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Gamification in Primary Education Grade. A Project of Gamification in Tutorial Action Subject to Increase Motivation and Satisfaction of the Students

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Abstract

Nowadays, one of the challenges in education is to maintain students motivated and participating in class. Teachers generally say that students are not involved in class, they do not take part in activities as they are not motivated... One of the new methodologies in education is gamification, which is presented as an active, original methodology, and as an appropriate methodology to get students motivated in their learning process. Gamification is a learning technique that moves the mechanics of games to the educational field. In addition to a theoretical approach, a summary of the activities that have been developed during the course are presented. This chapter presents the experience of a gamified project with students of Primary Education Degree, more specifically in the subject of tutorial action. This project was proposed to try to respond to the need of students of the Primary Education, so that they are motivated and active in the learning of the subject and to foster their participation and satisfaction with their learning. The results have shown an improvement in students' motivations.

13.1. Introduction

Today one of the main challenges in education is to keep students motivated and attentive in class. One of the most heard complaints among teachers is that students are not involved, they are not motivated, and they do not like to participate in class activities...

All of this is a problem, because if the student is not motivated, he will hardly want to get involved in activities, they will have difficulties when it comes to learning and even that learning can be difficult for them to transfer or use in real life, as it will not be significant to them. In addition, there are learnings that are done by rote, leading to an empty learning, which will be forgotten in the not too distant future.

Educational reforms arise as attempts to respond to society's educational needs, as a measure to address the potential inconveniences of previous education systems.

In addition to educational reforms, within the faculty and research in education, teaching methodologies arise or develop as well. Within this framework of methodological innovations, current methodologies emerge, where the use of technologies and new teaching methods come into play.

It is now fashionable to talk about active methodologies, which are the methodologies that require students to be active in their learning process (Méndez, 2008; Mendez & Trillo, 2010).

Getting students active and more involved during the teaching and learning process depends on teachers, as teachers we have to get students motivated. In addition, this would be one of the main obstacles, how to get our students motivated? How to make our students want to be active participants in classes? How to make them want to get involved in the teaching-learning processes that they do not care about it? How to bring learning closer and make it more attractive to students?
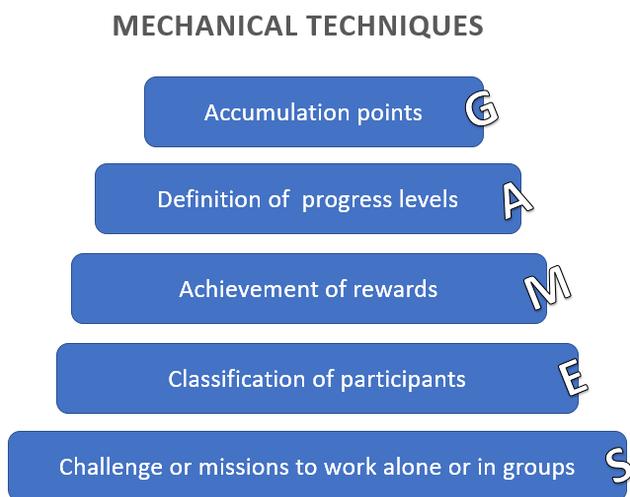
This chapter will answer many questions.

Currently one of the methodologies that are booming is gamification, which is presented as an active, original methodology, and as an appropriate methodology to get students motivated in their learning process (Kapp, 2012; Zichermann & Cunningham, 2011).

There are authors like Lister (2015) who argue that gamification is one of the most powerful and useful tools for attracting and maintaining students' attention in class. Gamification is the use of elements, designs or game structures in non-playful contexts (Deterding, Dixon, Khaled, & Nacke, 2011).

This type of learning gains ground in training methodologies due to its playful nature, which facilitates the internalization of knowledge in a more fun way, generating a positive experience in the user (Goethe, 2019; Reiners & Wood, 2015). A series of mechanical, dynamic and aesthetic techniques extrapolated from the games are used too.

