

Levelling Up Language Learning: A Study on the Impact of Gamification

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ABSTRACT

This study examines the use of gamification as an innovative assessment approach to foreign language learning with 12–14-year-old students. A mixed methodology has been applied. Quantitative data have been collected from formative non-gamified and gamified assessments. Qualitative data was collected from a student questionnaire. The results were obtained from an international middle school where four groups of students, two in Grade 7 and two in Grade 8, engaged with gamified formative assessment. Findings show that gamification can provide a useful support mechanism in assessment success, and also on an emotional level as it lowers the affective filter, allowing the students to reduce potential anxiety and face the assessment with greater confidence. However, gamification had a small negative impact on otherwise high-performing students in the study, suggesting that gamification may not be appropriate in all contexts.

KEYWORDS

Action Learning, Alternative Approaches, Assessment for Learning, Behaviour, Educational Innovation, Flow, Game-Based Assessment, Game-Based Learning, Motivation

INTRODUCTION

Games are a ubiquitous form of entertainment for adults and children around the world. Due to the exponential growth of the internet over the past few decades, video games and online games have become increasingly accessible as popular entertainment pastimes. Game developers have increasingly used behavioural science techniques to keep users - or 'gamers' - playing and engaged with their products. A report by Nielsen (2010), titled *What Americans Do Online: Social Media and Games Dominate Activity*, highlighted the most frequent activities of internet users in the United States. Despite the nearly limitless nature of the web, 40% of U.S. online time was reported to be spent on just three activities - social

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networking, email and games, with growth in the use of online games, especially by young audiences - leaving plenty of other areas vying for a declining share of the online attention pie (Nielsen, 2010).

The education system, ranging from primary to secondary schools and to universities, looks to leverage the potential for engagement through the integration of digital games or game mechanics or components, known as gamification, to support students' learning (Watson et al., 2011; Whitton & Hollins, 2008). Gamification can be defined as the utilisation of game-based mechanics, visual elements, and game-related thinking or behaviours in order to promote engagement, motivation, action, and problem-solving for learning (Kapp, 2012).

Regarding gamification in second language acquisition (SLA), Azzouz Boudadi and Gutiérrez-Colón's (2020) study focuses exclusively on the results that are obtained through gamification in the classroom, showing that the use of gamification with L2 (second language) learners is a predominantly positive experience. However, the authors conclude that there is a need for more research on the role Gamification could play in learning contexts.

This study intends to show how gamification motivation through games helps students not only to be more involved in language study, but more importantly to accept the errors that, through the game, are seen as part of it. In addition, if we consider the stress that each student in different measure may feel at the time of being evaluated through a test, the fear of making a mistake is greater because the grade would be compromised. For this reason, proposing a gamified test allows the student to complete the test in the allotted time feeling free to make mistakes during the execution of the gamified test since he/she is aware that in this way the mistake itself can indicate on how to proceed within the game and pass the different levels and/or phases that compose it. Two questions arise in this regard:

Q1. How might educators gamify a test?

Q2. Are all students facilitated when facing a gamified test?

These questions will be attempted to be answered through the findings made after experimenting and comparing the results of non-gamified and gamified tests.

This study employs a mixed methodological approach to examine the implications of Gamification on assessments for grades 7 and 8 students' vocabulary and reading comprehension during a Spanish language course. The results from this study will provide a preliminary understanding to inform a future study in this field.

BACKGROUND

Many academic disciplines such as psychology, sociology, ethnology, and anthropology have noted that the concept of the game is part of human culture, and significantly can help individuals' development. Huizinga (1972) conducted one of the most famous studies on the cultural aspects of games. In his book *Homo ludens*, he reveals the close historical relationship between games and human beings.

Defining a game

This study analyses aspects of games and how they can be leveraged for teaching and language acquisition. A logical first step should be defining what a game is, since its definition requires precision to avoid misunderstanding or omission of the fundamental aspects. Salen and Zimmerman's (2003) definition of a game is based on a synthesis, following the analysing of several studies on the subject, arriving at the description: "A game is a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome" (p. 80). Effectively, this definition lists the elements that are part of games and how they are interconnected, and fits perfectly with the concept of learning and language acquisition as it will be presented in more detail below. Chatfield's (2011) description of a game provides more detail as he states that the game is born from a consensus, one of learning and of maintaining the

rules adopted in the game. This set of consensus and rules, therefore, allows the competition between players, collaboration, and evaluation of the best actions for the achievement of a predetermined goal, which may be overcoming a level, gaining points, or victory, for example. Highlighting the concepts involved, such as collaboration, success, analysis, and evaluation, Chatfield (2011) states that there is a close connection between the game and the learning process.

In addition to the constituent elements of games, it is evident that when a ‘player’ is introduced to a game they immediately intend to understand the rules or read the instructions in order to play. The player then begins to move within the game to follow the gameplay, to earn points or solve the challenges that the game proposes. It can be the case that players play the same game repeatedly, however, setting new or different challenges for themselves, such as earning more points or performing the same steps in the shortest possible time because they have learned strategies and techniques that improve their performance from previous encounters. Questions arise at this point as to the presence of these game mechanisms in the process of learning generally. On this point, Csíkszentmihályi (1997) discusses that when people play, time seems non-existent, or they want it to pass faster just because they are engaged in the game and are living a moment of well-being. In fact, he considers games to be an experience that allows people to go beyond the limits of real-world experience, allowing users to enter into what he calls “flow”: an oscillating state that is between anxiety and boredom, two extremes that lead one to an imbalance. To be precise, for a state of pleasure to occur, Csíkszentmihályi lists the fundamental elements for its attainment, such as an activity that challenges and requires skill, combining action and consciousness, having clear goals and feedback, concentration on the task at hand, loss of self-awareness, and the transformation of time.

