would in the classroom, when being called out to speak in front of all the class. Even peer-corrections were seen as a positive aspect when they occurred within the team.

"When you are working on a dialog and you know that the other person can correct you and you can correct her, which is actually what happened to me, sometimes I corrected some of my teammates' accents. This engages you in going on and saying: I am good at this; I can help them and they can help me practice the language I like. And that is what I liked."

"The contact with my teammates speaking in English was very beneficial. (…) and making videos, audios and all that in teams is very… it is like you feel satisfied when you see the result and that you did a good job."

"There are people who encounter more difficulties when learning English, so when they need to complete exercises, we are afraid of answering, and we do not feel confident to see if you actually understood or if we will make a bad impression on our classmates."

(Post-interview 01/2019, Student 2)

"And then, well, we both progressed because if one said something wrong, the other one corrected it. We also helped each other correct our pronunciation because the two of us could listen more."

(Post-interview 01/2019, Student 4)

"Uh… I think what motivated me the most was when we had to score points. I guess that was the most motivating thing because you really say… when you started to make your own sentences to produce the script with the teammate, I suppose it was then when I thought I learned more, that is motivating and you say: wow, I didn't know that."

(Post-interview 01/2019, Student 5)

3 SUMMARY

How to gamify a second language course on Moodle

In this methodological proposal a specific literature review was performed in order to spot the main gamification elements used in research at higher education. We detected four specific clusters which are commonly implemented: (i) Immersion and narrative, (ii) Competition, (iii) Achievement and (iv) Socialising. We then described Mountain Experience's gamification design following these clusters and included relevant findings from empirical studies to support the beneficial effects of each game strategy.

As it has been shown, a game narrative creates a sense of immersion in the learning environment, where students feel part of the game. This is what meaningful gamification is about, making players be part of the game story. Moreover, keeping some grounding in students' reality helps make the game-like setting more meaningful to them. Competition is another powerful motivational element which has to be included with caution to avoid turning the system into a sandbox, and leaving the lowest achievers behind. An effective strategy to avoid such negative effects, would be adding social interactions and team competition. Students commonly prefer competing in groups since they feel more confident and also more helpful when they see they can help their peers achieve common goals. As they move forward in the gamified course, students are rewarded accordingly to their performance. Unlike traditional grades, it has been shown that when rewards are carefully integrated in the course and given a reasonable difficulty, they are highly valued by students. They appreciate being recognised for their efforts and according to the quality of their assignments. Finally, socialising and teamwork are essential features in game-like environments to promote students' engagement produced by the sense of relatedness. Instructors can include them in the gamified course as a pedagogical strategy to promote peer-learning.

Enhancing speaking fluency

Improving speaking fluency in a second language is a complex process for students, that requires much active participation in oral interactions as well as in self-reflection on the learning process. The implementation of learning styles and strategies is integral in enhancing their ability to speak fluently and accurately. Based on the discussion above, the most important aspect of improving speaking fluency is understanding the language in different contexts, its patterns and the linguistic mechanics such as grammar or pronunciation. The more individuals improve their understanding of the target language, the more they become confident in speaking the language.

To achieve this, different strategies can be promoted in the second language classroom. Cognitive strategies, meta-cognition, and social strategies are all effective in improving the students' ability to improve their speaking fluency. For instance, cognitive strategies focus on the brain functioning, and

how different strategies impact the students' memory and their ability to understand and retain information. Meta-cognitive strategies are mainly related to the self-reflection on the own process or procedures of learning. The strategy lays down different procedures that will improve the students' awareness of their speaking accuracy and fluency. Lastly, social strategies focus on the students' ability to cooperate with their teacher or with other students to improve their speaking fluency. This strategy also involves repetition of tasks, using task-based strategies, and using a question-answer approach by teachers to improve interactions in the class. In social strategies, interaction and cooperation are integral in improving the students' confidence in speaking and thus achieve higher levels of fluency.

Conclusions

1 GENERAL CONCLUSIONS

This dissertation intends to shed more light on using educational gamification in second language acquisition. Numerous theoretical frameworks published in the education field suggest that game elements incorporated properly and paired with a good pedagogical approach are highly efficient to enhance learning experiences. Previous research has already supported with solid evidence the beneficial effects of gamification on students' motivation and engagement (Dichev & Dicheva, 2017; Kapp, 2013a; Majuri et al., 2018; Sailer & Sailer, 2021). Experts in the field argue that meaningful gamification can promote constructive learning when it is aligned with students' interest and learning goals (Hamari et al., 2014; Nicholson, 2012). However, when it comes to learning achievement, the literature added to our empirical findings suggest being cautious about the idea of using gamification to improve actual learning or long-term acquisition in second languages (Hojjat Dehghanzadeh et al., 2019).

Both the quantitative and the qualitative findings resulting from our empirical inquiry also support the repeatedly evidenced positive effects of gamification on students' motivation. Additionally, we also provide evidence on better results of students' foreign language anxiety, which is considered a key affective factor in SLA (Horwitz, 2001; Krashen, 1981; MacIntyre & Gardner, 1994). A significant difference was drawn from the comparative study in terms of 'intrinsic motivation towards accomplishment' and 'extrinsic motivation from external regulation'. We argue that these two aspects can be directly connected to the effects reported by students in the gamified course. On the one hand, they expressed a strong sense of self-achievement produced by the effect of progression and constructive feedback generated by specific gamification elements such as the challenges, the rewards and the leaderboards. Socialising and competing in teams seemed to be the most powerful elements to engage students and make them persist in submitting learning tasks (Aldemir et al., 2018; Perry, 2015).

So far, while research can clearly support the motivational effects of gamification, numerous findings seemed to be either inconclusive or ambiguous in terms of learning outcomes. This is why, education practitioners willing to include gamification in their classes should consider using it as a supportive technique rather than a pedagogical tool. Pedagogical design should be well defined by teaching instructions, which can then be complemented with motivational techniques such as game elements. This is the reason why we also provide a methodological proposal including a meaningful gamification design as well as some guidelines to enhance speaking fluency in the second language classroom.

Finally, we would like to reiterate how important it is for teachers to carefully distinguish between pure pedagogical frameworks and additional resources that can help in achieving learning goals. In fact, we believe that the creative function of human teachers in pedagogical design should never be

substituted by technology. As Cornella (2019) puts it, "Education should be radically human in a world of intelligent machines".

2 RESEARCH LIMITATIONS

In this research we clearly knew from the beginning that the small size of the UdA would not allow certain types of inquiries involving a large number of participants nor findings to be generalised. Yet, the initial conditions in which this thesis started allowed room for a mixed research method including a comparative study with statistical treatments. A pilot study could be conducted within the described conditions. However, due to major unforeseen reasons like the Covid-19 Pandemic, among others, the research context was not available any longer when we had to perform the final experiment. Therefore, a new approach had to be embraced with the aim to give a continuity to the pilot study. A case study including a stronger emphasis on qualitative data together with a methodological proposal was considered a valid and reliable option to achieve the research goals to which we committed in the initial research project.

The small sample size of the quantitative (n=23) and the qualitative inquiry (n=5) allows us to describe the specific case of the UdA. According to (Cohen et al. 2007):

> *Sample size is also determined to some extent by the style of the research. […]. Borg & Gall (1979: 194-5) suggest that correlational research requires a sample size of no fewer than thirty cases, that causal-comparative and experimental methodologies require a sample size no fewer than fifteen cases…" (p. 102).*

Consequently, the quantitative analysis can so far be only considered as trending results, due to the limited size of the population. However, we believe that further research with a larger number of participants would probably provide significant results, especially regarding the positive effects on motivation and anxiety. Nevertheless, the outcomes in speaking fluency seem too ambiguous to predict any clearer trend.

As regards the didactic workload involved in the research, the gamification strategy implemented in the case study is not an easy and straightway to include game design on a platform like Moodle. The required time investment for an instructor to design a gamified Moodle is significantly more consuming than a traditional design (posting documents and tasks). Ideally, feedback on progression is more effective when it is immediate. However, the proposed gamification design requires giving continuous feedback manually to each student as soon as possible. Such tasks could be much more affordable if programmed in an automated system. In this sense time limitations can be a considerable drawback in using financially affordable or free gamification design strategies (Sánchez-Mena & Martí-Parreño, 2017).

3 ETHICAL CONSIDERATIONS

Some important ethical principles are being considered in this thesis following the guidelines of Zeni (2014) and Groundwater-Smith and Mockler (2007). Considering that the research involves human 'subjects' and sensitive information such as their psychobehavioural states and cognitive performance, we included any possible measure to meet some ethical commitments described in this section.

The author of this research is a teacher herself in one of the courses where the study was initially planned to be conducted. In order to avoid a direct involvement of the researcher in the study, we decided to have a different teacher taking over her course, so she could be 'freed' from ethical issues. This way, the author could still be an 'insider' researcher and focus on how to enrich the UdA's English teaching methodology (Zeni, 2014). In this line, students knew that their English teacher was the only one in charge of academic aspects such as grading, and the researcher just monitored the course on Moodle and made sure that anyone who delivered a gamified task was given suitable feedback. In other words, this process did not affect their academic results. Students were free to participate in the gamified process or just submit the tasks individually.

Informing participants in a research project requires providing clear and transparent information before they are asked to get involved in a study. With this idea in mind, the researcher herself visited both classes to describe the study and their implications in case they decided to participate. The key information was also shared with them through a consent form that students could freely decide to sign. Moreover, as a matter of deference, we also included a section in which they could ask to be sent the results of the research (see consent form in Appendix 8).

Regarding quality-oriented results, this study integrates some key principles established by the European Federation of Academies of Sciences and Humanities (ALLEA, 2017), namely:

- Reliability
    - The literature and references included in the theoretical framework have been thoroughly reviewed by the supervisor in any of the written work produced within the doctoral thesis.
    - The questionnaires used in the study are validated tools highly referenced in the research field. In order to ensure full comprehension, a reversed translation was performed on the FLCAS by two different translators. That is, a comparison was made after a translation from English to Catalan and From Catalan back into English. After the process, the scale in Catalan was included in the stud, since it was considered to be faithful to the original version. As for the AMS, a Spanish translation

was retrieved from Núñez et al. (2010) and then translated into Catalan. The latter scale was considered a valid tool for the study, as the similarities between the two languages allowed no room for misunderstandings.

- The fluency rates analyses were reviewed and validated by two raters other than the researcher (one reviewed randomly 50% of the results and the other one 25%). After the review, the raters checked the differences and repeated the measurement process until they obtained the same values.
- Quantitative data regarding FLA and AM was processed through a widely used software (SPSS) with the help of an expert in statistics.
- All the oral interviews were recorded in order to retrieve key content to be codified and analysed. The first interviews were performed with an external observer (thesis supervisor) to make sure that all the important issues were covered.

- Honesty
  - Any work or key information regarding the thesis was shared and agreed with the supervisor.
  - The findings deriving from the study were sent to all the students who requested it.

- Respect
  - As regard the access to students' sensitive data, a formal authorisation was requested to the UdA's Academic Board (see request and answer in Appendix 9).
  - Any data referring to students has been systematically codified so as to prevent sensitive data disclosure.
  - When an educational institution was mentioned together with negative findings (that would not be relevant to the research questions), the name was substituted by a text missing symbol (…).

- Accountability
  - The general goal of this research -exploring the effects of gamification on SLA- is aimed at enriching the research lines promoted by the Research Group on Languages (GREL in Catalan) as well as to quality education standards promoted by the UdA, in line with the 2030 Agenda for Sustainable Development Goals (SDG).

4 SUGGESTIONS FOR FUTURE RESEARCH

This last section describes some recommended research lines that could add valuable understanding on the discussed topics of this dissertation. Some of the ideas were already detected in the preliminary literature reviews and some others emerged as we moved towards the end of the dissertation.

1. **Gamification effects on anxiety:** As it was shown in different sections of this document, there is a clear lack of research focused on the construct of anxiety. This can be quite striking since motivation and anxiety often go hand by hand in the educational field. Key authors in SLA have repeatedly identified language anxiety as a key undermining factor in the second language acquisition process. Therefore, exploring students' anxious states in the use of gamification could provide interesting insights on further psychological affordances.

