



Gamification, Online Learning and Motivation: A Quantitative and Qualitative Analysis in Higher Education

Milagros Torrado Cespón ^{1*}

 0000-0002-3213-8405

José María Díaz Lage ²

 0000-0003-1865-3168

¹ Universidad Internacional de La Rioja, La Rioja, SPAIN

² Universidad Nacional de Educación a Distancia, Madrid, SPAIN

* Corresponding author: milagros.torrado@unir.net

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ABSTRACT

As a motivational teaching practice, gamification does not always work as expected. This paper supports these findings and adds the factor of online teaching analyzing the results of an experiment carried out in an online higher education context to test the relevance and motivational efficacy of ludic methodologies using learning and knowledge technology. Three groups of students (n=78, n=64, and n=74) participated in gamified experiences in the same subject. These groups were offered different approaches to the experiences, only one of which included a reward. Neither of the gamified experiences was compulsory. The results show how the use of technologies and gamification is not as appealing as it may seem and how other aspects—such as teacher-student relationship and interaction, rewards, and the sense of alienation generated by online teaching—influence student participation. The low rate of participation indicates that teachers must consider not only those students who participate but also those who do not. The main conclusion is that not only the methodology is important, but also the performance and the fact that student-teacher relationship in online education is more demanding, affectively speaking. Thus, those students who were in direct contact with the teacher during the execution of the gamified experience present a higher level of involvement. This is a factor to consider for the motivational needs of online university students where intrinsic and extrinsic motivation and direct interaction play essential roles.

Keywords: gamification, motivation, interaction, higher education, e-learning, alienation

INTRODUCTION

Instructors and learners have come to expect technology to be used in education (Ávila Muñoz & Santos Díaz, 2019; Prensky, 2001) despite the limitations that may derive from a digital divide that affects access to technology as much as knowledge of it and its correct implementation (Cabero & Ruiz Palmero, 2018; Torrado Cespón, 2021; Van Deursen, 2007). Adapting to the demands of current society is essential if education is not to be stranded in outdated methodologies, which would generate a generation divide between instructors and learners (Busquet i Duran et al., 2016; Turner, 2015). The present paper proposes a critical vision of the use of information and communication technology (henceforth ICT) and gamified experiences which took place in the realm of online university education. The online scenario is particularly relevant in this study because motivation and attention are not present at the same level as in face-to-face teaching. Thus, as multitasking is encouraged by digital technologies, more succinct formats are convenient to sustain attention (Baron, 2017; Cilliers, 2017; Firth et al., 2019; Llorca Abad, 2015). However, Baron's (2021) findings show that this also implies a more superficial approach to the material. Following these studies, the following null hypothesis is proposed: "a breakout is not more motivating than a whole semester gamification" by offering

a gamification (semester long) and a breakout (one session). These considerations entail the following research questions:

- In an online course with no face-to-face interaction, to what extent do students participate in an optional short-term or long-term gamification experience?
- Does online teaching prevent deeper involvement due to teacher-student-materials alienation?

In order to articulate this vision, this paper presents the results of an experiment involving three groups of students from the Universidad Internacional de La Rioja who are taking a degree in primary education teaching and specializing in the teaching of English. These students were given the opportunity to participate in a gamified experience designed to promote significant ICT use. The objective of the gamified practices was double: on the one hand, it was intended to provide an entertaining review of thitherto seen course content; on the other, it was designed to provide students with ideas that they could eventually incorporate to their own teaching (Castillo Rodríguez & Torrado Cespón, 2020; Pennucci, 2020). For the authors of the present paper, the objective was to test the relevance and motivational efficiency of ludic methodologies through ICT use in an online higher education context. A comparison between gamification and other methodologies is beyond the scope of this paper.

THEORETICAL FRAMEWORK

ICTs and Motivation

Motivation plays a crucial role in education, and the use of a ludic methodology may reinforce the learner's positive attitude towards the content of any subject (Teixes, 2014). ICT is usually considered an inherently motivating element (Alonso-García et al., 2019; Cox, 2014), but attention must always be paid to the target group and the individual features of its members. The need to personalize education to foster interest amongst learners can benefit from the use of ICT, but it is reasonable to wonder whether this always yields the expected results: an unsuitable use of ICT will lead to failure (Livingstone, 2011).

Following a design model informed by self-determination theory could be a first step towards achieving ICT activities that address intrinsic motivation from the outset. One such model might be METUX, proposed by Peters et al. (2018), which "applies existing evidence to describe and predict the impact of technologies on motivation, engagement and wellbeing, based on psychological needs satisfactions" (p. 6).

ICT use must also pay attention to the two main aspects of motivation: intrinsic and extrinsic motivation (Deci & Ryan, 1985; Dörnyei, 1994, 2004; Ryan & Deci, 2020). Both types are relevant in the classroom, but intrinsic motivation is more productive in the long run because it enables learners to fully involve themselves in the task at hand with no expectation of a reward.

It is also relevant considering that each of those two main types of motivation comprises different subtypes. Following Vallerand et al. (1992), Buckley and Doyle (2014) distinguish three types of intrinsic motivation: intrinsic motivation to know, intrinsic motivation towards accomplishment and intrinsic motivation to experience stimulation. Likewise, but following Deci et al. (2001), they distinguish three types of extrinsic motivation: external regulation, introjected regulation, and identification.

This taxonomy suggests that, since one of the forms of intrinsic motivation is itself oriented towards accomplishment, it will be positively influenced by the promise of a reward. The matter is made more complex because extrinsic motivation implies a reward which can be a personal one. Such a personal reward is often confused with intrinsic motivation, which expects nothing in return. Identified regulation or identification (Deci & Ryan, 1985; Ryan & Deci, 2020) entails that the activity must be seen as valuable. As to introjected regulation (Deci & Ryan, 1985; Ryan & Deci, 2020), it implies that the task is carried out because it is the right thing to do.

This classification of motivation has come under criticism as being needlessly involved: Locke and Schattke (2019), for instance, suggest reducing it to intrinsic motivation, achievement motivation and extrinsic motivation. For the purposes of this paper, however, whilst it is obvious that a task can sometimes be related to different types of motivation, it is believed that instructors ought to design their proposals thinking of learning for learning's sake. Should a reward be derived from a proposal, it must be borne in mind that this

does not depend solely on the instructor's intentions, but also on the specific needs and particular aims of each learner. This is particularly relevant in the context of higher education.

When rewards are offered, intrinsic motivation towards accomplishment and/or extrinsic motivation are fostered. This can yield negative results: the learner may focus exclusively on the reward, or the instructor may not try to design a genuinely attractive task. Furthermore, teachers must consider whether they want to get learners to perform the task, even if it is not attractive to them, or to have them enjoy it. At this point it is salutary to remember that, according to Deci et al. (2001) and Ryan and Deci (2020), extrinsic rewards have a negative effect on intrinsic motivation (see Lei, 2010; Lemos & Verissimo, 2014; see also, for an analysis of the situation in the workplace, Kuvaas et al., 2017). Deci et al.'s (2001) conclusion reinforces a stipulation that must be considered: it is often taken for granted that gamification (including rewards) is unequivocally a source of motivation.

Furthermore, as Deci and Ryan (1985) had already pointed out in their pioneering study, when students learn via intrinsic motivation, they usually understand their successes and failures as sources of information, and not as rewards and penalizations. Hence, a learner who is intrinsically motivated to do a task needs no reward other than learning, since she will be able to interpret her errors as a natural part of the learning process. It has been pointed out that intrinsic motivation does not require rewards (Cameron et al., 2005), even though Mekler et al. (2013, 2017) concluded that rewards do not harm intrinsic motivation.

Motivation in Online Learning

To all the differences in educational needs in the classroom it is important considering the online context in which our experiment took place. The subjects of the experiment are learners whose direct interaction with the instructor is limited to a chat and a forum. If learning is to be considered a motivational element, this type of online learning is not without advantages: learners know they can access course content at will from the beginning of the term.