In this regard, Fogg (2009) states that there are three factors in the behaviour model: motivation, ability and triggers. In his FBM model, Fogg (2009) states that in order “for a target behaviour to happen, a person must have sufficient motivation, sufficient ability, and an effective trigger” (p.1). Therefore, the author argues that for behaviour to occur, people must have a certain level of motivation and ability. If motivation is high enough, people might do difficult things, to perform the behaviour. In most cases of persuasion, people are not at the extremes; rather, they have a modest level of motivation and ability, and these levels can be manipulated. Effective persuasive technologies increase motivation, or ability, or both. But that’s not all - the third factor in FBM is the trigger. Without an appropriate trigger, the behaviour will not occur, even if motivation and ability are high. For a trigger to work, it must have three characteristics: first, the trigger must be noticed. Second, the trigger must be associated with the desired behaviour. Third, the trigger occurs when people are both motivated and able to perform the behaviour. It therefore turns out to be crucial to work on the timing to achieve the desired behaviour.

Differentiating games from gamification

Considering the above-mentioned definitions and discussion related to the components or mechanisms of the game, a correlation can be seen between gaming and learning for this study to explore. However, before looking into how to leverage aspects of the game in the classroom it is necessary to clarify the difference between Gamification and games. Building on the earlier definition, gamification refers to “a process related to player thinking and game techniques to attract users and solve problems” (Zichermann & Cunningham, 2011, p. 11). More recently, Webach (2014) redefines gamification as “the process of making activities more game-like” (p. 1) in which he links Gamification to persuasive design.

This study notes that these definitions mention two common points: problem-solving, which is part of the purpose of games, and influencing the psychological and social conduct of the player. In the first case, it is clear that if there were no problems or conflicts to solve within games, then they would not be games at all. However, the second aspect that the authors bring to light is interesting: the psychological change that encourages participation or continues it. The question that arises is: how to do it? In closer observation, it is clear that video games typically have prizes, medals, points, bonuses, and avatars, which are all elements that stimulate the user to continue playing and spend more time in it. This alone, however, is not enough.

Before going deeper into the aspects of gamification, it is appropriate to make a distinction between Gamification and conventional video games. Hamari and Koivisto (2013) define Gamification as a service that aims to provide gaming experiences to users with the goal of influencing their behaviour. Unlike gaming, Gamification is not focused on providing hedonistic activities but offers experiences such as mastery and autonomy that are reminiscent of play. Furthermore, Gamification aims to influence motivation and refers to adding gamefulness to existing systems rather than co-building an entirely new game.

In this regard, Vassileva's (2012) position on this issue seems to be more appropriate, in fact, she points out that the purpose of gamification is to create greater audience engagement in non-gaming environments through game mechanics that she defines:

“The related area of practical expertise called “Game Mechanics” has accumulated a number of patterns, rules, and feedback loops, that are motivational, create user engagement, and loyalty and can be applied to develop game-like elements in virtually any application or community. Examples of the most commonly used patterns are: ownership (allowing the user/player to own things, such as points, tokens, badges, as it creates loyalty to the application, game, or community); achievements (providing a virtual or physical representation of having accomplished something that can be easy, difficult, surprising, and funny, and can be accomplished alone or as a group), status (computing and displaying a rank or level of a user), community collaboration and quests (posing challenges to the users related to time-limit or competition, that can be resolved by working together)” (Vassileva, 2012, p.8).

As Vassileva clearly explains, in gamification there are elements of the game, such as incentives, earnings, bonuses, etc., and these involve the attitude or behaviour that is expected of the player, which is predictable and not surprising.

In this regard, Rivera and Palmer Garden (2021) carried out research in which they synthesised a theoretical framework that would allow for the systematic application of gamification with the specific purpose of influencing student engagement for the achievement of learning outcomes. To do so, they analysed Kahu's studies on a Student Engagement Framework (Kahu, 2013) and Landers' Theory of Gamified Learning (Landers, 2014) to produce the Gamification Framework for Student Engagement. They then concluded that to achieve the scientific application and evaluation of gamification, four testable propositions must be considered:

- “(1) Gamification is a process through which student engagement states can be modified to support the achievement of learning outcomes.
- (2) The achievement of learning outcomes can be a measurable consequence of the state of student engagement which spans affective, cognitive and behavioural domains.
- (3) It is possible to select game attributes appropriate to support the achievement of specific learning objectives categorised into the three domains of learning: cognitive, affective and psychomotor.
- (4) It is possible to select a game attribute for employment in a gamification strategy by identifying the psychological domain shared between the learning outcome/educational objective and the desired, modifying student experience of engagement.” (Rivera & Palmer Garden, 2021, p. 12).

Isn't this what teachers would like to obtain from their students? How then to gamify a lesson?

This article aims to show how gamification can change the behaviour of participants through reinforcement and emotions, so that users feel more involved and flow into the action in which they are involved. By looking more closely at the constituent elements of gamification, it is possible to see that the routes that directly connect games to learning tasks are the same. Table 1 summarises the correlations between elements, games and education that are examined in the subsequent section.

Table 1.
Correlation between elements, games and education

No.	Elements	Games	Education
(1)	Engagement as motivation	Appealing design and basic story	Appealing graphics and context
(2)	Action learning	Learning using a tutorial	Learning by doing
(3)	Problem-solving	Missions	Inductive learning
(4)	Planning and design	Structured environment	Structured environment
(5)	Error handling	Error as part of the game	Error as part of the learning process
(6)	Collaboration and community	Socialisation as part of the game and competition	Socialisation as part of the learning process, learning together
(7)	Progress and overcoming levels	The game progresses by levels	Learning progress by levels
(8)	Feedback	Progress is constantly upgraded	Teacher gives constant feedback to students
(9)	Evaluable outcome	Final mission	Final measurable communicative outcome

Engagement as motivation

It is clear that the more a game displays an appealing design with an engaging basic story, the greater the user’s curiosity and motivation. Similarly, if teachers gamify their lessons by including these two aspects: graphics and context, for example, they will see how the motivation of students will be greater and continuous as it creates:

- motivation by choice (pre-action)
- executive motivation (active phase)
- retrospective motivation (after the action).