2. **Speaking fluency in CALL/MALL**: Research on language acquisition has been more focused on exploring learning achievement in written more than oral skills. This is probably due to the complexity of measuring spoken language, considering the wide variety of subjective factors determining to what extent a learner is proficient in a second language (linguistic, social, cultural, emotional, etc.). Additionally, there is a lack of consensus on learning theories related to speaking achievement (Kormos, 2006). As a logical follow-up to the present thesis, further empirical research is needed to explore how fluency can be efficiently improved within CALL/MALL.

3. **Emotional factors involved in speaking fluency:** As described in the theoretical framework and evidenced by empirical findings, social-affective filters are essential predictors of language acquisition (Krashen, 1981; MacIntyre & Gardner, 1994). Following the path of relevant authors in this field such as Dewaele and Macintyre (2016) and Kramsch (2012), further studies can be conducted on how to better help learners feel emotionally bonded to a second language.

4. **Learning English in a multilingual context:** Considering the deeply rooted multilingualism context in Andorra, it would also be very enriching to conduct research at a national level, focused on social perceptions and beliefs on learning English as a second language.

Publications

PUBLICATIONS

The present thesis has provided interesting findings to be shared through international publications in order to disseminate further knowledge on the use of gamification in the educational field.

Conference proceedings:

- Azzouz, N.; Gutiérrez-Colón, M. (2019). Enhancing academic motivation in a gamified English course on Moodle. Presented at the *Fòrum Internacional d'Educació i Tecnologia (FIET) 2019.* Barcelona.

- Azzouz, N.; Gutierérrez-Colón, M. (2019). Effect of gamification on foreign language anxiety and speaking achievement in second language acquisition. Presented at *Eurocall 2019.* Louvain-La-Neuve, Belgium. Retrieved from: https://sites.uclouvain.be/eurocall2019/wp-content/uploads/2019/08/EUROCALL-2019-Book-of-abstracts.pdf

- Gutiérrez Colón, M., Azzouz, N. (November 2019). Using Gamification to motivate second language learners in higher education. Presented at the *International Conference of Intercultural Learning in the Digital Age: Building Telecollaborative Networks*, Universitat de València, Spain.

Journal article:

- Azzouz, N. & Gutiérrez-Colón, M. (2020). Effect of Gamification on students' motivation and learning achievement in Second Language Acquisition within higher education: a literature review 2011-2019. *The EuroCALL Review*, 28(1), 57-69.
  (See full article in Appendix 10)

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Appendices

Appendix 1: Academic Motivation Scale (Vallerand et al., 1992)

Using the scale below, indicate to what extent each of the following items presently corresponds to one of the reasons why you go to college.

Does not correspond at all		Corresponds a little		Corresponds moderately		Corresponds a lot	Corresponds exactly
1	2	3	4	5	6	7	

WHY DO YOU GO TO COLLEGE?

1. Because with only a high-school degree I would not find a high-paying job later on.
2. Because I experience pleasure and satisfaction while learning new things.
3. Because I think that a college education will help me better prepare for the career I have chosen.
4. For the intense feelings I experience when I am communicating my own ideas to others.
5. Honestly, I don't know; I really feel that I am wasting my time in school.
6. For the pleasure I experience while surpassing myself in my studies.
7. To prove to myself that I am capable of completing my college degree.
8. In order to obtain a more prestigious job later on.
9. For the pleasure I experience when I discover new things never seen before.
10. Because eventually it will enable me to enter the job market in a field that I like.
11. For the pleasure that I experience when I read interesting authors.
12. I once had good reasons for going to college; however, now I wonder whether I should continue.
13. For the pleasure that I experience while I am surpassing myself in one of my personal accomplishments.
14. Because of the fact that when I succeed in college, I feel important.
15. Because I want to have "the good life" later on.
16. For the pleasure that I experience in broadening my knowledge about subjects which appeal to me.
17. Because this will help me make a better choice regarding my career orientation.
18. For the pleasure that I experience when I feel completely absorbed by what certain authors have written.
19. I can't see why I go to college and frankly, I couldn't care less.
20. For the satisfaction I feel when I am in the process of accomplishing difficult academic activities.
21. To show myself that I am an intelligent person.
22. In order to have a better salary later on.
23. Because my studies allow me to continue to learn about many things that interest me.
24. Because I believe that a few additional years of education will improve my competence as a worker.
25. For the "high" feeling that I experience while reading about various interesting subjects.
26. I don't know; I can't understand what I am doing in school.
27. Because college allows me to experience personal satisfaction in my quest for excellence in my studies.
28. Because I want to show myself that I can succeed in my studies.

Academic Motivation dimensions:

# 2, 9, 16, 23	Intrinsic motivation - to know
# 6, 13, 20, 27	Intrinsic motivation - toward accomplishment
# 4, 11, 18, 25	Intrinsic motivation - to experience stimulation
# 3, 10, 17, 24	Extrinsic motivation - identified
# 7, 14, 21, 28	Extrinsic motivation - introjected
# 1, 8, 15, 22	Extrinsic motivation - external regulation
# 5, 12, 19, 26	Amotivation

Appendix 2: Foreign Language Classroom Anxiety Scale (Horwitz, 2001)

Questionnaire: Foreign Language Classroom Anxiety Scale	
1. Strongly agree / 2. Agree / 3. Neither agree nor disagree / 4. Disagree / 5. Strongly disagree	
SITUATIONS	
1	I never feel quite sure of myself when I am speaking in my foreign language class.
2	I don't worry about making mistakes in language class.
3	I tremble when I know I'm going to be called on in language class.
4	It frightens me when I don't know what the teacher is saying in the foreign language.
5	It wouldn't bother me at all to take more foreign language classes.
6	During language class, I found myself thinking about things that have nothing to do with the course.
7	I keep thinking that the other students are better at languages than I am.
8	I'm usually at ease during tests in my language class.
9	I start to panic when I have to speak without preparation in language class.
10	I worry about the consequences of failing my foreign language class.
11	I don't understand why some people get upset over foreign language classes.
12	In language class, I can get so nervous I forget things I know.
13	It embarrasses me to volunteer answers in my language class.
14	I would not be nervous speaking the foreign language with native speakers.
15	I get upset when I don't understand what the teacher is correcting.
16	Even if I'm well prepared for the language class, I feel anxious about it.
17	I often feel like not going to my language class.
18	I feel confident when I speak in foreign language class.
19	I'm afraid that my teacher is ready to correct every mistake I make.
20	I can feel my heart pounding when I'm going to be called on in language class.
21	The more I study for a language test, the more confused I get.
22	I don't feel pressure to prepare very well for language class.
23	I always feel that the other students speak the foreign language better than I do.
24	I feel very self-conscious about speaking the foreign language in front of other students.
25	Language class moves so quickly I worry about getting left behind.
26	I feel tenser and more nervous in my language class than in my other classes.
27	I get nervous and confused when I'm speaking in my language class.

28	When I'm on my way to language class, I feel very sure and relaxed.
29	I get nervous when I don't understand every word the language teacher says.
30	I feel overwhelmed by the number of rules you have to learn to speak a foreign language.
31	I am afraid that the other students will laugh at me when I speak the foreign language.
32	I would probably feel comfortable around native speakers of the foreign language.
33	I get nervous when the language teacher asks questions which I haven't prepared in advance.

FLCA dimensions:

Category 1: Communication apprehension (items 1, 4, 9, 14, 15, 18, 24, 27, 29, 30, 32)

Category 2: Fear of evaluation by peers and teachers (items 2, 7, 13, 19, 23, 31, 33)

Category 3: Test anxiety (items 3, 5, 6, 8, 10, 11, 12, 16, 17, 20, 21, 22, 25, 26, 28)

Appendix 3: Tables of the literature reviews

Gamification in SLA

Table 21: Learning tool used in the studies

Paper (authors, year)	Learning application/tool
(Liu, Holden & Zheng, 2016), (Perry, 2015), (Cardoso, Rueb & Grimshaw, 2017), (Palomo-Duarte et al., 2016), (Berns et al., 2016)	Self-created gamified learning App
(Bustillo et al., 2017), (Gafni, Achituv & Rahmani, 2016), (Munday, 2016),	Duolingo
(Hung, 2017), (Iaremenko, N. V., 2017), (Mateo-Gallego & Ruiz-Yepes, 2018)	Kahoot
(Barcena, & Sanfilippo, 2015)	Voki
(Kétyi, 2016)	Busuu and Lifeline
(Castañeda & Cho, 2016)	Conjugation Nation
(Purgina et al, 2019)	Wordbricks

Table 22: Subjects of study, variables observed in students and results

Paper (authors, year)	Subject of study (related to the research questions)	Variables observed in students	Results
(Barcena, & Sanfilippo, 2015)	Effects of a gamification component (avatar on Voki) on L2 (English, German, French, Italian) students' acceptance	Psychobehavioural	Positive towards gamification (avatar)

(Gafni et al, 2016)	Effects of a gamified app (Duolingo) on L2 (English) students' attitudes towards a mobile the app	Psychobehavioural	Positive on attitude towards gamification
(Iaremenko, 2017)	Effects of a gamified app (Kahoot) L2 (English) students' perception of on fun, competition and intrinsic motivation	Psychobehavioural	Positive on engagement
(Liu et al., 2016)	Effects of an Augmented Reality game (Guardians of the Mo'o) on L2 (English) student's engagement	Psychobehavioural	Positive on engagement
(Munday, 2016)	Effects of a gamified app (Duolingo) on L2 (Spanish) students' satisfaction	Psychobehavioural	Positive on attitude towards gamification in level A1 but ambiguous in level B2
(Perry, 2015)	Effects of a gamified AR self-designed platform (Explorez) on L2 (French) students' motivation	Psychobehavioural	Positive on attitude towards gamification
(Berns et al., 2016)	Effects of a gamified app (VocabTrainerA1) on L2 (German) students' motivation, attitudes, perceived learning and language achievement (grammar and vocabulary).	Psychobehavioural and Cognitive	Positive both on learning and attitude towards gamification
(Bustillo et al., 2017)	Effects of a gamified app (Duolingo) on L2 (English) acquisition and students' attitude towards using digital apps in learning	Psychobehavioural and Cognitive	Positive both on learning and attitude towards gamification
(Castañeda & Cho, 2016)	Effects of a gamified app (Conjugation Nation) on conjugation accuracy and confidence in L2 (Spanish)	Psychobehavioural and Cognitive	Positive both on learning and on attitude towards gamification
(Hung, 2017)	Effects of a gamified app (Kahoot) on L2 (English) students' learning, self-perception and attitudes towards the gamified app	Psychobehavioural and Cognitive	Positive both on learning perception and attitude towards gamification
(Kétyi, 2016)	Effects of gamified apps (Busuu, Lifeline) on L2 (English, German, Spanish, Italian) students' learning outcomes and motivation	Psychobehavioural and Cognitive	Positive on learning and motivation but with no correlation
(Cardoso et al, 2017)	Effects of a self-designed digital game (Prêt à Négocier) on L2 (French) speaking skills (comprehensibility, fluency and pronunciation)	Cognitive	Negative on learning
(Mateo-Gallego & Ruiz-Yepes, 2018)	Effect of a gamified App (Kahoot) on L2 (Spanish) error processing and self-reflections on mistakes	Cognitive	Ambiguous: positive on error correction, negative on self-reflections
(Palomo-Duarte et al. 2016)	Effects of a self-designed gamified app (Guess it! Guess it!) on L2 (German) students language achievement	Cognitive	Positive on learning

(Purgina et al, 2019)	Effect of a gamified App (WordBricks) on grammar achievement in L2 (English)	Cognitive	Positive on learning (grammar)

Table 23: Measurement instrument, research methodology, sample and duration

Paper (authors, year)	Measurement instruments	Research methodology	Sample	Duration
(Barcena, & Sanfilippo, 2015)	1) Pre- survey on e-learning platform user preferences and 2) Post- satisfaction questionnaire	Quantitative and qualitative	273 university e-learning students (aged 23-58)	4 months
(Berns et al., 2016)	1) Pre- and post- questionnaires on students' language achievement 2) focus group interviews to assess students' learning experience	Quantitative and qualitative	104 university students (A1 level)	4 weeks
(Bustillo et al., 2017)	1) Pre- and post- test son listening comprehension and 2) Post survey on students' attitude towards Duolingo	Quantitative	12 students (5 females and 7 males aged 19)	2 months
(Cardoso et al, 2017)	1) Pre and post tests on pronunciation (corrected by 16 graders)	Quantitative	34 pre-university students (average age 20) grouped in an experimental and a control group	4 weeks
(Castañeda & Cho, 2016)	1) Pre- and post- tests on conjugation 2) Post- quiz to measure accuracy 3) Pre- and post- surveys on confidence 4) Post- open-ended questions on attitudes towards the gamified app 5) Post-interview on overall students' experience	Quantitative and qualitative	80 university students of Spanish (41 females and 39 males in elementary and intermediate levels)	8 weeks
(Gafni et al, 2016)	1) Pre- and post- tests on attitudes towards language learning apps	Quantitative	89: 58 ESL students (male 35, female 23) and 31 high school pupils (male 10, female 21)	1 week