However, the role of the instructor is different. In this type of learning, the instructor explains the contents of the syllabus and fosters debate, but this can come to be perceived as a mere supplement to information that was already available. The instructor oversees assessment, and she must be satisfied that the learners' tasks pass muster; but, at the same time, she is perceived as somewhat external to the course content (Ma et al., 2015; Mandernach et al., 2018). It can be said that online learning causes a certain alienation from the traditional roles of learners and instructors (Johnson, 2005; Rovai & Wighting, 2005; Symeonides & Childs, 2015; Wei et al., 2012; Zembylas, 2008): this makes learners prefer face-to-face classes regardless of whether they have had experiences with online learning (Tichavsky et al., 2015).

According to Mann (2005), this feeling of alienation is not due to the lack of a sense of belonging to an educational community, but to a communication failure; still, this sense of belonging can be a crucial factor to establish successful communication (Dickey, 2004). Later studies, which were carried out after online learning had become more common, indicate that learners still have this sense of alienation, and they suggest that communication failure is the main culprit (Chyr et al., 2017; Rasheed et al., 2020). Schuman (2021) argues that many of these problems arise from the fact that expectations regarding online learning are not clear: if it is constantly compared to offline learning, which is implicitly taken as a standard, it will often be considered unsuccessful. Ferrer et al. (2022) found that, even though the students' attitude to online learning is likely to always have an impact, the design of online learning programs can have a positive influence on the motivation of students and, hence, on their learning experience. However, the fact remains that online communication does lack stimuli such as eye contact or physical proximity. This lack renders communication more difficult and makes it harder to generate academic relationships with a sense of attachment (Morgan & Tam, 1999; Rasheed et al., 2020).

Garrison et al. (1999) had already pointed out that online learning necessitates a sense of belonging that must be developed in the cognitive, social, and teaching realms. As online learning becomes more and more frequent, the framework that they suggested must be considered, lest the feeling of alienation take over to the detriment of the possible advantages of online learning. A more updated framework for online learning, albeit focusing specifically on virtual instruction offered by face-to-face institutions, has been put forward by García-Peñalvo (2020).

Furthermore, the subjects being adults, they are wholly responsible for the evolution of their learning, even more if they are in an online setting (Manoharan et al., 2022). They are taking a degree because they are interested in doing so, but also because of an extrinsic expectation: the reward of graduating. Learners make decisions concerning the amount of time they must devote to their work (Urban & Jirsáková, 2021) and freely choose whether they perform a task or not, regardless of whether it will have an impact on their grade. In this sense, proposing potentially motivating non-mandatory tasks may not yield the expected results, especially if a reward is not granted (Ortega Arranz et al., 2019).

Gamification, Breakout, and Motivation

The use of gamified practices has increased in the last years due to their motivational nature (Navarro-Mateos et al., 2021). Gamification, defined as “the use of game design elements in non-game contexts” (Deterding et al., 2011, p. 1), has become widespread in the last few years (Parra-González & Segura-Robles, 2019; Teixes, 2014). Games can be motivating and, therefore, the outcomes of proposals based on them are usually expected to be positive for both instructor and learner (Barab et al., 2005; Connolly et al., 2012). However, this is not always the case (Campillo-Ferrer et al., 2020). In their empirical study, Buckley and Doyle (2014) found that the positive effects of gamification are unevenly distributed along the different types of motivation. Thus, positive effects were detected in intrinsic motivation to know, intrinsic motivation to experience stimulation and identification, whilst intrinsic motivation towards accomplishment, external regulation and introjected regulation did not benefit from gamification at all. This suggests that, although the relationship between gamification and intrinsic motivation is of the utmost importance (Hamari et al., 2014; Mollick & Rothbard, 2014), it is far from univocal. In their study, Hanus and Fox (2015) arrived at conclusions that contradict the usual discourse on gamification: intrinsic motivation turned out to be higher in the student group that did not perform gamified tasks.

A further point must be considered: the sense of novelty generated by gamification is transient and the participants’ interest tends to decrease at a very quick pace (Faiella & Ricciardi, 2015). Frequent use of this technique, then, may largely deprive it from its positive impact. In turn, studies that present the outcomes of gamification usually focus on short-length experiences. According to Hamari et al. (2014), likely this circumstance causes a bias in results, so that they appear to be more positive than they would if the experiences had been longer and had gradually lost their novelty appeal. Moreover, attention must be paid to what Rosch and Schwartz (2009) called the “honeymoon effect”, also known as recency effect: the “bias in participant response in overstating the effect of the intervention immediately upon the completion of the program” (p. 181). Results based on the participants’ immediate impressions are likely to feature this bias.

The above seems to intimate that gamification is best applied in a cautious, probably sporadic manner without mistakenly assuming it to be the latest methodological panacea. This is the reason why in the experience described in this paper the breakout was applied during a single session, and one devoted to reviewing previously seen content. This is a common choice when implementing educational escape games (Guckian et al., 2020; Kinio et al., 2021).

To partake of this new approach to teaching, different experiences are often wrongly claimed to be gamification. This is the case of the use of educational breakouts. An educational breakout is a type of micro-gamification where participants must open a lock (real or virtual) by solving riddles, questions or problems related to the subject for which it is suggested (Negre, 2017).

Gamification in a University Context

Motivation in university education has traditionally been held to be the responsibility of the learner, who has finished mandatory education and has freely chosen to take a degree. There are no fundamental reasons to alter this view. Furthermore, gamification does not necessarily generate intrinsic motivation: it gives tasks a ludic veneer, which is different. This ludic character, however, can be genuine or a mere semblance: as Westera (2015) points out, people cannot be made to play: “if we would force them, they would reluctantly represent play by correctly conforming to the game’s rules and taking their turns, but they will not experience play” (p. 6).

In their study on gamification in the workplace, Mollick and Rothbard (2014) coined what they termed “the paradox of mandatory fun” (p. 12): in the last analysis, gamified activities are imposed upon participants. In

the workplace, this imposition comes from the management; in education, it comes from the teaching staff. For these activities to succeed, the subjects who will carry them out must consent to them. According to the conclusions of Mollick and Rothbard (2014), whenever this consent is present the effects of gamification are positive; when such consent does not exist, effects are negative.

This issue must not be overlooked, lest teachers fall into a naïve vision where any gamified activity is assumed to be welcomed by learners whose motivation will automatically improve: “the motivational power of games is often treated as an axiom. But games do not have motivational power per se” (Westera, 2015, p. 5). It seems more likely that learners who are already motivated will welcome gamification and will benefit from it, whilst learners whose motivation is low or non-existent will not improve in this respect. In other words: gamification does not seem to be inherently motivating.

The above does not entail that there is no place for gamification in a university context, if the activities are tailored to the age and the level of the learners so that they do not feel unconcerned. It is of paramount importance to carefully explain the aim and process of the activity, since there cannot be consent if participants do not understand the rules (Mollick & Rothbard, 2014). If this is done correctly, an appropriate choice of tools and a correct presentation of the experience will contribute to a positive reception, as Moreno Fuentes (2019) verified in her implementation of an educational breakout in a university context. It must be nevertheless pointed out that Moreno Fuentes (2019) relied on two factors—face-to-face contact and rewards—which were absent from our experiment.

METHOD

Research Model and Procedure

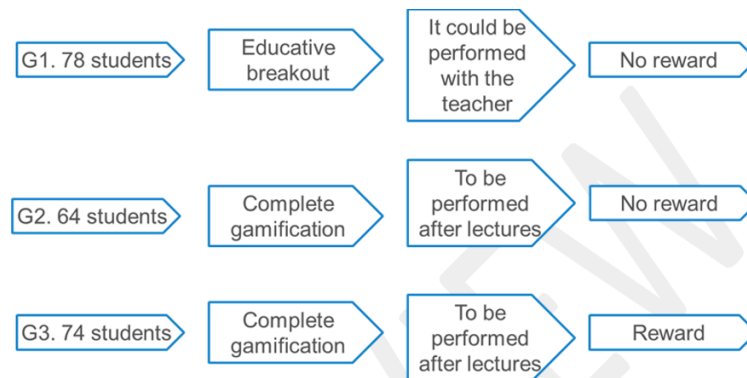
This research was carried out considering quantitative and qualitative models, using experimental research, where three groups took part in different approaches to online gamified practices. These differences allowed this experiment to explore the research questions stated in the introduction above. To fulfil both the desired quantitative and qualitative analysis, the subjects complemented two questionnaires (initial and final) before and after the online gamified experiences offered by the teacher.