Action Learning

As already stated, every time a player uses a video game, they learn the rules and strategies as they practice, and the same happens with learning, that is learning by doing: and in this case, the player is faced with implicit learning, and also in this case, aren’t they faced with increased motivation? In fact, what players learn implicitly is experienced at the right time and in the right way. To succeed in this regard in the classroom, teachers need to listen to students’ interests and recreate situations that are appealing to them based on what they themselves have indicated as such.

Problem Solving

If there is no problem solving there is no game, and this is clear. Furthermore, what the teachers propose to their students constitutes something new or a new problem to solve.

Planning and Design

A game, at its core, is a type of structured learning environment. Two important things are learned in games: new skills and new information, and the same happens when students learn a new topic.

Error Handling

One of the aspects that the authors want to emphasise in this study is just how students react to errors. Often, they either do not consider it or even feel frustrated, especially if their grades are compromised. In the game, the error represents a part of the game itself, as it offers the possibility of reorganising the

elements of the game to change strategy so that the problem can be solved or overcome. Therefore, it represents a safe space in which the error is fully accepted. Hence, why does this not happen in classrooms?

Collaboration and Community

It is given that a person can play a game alone, just as students can do exercises individually or study on their own. However, in the nature of gaming, there is also the aspect of socialisation that sometimes takes the form of competition, as Csíkszentmihályi (1997) presents it:

The roots of the word “compete” are the Latin con petire, which meant “to seek together.” What each person seeks is to actualize her potential, and this task is made easier when others force us to do our best. (Csíkszentmihályi, 1997, p.73).

Basically, it can be a double-edged sword, but in any case, at the base people have the need to share and *con petire* with others. Does not the same happen in classrooms? How often do students seek confirmation, feedback, or discussion with peers on aspects that they are learning?

Progress and Overcoming Levels

In gaming, especially in video games, passing levels are graphically represented by a progress bar in which points earned, etc. are often shown. This is because it is essential to show the player the stages of the game they are in and that each one is different from the other and easily distinguishable. Teachers could do the same, certainly not as quickly as a video game, but they can emphasise that the new topic will be experienced gradually, and maybe they can even challenge students to see how far they can advance during the lesson.

Feedback

This is probably the most important lesson teachers can learn from game designers: their feedback system. In any video game, it is possible to see how constantly progress is updated, as is the case in gaming, when a particular obstacle is overcome brilliantly to such an extent that the user receives a bonus, teachers could do the same thing by incentivizing student work and engagement.

Evaluable Outcome

In a literature review article, Azzouz Boudadi and Gutiérrez-Colón (2020) confirm that gamification has proven to be an effective technique to increase engagement and motivation, in turn, the authors call for further research to investigate the benefits of gamification both on an affective level and on the quality of second language learning. On the basis of this article, we take up the invitation and want to demonstrate through this study that all elements of gamification applied increase the level of motivation which is reflected in the final results and grades. The gamified test represents an innovation, in which even if the students have never played the game proposed as a test, they intuitively learn the rules of the game as they play it and make mistakes, which are reported on the spot to offer the opportunity to try again until they see the progress in the game and thus in the test.

GAMIFIED TESTS AS FORMATIVE ASSESSMENT IN LANGUAGE TEACHING IN SECONDARY SCHOOL

METHOD

This study utilises an experimental method starting with the research questions: Q1. How might educators gamify a test? Q2. Are all students facilitated when facing a gamified test? and making the hypothesis that gamification of tests results in an increase in motivation and subsequent improvement

in grades. The objective of this experiment is to propose a gamified test that helps the student to lower the affective filter and to face a test of reading comprehension with greater serenity and confidence.

A mixed methodology has been applied. Quantitative data have been collected by using the results of formative assessment from non-gamified and gamified tests, while the administration of a questionnaire to the pupils has provided qualitative data. The results show a significant increase in class grades as well as a rise in motivation and a lowering of anxiety.

In order to do this, 4 classes of a middle school were observed: two in grade 7 and two in grade 8 which were successively presented: a non-gamified formative test, a gamified formative test and finally a non-gamified summative test. During the first semester (academic year 2021/22) two grade 7 classes (7.1 and 7.3) in which there are 21 and 23 students aged 12-13 years, respectively, and two grade 8 classes (8.3 and 8.4) in which there are 25 students in each aged 13-14 years, were considered. A total of 94 students between the ages of 12 and 14 were tested for reading comprehension.

This is to specify that non-gamified formative tests are prepared within the foreign language department (MFL) so that the format is the same between languages. In this case, it is a Google Form in which multiple-choice questions are proposed, on vocabulary and reading comprehension of short texts referred to specific questions. The gamified test, on the other hand, is also a formative test and is a pilot test accepted by both the department and the school administration. In this case, the test is presented in the form of an escape room through the genial.ly software to which a short Google Form is added at the end to offer the possibility of answering 5 extra questions and in case it is all or almost all correct, the possibility of receiving a better grade. However, the fact remains that both tests are scored whose breakdown is as follows:

1. Non-gamified test: 15 mixed questions: reading comprehension and vocabulary knowledge. For zero to six correct answers the grade is 1, for 7 to 10 the grade is 2, for 11 to 13 the grade is 3, and for 14 to 15 the grade is 4.
2. Gamified test: 10 questions distributed within 10 rooms in the escape room: one question per room and covering reading comprehension only. At the end of the 10 rooms, a Google Form opens with 5 questions concerning only vocabulary. If the student finishes the 10 rooms, which implies having answered the previous 9 correctly, they have secured 2 as a grade. To get 3 they must correctly answer 1 to 3 questions in the Google Form and, 4 to 5 to reach the maximum grade of 4. If when the time limit is reached when the student has not finished the test, they must take a screenshot of the last room they arrived at and, from the room number, the grade is calculated: up to room 6 the grade is 1, and from room 7 to 10 the grade is 2.

As for the summative tests, however, the format is the same for the whole department and consists of a Google Form in which there is a short reading and 10 multiple-choice questions. The grade is as follows: from 1 to 4 correct answers the grade is 1, from 5 to 6 it is 2, from 7 to 8 it is 3, and from 9 to 10 it is 4.