(Hung, 2017)	1) Pre- and post- learning achievement tests 2) Post- perception survey 3) Semi-structured individual interviews on students' overall experience	Quantitative and qualitative	44 university students (English majors aged 20-22, 35 females, 9 males) grouped in an experimental and a control group	3 Kahoot sessions of 10-12 questions
(Iaremenko, 2017)	1) Post- questionnaire on engagement	Quantitative	120 university students (76 males and 44 females) with an upper-intermediate level	"After a series of classes" Doesn't provide the exact duration
(Kétyi, 2016)	1) Pre- and post- tests on language achievement and 2) Pre- and post- questionnaires on motivation	Quantitative and qualitative	94 higher education students (67.7% females 32.3% males, in control and experimental groups)	8 weeks
(Liu et al., 2016)	1) Pre- and post- interview on students' overall experience and 2) Recorded videos throughout the experiment	Qualitative: Conversation Analysis and Multimodal Analysis	3 adult students (2 females, 1 male)	One day
(Mateo-Gallego & Ruiz-Yepes, 2018)	1) Pre-, middle and post- tests on academic results 2) Posttest on self-reflection on mistakes	Quantitative and qualitative	2 groups of German university students (19-25 years old) of L2 (Spanish), in control and experimental groups	4 sessions
(Munday, 2016)	1) Post- questionnaire with closed-ended and open-ended questions on students' satisfaction	Quantitative and qualitative	62 university students (46 of A1 level, 16 of B2 level)	1 semester
(Palomo-Duarte et al. 2016)	1) 1 Pretest and 3 post- tests on word definitions	Quantitative	100 university students (A1 level)	4 weeks
(Perry, 2015)	1) Pre- and post- questionnaires on students' experience 2) Focus group interviews to assess gamification elements	Quantitative and qualitative	11 university students (7 females and 4 males)	3 sessions
(Purgina et al, 2019)	1) Pre- and posttest on grammar	Quantitative	21 Japanese university students (19-21 years old) of L2 (English), in control and experimental groups.	2 book units

Effect of game elements at higher education

	Paper	Discipline	Gamification strategy	Cluster of game elements: Narrative (N) Competition (C) Achievement (A) Socialising (S) *N*	*C*	*A*	*S*	*Sample*	*Research method*	Comparative study	Affordances in motivation/engagement	Affordances in learning	Affordances in anxiety
1	(Aldemir et al., 2018)	Education Sciences	Gamified a Teacher training course including a narrative	N				118	Qualitative	No	Using relevant narratives and characters seems to produce a sense of immersion in the game-like learning environment.	-	-
2	(Almanza-Arjona et al, 2020)	Chemical/ biotechnology engineering	Gamified a Chemical and biotechnology engineering course encouraging students to create their own narrative/stories using disciplinary concepts	N				74	Mixed	Yes	Students showed high engagement in learning tasks and better understanding of highly abstract concepts through sci-fi stories.	Higher average grades at the end of the course	-
3	(Armstrong & Landers, 2017)	Computer Science	Gamified a Laptop Security course using narrative	N				273	Quantitative	No	A positive effect on students' engagement has been found when making the instruction more attractive through narrative.	No evidence found	-
4	(Berkling & Thomas, 2013)	Computer Science	Gamified a Software Engineering course on a basic digital platform where students could choose 2 out of 3 tasks related to the course.	N				59	Mixed	No	Did not produce the desired effect on Gamification since it was viewed as unnecessary by students. One of the possible causes could be the lack of aesthetics in the gamified environment. Similarly, Chen et al. (2015) recommend taking good care of making the interface of the gamified platform visually appealing.	-	-
5	(Forndran & Zacharias, 2019)	Physics engineering	Gamified a Physics course on Moodle, including narrative, rewards and leaderboard	N				45	Quantitative	No	Most students accepted the narrative as a meaningful way to understand complex concepts in a more friendly context, close to their known environment.	-	-
6	(O'Donovan, Gain & Marais, 2013)	Computer Science	Gamified a Computer programming course using a storyline	N				34	Quantitative	Yes	Although students found it attractive, the story could have been more meaningful to them if properly integrated within the course.	Higher grades were shown compared to a previous non-gamified course	-

7	(Xiang et al., 2014)	Communication Technology	Gamified a Technology course in vocational education, including narrative	N				30	Mixed	No	Adding a story theme to dry academic topics make them more appealing and engaging for students.	No evidence found	-
8	(Aldemir et al., 2018)	Education Sciences	Gamified a Teacher training course including a leaderboard		C			118	Qualitative	No	Most students liked the competitive effect of leaderboards.	-	-
9	(Buckley & Doyle, 2016)	Economics	Gamified an Economics course platform providing individual ranking on a leaderboard		C			132	Quantitative	No	Competitive environments are particularly effective for students who are intrinsically motivated, particularly either by a motivation to know or a motivation towards stimulation.	-	-
10	(Buisman, van Eekelen, 2014)	Computer Science	Gamified a Computer software development course including a points system feeding a leaderboard		C			57	Quantitative	Yes	Students who received points on a public online ranking, could compare their score to others and had significantly more points and performed more activities than those who had no public ranking or were not gamified. Just receiving points apparently, was not enough.	Higher participation levels in the gamified group with a leaderboard found to be correlated to higher course grades (points)	-
11	(Çakıroğlu et al., 2017)	ICT	Gamifying an ICT course including mainly points, rewards and leaderboards		C			37	Mixed	No	One of the prominent factors for engaging students in the activities was the use of the leaderboard.	Positive effects on engagement might indirectly increase academic achievement	-
12	(Fernandez-Reyes et al., 2018)	Computer Science	Gamified a Computer science course using a card game and a leaderboard		C			71	Quantitative	No	Students showed higher motivation rates	Higher motivation levels found to be correlated to higher course grades and vice versa	-
13	(Forndran & Zacharias, 2019)	Physics engineering	Gamified a Physics and Engineering course on Moodle, including a leaderboard		C			45	Quantitative	No	Students showed very positive attitudes towards competition .	-	-
14	(Krause et al., 2015)	Computer Science/ Psychology	Gamified a MOOC course taken by different majors, adding social gamification elements		C			206	Quantitative	Yes	Social gamification elements such as leaderboards show beneficial effects on student engagement.	Positive evidence: Students in the plain gamified condition show an increase of 22,5% in their final test average scores and those in social gamification show 40% higher scores on average	-
15	(Landers & Landers, 2014)	Psychology	Gamified a wiki of a Psychology course including a leaderboard		C			64	Quantitative	Yes	Students in the treatment group showed about 30 times more interactions on the wiki project than those from the control group.	No evidence found	-
16	(Leaning, 2015)	Media	Gamified a Media theory module taught on a undergraduate Media Studies, including a leaderboard		C			125	Mixed	Yes	Students expressed more motivation compared to non-gamified modules in the sense that they put more effort in the learning tasks.	Although a small increase in scores was observed, it could not be correlated to the use of gamification.	-

17	(Morales-Trujillo & García-Mireles, 2020)	Computer Science	Gamified a Computer science course including a leaderboard.		C			115	Mixed	Yes	The competition effect enhances students' engagement produced by public recognition on a leaderboard although it also increases levels of anxiety when using competition.	Higher academic achievement was found in the treatment group.	Higher levels of anxiety were produced by competition.
18	(Nevin et al., 2014)	Medicine	Gamified an examination platform in Medicine, included an individual and team leaderboard		C			17	Qualitative	No	Students highlighted the leaderboard as highly motivational. While none reported that competition alone was de-motivating, those that found themselves or their teams towards the bottom of the leaderboard reported a loss of motivation as the competition progressed. Publishing only the scores of the highest achieving teams could be a way to avoid de-motivating the lowest achievers.	-	-
19	(Ntokos, 2019)	Computer Science	Gamified a Computer science course (game engineering) using virtual fights in Classcraft		C			34	Mixed	No	Competitions (fights) within the gamification platform engaged the less motivated students in class and increased the attendance.	.	-
20	(O'Donovan et al., 2013)	ICT	Gamified an IT course using a leaderboard.		C			200	Quantitative	Yes	Students perceived the leaderboard as highly motivating. Students also showed higher levels of attendance.	Compared to previous years, academic scores were found to be significantly higher.	-
21	(Pechenkina, 2017)	Accounting and Science	Gamified Accounting and Science courses with quizzes feeding a leaderboard		C			394	Quantitative	Yes	Students showed more engagement in learning through a gamified app.	Student higher engagement in the gamified option was found to correlate positively with their academic scores.	-
22	(Rojas-López et al., 2019)	Computer Science	Gamified a computer science course using team competition		C			60	Mixed	Yes	Students perceived competing in teams a powerful motivation and a better learning when performed with teammates	The control group performed better than the treatment group probably due to the fact that the latter received more instruction on the course content.	-
23	(Sailer & Sailer, 2021)	Not specified	Gamified and Education sciences flipped-classroom using points on a leaderboards		C			250	Quantitative	No	Team competition produced by the leaderboard increased student performance in the learning tasks.	Indirect positive effect of gamification on application-based knowledge.	-
24	(Van Nuland, 2014)	Health	Gamified an Anatomy course by including competition in the form of tournaments to assess students' knowledge		C			67	Mixed	Yes	Most students enjoyed taking part in the tournament and found it to be an engaging and enjoyable game-like.	Nosignificant difference found between control and treatment, although higher scores can be observed in a gamified course. Learning enhanced by social competition may require time to manifest into academic improvement on term tests.	-
25	(Aldemir et al., 2018)	Education Sciences	Gamified a teacher training course including a rewarding system			A		118	Qualitative	No	Students increased their participation thanks to rewards. For engagement to be sustained rewards should be given on a continuous basis (Deci & Ryan, 2000).	-	-
26	(Barata et al., 2013)	Engineering				A		35	Mixed	Yes	The desire to collect new rewards may be a powerful motivator. It also results in higher	No statistical positive effect found on grades	-

			Gamified an Engineering course by including a reward system based on challenges								attendance rates and participation in discussions with other classmates.		
27	(Barrio et al., 2015)	Sociology/ Telecommunications Engineering	Gamified 2 courses using a rewarding system			A		131	Quantitative	Yes	Students perceived more motivation in the gamified group.	-	-
28	(Basal & Kaynak, 2020)	Education Sciences	Included badges in a pre-service teacher training degree			A		79	Mixed	No	Students reported positive feelings towards earning badges, increasing motivation and participation. To avoid an exclusive badge system, different student profiles should be considered in the reward design in order to allow all the students to get some kind of recognition.	-	-
29	(Betts, Bal, Jay, Alan (2013)	Business and Management	Gamified a Management course on an online collaborative learning platform where students could share comments and get XP points			A		33	Quantitative	No	Experience points triggered student participation	Although higher participation levels can increase academic grades, no direct correlation can be generated. Authors recommend using the results with caution, especially when focusing on the final quality of students' work.	-
30	(Çakıroğlu et al., 2017)	ICT	Gamifying an ICT course including mainly points and rewards			A		37	Mixed	No	Points generally engaged the students in putting more effort in completing the learning tasks.	Positive effects on engagement might indirectly have increased academic achievement	-
31	(Caton & Greenhill, 2014)	Computer Science	Gamified a Computer science course using rewards and penalties			A		140	Quantitative	Yes	Students attended more classes and put more effort in their projects as well as in teamwork interactions.	A positive correlation was found between student engagement in the gamified course and their learning achievement	-
32	(Daubenfeld & Zenker, 2015)	Physical chemistry	Gamified a Chemistry course using a rewarding system			A		30	Mixed	Yes	Students showed higher levels of motivation compared to previous years.	Failure seemed lower in the gamified course, but no clear correlation could be set with gamification elements.	-
33	(Delello et al., 2018)	Education, Engineering, Human resource development, and Nursing	Included badges in different undergraduate courses			A		90	Mixed	No	Most students appreciated getting badges as an extra recognition for their effort. However, they did not see badges as the main drivers of their motivation to learn. Academic grades or content learned were seen as more important factors. Results suggest that badges would gain motivational influence if they are integrated in the assessment system.	-	-
34	(Denny, 2013)	Medicine	Gamified an online learning tool in a course on the Impact of disease in populations			A		1031	Quantitative	Yes	Most students were motivated by badges since they showed more active participation and posts on the platform.	-	-