All the participants were university students from the subject “advanced didactics of the English language for primary education teaching”, where English is used as a vehicular language. This subject deals with didactic theories and their application to the EFL primary school classroom. The tools used during these gamified experiences were designed to revise content, but also to provide students with tools and ideas which will be suitable for their future teaching practice with primary school students. Consequently, the aesthetics of the gamified experiences are deliberately in accordance with the levels that the students will teach in their professional lives. They were also designed considering Moreno-Ger et al.’s (2008) recommendations and Lazzaro’s keys to unlock emotion (Lazzaro, 2004). The gamified experiences were of two types:

- An educative breakout (<https://bit.ly/3RGCmaV>) about one of the units in the subject, specifically, about teaching the history and culture of the British Isles to primary school students.
 - The teacher presented it during a review session for the students to perform it while she was present, but they also had the possibility of completing it afterwards.
 - This breakout comprised a series of challenges included in a PDF file which contained links to several online tools (**Table 1**).
 - Their mission was to accomplish the tasks and obtain all the words to construct a question.
 - The answer to this question, also related to the contents of the revised unit, would open a padlock.
 - After this, students would send the answer to an email address. The first student to send the email was the winner.
- A complete gamification of the subject (<https://bit.ly/3AY8mBe>).
 - The teacher presented it during a review session and asked the students to perform it during the semester.

Table 1. Tools used for the gamified experiences and their web pages

Tool	Web page
ClassTools	https://www.classtools.net/arcade/
Educaplay	https://es.educaplay.com/
Genial.ly	https://www.genial.ly/
Google forms	https://www.google.com/forms/about/
Jigsawplanet	https://www.jigsawplanet.com/
Kahoot	https://kahoot.com/schools-u/
Learning Paths	https://learningpaths.symboloo.com/
Powtoon	https://www.powtoon.com/
Wordwall	https://wordwall.net/

**Figure 1.** Group distribution and type of gamified practice performed

- This gamification was placed in its own web page created by the teacher. It comprised five challenges which included several questions embedded in different ICT tools (Table 1). Access to each challenge was only granted if the student was able to complete the previous one successfully. Moreover, challenges 2, 3, and 4 required a small task related to the contents revised in each group of units. Students had to send this task to the teacher via email. Then, the teacher would give them the key code to enter the following challenge.
- Each challenge was available only after the contents of the units were revised during lectures.

Research Context and Sample

A total of 216 online university students divided into three different groups were the target of this experimental research. Each group belonged to a different academic year, so that this experiment was conducted over three academic years (2018-2019, 2019-2020, and 2020-2021).

The groups had the following characteristics (see Figure 1 as a summary):

- **Group 1 (G1):** During the academic year 2018-2019, a group of 78 students was offered an educative breakout about the unit on the history and culture of the British Isles during a live session. To promote intrinsic motivation, no reward was offered. This breakout included a satisfaction questionnaire at the end.
- **Group 2 (G2):** During the academic year 2019-2020, a group of 64 students was offered a complete gamification of the subject. To promote intrinsic motivation, no reward was offered, and no competition was established, so it did not matter who was the first to complete the tasks. This gamification also included a satisfaction questionnaire at the end.
- **Group 3 (G3):** During the academic year 2020-2021, a group of 74 students was offered the same gamified experience as group 2 and following the same methodology in its presentation and performance. However, in this case, the teacher offered them a reward: one of the questions that would feature in the exam. This gamification also included a satisfaction questionnaire at the end.

Before the implementation of the gamified practices, students completed a questionnaire using Google Forms to provide data about their backgrounds and their knowledge about gamified practices.

Table 2. Age groups of participants when the last experiment was accomplished in 2021. Generation division according to Dimock (2019)

Groups	Age			
	18-25	26-35	36-45	46-55
1	16.7%	56.4%	21.2%	5.7%
2	14.8%	58.1%	22.4%	4.7%
3	12.7%	62.7%	20.8%	3.6%

Table 3. Students' previous experience on gamified experiences

Groups	Do you know what an educative breakout or gamification is?	Have you ever participated in an educative breakout or gamification?
	1	24.5%
2	23.2%	14.7%
3	21.6%	13.8%
Mean	23.1%	14.6%

Concerning age, these students belong to four age groups, generation Y (26-35 group) being the most numerous in all of them (Table 2).

Regarding previous use of gamified experiences, all three groups showed little experience of similar practices (Table 3). Consequently, their experience and knowledge on the topic does not affect the levels of participation as it is similar in the three groups.

After each group had performed their correspondent gamified experiences, they were asked to complete a satisfaction questionnaire outside lecture hours. In the case of group 1, the teacher offered it to the participants after the accomplishment of the breakout. In G2 and G3, it was embedded in the gamification itself, so filling it in was compulsory to finish the last part of the gamified experience. This questionnaire included questions related to their appreciation of the experience, the need for a prize in this type of the activities and the possibility of using something similar with their students in the future. Additionally, it also included an open question about their sensations during the gamified practice and their views on online teaching. These answers were analyzed regarding their main topic and classified accordingly to proceed to their qualitative analysis.

Instruments Used and Their Validation

The initial questionnaire was designed to provide the instructor with a general overview of the subjects, including demographic data (Table 2) and yes/no questions (Table 3). The final questionnaire was designed to collect both quantitative and qualitative data. To do so, the first part dealt with questions about the gamified practices and their possible application to their future teaching practice. A second part included a free space for reflections about the online experience taking these questions as a starting point: "Do you consider you would have acted differently if this were not online teaching? Does online teaching make you face tasks in a different way? Why?"

These questionnaires were validated by ten experts on education who participated in the project (name to be included after revision).

Data Analysis

Although the initial questionnaire provided information about the participants' previous experience on gamified practices, the final questionnaire is the one which answers the research questions of this study. This questionnaire was designed following a mixed-method approach to offer a better analysis of the experiment (Creswell & Plano Clark, 2018).

The quantitative analysis in the next section was made considering the final questionnaire. This included:

- A dichotomous yes/no question: Have you enjoyed the experience?
- Likert scale question: a four-scale question (totally disagree, disagree, agree, totally agree) to indicate their degree of satisfaction regarding four items: "it was difficult to follow", "it helps in the review of concepts learnt in class", "with this method I think I learn more and better than with traditional individual tests", and "I feel more relaxed with it than with another type of tests".

Table 4. Percentage of participants who finished the gamified experiences

Group	Students' participation
G1	75.64% (n=59)
G2	1.57% (n=1)
G3	40.55% (n=30)

Table 5. Percentage of participants in each challenge

	Challenge 1	Challenge 2	Challenge 3	Challenge 4	Challenge 5
G2	25.00% (n=16)	25.00% (n=16)	3.12% (n=2)	1.51% (n=1)	1.57% (n=1)
G3	98.65% (n=73)	81.09% (n=60)	40.54% (n=30)	40.54% (n=30)	40.54% (n=30)

- Multiple choice questions: two questions which only appear in the G3 questionnaire, as it was the only one which included a reward.
 - Would you have participated without a prize?
 - Would you feel this has been a waste of time if there was not any prize finally?
- A dichotomous yes/no question which only appears in G1 questionnaire: "Do you think you should have received a prize after the breakout?"

The qualitative analysis' data were provided by directed open-ended questions at the end of the questionnaire: "Do you consider you would have acted differently if this were not online teaching? Does online teaching make you face tasks in a different way? Why?". The answers were analyzed considering keywords to conform thematic groups (Hsieh & Shannon, 2005). To do so, each student was assigned a number and each answer was compiled to be later analyzed using AntConc 4.0 (concordance and text analysis tool) to find those keywords.