Some of the mechanical techniques that can be included in our gamified experiences are the following (figure 1):

MECHANICAL TECHNIQUES

- Accumulation points
- Definition of progress levels
- Achievement of rewards
- Classification of participants
- Challenge or missions to work alone or in groups

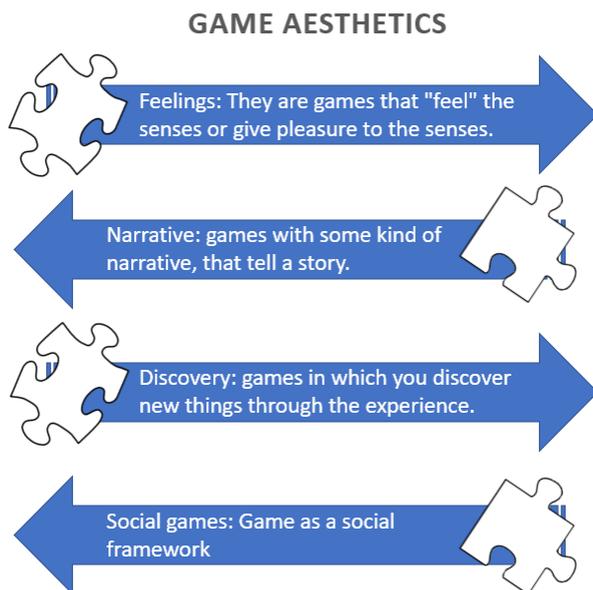**Figure 1.** Example of mechanical techniques extracted from games

Some of the dynamic techniques that can be included in our gamified experiences are the following. All of these are related to motivation:

DYNAMIC TECHNIQUES

Promote personal growth

Get a reward

Get a superior status

Self Expression
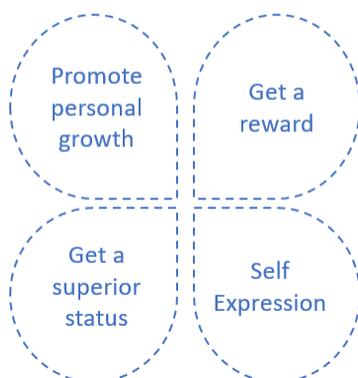
Figure 2. Example of dynamic techniques

Some of the game aesthetic examples (figure 3) that can be included in our gamified experiences are the following. Aesthetics evoke emotional responses by the player when interacting with the video game (Hunicke, LeBlanc, & Zubek, 2011):

GAME AESTHETICS

Feelings: They are games that "feel" the senses or give pleasure to the senses.

Narrative: games with some kind of narrative, that tell a story.

Discovery: games in which you discover new things through the experience.

Social games: Game as a social framework

Figure 3. Example of game aesthetics

In addition to this, some authors emphasize that apart from using the design, strategies or mechanics of the game, using gamification in the classrooms, it encourages, promotes and motivates for the student's action, their learning and even the resolution of problems (Kapp, 2012), so gamification would lead to work towards meaningful and contextualized learning.

Many authors claim that, with the use of gamification in education, the climate for students' motivation levels to improve is created (Erenli, 2013; Lee & Hammer, 2011; Shneiderman, 2004), an element that facilitates and encourages their learning. Authors such Lee and Hammer (2011) point out that games have great potential to provoke and work on the development of certain emotions such as curiosity, optimism, pride, or security through the positive treatment that is made of the failure through the game, which allows learning through repetition without taking risks.

In the same line of argument, De Freitas (2018) argues that the use of gamification in education promotes and encourages a high commitment on the behalf of students, motivational and wilful that favours that the student will have a need and interest in knowing and learning more so they can understand things in order to win the game.

As we see, this methodology achieves positive effects in the students, but there are authors who warn about the importance of this methodology. As Buckley and Doyle (2014) say, it is true that the games and this methodology create a commitment on the part of the students and it increases their motivation in learning experiences. However, it should be kept in mind that the methodology must be implemented in class correctly, because if not, the benefits fostered by that methodology could become negative effects arising from its misuse

Because of the above, teachers should first know all the ins and outs of this methodology at the theoretical level and then plan with care, attention and consistency all the activities, tasks or projects to be carried out in a practical way within their classrooms (Von Ahn & Dabbish, 2008).

This results in a change in relation to the use or idea of the games. These will go from being an element or resource only of recreation or leisure, to being used in education, since it has become clear that they can be a useful and effective tool or resource for training and motivation (Hamari, 2017).

Gradually more and more teachers and researchers are seeing the potential of this methodology in education and some defend it by encouraging its use and others spreading their experiences (Balducci, Grana, & Cucchiara, 2016), which, in our view, also promotes the use of it.

After this review of gamification as a methodology with these benefits that seem to respond to problems regarding the lack of motivation and involvement of students, it is not surprising that gamification is adopted as a methodology in the classroom (Piñeiro-Otero & Costa-Sánchez, 2015).