35	(Figueiredo & Garcia-Penalvo, 2020)	Computer Science	Gamified a computer science course using rewarding system (points, badges)			A		154	Mixed	Yes	Students showed more engagement in the course and performed more evaluation tasks.	-	Low achieving students can feel stressed to be left behind
36	(Goelhe, 2013)	Mathematics	Gamified a Mathematics course using an achievement system with points and badges			A		60	Mixed	No	Most students enjoyed obtaining achievements as a recognition of their completed tasks and engaged them to get better scores.	Inconclusive evidence since the study did not include a control group	-
37	(Haaranen et al., 2014)	Computer Science	Gamified a course in Computer science including badges aligned with students' grades			A		162	Mixed	No	Badges were found to be effective in stimulating students' participation in the course. Badges should be fun and bonded to students' interests. For students who are not motivated by badges, an opt-out option should always be available.	-	-
38	(Hakulinen & Auvinen, 2014)	Computer Science	Added achievement badges to an online learning environment used in a Data Structures and Algorithms course			A		278	Quantitative	No	Students with higher mastery-intrinsic, mastery-extrinsic orientation, and lower avoidance-orientation show more motivation produced by badges	-	-
39	(Hakulinen et al., 2015)	Computer Science	Added achievement badges to an online learning environment used in a Data Structures and Algorithms course			A		281	Quantitative	Yes	Achievement badges seem to be a promising method to motivate students and to encourage desired study practices.	-	-
40	(Hasegawa et al. 2015)	SLA	Used a gamified app to learn English vocabulary			A		53	Quantitative	No	Displaying points in a clear and visual way engages students as they can clearly check their progress on the skills and effort. This may also encourage students to persist in their learning to improve their results.	-	-
41	(Huang & Hew, 2018)	Library and Information Management	Gamified a statistic course including points and badges			A		80	Quantitative	Yes	External rewards such as points and badges provide valuable feedback to students to set higher goals and complete more tasks. The recognition for their efforts, made students choose challenges with higher difficulty and put more effort in out-of-class learning tasks.	-	-
42	(Ibañez et al., 2014)	Computer Science	Gamified a Computer programming course including basic gamification elements (social feedback, leaderboard, badges)			A		22	Mixed	No	Collecting badges was the most effective driver of participation.	-	-
43	(Osipovskaya &	Public relations	Gamified 2 Public relations courses including rewarding systems (badges)			A		64	Mixed	Yes	Students prefered badges compared to other elements and showed more engagement in the course in terms of	Higher grades we found by the end of the course in the treatment group	-

	Miakotnikova, 2019)										participation in learning activities and attendance		
44	(Pinter et al., 2020)	Computer Science	Gamified 2 computer science courses using points and badges			A		570	Quantitative	Yes	As an effect of the leaderboard, students were more motivated to attend the classes	-	-
45	(Reid et al., 2015)	English (L1)	Included badges in English course (L1)			A		53	Quantitative	Yes	Badges on their own do not produce significant effects on motivation. However, earning badges produces higher intrinsic motivation only among students with high-expectancy values on their learning.	-	-
46	(Sánchez-Martín et al., 2017)	Education Sciences	Gamified a Science course for student teachers, including a rewarding system based on points			A		33	Quantitative	No	Students showed active participation in the course	A positive correlation was found between student scores in the gamified course and their academic performance	-
47	(Song et al, 2017)	Computer Science	Gamified an Introduction to Computer Science, including points			A		50	Quantitative	No	Points engaged even the shiest students	-	-
48	(Tan & Hew, 2016)	Research methods	Gamified a blended course on Research Methods including PBL			A		22	Mixed	Yes	Rewards engage students in more challenging learning tasks and put more effort in achieving learning goals.	No significant difference on students' conceptual knowledge, however the quality of a practical task was better in the treatment group than in the control group. this suggests that gamification is more efficient for practical than for factual competences.	-
49	(Venter & Swart, 2019)	IT	Gamified an Information Technology course adding a rewarding system in Khan Academy			A		192	Quantitative	No	Rewards were found to be the strongest motivating element in the gamified platform.	-	-
50	(Aldemir et al., 2018)	Education Sciences	Gamified a teacher training course including teams				S	118	Qualitative	No	Students asserted that they would prefer to have competitive challenges between the teams so they can collaborate with teammates.	-	-
51	(Huang & Hew, 2018)	Library and Information Management	Gamified a statistic course including points and badges and peer-interaction				S	80	Quantitative	Yes	Make students provide peer feedback on other posts was seen as an engaging experience	-	-
52	(Ibañez et al., 2014)	Computer Science	Gamified a Computer programming course including basic gamification elements (social feedback, leaderboard, badges)				S	22	Mixed	No	Social activities such as providing peer-feedback on other students' posts seemed to engage learners beyond their academic compulsory tasks.	-	-
53	(Iosup & Epema, 2014)	Computer Science	Gamified a Computing course including including social activities				S	450	Quantitative longitudinal	No	Working in teams engages students in learning from and helping their peers.	Gamification is correlated with an increase in the percentage of passing students	-

54	(Kim, 2015)	Undergraduates/ not specified	Gamified revision tasks to help students prepare their end-of-term exams.				S	52	Quantitative	No	Posting questions to be answered by peers motivated students and made them focus on the task.	-	-
55	(Pirker et al.,2014)	Computer Science	Gamified a computer science course, including teamwork				S	21	Mixed	No	Most students prefer earning rewards by doing tasks in teams.	-	-

Appendix 4: Request message for the gamification design review and feedback from reviewers

Message sent to reviewers:

MOUNTAIN EXPERIENCE

Curs de Moodle Gamificat creat per Nadia Azzouz per a la seva tesi doctoral.

Universitat d'Andorra.

Abans de començar, et donem les gràcies pel teu temps. La teva opinió ens ajudarà molt a millorar el curs i obrir-lo als alumnes aquest proper curs.

Aquí tens unes preguntes per ajudar-te a avaluar el curs, però pots afegir tots els comentaris que creguis necessaris:

1. Has fet alguna part del curs com si fossis un alumne?
2. T'ha resultat dinàmic? (afegeix els comentaris que creguis necessaris)
3. Creus que és motivador per avançar en els temes del curs? (afegeix els comentaris que creguis necessaris)
4. La dinàmica dels premis que es donen t'ha agradat?
5. Què és el que més t'ha agradat? El que menys? Canviaries alguna cosa?
6. Altres comentaris que vulguis fer.

Feedback from reviewers:

- Reviewer 1 (second language teacher)

He accedit a Moodle i a dos shelters- el primer i el quart (?) i he provat els exercicis. M'ha agradat el fil conductor i el disseny del mapa. Es nota que hi ha feina darrera. Veig que hi ha una lògica darrera els premis (grup/individual) que està molt bé.

És difícil saber si serà motivador o no sense estar directament involucrat. Sens dubte una imatge nova ajuda. Per això és una pena que les activitats acabin sent les tradicionals majoritàriament (fill in the blanks, grammar, listening and multiple choice). De fet m'ha cridat l'atenció que al "syllabus" només s'especifiquin temps verbals com a contingut.

Crec que l'explicació dels "challenge" pot millorar si les activitats són només virtuals. Hi ha enunciats que no queden pou clars per novells. En aquest sentit he vist cosetes com les següents:

- Modify Moodle so links open in a new window by default.
- In the google map, all shelters are listed by name by default (on the left-hand side list), so providing the name of the shelter (like in Shelter 1) is a direct link to the place.
- Shelter 1, activity 1- Maybe it would be good to remind the Student that "CTRL + Right click" opens a link in a new window. Copy/paste from that page gave me trouble (it took me longer to copy/paste than to complete the task).
- Shelter 1, activity 3- Revise the instruction "So in this first video, you can ask each other to introduce him/herself."

- Shelter 4 (Ila), activity 2- Instructions for the podcast are unclear. The page is not yet published and it reads shelter 3 (I guess this is work in progress).

Al principi també parla de "physical challenges", però no m'ha semblat llegir cap. Hi haurà punts pels estudiants que pugin a un refugi?

- Reviewer 2 (second language teacher)

1. Has fet alguna part del curs com si fossis un alumne?

Si, la primera activitat (tot i que per alguna raó no he pogut accedir al Text Builder)

2. T'ha resultat dinàmic? (afegeix els comentaris que creguis necessaris)

Força. Com a professor he treballat amb aquest llibre amb alumnes majors de 18 anys i he de reconèixer que algunes activitats es fan "feixugues" per als alumnes. Considero que la forma de plantejar el curs i les activitats poden afegir un extra en la motivació dels alumnes alhora de fer les activitats proposades. Tot i així considero que l'enunciat de la primera tasca hauria de donar més context per afavorir la immersió dels alumnes en les activitats que duran a terme; és a dir en la presentació del curs se'ls hi diu que una companyia de turisme està buscant nou personal i que els hi faran diverses proves; crec que contextualitzar les proves seria interessant. Per exemple la primera activitat podria ser que en una empresa de turisme és important causar una bona primera impressió amb els clients i que per això cal saber presentar-se i aconseguir i obtenir informació (greetings + qüestions) i que per això aquesta setmana se'ls avaluarà en aquest sentit.

3. Creus que és motivador per avançar en els temes del curs? (afegeix els comentaris que creguis necessaris)

Si s'afegeix el context que comento en la resposta anterior i es crea una ambientació adequada crec que els alumnes estaran motivats a continuar amb els reptes setmanals; també considero que la dinàmica dels premis pot afectar a la motivació (com explico en la resposta següent).

4. La dinàmica dels premis que es donen t'ha agradat?

Trobo que els premis segueixen un patró de progressió lineal i no ofereixen cap motivació extra a banda d'anar sumant punts. La recompensa bàsica són les estrelles,

cada tasca completada = 1 estrella (2 si a nivell individual ho has fet molt bé), el següent nivell de recompenses son les medalles que s'aconsegueixen amb 5 estrelles (és a dir, no deixa de ser una representació visual diferent per a la mateixa escala de recompenses), i el següent nivell de recompenses són les súper medalles que s'aconsegueixen amb 2 medalles normals (és a dir cada 10 estrelles).

L'única recompensa que surt d'aquesta progressió lineal és la recompensa final que només és pot aconseguir sent el primer equip en descobrir el missatge secret (que en certa forma bé a ser la culminació de les estrelles i les medalles, ja que s'atorgarà al final de l'activitat segons he entès).

Aquesta estructura dels premis és interessant, i la valoració del progrés en estrelles pot ser interessant, però al final els premis "es simplifiquen" en "fer una tasca = sumar un punt"; per aquesta raó considero que hi podrien haver altres premis que s'aconseguissin d'altres formes; per exemple afegir 3 cintes que s'aconseguissin per demostrar habilitats complementaries en les tasques proposades:

Red Ribbon (Company Improvement): awarded for including captions in your first video

Aquest podria ser un exemple en el que els premis obtinguts afegeixen un grau extra de dificultat o un nou nivell de motivació, permetent a aquells grups que ho decideixin aconseguir més premis (que podrien tenir un valor en estrelles també) a canvi d'un esforç extra.

5. Què és el que més t'ha agradat? El que menys? Canviaries alguna cosa?

L'ús dels refugis i les ubicacions com a punt de partida de les activitats és un element força interessant, tot i que si no es contextualitza de forma adequada (per exemple amb un bon arc narratiu) pot acabar sent repetitiu. Els premis afegeixen un extra en la motivació per fer les activitats però considero que una

progressió lineal basada en punts no ofereix tots els incentius que un sistema de premis més extens pot aportar als alumnes i a les activitats.