All the participants in this research were asked to participate freely and express their consent for doing so. It was not made compulsory; declining to participate entailed no disfavor of any kind.

RESULTS

In general terms, the three gamified experiences were well received by the students when presented during the revision sessions, with most of them expressing their gratitude for creating a different way of teaching and revising contents. However, most students did not reach the final part of the gamified experience (Table 4).

Even though not all students finished the complete gamification, most of them accomplished some parts (Table 5).

Final Questionnaire: Quantitative Analysis

The first question "Have you enjoyed the experience?" received 100% of affirmative answers.

The second question used a Likert scale to measure the participants' perceptions about the gamified practice (Figure 2). The items were "it was difficult to follow", "it helps in the review of concepts learnt in class", "with this method I think I learn more and better than with traditional individual tests", and "I feel more relaxed with it than with another type of tests". Each level was given a number, 4 to 1, 4 being "totally agree" and 1 "totally disagree". Note that the first item is to be considered as negative, so the desirable result is "disagree" or "totally disagree".

In the case of G1, only 14 students completed the satisfaction questionnaire. It is important to note that G1 did not access the questionnaire during lecture hours, and it was neither part of the breakout nor part of a lecture. Therefore, only those willing to complete the form did so. On the other hand, as the questionnaire was part of the gamification for G2 and G3, they had to complete it to finish the last challenge. The results of the satisfaction questionnaire provide both quantitative and qualitative data which must be analyzed separately. As only one of the participants in G2 completed the satisfaction questionnaire, that result is not considered relevant and, therefore, it is not included in the following tables.

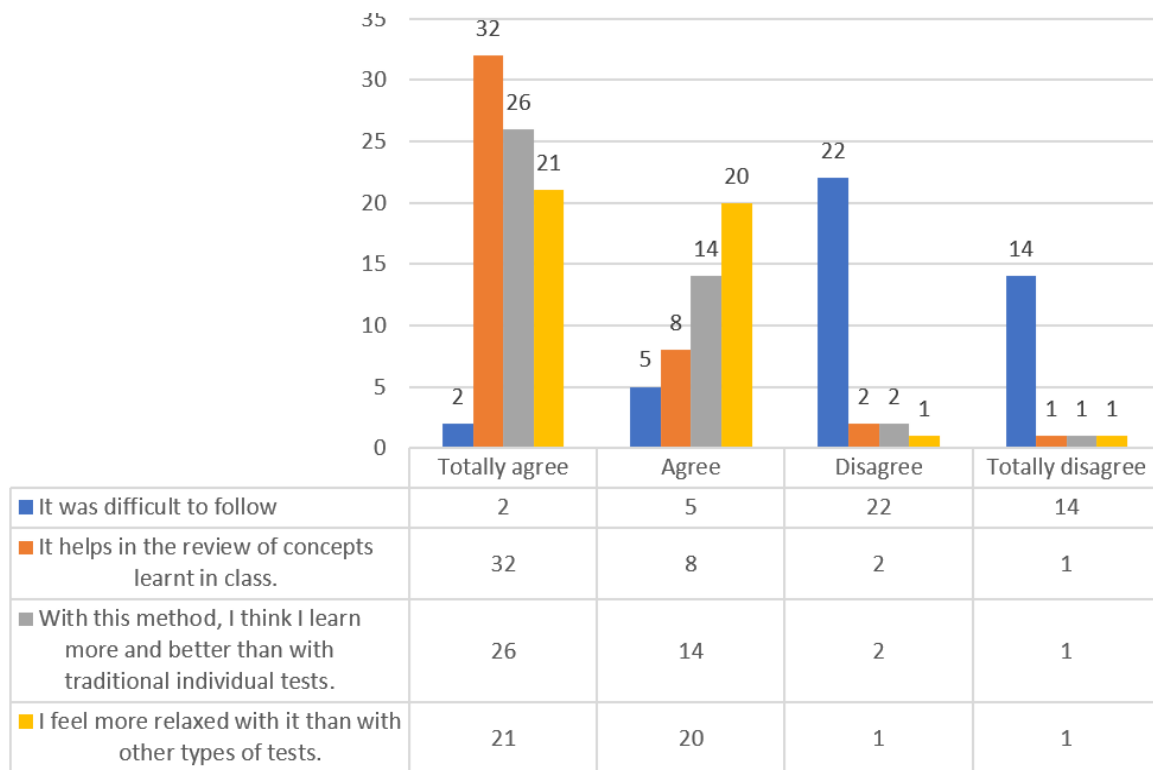


Figure 2. Students' perceptions (n=43)

Table 6. Satisfaction and attitude towards the gamified experiences ranges using U Mann-Whitney

	Group	N	Average range	Range sum
It was difficult to follow.	G1	14	21.79	305.00
	G3	29	22.10	641.00
	Total	43		
It helps in the review of concepts learnt in class.	G1	14	19.64	275.00
	G3	29	23.14	671.00
	Total	43		
With this method, I think I learn more and better than with traditional individual tests.	G1	14	19.93	279.00
	G3	29	23.00	667.00
	Total	43		
I feel more relaxed with it than with other types of tests.	G1	14	19.82	277.50
	G3	29	23.05	668.50
	Total	43		

The Likert scales question described before show the level of satisfaction of both G1 and G3. The results were analyzed first using U Mann-Whitney test to obtain the ranges (Table 6) and later, these data were used to compare the significance of both groups (Table 7).

Considering these results and the research questions in this experiment, the null hypothesis "a breakout is not more motivating than a whole semester gamification" was proposed. To check this, non-parametric tests were applied to the results (Table 6), which supported the null hypothesis as the difference is not significant in any of the items included (see asymptotic significance being clearly >0.05 , Table 7).

The final questionnaire also dealt with the use of rewards in the actual gamified experiences. The questionnaire in G1 included the question "Do you think you should have received a prize after the breakout?". Only 2 participants answered affirmatively. In another part of the questionnaire, they explained why. Both participants agreed on the need for a symbolic prize, such as teacher recognition.

The section about rewards in the questionnaire for G3 was more elaborate and included two multiple choice questions. So, when asked if they would have participated without a prize, 13 out of 29 (44.82%) said "yes", 3 (10.34%) said "no" and 13 (44.82%) said "not sure".

Table 7. Non-parametric tests prove null hypothesis: A breakout is not more motivating than a whole semester gamification

	Test statistics ^a			
	It was difficult to follow.	It helps in the review of concepts learnt in class.	With this method, I think I learn more & better than with traditional individual tests.	I feel more relaxed with it than with other types of tests.
Mann-Whitney U	200.000	170.000	174.000	172.500
Wilcoxon W	305.000	275.000	279.000	277.500
Z	-.085	-1.121	-.871	-.893
Asymp. Sig. (2-tailed)	.933	.262	.384	.372

Note. ^aGrouping variable: Group (G1, G3)

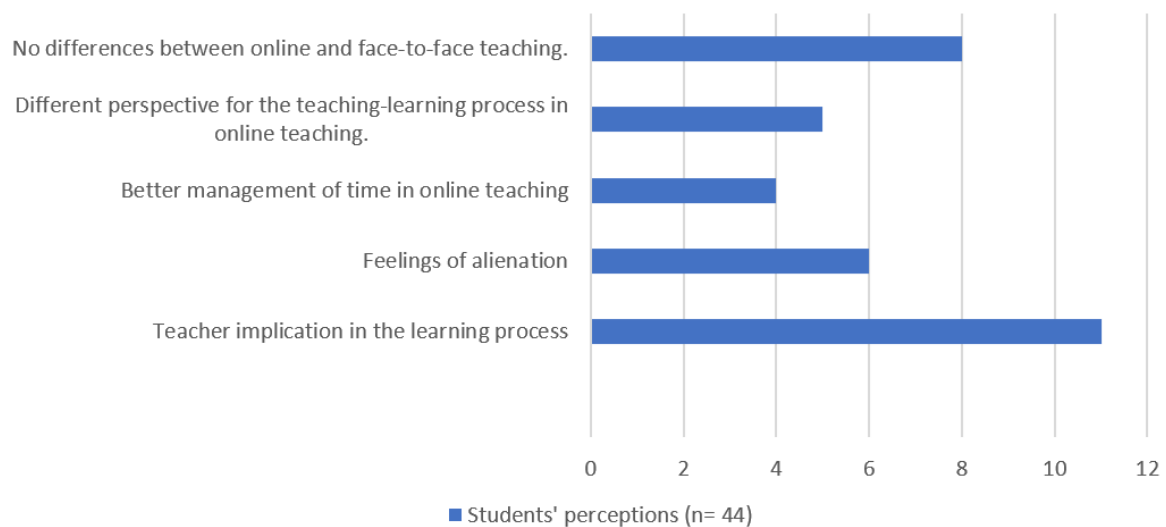


Figure 3. Students' perceptions (n= 44)