Therefore, if as teachers we need students to be active, to obtain different responses or behaviours from them, we have to try to motivate them; we must encourage and develop the capacity to solve challenges. This is how we work to prepare students for life, for the outside world around us, and not just to limit learning to the classroom.

The outside world is changing and needs people prepared to be able to face and respond to the challenges that will arise in life. This will encourage meaningful learning for students.

One of the keys to be able to use this method effectively are marked Pérez-López & Rivera (2017) who emphasize that three elements must be taken into account for the good use of this methodology and to be able to achieve the optimal effect of it. These elements are creating a good environment in class, implementing the methodology in a way that is focused on experience and play, and the use and importance of a shared assessment.

As can be seen, all these gamification researches are current. It is an active methodology with an increasing use as well as research nowadays.

The findings of one of Quintero, Jiménez, & Area (2018) latest researches, state that, through the use of gamification, the levels of motivation and cooperative work of students are improved and that students are more involved in their learning and have worked more during the process.

For all this, this chapter presents the experience of a gamified project with students of the Primary School Year, more specifically in the subject of Tutorial Action. This project is proposed to try to respond to the need for students of the Primary School Year, so that they are motivated and active in the learning of the subject.

A gamification project was developed using different strategies for active elaboration of the contents of the subject and working the different techniques and strategies through gamification. An evaluation process was also built through gamification, as we must always keep in mind that we cannot work through a methodology and evaluate otherwise.

13.2. Methodology

Participants

Participants have been all third-year students of the Primary Education Degree, enrolled in the subject of Tutorial Action in Primary Education. The average age of the participants is 21 years old. The total number of participants during the experience was 46 (figure 4).
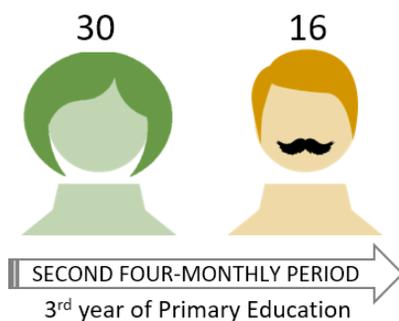
Figure 4. Participant sample in the experience

Gamification project carried out with the students

During the 2017/2018 academic year, there was a low motivation towards the subjects of the students of the Primary Education Degree and some disenchantment and lack of involvement on the part of the students.

Therefore, at the beginning of the 2018/2019 academic year, a questionnaire is distributed to students, with only three questions about their level of motivation, participation or involvement and their level of satisfaction with the subjects they take in general

and last question for final questionnaire, what do you think of the experience?

After needs detection and diagnosis, and given the benefits of using the gamification methodology in other areas after the literature review, it is decided by the teachers to design and carry out a gamification project in the subject of Tutorial Action in Primary Education.

Students are informed of the type of methodology with which they will work in the classes and they welcome them with expectation, since they have never had such an experience of these characteristics and the novelty puts them on alert. Different strategies are started to be used to make students know how gamification is worked, materials are started to be created among all the students, and teachers involved, which will be used during the subject.

Therefore, students are actively creating the materials they will then use for their own learning. This will help them see how they would do in a class, just as they will be able to do in the near future when they are teachers, have their classrooms and their students (figure 5).

The materials and activities that were created were digital, through computers and Tablets, and adaptations of board or traditional games were also made. All the contents and the process are carried out taking into account the elements of the gamification.
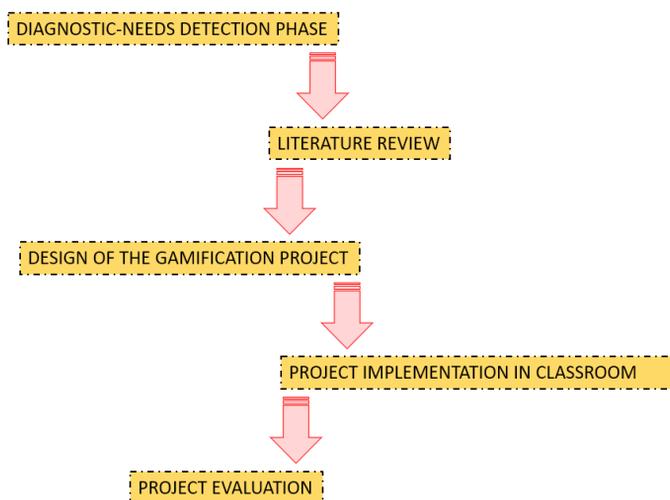
Figure 5. Flow of the gamified project in Tutorial action

The materials created by the students were digital and physical games, which were created to gamify the subject with the teacher's guidance.