6. Altres comentaris que vulguis fer.

Espero que aquest feedback sigui d'utilitat i estic a la vostra disposició per comentar en més profunditat qualsevol aspecte que he mencionat en les meves respostes. guillem.robert@estudiants.urv.cat

- Reviewer 3 (second language teacher)

1. Has fet alguna part del curs com si fossis un alumne?

No, no he fet les activitats, però n'he obert i he mirat tot el curs amb detall.

2. T'ha resultat dinàmic? (afegeix els comentaris que creguis necessaris)

Sí, molt dinàmic. Aquí sota copio un dels documents de Word i en vermell apareixen les meves propostes. Crec que si demanem que entreguin els documents amb un mètode de noms, és més dinàmic perquè els queda més clar què han fet i què no. Inclús es podria afegir una llista amb un Check que vagin marcant conforme entreguin.

3. Creus que és motivador per avançar en els temes del curs? (afegeix els comentaris que creguis necessaris)

Si, és molt motivador. El fet d'escollir els refugis i les muntanyes d'Andorra com a tema de la Gamificació és clau. Proposo afegir un link de la pàgina web de turisme Andorra a cada refugi (on parlen de l'entorn), així no només veuran els exercicis sinó que podran conèixer millor Andorra. La informació hauria d'estar en anglès.

4. La dinàmica dels premis que es donen t'ha agradat?

Imagino com funciona, però no acabo de veure com els donaràs i quin aspecte tenen.

Els premis es veuran al Moodle de cada alumne? Hauries de ser vistosos i a l'inici.

5. Què és el que més t'ha agradat? El que menys? Canviaries alguna cosa?

Necessitaria veure com els dones els premis per poder opinar, i afegiria info en anglès sobre l'entorn del refugi. Però crec que t'ha quedat molt, molt bé.

6. Altres comentaris que vulguis fer.

Ja els he fet tots.

Challenge 1

- **Individual task:**

  Click on the links and complete the grammar exercises. Practise until you get them all right! Then copy your answers in a *PDF* document, call it PDF1-Challenge1_Surname.

  A.https://elt.oup.com/student/englishfile/preint3/grammar/file01/grammar01_a01?cc=global&selLanguage=en

  B.https://elt.oup.com/student/englishfile/preint3/grammar/file01/grammar01_a02?cc=global&selLanguage=en

  C.https://elt.oup.com/student/englishfile/preint3/grammar/file01/grammar01_b01?cc=global&selLanguage=en

  D.https://elt.oup.com/student/englishfile/preint3/grammar/file01/grammar01_b02?cc=global&selLanguage=en

- **Individual task:**

  Complete the Text Builder exercise. Practise until you get it all correct! Then copy your answers in the *PDF* document, call it PDF2-Challenge1_Surname.

  - Click on the link:
  https://elt.oup.com/student/englishfile/preint3/g_ef_pre_builder?cc=global&selLanguage=en

  - Once you are there, read the instructions *How to Play*; then click on *NEXT*; Take out 25 % of the words. Click on *START* and complete the text.

- **Team task: Record a video**

  Tell us about each other. Talk about your partner's...

  - name, nationality, age, family, work/study
  - physical characteristics
  - personality
  - hobbies and interests

  Say your name and surname before you start speaking.

Here's a useful video lesson: https://www.youtube.com/watch?v=x0YQX7qGkQs

Call this video Video-Challenge1_Surname

IMPORTANT: Send the *PDF* documents and the video. After you record your video together, each one of you must save a copy of the file, using the activity number and your name_surname (ex: 1sara_clot). Send the task by Sunday at 23.55h through the "submission point". If you can't send it through the campus, use Wetransfer.com and send it to your teacher's email address.

- Reviewer 4 (young gamer)

1. Has fet alguna part del curs com si fossis un alumne?

Si.

2. T'ha resultat dinàmic? (afegeix els comentaris que creguis necessaris)

Si, m'ha resultat divertit de llegir i sentir.

1. Creus que és motivador per avançar en els temes del curs? (afegeix els comentaris que creguis necessaris)

Es una bona forma de fer que els alumnes desenvolupin el seu coneixement de la llengua anglesa mitjançant una competició, per tant, si.

2. La dinàmica dels premis que es donen t'ha agradat?

Si, la competició es una bona forma de superar-se a un mateix.

3. Què és el que més t'ha agradat? El que menys? Canviaries alguna cosa?

El que més m'ha agradat es el tema de que hagueu ficat un sistema de competició per a que la gent s'entretingui. El que menys m'ha agradat ha estat la forma presentada degut a que no m'agrada (per gustos personals), pero tot i així no canviaria res.

4. Altres comentaris que vulguis fer.

És una molt bona idea i espero que es pugui dur a terme.

Appendix 5: Transcripts

Due to the large size of the documents, all the transcripts are available at the following link:

https://calaix.uda.ad/index.php/s/h1X12y1nbUbuayI

The shared folder includes:

- Students' speeches transcribed processing their speaking audio files through an automatic speech-to-text application (*Listenbycode*). The raw transcribed text was then double checked and corrected by the researcher.

- Students' individual interviews which were manually transcribed.

Appendix 6: Individual results of fluency rates

	Speaking 1 (raw data)								Speaking 1 total rates						Speaking 2 (raw data)								Speaking 2 total rates						Speaking 3 (raw data)								Speaking 3 total rates					
Student code	Time	syllables	OLW	FPPM	SPPM	SPPM min	Words English	Total words	(SPM)	(OLWR)	(FPPM)	(SPPM)	(AR)	(LFR)	Time	syllables	OLW	FPPM	SPPM	SPPM min	Words English	Total words	(SPM)	(OLWR)	(FPPM)	(SPPM)	(AR)	(LFR)	Time	syllables	OLW	FPPM	SPPM	SPPM min	Words English	Total words	(SPM)	(OLWR)	(FPPM)	(SPPM)	(AR)	(LFR)
EGS12	0.42	112	1	2	0	0.000	71	72	266.67	0.01	4.76	0.00	171.43	26	0.57	131	2	2	3	0.041	92	94	229.82	0.02	3.51	5.26	177.56	18	0.45	128	1	1	1	0.009	92	93	284.44	0.01	2.22	2.22	210.84	14
EGS3	1.55	291	1	18	0	0.000	211	212	187.74	0.00	11.61	0.00	136.77	20	1.22	254	0	0	0	0.000	192	192	208.20	0.00	0.00	0.00	157.38	192	1.09	226	2	2	3	0.026	169	171	207.34	0.01	1.83	2.75	160.65	55
EGS4	0.47	161	0	5	0	0.000	119	119	342.55	0.00	10.64	0.00	253.19	31	1.06	181	0	6	0	0.000	140	140	170.75	0.00	5.66	0.00	132.08	43	1.18	256	0	2	1	0.005	209	209	216.95	0.00	1.69	0.85	177.84	27
EGS5	0.46	153	0	1	4	0.027	108	108	332.61	0.00	2.17	8.70	249.19	28	1.19	215	1	4	2	0.023	139	140	180.67	0.01	3.36	1.68	119.97	40	1.12	237	0	1	1	0.009	187	187	211.61	0.00	0.89	0.89	168.27	35
EGS2	0.13	33	2	2	0	0.000	20	22	253.85	0.09	15.38	0.00	169.23	6	1.42	242	2	3	2	0.018	194	196	170.42	0.01	2.11	1.41	139.80	50	0.31	114	0	0	1	0.011	84	84	367.74	0.00	0.00	3.23	280.84	19
CGS1	1.07	186	3	8	4	0.039	136	139	173.83	0.02	7.48	3.74	134.87	16	1.08	234	5	1	0	0.000	165	170	216.67	0.03	0.93	0.00	157.41	112	0.55	214	0	2	0	0.000	159	159	389.09	0.00	3.64	0.00	289.09	38
EGS16	0.45	129	1	0	0	0.000	96	97	286.67	0.01	0.00	0.00	215.56	31	1.15	191	0	0	5	0.048	134	134	166.09	0.00	0.00	4.35	121.60	27	0.54	154	0	0	2	0.014	112	112	285.19	0.00	0.00	3.70	212.77	50
EGS7	0.42	99	0	0	0	0.000	67	67	235.71	0.00	0.00	0.00	159.52	31	0.26	68	2	1	1	0.005	55	57	261.54	0.04	3.85	3.85	223.27	20	0.28	91	0	0	2	0.011	70	70	325.00	0.00	0.00	7.14	260.61	21
EGS15	0.42	150	0	0	1	0.007	109	109	357.14	0.00	0.00	2.38	263.67	35	1.21	187	0	0	2	0.015	149	149	154.55	0.00	0.00	1.65	124.67	21	1.19	193	2	0	0	0.000	141	143	162.18	0.01	0.00	0.00	120.17	18
CGS5	0.50	144	0	3	1	0.006	104	104	288.00	0.00	6.00	2.00	210.40	17	1.06	175	0	0	0	0.000	142	142	165.09	0.00	0.00	0.00	133.96	142	1.10	203	0	2	0	0.000	157	157	184.55	0.00	1.82	0.00	142.73	44
CGS6	0.55	201	0	8	0	0.000	148	148	365.45	0.00	14.55	0.00	269.09	20	0.25	79	0	0	1	0.005	53	53	316.00	0.00	0.00	4.00	216.41	33	0.12	43	0	0	0	0.000	32	32	358.33	0.00	0.00	0.00	266.67	18
CGS8	0.21	63	1	0	0	0.000	50	51	300.00	0.02	0.00	0.00	242.86	31	0.51	163	0	1	0	0.000	126	126	319.61	0.00	1.96	0.00	247.06	64	0.14	50	0	0	0	0.000	38	38	357.14	0.00	0.00	0.00	271.43	19
CGS10	0.55	132	0	12	0	0.000	109	109	240.00	0.00	21.82	0.00	198.18	20	0.40	157	1	0	0	0.000	109	110	392.50	0.01	0.00	0.00	275.00	74	1.17	235	1	5	1	0.015	155	156	200.85	0.01	4.27	0.85	135.06	25
CGS11	2.27	346	3	5	9	0.780	322	325	152.42	0.01	2.20	3.96	218.12	20	0.50	147	1	0	0	0.000	114	115	294.00	0.01	0.00	0.00	230.00	20	1.29	281	0	0	1	0.076	195	195	217.83	0.00	0.00	0.78	160.63	33
CGS13	1.28	261	1	4	1	0.010	186	187	203.91	0.01	3.13	0.78	147.24	40	1.01	227	0	0	0	0.000	173	173	224.75	0.00	0.00	0.00	171.29	55	1.13	232	1	3	0	0.000	167	168	205.31	0.01	2.65	0.00	148.67	27
CGS14	0.45	166	0	4	1	0.006	121	121	368.89	0.00	8.89	2.22	272.34	49	1.48	346	0	1	0	0.000	274	274	233.78	0.00	0.68	0.00	185.14	59	1.33	312	0	12	1	0.005	234	234	234.59	0.00	9.02	0.75	176.59	50
EGS14	0.50	166	1	4	1	0.005	121	122	332.00	0.01	8.00	2.00	246.22	33	0.44	129	3	0	3	0.033	106	109	293.18	0.03	0.00	6.82	267.81	47	0.28	99	1	0	0	0.000	70	71	353.57	0.01	0.00	0.00	253.57	48
CGS15	0.50	184	0	3	1	0.011	115	115	368.00	0.00	6.00	2.00	235.17	14	0.59	142	0	0	0	0.000	113	113	240.68	0.00	0.00	0.00	191.53	67	0.38	155	0	0	0	0.000	110	110	407.89	0.00	0.00	0.00	289.47	72
EGS8	0.47	91	0	0	0	0.000	126	126	193.62	0.00	0.00	0.00	268.09	39	0.42	109	0	1	1	0.006	76	76	259.52	0.00	2.38	2.38	183.53	18	0.46	150	1	0	0	0.000	107	108	326.09	0.01	0.00	0.00	234.78	80
CGS20	1.11	220	3	13	1	0.015	161	164	198.20	0.02	11.71	0.90	149.72	9	0.57	172	2	17	1	0.030	156	158	301.75	0.01	29.82	1.75	292.43	13	0.52	169	0	23	1	0.012	130	130	325.00	0.00	44.23	1.92	255.91	13
EGS10	0.50	135	1	4	0	0.000	98	99	270.00	0.01	8.00	0.00	198.00	22	0.44	142	1	0	0	0.000	107	108	322.73	0.01	0.00	0.00	245.45	49	0.08	19	0	0	0	0.000	15	15	237.50	0.00	0.00	0.00	187.50	8
EGS11	0.53	168	1	2	0	0.000	115	116	316.98	0.01	3.77	0.00	218.87	36	0.58	180	0	0	1	0.010	146	146	310.34	0.00	0.00	1.72	256.14	108	0.19	57	0	0	0	0.000	37	37	300.00	0.00	0.00	0.00	194.74	24
EGS13	1.15	184	0	8	0	0.000	133	133	160.00	0.00	6.96	0.00	115.65	29	0.37	130	0	1	1	0.005	95	95	351.35	0.00	2.70	2.70	260.49	53	1.53	350	0	3	0	0.000	267	267	228.76	0.00	1.96	0.00	174.51	36