Final Questionnaire: Qualitative Analysis

A final part of the questionnaire included a space where students could reflect on the gamified experiences and online instruction. The data provided by the 44 (G1, 14; G2, 1; G3, 29) students who sent feedback are useful for analyzing the results qualitatively. Apart from explicitly thanking the teacher for her involvement in the gamified experiences (around 61% of participants), the other comments were related to the differences perceived between online and face-to-face teaching. These comments were codified using keywords related to the main aspects revised in the literature review regarding online versus face-to-face learning: alienation, time management, teacher's role/implication, differences between online and face-to-face teaching. Answers appear divided into five blocks (**Figure 3**).

These are some examples of students' opinions (students' comments have not been corrected or modified. Bold type added for emphasis):

- G3-1. Maybe if we had **face to face classes**, we, students, would have **more opportunities to discuss** and share our thoughts about the different tasks that you, teachers, present to us. Online studying gets a bit lonely sometimes. I understand we have the forums to discuss ideas, but they are too "formal".
- G3-16. I agree when it is said that online teaching develop other skills in students because you need to know how to use technology, but **interaction and relationships** are unforgettable during studies ages.
- G3-13. I think that **on-line learning is more difficult on the teachers' position**, as they need to make an extra effort to create a good environment in the classroom, which is easier to get in a traditional way because of the direct contact.

DISCUSSION

The research questions “In an online course with no face-to-face interaction, to what extent do students participate in an optional short-term or long-term gamification experience?” and “Does online teaching prevent deeper involvement due to teacher-student-materials alienation?” are answered together considering the results above. Most participants in G1 accomplished the breakout with the teacher, whilst the others completed it afterwards. Working with them during the breakout was a way of solving the difficulties they found in some tasks, mainly because of their lack of competence in ICT, thus supporting König et al. (2020). In this case, students perceived the teacher as a specialist in ICT, which gave her a double role as instructor and as a figure of attachment (Garrison et al., 2000). In that sense, accompaniment by the teacher seems to have had a direct, positive influence on student engagement. In the case of G2 and G3, the teacher did not accompany the students whilst doing the challenges, although she reminded them, from time to time, to start the next level. She presented the gamification during a revision session, so they could look at it and start it at that moment. The follow-up of their progress was easy because they had to use either a Google questionnaire at the end of challenge 1 or send an email to the teacher at the end of the other challenges. As stated in [Table 4](#), not all participants finished the complete gamification, but most of them accomplished some parts ([Table 5](#)).

The third challenge was a turning point for most students. Whereas in G2 the participation rate was not high (25%, see [Table 4](#)) from the beginning, in the case of G3 this challenge entailed a drastic reduction of the number of participants since the gamification started. However, in absolute numbers, the decrease in participation was higher in the case of G2, as it involved as much as 90% in relation to challenge 1. The problem here seems to be the challenge itself, as it was the first which required emailing a small task to the teacher. In this case, students had to send a short proposal for a listening activity to be used in the EFL primary school classroom. Having to send an email seems to have been a significant drawback for the participants. The following challenges also implied sending small tasks by email to get access to the next challenge and the number of participants remained stable in the case of G3, but it was reduced by half in the case of G2.

As these students disappeared from the gamified experience and did not leave their opinions in the satisfaction questionnaire, it is not possible to know what went wrong for them. Their relinquishment seems congruous with Faiella and Ricciardi's (2015) research and Rosch and Schwartz's (2009) concept of the “Honeymoon effect”. The initial enthusiasm shown by students during virtual sessions decreased substantially when they had to face the tasks after the gamified experience had been presented and a certain period of time had elapsed. The motivation that gamification might inherently possess seems not to be enough to maintain engagement.

Even though factors such as the lack of time come to mind, attention must be paid to the concept of alienation as a type of comfort zone. That is: online teaching provides a privacy shelter which must not be perceived as a necessarily negative factor. Even though Garrison et al. (1999) considered the need for a sense of belonging, direct contact with the teacher can be left out as the teacher is not actually perceived as a colleague, but as someone who is academically and hierarchically above students, as happens also in face-to-face teaching. Although further research on the topic is needed, there may exist a voluntary alienation in computer-mediated communication and online teaching.

The inclusion of a reward plays an important role in participant numbers. However, the inclusion of a reward did not imply a significant rise in participation, showing how other factors (the teacher's presence and direct interaction) are far more relevant in the involvement of students. As the level of demand increases (sending a task from challenge 2 onwards) the perceived value of the reward decreases.

As stated above, the instructor asked the students to fill in a satisfaction questionnaire. In the case of G1, only 14 participants completed it. G1 did not access the questionnaire during lecture hours, and it was neither part of the breakout nor part of a lecture. Therefore, only those students truly willing to complete the form did so. This also supports the idea of the need for face-to-face interaction to promote participation in non-compulsory activities (Chyr et al., 2017; Rasheed et al., 2020). On the other hand, as the questionnaire was part of the gamification for G2 and G3: they had to complete it to finish the last challenge.

The answers to the questionnaire show that the participants enjoyed the experience and perceived it as valuable and useful for learning purposes. From the point of view of the instructor, this fulfils the objective of the gamification. However, the students who responded were only those who had accomplished the gamification. It is worth wondering whether the gamification was interesting to the members of the group who did not participate. Unfortunately, that question cannot be answered and, again, attention should be paid to the studies of Faiella and Ricciardi (2015) and Rosch and Schwartz (2009), as pointed out in the analysis of [Table 5](#).

Regarding the use of rewards, G1 and G3 present different but equivocal results. Considering their similar backgrounds (see the groups' description above), the difference here lies on the type of gamified experience they undertook. Given that G1 accomplished a breakout and G3 faced a semester-long gamification, the difference in opinions may be due to the different amounts of work one gamified experience and the other implied and the extrapolation of similar practices to different educational levels. However, as this question was modified after G1's participation, the results are not completely transparent. Although the perceived need for rewards in the case of breakouts can be discussed, another group—with the same breakout and the same three options that the G3 questionnaire included—would be needed.

The 29 students who submitted the final questionnaire in G3 clearly showed that the experience was satisfactory even if a prize was not granted, that is, that it was intrinsically motivating. This was also supported by G1, although the gamified experience was different. Considering that all stated that they found the experience interesting and most of them considered it as positive ([Table 6](#)), these results offer a different perception. The fact is that only 13 people in G3 would definitively have reached the end without a prize. This consideration is supported by the results of G2, as no reward was offered and only one person completed the gamification. Thus, even though Deci et al. (2001) and Ryan and Deci (2020) stated that extrinsic rewards negatively influence those activities which are intrinsically motivating per se, the fact is that, when the number of participants in G2 and in G3 ([Table 5](#)) are compared, the reward played a critical role. Therefore, it might be said that without a reward, the intrinsic value of the activity as a learning tool would be lost, despite the effort of the instructor in designing the gamification. With this in mind, after analyzing the results of this experiment, it was decided to increase the value of the reward. This time, during the first term of the academic year 2021-2022, a larger group of students ($n=156$) in the same subject and with similar characteristics to the experimental groups was offered the same gamification as G3 but offering 0.5 extra score in their exam. Only 54 students completed it, that is, 34.61%. Considering the participation registered in [Table 4](#), the difference with G3 is not statistically significant ($p=0.7483$).