At the end of the gamified test, students were asked to voluntarily leave open-ended feedback in which they could express their reaction to the gamified test, and the responses were subsequently analysed by trying to categorise the obtained responses.

In order to represent the open-ended responses and analyse them statistically, the results were quantified using a scale of 0 to 4 (A-E), where 0 (E) represents no comment, 1 (D) a negative comment, 2 (C) a comment with only one positive adjective, 3 (B) with two positive adjectives, and 4 (A) with 3 or more positive adjectives.

Finally, the grades obtained by each student for the non-gamified and the gamified test were compared and the growth or decrease values for each test were measured.

Research site

In Dubai, United Arab Emirates (UAE), primary and secondary schooling is mandatory for children. Arabic is the predominant language of delivery in state-funded schools with English as a second language. However, private schools that follow American, British, CBSE, and International Baccalaureate (IB) curriculums are taught in English.

The research site for this study is one of the schools in the GEMS Education network. The Middle School curriculum consists of both core subjects and electives. The study of a foreign language, French or Spanish, is compulsory in grade 6 with students given the choice to continue it in grades 7 and 8. This ensures additional language exposure for students in grades 7 and 8. The department follows the American Council on the Teaching of Foreign Languages (ACTFL) proficiency guidelines. The MFL standards are: culture, reading, listening, writing and speaking, and the Middle School gradings are Mastering (4 - MST), Achieving (3 - ACH), Approaching (2 - APP) and Developing (1 - DEV).

In accordance with the school's rules, each semester must show the 5 standards evaluated through formative exams and later summative exams. For greater objectivity, the summative exams must be the same for all teachers of the same language and given to the students preferably on the same dates, and the text of the exam must have been agreed upon by the teachers. Formative examinations, on the other hand, can be created independently by each teacher and given to the students on the most convenient dates based on their observed preparation.

Research design

The aim of this study is to consider the impact from elements of gamification in relation to its application on assessment to improve academic performance.

Three variations of the assessment were administered at different stages to the same set of students, as detailed in the following Tables:

- Assessment 1 - Non-gamified formative test (Table 2)
- Assessment 2 - Formative gamified test (Table 3)

Table 2.
Assessment 1- Non-gamified formative

SEMESTER 1 GRADE 7 (7.1-7.3)	SEMESTER 1 GRADE 8 (8.3-8.4)
UNIT 1: Daily Activities Around Town	UNIT 1: My Ideal Community
<p>Evaluation: Communication 2 (Interpretive) WLA1.3 Reading (ACTFL) Understand, interpret, and analyse what is read, or viewed on a variety of topics. Comprehend the main idea of orally related personal anecdotes, familiar fairy tales and other narratives based on well-known themes.</p>	<p>Evaluation: Communication 2 (Interpretive) WLA1.3 Reading (ACTFL) Understand, interpret, and analyse what is read, or viewed on a variety of topics. Read simple texts in the target language and answer simple questions (e.g., weather report, travel poster or brochure, T.V. Guide, etc.) Use a primary bilingual dictionary, picture dictionary or glossary to access information. Obtain information from short messages (oral or written) (e.g., invitations, directions, announcements, appointments)</p>
<p>TEST: Google Form with multiple choice questions and answers: Associate an image with the corresponding word -associate to a picture the sentence that best describes it Complete a sentence with the missing word -choose the correct translation from English to Spanish and vice versa Total 15 questions.</p>	<p>TEST: Google Form with multiple choice questions and answers: Associate an image with the corresponding word -associate to a picture the sentence that best describes it Complete a sentence with the missing word Total 15 questions.</p>

Table 3.
Assessment 2 - formative gamified test

SEMESTER 1 GRADE 7 (7.1-7.3)	SEMESTER 1 GRADE 8 (8.3-8.4)
UNIT 1: Daily Activities Around Town	UNIT 1: My Ideal Community
<p>Evaluation: Communication 2 (Interpretive) WLA1.3 Reading (ACTFL) Understand, interpret, and analyse what is read, or viewed on a variety of topics. Comprehend the main idea of orally related personal anecdotes, familiar fairy tales and other narratives based on well-known themes.</p>	<p>Evaluation: Communication 2 (Interpretive) WLA1.3 Reading (ACTFL) Understand, interpret, and analyse what is read, or viewed on a variety of topics. Read simple texts in the target language and answer simple questions (e.g., weather report, travel poster or brochure, T.V. Guide, etc.) Use a primary bilingual dictionary, picture dictionary or glossary to access information. Obtain information from short messages (oral or written) (e.g., invitations, directions, announcements, appointments)</p>
TEST: Escape room using genial.ly	TEST: Escape room using genial.ly
<p>Total: 10 questions + 5 extra Escape room: 10 questions distributed within 10 rooms: one question per room and covering reading comprehension only. Every single room has text that students have to read and understand so that they can click within the room on an object or word in order to proceed to the next room. At the end of the 10 rooms, a Google Form opens with 5 questions concerning only vocabulary.</p>	<p>Total: 10 questions + 5 extra Escape room: 10 questions distributed within 10 rooms: one question per room and covering reading comprehension only. Every single room has text that students have to read and understand so that they can click within the room on an object or word in order to proceed to the next room. At the end of the 10 rooms, a Google Form opens with 5 questions concerning only vocabulary.</p>

· Assessment 3 - Summative non-gamified test (Table 4)

The teacher created an interactive game, utilising a web-based application named genial.ly, (<https://app.genial.ly/>) in which the content of the test was very similar to the previous one, except that it was in the form of an interactive escape room, in which students could not access the level (and therefore the next question) until they found the solution to the room they were in. To do this, the student would in some cases click on the screen at a specific spot that corresponded to the correct answer or in other cases write inside a padlock the answer to a question they were asked. A positive aspect of this program is that it can be accessed safely from any device: laptop, tablet and mobile phone, and in case a student is unable for any reason to connect with his/her laptop to the test for any technical problem, he/she can safely take it through his/her cell phone.