Games were created such as the Pasapalaba, the game of humor (to work the emotions), the taboo… all with the aim of working the contents of Tutorial Action, whose main areas of work were covered.

Students have needs that tutors and teachers must attend from the tutorial action, and all of them have been covered from this methodology, with this project. These needs have been worked for undergraduate students in a way that they can then learn to work with their students in a classroom. These needs or work guidelines, according to Expósito (2013, 2018) are that the work from the Tutorial Action is:

▸ Generalized and individualized: Students should be treated individually, as they
▸ Have needs, although they must also be treated in a general way, as action is taken on the group.
▸ Planned and flexible: To achieve the objectives set, optimally, the work must be planned, organized and structured, but at the same time it must have some flexibility, because it must adapt to the different situations that can happen in a classroom.
▸ Preventive and post-active: Knowing the possible problems that may occur in the classroom, try to avoid them, thus having less risk and even being solved before they occur or cause more problems that are possible.
▸ Procedural: It is not an action of a specific moment but is carried out throughout a process.
▸ Systemic: It must be governed by a structure, which is established and organized in the teacher's planning.
▸ Specific and integrated: It occurs within a specific context and at a certain time, allowing integrating different knowledge.

This project has maintained all these aspects and integrated them into the knowledge of the subject.

It should be remembered, on the other hand, that one of the elements of gamification is the establishment of score rankings. The students have also drawn up these rankings. It was they themselves who developed it and even designed the badges they were

earning for their work. It should be remembered in this section that gamification badges are achieved by effort, not achievement, as in traditional learning.

However, as we have said not only the content and learning process of the subject was gamified, but also the methodology itself was used for evaluation, since we cannot work in one way and evaluate another.

An example of the evaluation shows the use of the Plickers application, where through the computer, a projector and each student with his or her toothed cards. As shown in figure 6, with a mobile phone or tablet, the students' responses are captured and after scanning them, which takes a matter of seconds, the correct or incorrect results of the answers come out, a highly motivating element for the participants, to have an instant feedback.
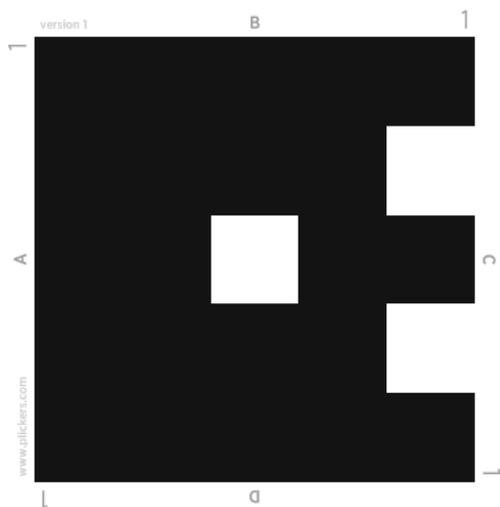
Figure 6. Student cards generated for the Plickers evaluation applicationAvailable at: <https://plickers.com/>

Finally, and following the same methodology, the teacher organized an Escape Room with the purpose of the students knowing their grades at the end of the subject. The Escape Room activity consisted of having the students in their classroom, the teacher had designed and prepared the class so that. For an hour, students

had to solve riddles and clues, all related to the subject and how it had been worked throughout the semester and the students had to solve the riddles and follow the clues until they reached the end that had double reward: being able to leave the classroom and know their final grades.

13.3. Results

This section presents the results of the variables analyzed before and after the gamification experience. At the beginning of the course, a few questionnaires were passed to the students to learn the levels of motivation, participation and satisfaction. The answers given to the question are also presented, what do you think of the experience?

At the end of the gamification project explained in the previous section, the questionnaires with the same items were passed again to see if the values of the degree of motivation, participation and satisfaction of the students had suffered any alteration. Possible answers to items ranged from scores 1 to 10. The results obtained are shown below.
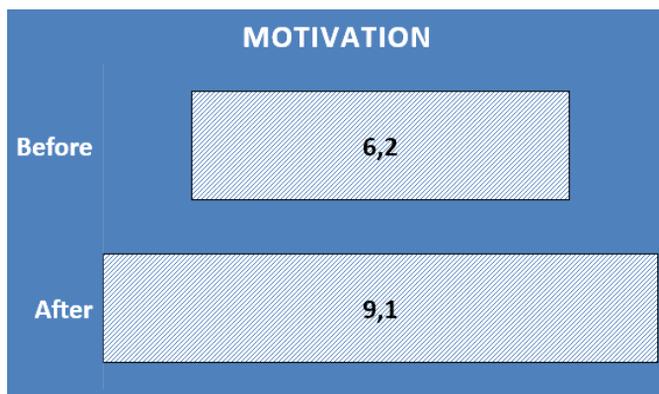
Figure 7. Motivation levels before and after of gamified project

As seen in Figure 7, students have shown an obvious difference between the motivation values obtained before the project, with an average of 6.2 and after applying it, obtaining an average value of 9.1.