As teachers-to-be, participants are aware of the implications of ICT and online teaching, either because they are living it as students or because of the pandemic conditions, which forced online teaching in all educational levels since March 2020. Their perception of the differences between online and face-to-face teaching is highly relevant for this experiment regarding the motivational intentions of classroom practice. In fact, considering that only 44 out of 216 students got fully involved in the gamified experiences, readers may think that the gamification went wrong or was not motivating, but other factors should be considered (see the concept of alienation as a comfort zone above). If attention is paid to the number of students who participated in the educative breakout (G1), the number is higher than the level of participation recorded for the gamification (G2 and G3) ([Table 3](#)).

Both the gamification and the breakout followed the same structure, but the main difference, apart from the short duration of the first, is where it was performed. During sessions and after sessions are to be considered important variables here. This was verified when students in G1 were asked to fulfil the satisfaction questionnaire after the virtual sessions and not even half of them did so. The sense of alienation signalled by Tichavsky et al. (2015) can be mentioned here, since it provokes unconcern towards whatever requires more human contact, as expressed by some students (see qualitative analysis section). This lack of personal contact influences motivation directly. The instructor's effort must be greater in online instruction to compensate for this. Motivating students in face-to-face teaching is rather easy in the sense that they perceive their teacher as someone tangible and not as somebody who disappears when they switch off the computer. The teachers' efforts to provide students with intrinsically motivating contents, enthusiasm, and novel and useful methodologies are much harder, as some students recognize in the open question.

CONCLUSION

At first sight, this experimental research may look scarce regarding the number of participants who reached the end (see results above), but, in fact, there were 216 students in it.

Reaching online students is more difficult due to the lack of visual or physical contact, preventing higher levels of participation in general. Considering that this is an online university where students can watch all recorded live sessions, some students never get in touch directly with their teachers. Actually, some of them are there just because they need to pass a subject and do not get too involved in the process. Those who attended regularly were asked about the gamified experiences and manifested their satisfaction with them. The instructor herself observed during the presentation of the experiences in all three groups how the students' attitude was positive. However, although gamification offers some novelty and a change in the routine, if it is not well-presented or if its contents are not well developed, student motivation will not emerge spontaneously. The results of this experimental research contradict the extended belief that if we gamify the classroom, students will be more motivated.

Gamifications and breakouts in the classroom should be used according to the workload the students already have. A subject which, by itself, is complex due to the quantity of new information it contains can find in a gamified experience a way to optimize study time. However, offering it as a complement can imply extra work that the student is not willing to do or lacks time to do. Gamification should not be everywhere and, above all, must be designed considering the needs of the target audience. Online teaching does not allow instructors to know students to the same extent as face-to-face teaching, and this is a hurdle that instructors must consider too.

This, however, does not mean that using gamification in the classroom is not worth it. If instructors want this type of ludic practices to be motivating and useful for the students, they must be proactive. The key role of the instructor as a figure of attachment and thus her ability to prevent the alienation felt in online teaching has been proved by the number of participants in G1. Not only does the presence of the teacher imply performing the task demanded: it also gives students the confidence they need by answering their possible doubts which could otherwise be forgotten if not asked whilst performing the activity. This is also related to the fact that students are influenced by introjected regulation when the teacher is there asking them to perform an activity. On the other hand, lack of participation needs to be analysed as voluntary. Avoidance of extra contact with the teacher or lack of involvement in tasks which are not compulsory when they are not presented face-to-face can be signaled as effects of online teaching.

Using extrinsic motivation seems to work better, but the actual reward is also a factor to be considered: if it is not attractive enough, extrinsic motivation will not work either. Even in the case of offering a reward, although the number of participants increases, if the gamification is not included as a part of the virtual sessions, it is no longer perceived as compulsory and, therefore, it is considered unnecessary and time-consuming for the student. The dichotomy, therefore, is not solely intrinsic or extrinsic motivation, but during and after live interaction with the teacher through virtual contact.

Limitations and Further Research

Considering the limitations of this research, which involved basically the impossibility of reaching all students due to the online nature of the teaching, the authors have proposed taking this type of gamified practices a step beyond. As the results show that those who reached the final part of the gamification considered it as a positive activity, the next step has been suggesting the use of gamified practices as a part of continuous assessment in the teaching plan. To do this, the authors have created a series of challenges following the structure described in the methodology above to be implemented in the virtual campus of two different subjects replacing the current self-corrective tests included in each, providing the students with up to one point in their continuous assessment score. This proposal has been based on the results of this paper and the possibilities to improve other areas such as reading. Thanks to this, the intention is to explore how online students can be reached more directly, albeit without being detrimental to the general results of the subject. The response will be analyzed and presented for the benefit of instructors teaching online.

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Data availability: Data generated or analyzed during this study are available from the authors on request. Complete gamification: <https://milagrostorrado198.wixsite.com/clevercookie> & Breakout: <https://drive.google.com/file/d/1HkDnXcfBce30w4HTSPriNyPcdeFhCMaw/view?usp=sharing>

REFERENCES

- Alonso-García, S., Aznar-Díaz, I., Cáceres-Reche, M. P., Trujillo-Torres, J. M., & Romero-Rodríguez, J. M. (2019). Systematic review of good teaching practices with ICT in Spanish higher education. Trends and challenges for sustainability. *Sustainability*, 11(24), 7150. <https://doi.org/10.3390/su11247150>
- Ávila Muñoz, A. M., & Santos Díaz, I. C. (2019). Observación de la brecha tecnológica generacional desde el prisma de la disponibilidad léxica [Observing the generational technological gap from the perspective of lexical availability]. *Ogigia, Revista Electrónica de Estudios Hispánicos [Ogigia, Electronic Journal of Hispanic Studies]*, 25, 259-292. <https://doi.org/10.24197/ogigia.25.2019.259-292>
- Barab, S., Thomas, M., Dodge, T., Carteaux, R., & Tuzun, H. (2005). Making learning fun: Quest Atlantis, a game without guns. *Educational Technology Research and Development*, 53, 86-107. <https://doi.org/10.1007/BF02504859>
- Baron, N. S. (2017). Reading in a digital age. *Phi Delta Kappan*, 99(2), 15-20. <https://doi.org/10.1177/0031721717734184>
- Baron, N. S. (2021). Know what? How digital technologies undermine learning and remembering. *Journal of Pragmatics*, 175(1), 27-37. <https://doi.org/10.1016/j.pragma.2021.01.011>
- Buckley, P., & Doyle, E. (2014). Gamification and student motivation. *Interactive Learning Environments*, 24(6), 1162-1175. <https://doi.org/10.1080/10494820.2014.964263>
- Busquet i Duran, J., Munté Ramos, R. A., & Garrido Lora, M. (2016). From ICT to ICRT. A study of ICT use and the digital divide among adults and adolescents in Spain. *Anàlisi. Quaderns de Comunicació i Cultura [Analysis. Communication and Culture Notebooks]*, 54, 44-57. <https://doi.org/10.7238/a.v0i54.2953>
- Cabero, J., & Ruiz-Palmero, J. (2018). Las tecnologías de la información y la comunicación para la inclusión: Reformulando la brecha digital [Information and communication technologies for inclusion: Reformulating the digital divide]. *International Journal of Educational Research and Innovation*, 9, 16-30. <https://www.upo.es/revistas/index.php/IJERI/article/view/2665/2222>
- Cameron, J., Pierce, W. D., Banko, K. M., & Gear, A. (2005). Achievement-based rewards and intrinsic Motivation: A test of cognitive mediators. *Journal of Educational Psychology*, 97(4), 641-655. <https://doi.org/10.1037/0022-0663.97.4.641>
- Campillo-Ferrer, J. M., Miralles-Martínez, P., & Sánchez-Ibáñez, R. (2020). Gamification in higher education: Impact on student motivation and the acquisition of social and civic key competencies. *Sustainability*, 12(12), 4822. <https://doi.org/10.3390/su12124822>
- Castillo Rodríguez, C. & Torrado Cespón, M. (2020) Follow the path: A learning proposal for the EFL flipped classroom. *H2D. Digital Humanities Journal*, 2(1). <https://doi.org/10.21814/h2d.2539>
- Chyr, W.-L., Shen, P.-D., Chiang, Y.-C., Lin, J.-B., & Tsai, C.-W. (2017). Exploring the effects of online academic help-seeking and flipped learning on improving students' learning. *Journal of Educational Technology & Society*, 20(3), 11-23. <https://www.jstor.org/stable/26196116>