The gamified test represents an innovation in which even if students have not had prior exposure to the software, they intuitively learn the rules of the game as they play it through trial-and-error. Mistakes are reported instantly to offer the possibility to try again until the user sees the progress in the game and then in the test.

Since invisible areas can be found even without reading the question or written paragraph, the teacher made sure not only to include very small invisible areas, which makes it more difficult to search without reading, but also gave a time limit to complete the entire game. These restrictions allowed for more objective results. Moreover, in the last room, the student was offered the choice to continue the game further by clicking on a precise point, opening a short Google Form in containing questions similar to the first test. In this case, grammar helped to find the correct answer. If the student managed to answer at least 3 out of 5 of the questions correctly, they could guarantee the 3 ACH. For 4 or 5 correct answers the ycould get 4 MST as the final result of the test. If the student decided not to click to continue the game and get to the Google Form, the grade would be 2 APP if they had completed the last room of

Table 4.
Assessment 3 - Summative non- gamified test

SEMESTER 1 GRADE 7 (7.1-7.3)	SEMESTER 1 GRADE 8 (8.3-8.4)
UNIT 1: Daily activities around town	UNIT 1: My Ideal Community
<p>Evaluation: Communication 2 (Interpretive) WLA1.3 Reading (ACTFL) Understand, interpret, and analyse what is read, or viewed on a variety of topics. Comprehend the main idea of orally related personal anecdotes, familiar fairy tales and other narratives based on well-known themes.</p>	<p>Evaluation: Communication 2 (Interpretive) WLA1.3 Reading (ACTFL) Understand, interpret, and analyse what is read, or viewed on a variety of topics. Read simple texts in the target language and answer simple questions (e.g., weather report, travel poster or brochure, T.V. Guide, etc.) Use a primary bilingual dictionary, picture dictionary or glossary to access information. Obtain information from short messages (oral or written) (e.g., invitations, directions, announcements, appointments)</p>
<p>TEST: Google Form with multiple choice questions and answers about an infographic concerning daily routines.</p>	<p>TEST: Google Form with multiple choice questions and answers about an infographic concerning a shop.</p>
Total 10 questions.	Total 10 questions.

the escape room, otherwise the grade would be 1 until the completion of room #4. The total number of rooms is 10 and the completion of the entire test, including the Google Form, takes 10 minutes.

RESULTS AND DISCUSSION

The intent of this study is to show how motivation through games helps students not only improve their overall achievement but to incorporate error as a mechanism of the game itself. In the gamified test mode, the error made does not affect the grade at that moment, as within the allotted time of 10 minutes, students should be able to complete all rooms/questions to the end, regardless of how much time they spent in each individual room/question.

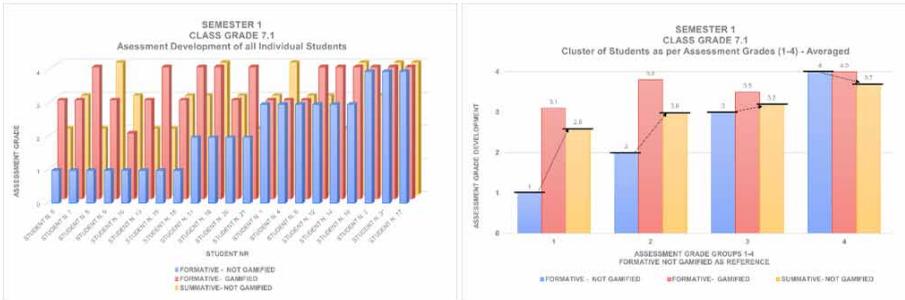
A gamified test, such as the one introduced in grade 7 and 8 courses has indeed shown that the hypothesis presented is true, but some variables must be taken into account such as;

1. All gamified and non-gamified formative tests were prepared by the same teacher, which may lead to an *ad hoc* creation with the aim of showing the desired results. In this regard, comparing the results of the formative tests with the summative ones obtains greater rigour, since the summative tests were prepared by multiple teachers within the language department.
2. For the analysis of the quantitative data, the results of the formative and summative tests obtained by each student were compared, showing the grades according to the evaluation scale performed by the school in question, but for the qualitative data, their interpretation is subjective since the answers received from the students are open-ended and therefore not easily evaluable within a scale of values. In addition, not all students completed the feedback, resulting in a fairly high percentage of non responses. Therefore, the feedback given by the students was graded on a scale from 0 to 4. Where 0 means no response, 1 dissatisfaction, 2 a simple response indicating only one positive adjective concerning the test; 3 a positive response in which 2 positive adjectives or concepts appear and finally 4 for more than 2 adjectives or concepts.

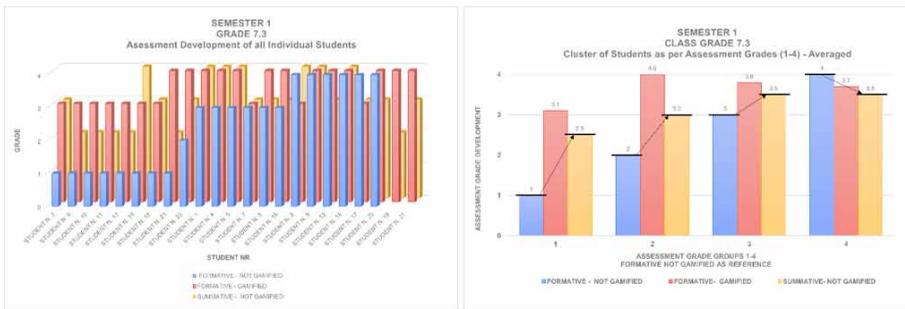
The left-hand column of Table 5 shows individual student results for the three tests: formative non-gamified, formative gamified, and summative non-gamified. The right column shows the delta

Table 5.
Assessment Development of all individual Students for each class - Cluster of Students as per Assessment Grade (1-4) - Averaged for each class