PARTICIPATION

Before 5,2

After 8,9
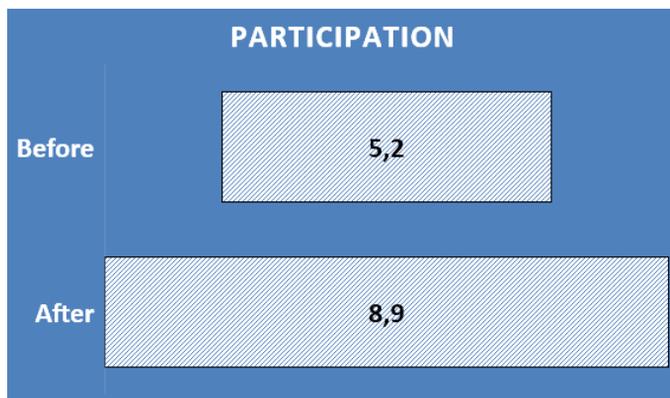
Figure 8. Participation levels before and after of gamified project

As with motivation and, as shown in Figure 8, students have shown a significant difference between the participation values obtained before the project, with an average of 5.2 and applying it, obtaining an average value of 8.1.

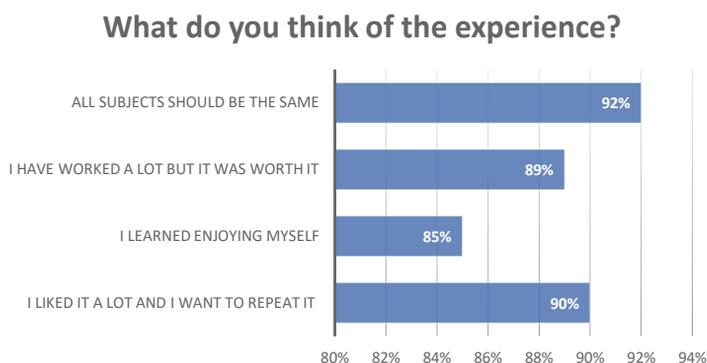**SATISFACTION**

Before 6

After 9,3

Figure 9. Satisfaction levels before and after of gamified project

Regarding what happened with the two dimensions for which it was previously asked, there is an increase in the general satisfaction (figure 9) presented by the participants in the experience.

As shown in Figure 10, the answers collected in the qualitative part are positive. Ninety-two percent of students think that all subjects of their current career should follow a similar methodology. Eighty-nine percent think that the time spent during the devel-

opment of the subject has been worthwhile. On the other hand, eighty-five percent indicate that they have been able to learn while having fun. Finally, ninety percent indicate that they would like to repeat this experience throughout their university career.

What do you think of the experience?

Figure 10. Satisfaction levels before and after of gamified project

13.4. Discussion and conclusions

As it has been seen in the previous section, students have high levels of participation or involvement and with the help of the teacher, they build the subject's project. With regard to this development by students, the results are supported by those found in other studies on gamification and the involvement of the participants (Roth, Schneckenberg, & Tsai, 2015).

The development has been linked to intrinsic motivation (Csikszentmihalyi, 2002; Hanus & Fox, 2015), so in these kinds of experiences the values of motivation and development are important related to each other.

The motivation and satisfaction of students regarding their learning presents high levels in the score obtained. All the members involved have thus built significant and active learning.

The different variables analyzed show high satisfaction values, which has led to the good results in the subject, to the motivation of the students (Erenli, 2013; Lee & Hammer, 2011) and the faculty.

It can be said that the levels of the variables analyzed have been increased after the implementation of the gamification pro-

ject in the Primary Education Degree, thus proving the benefits of this project.

It is thus confirmed that a well-designed gamified project, with mastery of methodology, is beneficial for the motivation, participation and involvement of students.