- Cilliers, E. J. (2017). The challenge of teaching Generation Z. *People: International Journal of Social Sciences*, 3(1), 370-377. <https://doi.org/10.20319/pijss.2017.31.188198>
- Connolly, T. M., Boyle, E. A., MacArthur, E., Hainey, T., & Boyle, J. M. (2012). A systematic review of empirical evidence on computer games and serious games. *Computers and Education*, 59(2), 661-686. <https://doi.org/10.1016/j.compedu.2012.03.004>
- Cox, M. J. (2014). Motivating pupils through the use of ICT. In M. Leask, & N. Pachler (Eds.), *Learning to teach using ICT in the secondary school: A companion to school experience* (pp. 19-35). Routledge. <https://doi.org/10.4324/9780203212301-2>
- Creswell, J. W., & Plano Clark, V. L. (2018) *Designing and conducting mixed methods research*. SAGE.
- Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behaviour*. Springer. <https://doi.org/10.1007/978-1-4899-2271-7>
- Deci, E. L., Koestner, R., & Ryan, R. M. (2001). Extrinsic rewards and intrinsic motivation in education: Reconsidered once again. *Review of Educational Research* 71(1), 1-27. <https://doi.org/10.3102/00346543071001001>
- Deterding, S., Khaled, R., Nacke, L. E., & Dixon, D. (2011). Gamification: Toward a definition. In D. Tan (Chair), *ACM CHI Conference on Human Factors in Computing Systems*. Vancouver, Canada. https://www.researchgate.net/profile/Sebastian-Deterding/publication/303018696_Gamification_Toward_a_definition/links/595f6ff5458515a357a62497/Gamification-Toward-a-definition.pdf
- Dickey, M. (2004). The impact of web-logs (blogs) on student perceptions of isolation and alienation in a web-based distance-learning environment, *Open Learning: The Journal of Open, Distance and e-Learning*, 19(3), 279-291. <https://doi.org/10.1080/0268051042000280138>
- Dimock, M. (2019). Defining generations: Where millennials end and generation Z begins. *Pew Research Center*. <https://www.pewresearch.org/fact-tank/2019/01/17/where-millennials-end-and-generation-z-begins/>
- Dörnyei, Z. (1994). Motivation and motivating in the foreign language classroom. *The Modern Language Journal*, 78(3), 273-284. <https://doi.org/10.2307/330107>
- Dörnyei, Z. (2001). *Motivational strategies in the language classroom*. Cambridge University Press. <https://doi.org/10.1017/CBO9780511667343>
- Faiella, D., & Ricciardi, M. (2015). Gamification and learning: A review of issues and research. *Journal of e-Learning and Knowledge Society*, 11(3), 13-21. <https://doi.org/10.20368/1971-8829/1072>
- Ferrer, J., Ringer, A., Saville, K., Parris, M. A., & Kashi, K. (2022). Students' motivation and engagement in higher education: the importance of attitude to online learning. *Higher Education*, 83(2), 317-338. <https://doi.org/10.1007/s10734-020-00657-5>
- Firth, J., Torous, J., Stubbs, B., Firth, J.A., Steiner, G. Z., Smith, L., Alvarez-Jimenez, M., Gleeson, J., Vancampfort, D., Armitage, C. J., & Sarris, J. (2019) The "online brain": How the Internet may be changing our cognition. *World Psychiatry*, 18(2), 1129-129. <https://doi.org/10.1002/wps.20617>
- García-Peñalvo, F. J. (2020). Reference model for virtual education at face-to-face universities. *Campus Virtuales*, 9(1), 41-56.
- Garrison, D. R., Anderson, T., & Archer, W. (1999). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education*, 2(2), 87-105. [https://doi.org/10.1016/S1096-7516\(00\)00016-6](https://doi.org/10.1016/S1096-7516(00)00016-6)
- Guckian, J., Sridhar, A., & Meggitt, S. J. (2020). Exploring the perspectives of dermatology undergraduates with an escape room game. *Clinical and Experimental Dermatology*, 45(2), 153-158. <https://doi.org/10.1111/ced.14039>
- Hamari, J., Koivisto, J., & Sarsa, H. (2014). Does gamification work?—A literature review of empirical studies on gamification. In *Proceedings of the 47th Hawaii International Conference on System Sciences*. Hawaii, USA. <https://doi.org/10.1109/HICSS.2014.377>
- Hanus, M. D., & Fox, J. (2015). Assessing the effects of gamification in the classroom: A longitudinal study on intrinsic motivation, social comparison, satisfaction, effort and academic performance. *Computers and Education*, 80, 152-161. <https://doi.org/10.1016/j.compedu.2014.08.019>

- Hsieh, H.-F., & Shannon, S. (2005) Three approaches to qualitative content analysis. *Qualitative Health Research*, 15(9), 17277-17288. <https://doi.org/10.1177/1049732305276687>
- Johnson, G. M. (2005). Student alienation, academic achievement, and WebCT use. *Educational Technology & Society*, 8(2), 179-189. https://drive.google.com/file/d/1lujdOJWiMCCZZIH_HUnQ2UTni9ZiVpRo/view
- Kinio, A. E., Dufresne, E., Brandys, T., & Jetty, P. (2021). Break out of the classroom: The use of escape rooms as an alternative teaching strategy in surgical education. *Journal of Surgical Education*, 76(1), 134-139. <https://doi.org/10.1016/j.jsurg.2018.06.030>
- König, J., Jäger-Biela, D. J., & Glutsch, N. (2020). Adapting to online teaching during COVID-19 school closure: teacher education and teacher competence effects among early career teachers in Germany. *European Journal of Teacher Education*, 43(4), 608-622. <https://doi.org/10.1080/02619768.2020.1809650>
- Kuvaas, B., Buch, R., Weibel, A., Dysvik, A., & Nerstad, C. G. L. (2017). Do intrinsic and extrinsic motivation relate differently to employee outcomes? *Journal of Economic Psychology*, 61, 244-258. <https://doi.org/10.1016/j.joep.2017.05.004>
- Lazzaro, N. (2004) *Why we play games: Four keys to more emotion without story*. XEODesign.
- Lei, S. A. (2010). Intrinsic and extrinsic motivation: Evaluating benefits and drawbacks from college instructors' perspectives. *Journal of Instructional Psychology*, 37(2), 153-160.
- Lemos, M. S., & Veríssimo, L. (2014). The relationships between intrinsic motivation, extrinsic motivation, and achievement, along elementary school. *Procedia-Social and Behavioral Sciences*, 117, 930-938. <https://doi.org/10.1016/j.sbspro.2014.01.1251>
- Livingstone, S. (2011). Critical reflections on the benefits of ICT in education. *Oxford Review of Education*, 38(1), 9-24. <https://doi.org/10.1080/03054985.2011.577938>
- Llorca Abad, G. (2015). Audio-visual transmedia content and new users' behaviour. *Obra Digital*, 8, 136-154. <https://doi.org/10.25029/od.2015.51.8>
- Locke, E. A., & Schattke, K. (2019) Intrinsic and extrinsic motivation: Time for expansion and clarification. *Motivation Science*, 5(4), 277-290. <https://doi.org/10.1037/mot0000116>
- Ma, J., Han, X., Yang, J., & Cheng, J. (2015). Examining the necessary condition for engagement in an online learning environment based on learning analytics approach: The role of the instructor. *The Internet and Higher Education*, 24, 26-34. <https://doi.org/10.1016/j.iheduc.2014.09.005>
- Mandernach, B. J., Robertson, S. N., & Steele, J. P. (2018). Beyond content: The value of instructor-student connections in the online classroom. *Journal of the Scholarship of Teaching and Learning*, 18(4), 130-150. <https://doi.org/10.14434/josotl.v18i4.23430>
- Mann, S. J. (2005). Alienation in the learning environment: A failure of community? *Studies in Higher Education*, 30(1), 43-55. <https://doi.org/10.1080/0307507052000307786>
- Manoharan, S. R., Hua, T. K., & Sultan, F. M. M. (2022). A comparison of online learning challenges between young learners and adult learners in ESL classes during the COVID-19 pandemic: A critical review. *Theory and Practice in Language Studies*, 12(1), 28-35. <https://doi.org/10.17507/tpls.1201.04>
- Mekler, E. D., Brühlmann, F., Opwis, K., & Tuch, A. N. (2013). Do points, levels and leaderboards harm intrinsic motivation? An empirical analysis of common gamification elements. In *Gamification '13: Proceedings of the First International Conference on Gameful Design, Research, and Applications* (pp. 66-73). <https://doi.org/10.1145/2583008.2583017>
- Mekler, E. D., Brühlmann, F., Tuch, A. N., & Opwis, K. (2017). Towards understanding the effects of individual gamification elements on intrinsic motivation and performance. *Computers in Human Behavior*, 71, 525-534. <https://doi.org/10.1016/j.chb.2015.08.048>
- Mollick, E., & Rothbard, N. (2014). Mandatory fun: Consent, gamification and the impact of games at work. *The Wharton School Research Paper Series*. <https://doi.org/10.2139/ssrn.2277103>
- Moreno Fuentes, E. (2019). Breakout EDU as key element in gamification experiences carried out on pre-service teaching degrees. *EduTec. Revista Electrónica de Tecnología Educativa [EduTec. Electronic Magazine of Educational Technology]*, 67, 66-79. <https://doi.org/10.21556/edutec.2018.66.1247>