Appendix 7: Guiding questions used in the semi-structured interviews

Pre-interview	Post-interview
Warming-up questions: 1. Do you play games? a. Which ones? b. What do you like about games? **Main questions and sub-questions:** 2. How do you feel about learning English? a. What do you use English for? 3. What challenges do you experience in learning English? a. Why? b. Any other difficulty? 4. How do you think these challenges in learning English could be overcome? a. What can be done in the English courses to help students improve that? b. How do you deal with this problem? 5. Do you know what Gamification is? a. What do you think about this technique? b. Have you ever seen Gamification in your studies before? c. Can you imagine Gamification applied at the university? And in English courses? d. How do you think it would affect people like you in learning English?	**Warming-up question:** 1. How did the course go? **Main questions and sub-questions:** 2. How did you feel about the Gamified Moodle? a. Were there any elements/aspects that caught your attention? a. Why? b. Was there any element that made you stick to the course? a. If yes, which one? c. Were there any elements/aspects that you didn't like? a. Anything you would consider totally useless? 3. Do you think you have improved in English after this course? a. In what sense? b. Is there any task you did that specially helped improve your English? c. How do you feel when speaking English now? 4. If you had this course in the future, what would you change? a. What would you add? b. What would you definitely dismiss?

Appendix 8: Consent form for the participant students

UNIVERSITAT D'ANDORRA

Consentiment per al tractament de dades a l'assignatura d'Anglès Preparatori (B1.1) per motius de recerca

Projecte: Efectes de la Gamificació sobre l'ansietat de la llengua estrangera dels estudiants d'anglès i el seu rendiment en la producció oral (Grup de Recerca en Llengües, UdA)

Autoritzo el tractament de les meves dades acadèmiques com a material de recerca del present projecte conduït pel *Grup de Recerca en Llengües* (GREL) de la *Universitat d'Andorra*. El propòsit d'aquest document és especificar els termes de la meva participació com a estudiant en el projecte:

1. He rebut informació suficient sobre aquest projecte de recerca. La meva participació m'ha estat explicada en termes clars i entenedors.
2. La meva participació en el projecte és voluntària. No he rebut cap coerció de cap tipus per participar.
3. La meva participació implica que el GREL faci un seguiment del meu rendiment acadèmic durant tot el curs.
4. Se m'ha confirmat que els investigadors no publicaran les dades personals que es puguin derivar d'aquest recerca en cap plataforma. Per tant, es garanteix la meva confidencialitat com a participant en aquesta estudi. En tots els casos, els usos subseqüents de les dades estaran subjectes a les polítiques d'ús de dades de la Universitat d'Andorra.
5. He llegit i he entès els punts d'aquest document. En cas que tingués preguntes, s'han respost satisfactòriament i accedeixo voluntàriament a participar en aquest estudi.
6. He rebut una còpia d'aquest document de consentiment, signada per la investigadora.
7. Voldria rebre els resultats d'aquest estudi un cop finalitzat: Sí ☐ No☐

Data: 17/09/2018

Investigadora principal
Nom: **Nadia Azzouz**
Signatura:

Participant

Nom:.....
Signatura:

Per a més informació, si us plau contacteu: Nadia Azzouz (nazzouz@uda.ad)

Appendix 9: Request and authorisation to access sensitive data of the UdA's students

Letter sent to the UdA's Academic Board:

Junta Acadèmica

Universitat d'Andorra

Distingits(des) Senyors(res),

Em plau dirigir-me a vostès per sol·licitar els permisos necessaris per dur a terme estudis de recerca del meu doctorat, en els diferents cursos d'anglès que ofereix la Universitat d'Andorra.

L'objectiu de la recerca és explorar l'efecte de les TIC sobre els factors emocionals i els resultats d'aprenentatge de l'anglès.

Aquests estudis tenen com a finalitat recollir les següents dades:

- Nivells d'anglès d'entrada del test Oxford English Testing
- Resultats dels exàmens d'avaluació
- Resultats de qüestionaris (pretest, posttest)
- Resultats d'entrevistes als participants

Abans d'iniciar qualsevol procés de recerca, em comprometo a informar els participants per escrit sobre l'objecte i el procediment dels estudis, així com a respectar la confidencialitat de totes les seves dades.

Agraint-los l'atenció prestada a la meva sol·licitud, resto a la seva disposició per a qualsevol aclariment addicional i aprofito l'avinentesa per a saludar-los molt atentament,

Nadia Azzouz Boudadi

Sant Julià de Lòria, a 13 d'octubre del 2017

Favourable answer:

Request approved by the Academic Board on 12th October 2017:

Dades per a recerca

S'aprova la sol·licitud de la Sra. Nadia Azzouz per recollir dades anònimes dels estudiants de l'UdA amb l'objectiu de realitzar un estudi de recerca en l'àmbit de les TIC i la llengua anglesa.

(Research data

The Academic Board approves the request, submitted by Ms. Nadia Azzouz, to collect UdA students' anonymous data from research studies in the fields of ICT and English.)

The EUROCALL Review, Volume 28, No. 1, March 2020

Effect of Gamification on students' motivation and learning achievement in Second Language Acquisition within higher education: a literature review 2011-2019

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Abstract

This paper focuses on a fairly new motivational technique, the so-called Gamification, which consists of introducing game mechanics in non-game environments to promote motivation and engagement. By the turn of the 21rst century, Gamification took off in the business field and soon after became an attractive concept for researchers and professionals in education as it appears to be an increasingly popular method to motivate learners. Nevertheless, it is still a nascent field in terms of empirical evidence available to firmly support its educational benefits. This paper intends to shed some more light on this topic through a comprehensive review of literature published in the most prominent journals. The present study is framed within the field of Second Language Acquisition (SLA) in higher education and Computer-Assisted Language Learning, and focuses on the effects of gamified learning environments on student's motivation and learning. A Meta-analysis method was used to explore relevant empirical research published between 2011 and 2019. After reviewing a corpus of 68 papers drawn from the leading databases Scopus and Web Of Science, and from which only 15 could be included in the study, we can point out two main findings: (i) there is still very limited literature in the field of SLA and, (ii) results seem to be predominantly positive in terms of motivation and engagement but only a few studies confirm clear interconnections with learning outcomes. The results suggest a lack of solid correlations between Gamification, motivation and cognitive processes.

Keywords: Gamification, Second Language Acquisition (SLA), Computer-Assisted Language Learning (CALL), motivation, learning achievement.

1. Introduction

Due to the fast development of CALL, second language teachers and researchers have to cope with growing pressure to become more technologically oriented, combined with a growing expansion of mobile applications (Godwin-Jones, 2015). With the proliferation of digital gadgets and apps, new sub-fields of study have been developed in CALL such as Gamification, a fairly recent pedagogical technique that seems to enhance motivation in learning among both digital natives and digital immigrants. In the last few years, digital tools for educational purposes have also proliferated both in formal and non-formal education to engage and motivate students in learning (Quest2Learn, Lego education, Kahoot, Minecraft Education, etc.). As a reflection of the proliferation of games in education, they have been incorporated in a wide range of subjects (Domínguez et al., 2013; Sheldon, 2012).

In language learning, we can also find a considerable number of apps which include game elements and help people improve different language skills (Babbel, Duolingo, Busuu, Memrise, to name a few). Their motivational factor can be linked to what several authors addressed as an essential key to succeed in SLA (Dörnyei & Ryan, 2015; Gardner & Lambert, 1972; MacIntyre, 2002). Considering that game-like activities in education seem to help keep students engaged and motivated in learning tasks, it is no wonder that Gamification has become highly appealing to second language teachers.

2. Research questions

Although noted scholars suggest that gamified environments are powerful settings to boost motivation in learning, their cognitive impact has not been sufficiently supported empirically (Dicheva, et al., 2015; Domínguez et al., 2013; Plass, Homer, & Kinzer, 2015). Thus, our work is aimed at answering the following research questions (RQ), within the frame of CALL:

- **RQ1**: What literature has been produced recently on the effect of Gamification on L2 students' motivation or engagement?
- **RQ2:** What literature has been produced recently on the effect of Gamification on second language learning achievement?
- **RQ3:** Are there any significant results to support the benefits of Gamification on both motivation or engagement and second language learning achievement?

3. Theoretical framework

Although the overall framework of this research is Second Language Acquisition (SLA), we will focus on CALL, which can be considered its technological subfield (Chapelle, 2003). CALL is a relatively young research field and has been frequently re-defined as technology evolves (Beatty, 2013). Chapelle (2009, 2016) and Hubbard (2008) suggest that CALL, combined with the appropriate SLA approaches, provides so many opportunities for language learning that it is undoubtedly enriching for educators who exploit them in their teaching settings. Besides its benefits on students' motivation and engagement, CALL also provides high-quality and authentic linguistic materials, immediate and individualized feedback (Li, 2016).

In education, Gamification would be under the theoretical umbrella of CALL and seems to be worth exploring as an offshoot of Game-Based Learning (GBL). Although Gamification and GBL are two close concepts, some confusion still exists regarding their functioning. While GBL is the use of actual games to achieve educational goals, Gamification would be narrowed to the use of some game design elements (Deterding, et al., 2011) to promote engagement and motivation in any context, whether it's an educational setting or not. Werbach and Hunter (2012) defined it as the use of game design techniques in non-game contexts and added: "basically, any task, assignment, process or theoretical context can be gamified". Within gamification-related concepts in education and professional training, the term Serious Games can also cause some confusion. It is another sub-technique deriving from GBL, but it should also be differentiated from Gamification, since it consists of actual digital games made for purposes other than entertainment, for instance education (Classcraft [1]), corporate training (Business Battle [2]) or institutional instruction (Strike Group Defender [3]).

4. Motivational drives in gamification

Werbach and Hunter (2012b) proposed a framework showing how motivation is triggered by Gamification in three different levels, which they named 'elements': *Dynamics* are produced by *Mechanics* that are in turn generated by *Components*. The following figure shows the description and examples of each one of them in an abstraction hierarchy:

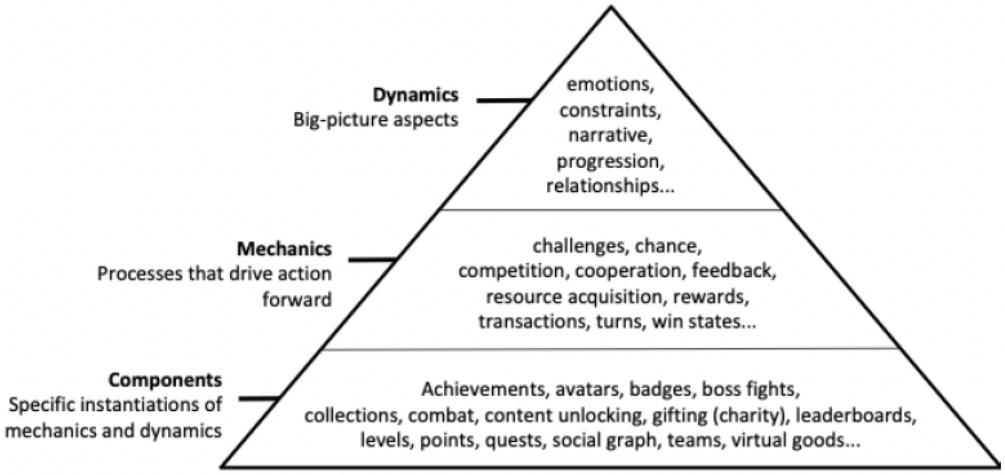

Figure 1. Game elements pyramid from Werbach and Hunter (2012) in For the Win.