References

Balducci, F., Grana, C., & Cucchiara, R. (2016). Affective level design for a role-playing videogame evaluated by a brain–computer interface and machine learning methods, *The Visual Computer*, 33(4), 413-427. doi: 10.1007/s00371-016-1320-2.

Buckley, P. & Doyle, E. (2014). Gamification and student motivation, *Interactive Learning Environments*, 24 (6), 1162-1175. doi: 10.1080/10494820.2014.964263.

Csikszentmihalyi, M. (2002). *Flow: The Psychology of Happiness*. London: Ebury Publishing.

De Freitas, S. (2018). Are Games Effective Learning Tools? A Review of Educational Games, *Journal of Educational Technology & Society*, 21 (2), 74-84.

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness. In *Proceedings of the 15Th International Academic Mindtrek Conference on Envisioning Future Media Environments - Mindtrek '11*. doi: 10.1145/2181037.2181040.

Erenli, K. (2013). The impact of gamification: Recommending education scenarios, *International Journal of Emerging Technologies in Learning*, 8 (SPL.ISSUE), 15-21.

Expósito, J. (2013). *Recursos y materiales para la formación en acción tutorial en educación primaria.* Granada: GEU.

—— (2018). *Formación teórica y práctica para la acción tutorial en educación primaria*. Granada: GEU.

Goethe, O. (2019). Immersion in Games and Gamification. In *Human–Computer Interaction Series*. Springer International Publishing, pp. 107-117. doi: 10.1007/978-3-030-11078-9_10.

Hamari, J. (2017). Do badges increase user activity? A field experiment on the effects of gamification, *Computers In Human Behavior*, 71, 469-478. doi: 10.1016/j.chb.2015.03.036.

Hanus, M. & Fox, J. (2015). Assessing the effects of gamification in the classroom: A longitudinal study on intrinsic motivation, social com-

parison, satisfaction, effort, and academic performance, *Computers & Education*, 80, 152-161. doi: 10.1016/j.compedu.2014.08.019.

Hunicke, R., LeBlanc, M., & Zubek, R. (2004, July). MDA: A formal approach to game design and game research. In *Proceedings of the AAAI Workshop on Challenges in Game AI*, vol. 4, 1, p. 1722.

Kapp, K. M. (2012). *The Gamification of learning and Instruction*. San Francisco: John Wiley.

Lee, J. J. & Hammer, J. (2011) Gamification in education: What, how, why bother?, *Academic Exchange Quarterly*, 15 (2). 1-5

Lister, M. (2015). Gamification: The effect on student motivation and performance at the post-secondary level, *Issues and Trends in Educational Technology*, 3 (2).

Méndez, R. (2008). Los jóvenes universitarios y su (des)orientación ante los nuevos retos que plantea el EEES, *Educatio Siglo XXI*, *26*, 197-224.

Méndez, R. & Trillo, F. (2010). El papel de la información universitaria en el proceso de formación de actitudes de los estudiantes hacia la Universidad, *Revista de Educación*, 353, 329-360.

Pérez-López, I. & Rivera García, E. (2017). Formar docentes, formar personas: análisis de los aprendizajes logrados por estudiantes universitarios desde una experiencia de gamificación, *Signo y Pensamiento*, *36* (70), 112-129. <http://dx.doi.org/10.11144/Javeriana.syp36-70.fdfp>.

Piñeiro-Otero, T. & Costa-Sánchez, C. (2015). ARG (juegos de realidad alternativa). Contribuciones, limitaciones y potencialidades para la docencia universitaria, *Comunicar*, 44 (22), 141-148.

Quintero, L., Jiménez, F., & Area, M. (2018). Más allá del libro de texto. La gamificación mediada con TIC como alternativa de innovación en Educación Física, *Retos: nuevas tendencias en educación física, deporte y recreación*, 34, 343-348.

Roth, S., Schneckenberg, D., & Tsai, C. (2015). The Ludic Drive as Innovation Driver: Introduction to the Gamification of Innovation, *Creativity and Innovation Management*, 24 (2), 300-306. doi: 10.1111/caim.12124.

Reiners, T., & Wood, L. (2015). *Gamification in Education and Business*. Switzerland: Springer International Publishing.

Shneiderman, B. (2004) Designing for Fun: How Can We Design User Interfaces to Be More Fun?, *Interactions*, 11 (5), 48-50

Zichermann, G. & Cunningham, C. (2011). *Gamification by Design: Implementing Game Mechanics in Web and Mobile Apps*. Cambridge: O'Reilly Media.