- Moreno-Ger, P., Burgos, D., Martínez Ortiz, I., Sierra, J. L., & Fernández Manjón, B. (2008). Educational game design for online education. *Computers in Human Behaviour*, 24, 2530-2540. <https://doi.org/10.1016/j.chb.2008.03.012>
- Morgan, C. K., & Tam, M. (1999). Unraveling the complexities of distance education student attrition. *Distance Education*, 20(1), 96-108. <https://doi.org/10.1080/0158791990200108>
- Navarro-Mateos, C., Pérez-López, I. J., & Femia Marzo, P. (2021). Gamification in the Spanish educational field: A systematic review. *Retos*, 42, 507-516. <https://doi.org/10.47197/retos.v42i0.87384>
- Negre, C. (2017). 'BreakoutEdu', microgamificación y aprendizaje significativo ['BreakoutEdu', microgamification and meaningful learning]. <https://www.educaweb.com/noticia/2017/07/26/breakoutedu-microgamificacion-aprendizaje-significativo-15068/>
- Ortega Arranz, A., Bote Lorenzo, M., Asensio Pérez, J., Martínez Monés, A., Gómez Sánchez, E., & Dimitriadi, Y. (2019). To reward and beyond: Analyzing the effect of reward-based strategies in a MOOC. *Computers and Education*, 142. <https://doi.org/10.1016/j.compedu.2019.103639>
- Parra-González, M. E., & Segura-Robles, A. (2019). Scientific production on gamification in education: A scientometric analysis. *Revista de Educación [Education Magazine]*, 386, 109-131. <https://doi.org/10.4438/1988-592X-RE-2019-386-429>
- Pennucci, S. S. (2020). Flip it and break it. Using flipped lessons and breakouts to energize learning. *Philadelphia Libraries: Research and Practice*, 8(2), 115-123. <https://doi.org/10.5195/palrap.2020.220>
- Peters, D., Calvo, R. A., & Ryan, R. M. (2018). Designing for motivation, engagement and wellbeing in digital experience. *Frontiers in Psychology*, 9, 1-15. <https://doi.org/10.3389/fpsyg.2018.00797>
- Prensky, M. (2001). Digital natives, digital immigrants, Part 1. *On the Horizon*, 9(5), 1-6. <https://doi.org/10.1108/10748120110424816>
- Rasheed, A. R., Kamsin, A., & Abdullah, N. A. (2020). Challenges in the online component of blended learning: A systematic review. *Computers and Education*, 144, 1-17. <https://doi.org/10.1016/j.compedu.2019.103701>
- Rosch, D. M., & Schwartz, L. M. (2009). Potential issues and pitfalls in outcomes assessment in leadership education. *Journal of Leadership Education*, 8(1), 177-194. <https://doi.org/10.12806/V8/I1/IB5>
- Rovai, A. P., & Wighting, M. J. (2005). Feelings of alienation and community among higher education students in a virtual classroom. *The Internet and Higher Education*, 8(2), 97-110. <https://doi.org/10.1016/j.iheduc.2005.03.001>
- Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices and future directions. *Contemporary Educational Psychology*, 61, 1-11. <https://doi.org/10.1016/j.cedpsych.2020.101860>
- Schuman, B. F. (2021). What does success in online teaching look like? *Teaching Philosophy*, 44(3), 339-367. <https://doi.org/10.5840/teachphil202132140>
- Symeonides, R., & Childs, C. (2015). The personal experience of online learning: An interpretative phenomenological analysis. *Computers in Human Behavior*, 51(A), 539-545. <https://doi.org/10.1016/j.chb.2015.05.015>
- Teixes, F. (2014). *Gamificación: Fundamentos y aplicaciones [Gamification: Fundamentals and applications]*. UOC.
- Tichavsky, L. P., Hunt, A. N., Driscoll, A., & Jicha, K. (2015). "It's just nice having a real teacher": Student perceptions of online versus face-to-face instruction. *International Journal for the Scholarship of Teaching and Learning*, 9(2), 2. <https://doi.org/10.20429/ijstol.2015.090202>
- Torrado Cespón, M. (2021). TIC/TAC y COVID-19: Uso y necesidades del profesorado de secundaria en Galicia [ICT/TAC and COVID-19: Use and needs of secondary school teachers in Galicia]. *Digital Education Review*, 39, 356-373. <https://doi.org/10.1344/der.2021.39.356-373>
- Turner, A. (2015). Generation Z: Technology and social interest. *The Journal of Individual Psychology*, 71(2), 103-113. <https://doi.org/10.1353/jip.2015.0021>
- Urban, K., & Jirsáková, J. (2021). Motivation and personally traits in adult learners. *Journal of Adult and Continuing Education*, 28(1), 151-166. <https://doi.org/10.1177/14779714211000361>

- Vallerand, R. J., Pelletier, L. G., Blais, M. R., Senecal, C., & Vallieres, E. F. (1992). The academic motivation scale: A measure of intrinsic, extrinsic and amotivation in education. *Educational and Psychological Measurement*, 52(4), 1003-1017. <https://doi.org/10.1177/0013164492052004025>
- Van Deursen, A. (2007). Where to go in the near future: Diverging perspectives on online public service delivery. *Lecture Notes in Computer Science*, 4656, 143-154. https://doi.org/10.1007/978-3-540-74444-3_13
- Wei, C. W., Chen, N. S. & Kinshuk (2012). A model for social presence in online classrooms. *Educational Technology Research and Development*, 60, 529-545. <https://doi.org/10.1007/s11423-012-9234-9>
- Westera, W. (2015). Games are motivating, aren't they? Disputing the arguments for digital game-based learning. *International Journal of Serious Games*, 2(2), 3-17. <https://doi.org/10.17083/ijsg.v2i2.58>
- Zembylas, M. (2008). Adult learners' emotions in online learning. *Distance Education*, 29(1), 71-87. <https://doi.org/10.1080/01587910802004852>