Most gamification systems use reinforcement elements (points, levels, badges, leaderboards, etc.) to promote engagement and motivation in users (Subhash & Cudney, 2018; Dicheva et al., 2015). In this sense, the system follows a behaviourist approach, since it impinges on people's behaviour through rewards, reinforcement and immediate feedback at the right time, just like in a Programmed Instruction (Skinner, 1958) aimed at enhancing second language learning.

In their Self-Determination Theory (SDT), Deci and Ryan (2010) defined the most basic distinction between intrinsic motivation, which leads to an action for the sake of enjoyment and interest, and extrinsic motivation, which encourages actions towards external rewards. According to the SDT, human beings show innate needs for *Autonomy*, which relates to self-regulated behaviours; *Competence*, which is the achievement capacity and; *Relatedness*, which involves a feeling of being connected to a community as a safe environment. Following this theory, Marczewski (2019) proposed a framework named RAMP (standing for *Relatedness*, *Autonomy*, *Mastery* and *Purpose*) which integrates the SDT and shows how to motivate different types of players with game elements. Similarly, Zichermann and Cunningham (2011) also described intrinsic motivation drives in gamers, based on Bartle's player types (Bartle, 1996).

Gamification also creates dynamic environments in which people can feel the sense of progress by achieving levels. The idea of progression embeds what Bandura (2012) defined as Self-efficacy in his Social Learning Theory. According to his construct, perceived self-efficacy reflects people's beliefs about their achievement capabilities and consequences of their behaviours. In this sense, positive outcomes such as self-fulfilment and feeling of achievement can boost and sustain intrinsic motivation. The Flow theory also refers to the idea that sustained motivation arises from a balanced relation between a challenge and people's sense of efficacy based on their skills. According to Csikszentmihalyi (1991), people reach the Flow state when they stick to an activity for the sake only of its enjoyment and gratification. This is what Zichermann and Cunningham (2011) refer to as 'engagement loop', a process in which players constantly seek satisfaction through regular rewards. Following this idea, Hamari et al. (2016) explored the correlations between two variables of the Flow theory (challenge and skills), engagement, immersion, and perceived learning. Their study was conducted in engineering disciplines with higher education students and their conclusions showed positive results in perceived learning outcomes, sense of challenge and engagement.

Kapp (2012) states that gamifying activities is a way to incorporate motivating digital game-based learning strategies into the classroom, and provide players (learners) with "the sense of engagement, immediate feedback, feeling of accomplishment, and success of striving against a challenge and overcoming it" (Figueroa Flores, 2015). In order to produce all these motivating

experiences, gamified activities should follow a progressive system with sequenced levels through which players can advance at their own pace.

Along with the spread of Gamification, some researchers also detected little evidence supporting positive effects on both psychological states and cognitive processes, and focussed their work on finding out more about its long-term effects on learning (Dichev & Dicheva, 2017; Hew, et al. 2016; Severengiz, et al., 2018).

5. Methodology

In order to provide clear outcomes, a meta-analysis methodology was used following the six-step review process defined by Rickinson and May (2009): scoping, searching, selecting, analysing, synthesising and reporting.

We first established a strategic search method based on effective scanning of the most relevant literature. The bibliography was retrieved from the two leading international databases: Web of Science and Scopus; the reason for doing this is to ensure high quality standards of the research presented in those articles. We applied a search strategy by introducing different combinations of keywords such as *Gamification, Gamif*, "Second Language" Acquisition, "Foreign language" learning, ESL* or *EFL*. After cross-referencing the publications provided by the two databases, we rejected duplicated results.

The following step consisted of identifying those papers which presented empirical studies. We applied some criteria to eliminate those articles which:

- were only conceptual papers
- were game design/engineering papers
- had the term Gamification mentioned in the text but was not the actual focus of study
- were not conducted with higher education or adult learners
- included participants showing a disability

Table 1. Search procedure and results.

Step	Procedure description	Results from Scopus	Results from WoS
1st	Search using combined Booleans: *gamif*, gamification and «second language", "foreign language", ESL or EFL*	47	50
Papers found		97	
2nd	1st selection excluding duplicates	68	
3rd	Final selection excluding irrelevant literature	15	

Our first search phase provided 97 papers from which we excluded several duplicates. From the remaining articles, we selected the most relevant ones in a second phase. In the third phase, we ended up synthesising and reporting 15 papers, which explored the effects of Gamification on L2 learning. We extracted key content from all the papers and classified it systematically by: authors, date, observed variables, methodology, measuring tools, sample, duration, research questions and results. The following section contains the results obtained after a combined analysis of these key features.

6. Results and discussion

This section aims to answer the three research questions posed in the study:

- RQ1: What literature has been produced recently on the effect of Gamification on L2 students' motivation or engagement?
- RQ2: What literature has been produced recently on the effect of Gamification on second language learning achievement?

All the reviewed studies include experiments, which consist of implementing some self-designed or commercial gamified resource, mainly apps, in second language learning contexts. Practically all of them were conducted with the help of free applications that can be easily accessed or downloaded from the Internet and used whether on a computer or a mobile device. Most experiments incorporated a gamified resource especially created for the study (Berns, et al. & Dodero, 2016; Cardoso, et al. 2017; Liu, et al. 2016; Palomo-Duarte et al., 2016; Perry, 2015), whereas Duolingo and Kahoot were the most popular commercial apps (Bustillo, et al. 2017; Gafni, et al. 2017; Hung, 2017; Iaremenko, 2017; Mateo-Gallego & Ruiz Yepes, 2018; Munday, 2016).

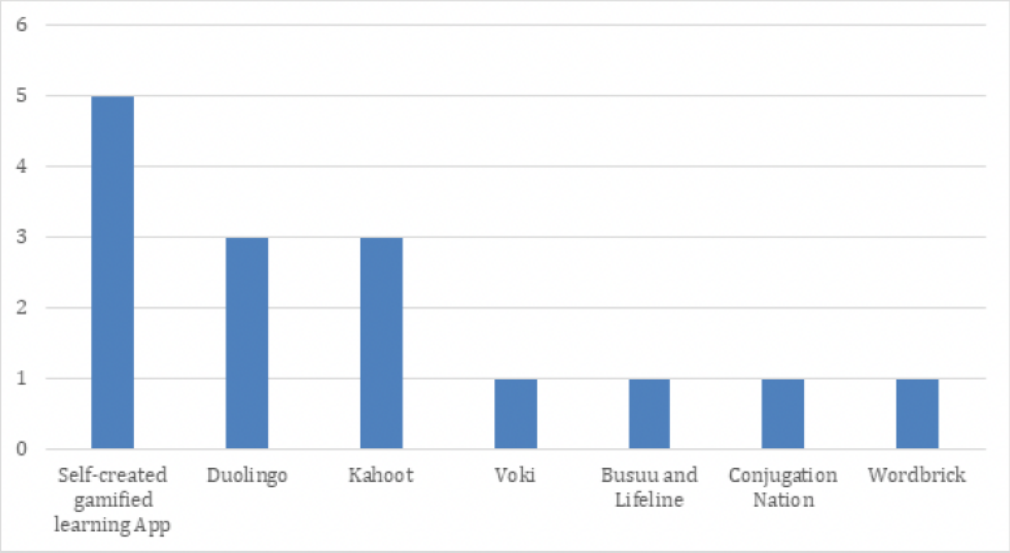

Figure 2. Learning tools used in the studies.

English stands out among the second languages studied. More than half of the studies were performed with students of English (8) and the rest mainly in courses of German (4), Spanish (4), French (3) and Italian (1).

Psycho-behavioural variables seem to be the main focus. This is probably due to the fact that Gamification is often used exactly for that purpose: stimulating psycho-behavioural aspects like motivation and engagement. In fact, almost half of the studies (6) focussed only on psycho-behavioural evidence such as motivation, engagement or attitudes towards the gamified experience (Barcena & Sanfilippo, 2015; Gafni et al., 2017; Iaremenko, 2017; Liu et al., 2016; Munday, 2016; Perry, 2015), five papers were focussed on a combination of psycho-behavioural and cognitive effects (Berns et al., 2016; Bustillo et al., 2017; Castañeda & Cho, 2016; Hung, 2017; Kétyi, 2016) and four were centred just on cognitive results (Cardoso et al., 2017; Mateo-Gallego & Ruiz Yepes, 2018; Palomo-Duarte et al., 2016; Purgina, Mozgovoy, & Blake, 2019).

- RQ3: Are there any significant results to support the benefits of Gamification on both motivation or engagement and second language learning achievement?

From a general point of view, most studies show positive results with a balanced attention on both psycho-behavioural and cognitive variables (11), three are ambiguous and just one showed negative results on learning.

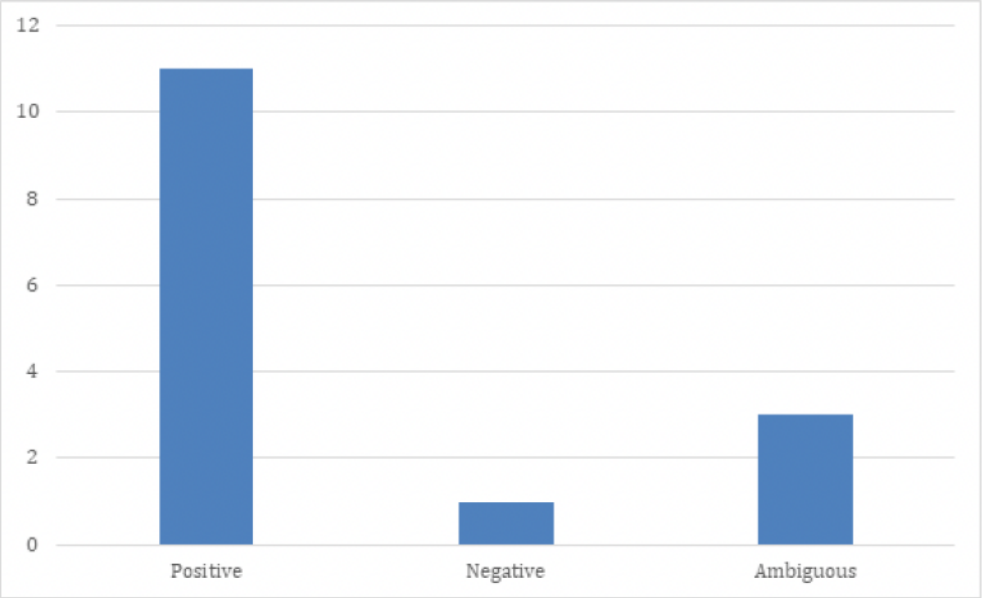

Figure 3. General overview of results.

If we have a closer look at the findings, we can identify different combinations of results but the most common would be centred on: (i) positive results on both learning and students' attitude towards Gamification (Berns et al., 2016; Bustillo et al., 2017; Castañeda & Cho, 2016; Hung, 2017) and (ii) positive results on student engagement (Iaremenko, 2017; Liu et al., 2016; Perry, 2015).

Some researchers reported that participants expressed a sense of challenge and fun using Kahoot (Iaremenko, 2017), and a sense of immersion in an Augmented Reality learning environment (Liu et al., 2016; Perry, 2015). In Perry's study, a self-designed gamified tool (Explorez) was used by students of French at the University of Victoria. Her findings demonstrate that game-based mechanics can be powerful motivators for learners. This author bases her research on a challenging question: *"What if educators could engage learners the way video games engage players?".*

Bustillo et al. (2017) incorporated Duolingo in an A1 course of English and confirmed, on the one hand, a significant improvement in students' listening skills and, on the other hand a positive attitude towards using the app as a learning support. Castañeda and Cho (2016) found that a gamified conjugation app (Conjugation Nation) increased students' confidence while improving their accuracy in conjugating verbs in Spanish as an L2. Their experiment showed a positive attitude of their students towards Gamification, also evidenced in a study conducted by Hung (2017), in which a clicker app (Kahoot) also proved to be beneficial in terms of learning perception. Similarly, Berns et al. (2016) showed positive effects of a gamified tool (VocabTrainerA1) on students' attitudes towards the app. The participants also expressed a high perceived learning by using the gamified learning tool which was in line with positive academic results, specifically in grammar and vocabulary.

Bárcena and Sanfilippo (2015) included avatars in an online Spanish university platform (UNED). In general, their results showed a favourable attitude towards the gamification technique. It made it easier for students to find and learn course-related content online, although a few of them

expressed their rejection as they did not associate "childish" avatars with a formal university learning environment. Gafni et al. (2017) also observed L2 students' positive attitudes towards using Duolingo as a parallel support of their language courses. Although the study was short, students expressed their satisfaction towards the app as a learning enhancer.