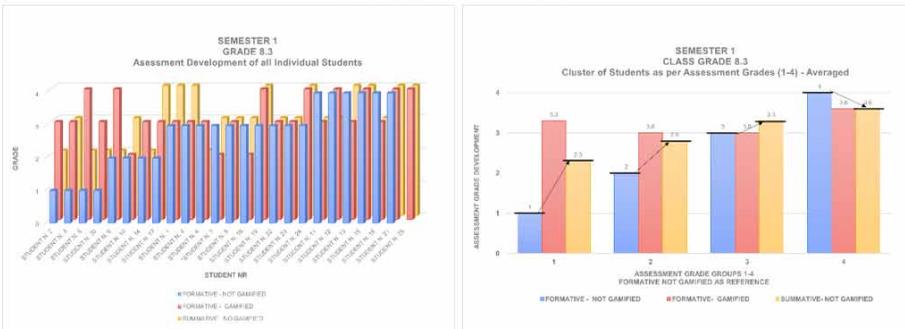
SEMESTER 1 GRADE 7.1



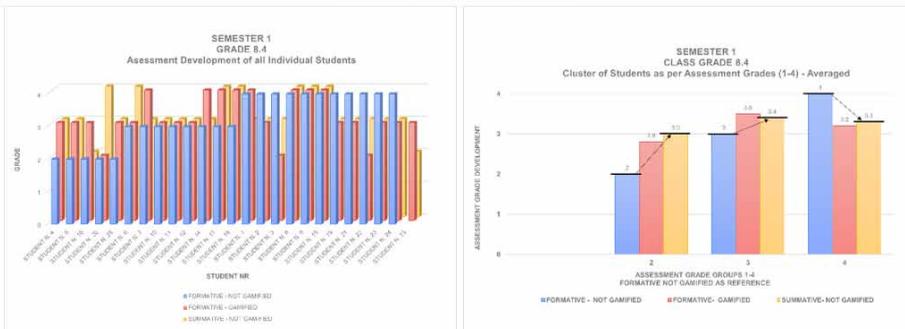
SEMESTER 1 GRADE 7.3



SEMESTER 1 GRADE 8.3



SEMESTER 1 GRADE 8.4



variance for groups of students ranging from those who scored 1 during the first non-gamified formative to those who scored two, and so on.

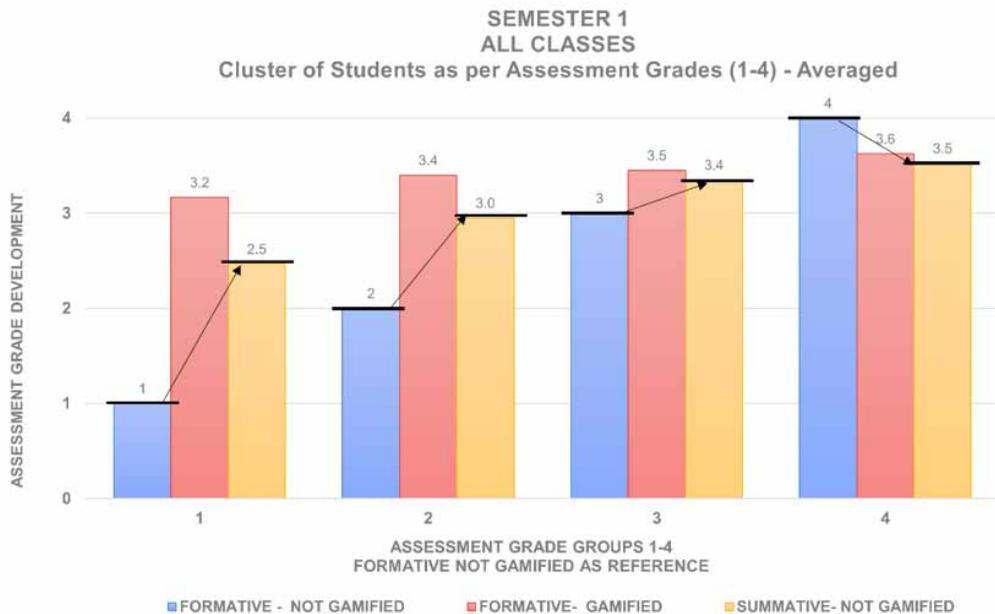
As can be seen in detail for each class the trend is always the same. The lower the grade (1) in the formative not gamified test, the greater the improvement that is obtained in the formative gamified test (about two points) and this improvement is maintained even in the summative test, although slightly lower. Vice versa, when the starting grade of the non-gamified test is the maximum (4), then in the gamified test a slight decrease is present, reconfirming the maximum grade in the summative, which is never gamified. This mechanism is repeated for each grade: 7.1-7.3-8.1-8.4. These results are fully represented in Table 6.

It is clearly seen that in general those who got 1 increased 1.5, those who got 2 increased by 1, and those who got 3 improved by 0.4, while those who got 4 decreased by 0.5.

These results may suggest that indeed the proposal of a gamified test involves an increase in motivation as far as the newness is concerned, for it is a game with its own dynamics where the error is seen as an integral part of the game, but it definitely works for students whose grade varies between 1 and 2.

On the other hand, if the student has a starting grade of 3, the result decreases and even goes down if the grade is 4. At this point, these results suggest that for the range of grades from 3 to 4 the proposal of a gamified test does not assume the same value, since it could be a distraction or even the test is not taken seriously. Quoting the concept of “flow” of Csíkszentmihályi (1997) in which the state of well-being oscillates between two extremes such as anxiety and boredom, it would seem that probably those students who are anxious about the test because they got a very low grade in the previous one or because they do not want to make mistakes, have found benefit and therefore well-being in facing it through the game, instead, those who started from a very good grade have perhaps fallen into a state of boredom.

Table 6.
Cluster of Students as per Assessment Grade (1-4) - Averaged for all classes



There are also three very interesting studies that might offer an explanation for this fact: Smiderle et al. (2020), after experimental research, concluded that introverted students who used a gamified version of the lessons were more engaged than extroverted students for the same version, even finding a negative correlation between the trait of extroversion and the number of views of the leaderboard, indicating that gamification in general and, especially the element of the leaderboard, is more beneficial to introverts. This finding leads us to think that students who were confident in their abilities and consequent high grades felt “threatened” by the novelty of being faced with a gamified test, which instead granted more engagement and interest for students who were more insecure about their language level assessed by low to medium grades.