Positive benefits on vocabulary acquisition were also evidenced in the study conducted by Palomo-Duarte et al. (2016) who used a self-designed app (Guess it! Guess it!) to gamify an A1 course of German. Positive evidence on learning was also reported by Purgina et al. (2019) who increased grammar achievement by using a gamified digital too (Wordbricks) in an English course.

Kétyi (2016) gamified courses of four different languages using Busuu and Lifeline. After the experiment, the author showed positive results on learning and motivation but could not confirm any correlation between the two variables. Munday (2016) concluded her study with ambiguous results. In fact, students showed a positive attitude towards Duolingo in a basic L2 level (A1) but not in a more advanced level (B2), since they found the app was too limited. Similarly, the study of Mateo-Gallego and Ruiz Yepes (2018) showed inconclusive outcomes when they demonstrated that using Kahoot in an English course helped students decrease their language errors, but did not promote their self-reflection on mistakes.

As the only clearly negative result, Cardoso et al. (2017) demonstrated that using a gamified tool (Prêt à Négocier) in a French course of intermediate level, did not show significant differences on oral skills (comprehensibility and fluency) between a treatment and a control group.

Table 2. Result details.

No. of papers	Authors	Results
4	(Berns et al., 2016), (Bustillo et al., 2017), (Castañeda & Cho, 2016), (Hung, 2017)	Positive both on learning achievement and attitude towards gamification
3	(Iaremenko, 2017), (Liu et al., 2016), (Perry, 2015)	Positive on engagement and motivation
2	(Barcena & Sanfilippo, 2015), (Gafni et al., 2016)	Positive on attitude towards gamification
2	(Palomo-Duarte et al., 2016), (Purgina et al., 2019)	Positive on learning achievement
1	(Kétyi, 2016)	Positive on learning achievement and motivation but with no correlation
1	(Mateo-Gallego & Ruiz Yepes, 2018)	Positive on error correction but negative on students' self-reflections
1	(Munday, 2016)	Positive on attitude towards gamification in level A1 but ambiguous in level B2

No. of papers	Authors	Results
1	(Cardoso et al, 2017)	Negative on learning

Mixed methodologies combining quantitative and qualitative research seemed to be predominant in this research field (Barcena & Sanfilippo, 2015; Berns et al, 2016; Castañeda & Cho, 2016; Hung, 2017; Kétyi, 2016; Mateo-Gallego & Ruiz Yepes, 2018; Munday, 2016; Perry, 2015). There were also a considerable number of researchers who chose purely quantitative methods (Bustillo et al., 2017; Cardoso et al., 2017; Gafni et al, 2016; Iaremenko, 2017; Palomo-Duarte et al., 2016, Purgina et al., 2019), but qualitative research on its own was used in just one study (Liu et al., 2016).

Among those studies including quantitative methodology, five papers (Cardoso et al., 2017; Hung, 2017; Kétyi, 2016; Mateo-Gallego & Ruiz Yepes, 2018; Purgina et al., 2019) out of fourteen included a comparative method using pre- and post-tests with control and experimental groups.

Table 3. Research methodology.

No. of papers	Paper	Methodology	Comparative analysis
8	(Barcena & Sanfilippo, 2015), (Berns et al., 2016), (Castañeda & Cho, 2016), (Hung, 2017), (Kétyi, 2016), (Mateo-Gallego & Ruiz Yepes, 2018), (Munday, 2016), (Perry, 2015)	Quantitative and qualitative	(Hung, 2017), (Kétyi, 2016), (Mateo-Gallego & Ruiz Yepes, 2018)
6	(Bustillo et al., 2017), (Cardoso et al., 2017), (Gafni et al, 2016), (Iaremenko, 2017), (Palomo-Duarte et al., 2016), (Purgina et al., 2019)	Quantitative	(Cardoso et al., 2017), (Purgina et al., 2019)
1	(Liu et al., 2016)	Quantitative	None

The following charts show the duration and the number of participants classified by general criteria. Concerning the duration, we can identify only three studies that covered a course period (four months, sixteen weeks or one semester). The largest number of experiments lasted just one or a few sessions. Three were conducted during two months and two lasted one month.

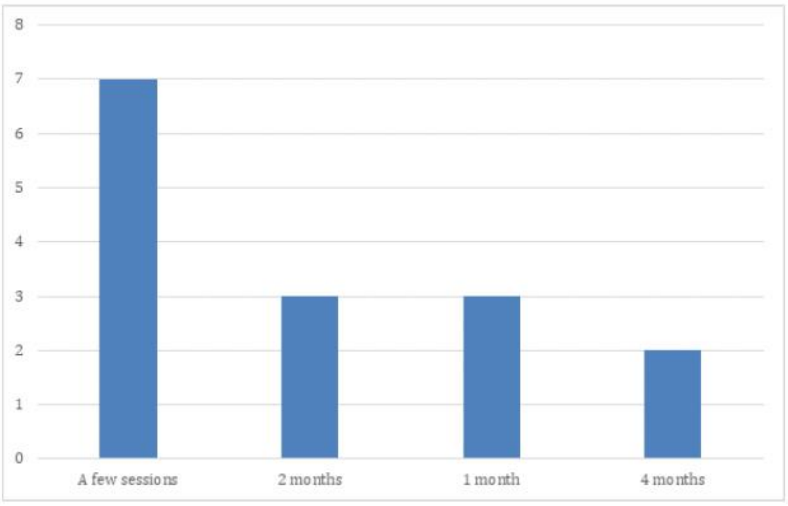

Figure 4. Studies duration.

As for the number of participants, for the sake of simplicity we grouped them in four sizes based on the results: small (3-16), medium (40-94), large (100-120) and very large (273). We can clearly identify a predominant trend in almost half of the experiments (7) which included a considerable number of participants ranging from 40 to 94 students. The smallest range includes four studies with 3 to 12 students. A similar number of papers (3) can be found with 100-120 participants, and the last one is the largest with 273 students involved in the study.

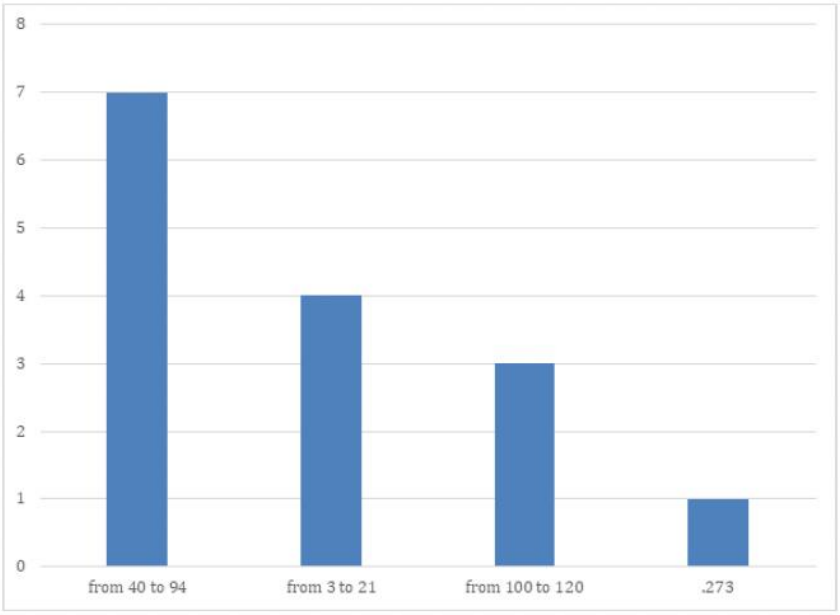

Figure 5. Number of participants in the studies.

After analysing all the papers, we can now recap features from each study that would indicate some kind of limitations from an empirical viewpoint. Besides the very limited number of studies, all of them show some kind of research limitations. Almost 70% of the studies included some quantitative research with no control group. Among all the quantitative studies, 54% lasted less than one month, 31% showed an imbalance between students' gender or between the group

allocation (control vs experimental) and 23% involved small groups of participants. Nonetheless, altogether the reviewed literature provides valuable data to guide researchers and educators keen on using Gamification as a potential booster of second language learning. We hope this paper will spark enough interest among research communities so as to keep on exploring educational benefits of Gamification.

7. Conclusions

Up to now, Gamification has proved to be an efficient technique to boost engagement and motivation but when it comes to education, more research will be needed to provide solid evidence of its benefits both on students' affective states and learning outcomes (Dicheva et al., 2015). The lack of unified discourse among researchers (Hamari, Koivisto, & Sarsa, 2014) shows the need to dig deeper into the effects of Gamification on learning. After a thorough literature search, only a very limited number of papers matched our selection criteria regarding empirical evidence supporting the educational benefits of using Gamification in SLA. This review adds even more weight to the idea that further research should be undertaken to clear up confusing and ambiguous results.

An analysis focused purely on results would show that the use of Gamification with L2 learners is a predominantly positive experience. However, considering the research limitations found in most studies, we should exercise caution, at least until further research has shown clearer results and allows researchers and teachers to reach a general consensus on the role that Gamification should be given in learning contexts.

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Appendix

The complete tables where all the data is displayed can be found clicking on this link: http://eurocall.webs.upv.es/wp-content/uploads/2020/05/Azzouz_Literature_review_tables.pdf

Endnotes

[1] https://www.classcraft.com/

[2] Winner at the 2017 Serious Play Events: https://seriousplayconf.com/2017-serious-play-awards/

[3] MIT news: https://seriousplayconf.com/2017-serious-play-awards/

Metrics report:

Mar Gutiérrez-Colón Plana
RV: ERIC Publisher Report
To: Nadia Azzouz

Benvolguda Nadia,

Com a editora de la revista The EuroCALL Review, t'envio les dades de consultes del teu article.
Salutacions cordials,
Mar

Dr. Mar Gutiérrez-Colón Plana
Associate Editor of The EUROCALL Review

Department of English and German Studies
Universitat Rovira i Virgili

From: eric@ed.gov <eric@ed.gov>
Sent: 02 July 2021 15:09
Subject: ERIC Publisher Report

Institute of Education Sciences

ERIC Metrics Report Generated for: European Association for Computer-Assisted Language Learning (EUROCALL)

This report shows the number of views of the ERIC records for your content and the number of PDF downloads if you permit the full text to display in ERIC. These statistics are for the six-month period from January 1, 2021 to June 30, 2021.
• A view is counted whenever a user accesses the abstract.
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Source Name	All Views	All Downloads	Activity Chart
The EUROCALL Review	1,755	1,618	

Title	URL	Views	Downloads
Comparing Vocabulary Learning of EFL Learners by Using Two Different Strategies: Mobile Learning vs. Flashcards	https://eric.ed.gov/?id=EJ1064983	374	177
Effect of Gamification on Students' Motivation and Learning Achievement in Second Language Acquisition within Higher Education: A Literature Review 2011-2019	https://eric.ed.gov/?id=EJ1257523	227	217
Comparing the Efficacy of Digital Flashcards versus Paper Flashcards to Improve Receptive and Productive L2 Vocabulary	https://eric.ed.gov/?id=EJ1154334	162	103
"Facebook" for Informal Language Learning: Perspectives from Tertiary Language Students	https://eric.ed.gov/?id=EJ1082622	117	51
Why and How Do Distance Learners Use Mobile Devices for Language Learning?	https://eric.ed.gov/?id=EJ1096422	90	39
Smartphone Tapping vs. Handwriting: A Comparison of Writing Medium	https://eric.ed.gov/?id=EJ1257507	72	49
Variations in Motivation, Anxiety and Boredom in Learning English in Second Life	https://eric.ed.gov/?id=EJ1096398	72	37
Digital Flashcard L2 Vocabulary Learning Out-Performs Traditional Flashcards at Lower Proficiency Levels: A Mixed-Methods Study of 139 Japanese University Students	https://eric.ed.gov/?id=EJ1187065	71	50
Podcasting as a Tool to Develop Speaking Skills in the Foreign Language Classroom	https://eric.ed.gov/?id=EJ1257497	59	118
Challenges and Other Feedback: Integrating Intercultural Learning in the Digital Age	https://eric.ed.gov/?id=EJ1257510	38	44