In contrast, another study conducted by Landers and Armstrong (2017) suggests that if learners do not trust gamification, then it most likely will not help them. In this sense, we can think that again for high-level students, the novelty of a gamified test is not taken seriously since it does not represent their idea of testing, which leads them to take the test lightly and perhaps get distracted by the graphic story content that underlies the escape room. In this regard, it would seem that we would be in a similar case to what Hanus and Fox (2015) found, where students within the gamified course showed less motivation, satisfaction, and management over time than those within the non-gamified category. The impact on students’ exam scores was mediated by students’ levels of intrinsic motivation, with students in the gamified course showing less motivation and lower exam scores than the non-gamified category. This suggests that some care ought to be taken when applying gamification mechanics to educational settings.

Finally, looking at the feedback issued by the students, it can be seen that out of 94 students, 70 responses were received, of which 2 were negative, but it is not possible to make a statistical study, since these are open comments whose interpretation could sometimes be subjective. As shown, for example, in Table 7 for grade 7.1.

In order to represent the open-ended responses and analyse them statistically, results were quantified on a scale of 0 to 4 (A-E), where 0 (E) represents no comment, 1(D) a negative comment, 2 (C) a comment with only one positive adjective, 3 (B) with two positive adjectives, and 4 (A) with 3 or more positive adjectives. However, searching for a correlation between the results obtained after a gamified test and the feedback from the students, one might expect that for students who had 1 the feedback would be of high value, but Table 8 shows the opposite:

The table clearly shows that although not all feedback was received, the trend is inversely proportional, the greater the improvement the lower the value obtained at the level of positive feedback of the gamified test.

This result suggests that in order to objectively obtain results on the emotional effect that a gamified test can produce on the student, it is essential to distribute questionnaires with closed-ended answers and with evaluation using a numerical scale. In addition, this study leads one to think about how to distinguish gaming ability from one’s knowledge of the language. This point is suggested by the fact that students who started with a grade of 4 worsened slightly after the gamified test, which may suggest that it was not due to a lack of knowledge or preparation of the language, but rather not having fully grasped the mechanics of the game.

CONCLUSION

This article aimed to contribute to the understanding of how gamification affects student motivation when taking a test. More specifically, the authors found that the acceptance of error within a game is fully accepted by the student in such a way that they continue to try different solutions for the question/level of the game they are facing.

The evidence from observing the results of applying a gamified test in four classes of an International Middle School, two in Grade 7 (12-13 year-olds) and two in Grade 8 (13-14 year-olds), suggest that this had positive effects, not only related to the subject contents but also on an

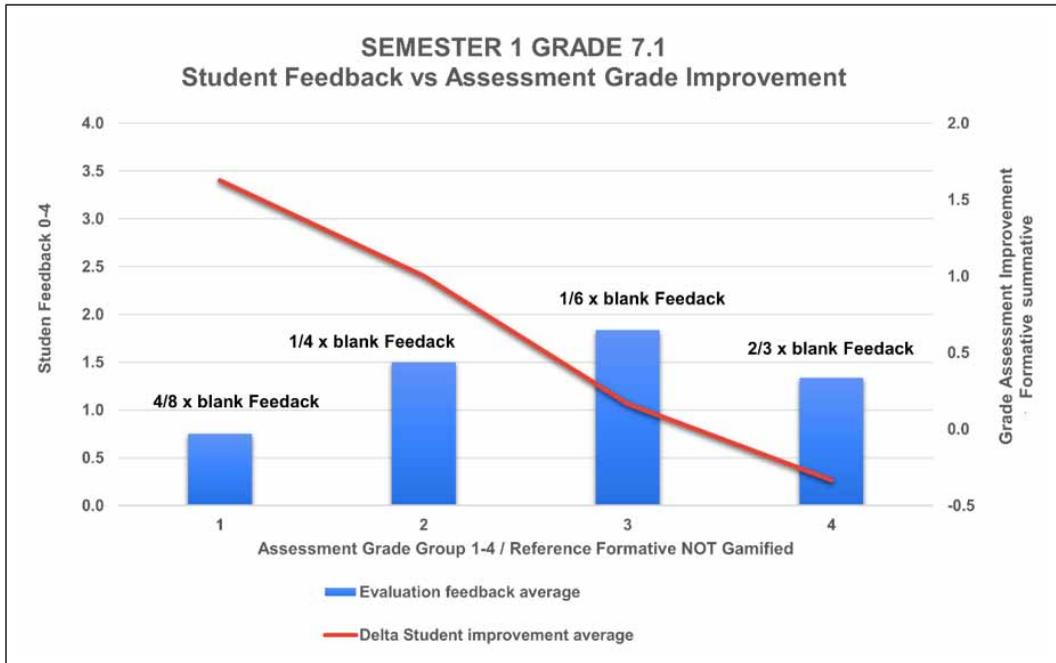
Table 7.
Feedback from students grade 7.1

Students	Feedback	Wording	Evaluation Feedback
Student Nr 1	I liked the test like this because it is different	I like it - different	B
Student Nr 2	I enjoyed the test because it was fun and creative	I enjoy it - fun - creative	A
Student Nr 3	/	/	E
Student Nr 4	/	/	E
Student Nr 5	/	/	E
Student Nr 6	It was confusing at the beginning, but then I understood	Confusing - understood	C
Student Nr 7	If I had more time I could finish it.	Unsatisfied	D
Student Nr 8	I finished the test before the time. I am happy!	Happy	C
Student Nr 9	I did not like it, because I was lost in the rooms.	I did not like it	D
Student Nr 10	/	/	E
Student Nr 11	I want all my tests like this one. I got a 4!	I like it	C
Student Nr 12	I like this test!	I like it	C
Student Nr 13	/	/	E
Student Nr 14	I love it.	I love it	C
Student Nr 15	/	/	E
Student Nr 16	I like the test, I was scared at the beginning because it was new, but then I loved it!	I like it	C
Student Nr 17	/	/	E
Student Nr 18	I want the test like this always!!!!	I like it	C
Student Nr 19	Thank you, Mrs Cecilia, it was wonderful!	Wonderful	C
Student Nr 20	Can we do the test as a gimkit?	I like it	C
Student Nr 21	/	/	E
<i>Feedback Key:</i>			
A	3 x or more positive adjective or facts		
B	2 x positive adjective of facts		
C	1 x positive adjective		
D	Not satisfied		
E	No Answer		

emotional level, as it lowered the affective filter, allowing students to relax and face the test with greater confidence. Furthermore, the results obtained lead us to think that formative tests would be positive when applied to any educational path. The exploration will be the basis of larger research in this field, and it will be used as a preliminary study.

The results showed a significant improvement for students who start from a low grade (1 or 2) after a non-gamified formative test, significantly increasing their performance during a subsequent gamified test. This improvement certainly facilitated their self-confidence since on a third non-gamified test performance remained constant or dropped slightly. However, this does not happen with students who initially have very high grades, and future research could study whether gamification loses its

Table 8.
Student Feedback vs Assessment Grade Improvement grade 7.1



effectiveness over time, to identify possible points of saturation and limitations in its application for both high and low-performing students. In addition, it would be desirable to study the extent to which a gamified test fully assesses language proficiency or gaming ability.

CONFLICT OF INTEREST

The authors of this publication declare there is no conflict of interest.

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REFERENCES

- Azzouz Boudadi, 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. doi:10.4995/eurocall.2020.12974
- Chatfield, T. (2011). *Fun Inc.: Why Games are the 21st Century's Most Serious Business*. Virgin Books.
- Chorney, A. I. (2012). Taking the game out of gamification. *Dalhousie Journal of Interdisciplinary Management*, 8(1), 1–14. doi:10.5931/djim.v8i1.242
- Csikszentmihalyi, M. (1990). *Flow, The Psychology of Optimal Experience* (Vol. 1990). Harper & Row.
- Dörnyei, Z., & Ushioda, E. (2013). *Teaching and researching: Motivation*. Routledge. doi:10.4324/9781315833750
- Ermí, L., & Mäyrä, F. (2005). Player-Centred Game Design: Experiences in Using Scenario Study to Inform Mobile Game Design. *Game Studies*, 5(1), 1–10.
- Fogg, B. J. (2009, April). A behavior model for persuasive design. In *Proceedings of the 4th international Conference on Persuasive Technology* (pp. 1-7). Academic Press.
- Fong, G. (2004, June). Adapting COTS games for military simulation. In *Proceedings of the 2004 ACM SIGGRAPH international conference on Virtual Reality continuum and its applications in industry* (pp. 269-272). ACM.
- Gerber, H. R. (2012). Can Education be Gamified? Examining Gamification, Education, and the Future. APUS (American Public University System).
- Hamari, J., & Koivisto, J. (2013). *Social Motivations To Use Gamification: An Empirical Study Of Gamifying Exercise*. ECIS.
- 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 & Education*, 80, 152–161. doi:10.1016/j.compedu.2014.08.019
- Huizinga, J. (1972). *Homo Ludens*. Alianza Editorial.
- Juul, J. (2010). *A Casual Revolution, Reinventing Video Games and Their Players*. MIT Press.
- Juul, J. (2011). *Half-real: Video games between real rules and fictional worlds*. MIT Press.
- Kahu, E. R. (2013). Framing Student Engagement in Higher Education. *Studies in Higher Education*, 38(5), 758–773. doi:10.1080/03075079.2011.598505
- Kapp, K. M. (2012). *The gamification of learning and instruction: game-based methods and strategies for training and education*. John Wiley & Sons.
- Landers, R. N., & Armstrong, M. B. (2017). Enhancing instructional outcomes with gamification: An empirical test of the Technology-Enhanced Training Effectiveness Model. *Computers in Human Behavior*, 71, 499–507. doi:10.1016/j.chb.2015.07.031
- Nielsen. (2010). <https://www.nielsen.com/us/en/insights/article/2010/what-americans-do-online-social-media-and-games-dominate-activity/>
- Paniagua, A., & Istance, D. (2018). *Teachers as designers of learning environments*. In *Educational Research and Innovation*. OECD. doi:10.1787/9789264085374-en
- Rivera, E. S., & Palmer Garden, C. L. (2021). Gamification for student engagement: A framework. *Journal of Further and Higher Education*, 45(7), 999–1012. doi:10.1080/0309877X.2021.1875201
- Schell, J. (2008). *The Art of Game Design: A book of lenses*. CRC Press. doi:10.1201/9780800919171
- Smiderle, R., Rigo, S. J., Marques, L. B., Peçanha de Miranda Coelho, J. A., & Jaques, P. A. (2020). The impact of gamification on students' learning, engagement and behavior based on their personality traits. *Smart Learning Environments*, 7(1), 1–11. doi:10.1186/s40561-019-0098-x

- Tekinbas, K. S., & Zimmerman, E. (2003). *Rules of play: Game design fundamentals*. MIT Press.
- Vassileva, J. (2012). Motivating participation in social computing applications: A user modeling perspective. *User Modeling and User-Adapted Interaction*, 22(1), 177–201. doi:10.1007/s11257-011-9109-5
- Watson, W. R., Mong, C. J., & Harris, C. A. (2011). A case study of the in-class use of a video game for teaching high school history. *Computers & Education*, 56(2), 466–474. doi:10.1016/j.compedu.2010.09.007
- Werbach, K. (2014, May). (Re) defining gamification: A process approach. In *International conference on persuasive technology* (pp. 266-272). Springer. doi:10.1007/978-3-319-07127-5_23
- Whitton, N., & Hollins, P. (2008). Collaborative virtual gaming worlds in higher education. *ALT-J*, 16(3), 221–229. doi:10.3402/rlt.v16i3.10900
- Zichermann, G., & Cunningham, C. (2011). *Gamification by design: Implementing game mechanics in web and mobile apps*. O'Reilly.

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