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ORIGINAL

GAMIFICATING PHYSICAL EDUCATION PEDAGOGY. COLLEGE STUDENTS' FEELINGS

GAMIFICANDO LA DIDÁCTICA DE LA EDUCACIÓN FÍSICA. VISIÓN DEL ALUMNADO UNIVERSITARIO

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ABSTRACT

The aim of the study was to assess the impact of the Gamificated experience “Super Mario Bros” in future Physical Education teachers’ initial training. All students enrolled in the subject "Physical Education Didactics II" (n=76) of the Undergraduate program in Physical Activity and Sport Sciences from a university in eastern Spain agreed to participate. The students answered an online *ad hoc* questionnaire, which included open and closed questions (Likert scale). Results revealed very positive and satisfactory perceptions of the experience and its structural characteristics; highlighting, above all, a direct impact on the students’ motivation and commitment to the class; in addition to the desire to modify the formation of heterogeneous groups.

KEY WORDS: Gamification, cooperative learning, didactics of physical education, formative assessment.

RESUMEN

El objetivo de este trabajo fue valorar el impacto de la experiencia gamificada "Súper Mario Bros" en la formación inicial universitaria de futuros docentes de Educación Física. Los 76 estudiantes matriculados en la asignatura "Didáctica de la Educación Física II" del Grado de Ciencias de la Actividad Física y del Deporte de una universidad del Este de España accedieron a participar. Todos respondieron a un cuestionario *online ad hoc* compuesto por preguntas abiertas y cerradas (escala Likert). Los resultados revelaron percepciones muy positivas y satisfactorias sobre la experiencia en general, y de sus pilares educativos en particular; destacándose, por encima de todo, una incidencia directa en el grado de motivación y compromiso hacia la asignatura; además del deseo de modificar la creación de grupos heterogéneos.

PALABRAS CLAVE: Gamificación**,** aprendizaje cooperativo, didáctica de la educación física, evaluación formativa.

INTRODUCTION

21st century Physical Education (PE) needs to be reformed in different ways, and one of them deals with the pedagogical framework (López-Pastor, Pérez, Manrique, & Monjas, 2016). To make students the central character of their own learning, new active methods and pedagogical models are very important (Haerens, Kirk, Cardon, & De Bourdeaudhuij, 2011). Physical Education Teacher Education programs have a key role analyzing, promoting and incorporating these new instructional frameworks into their programs. The European Higher Education Area made this issue a first order need (Berné, Lozano, & Marzo, 2011).

Based on these ideas, the experience "Super Mario Bros" (Flores-Aguilar, 2019) was implemented in the subject "PE Pedagogy II" of the undergraduate program: "Sport and Physical Activity Science", where Gamification has hybridized with cooperative learning (CL) within a formative assessment framework. Next, a short introduction of these three pillars of the experience.

Gamification

It is also known as Ludification (Kapp, Blair & Mesch, 2014). Although the term Gamification came out in 2008, it was not until 2010 when starts to be used in Education and in other contexts such as business, health, marketing… (Melchor, 2012). It means living game experiences in non-game contexts (Werbach & Hunter, 2012). In Education, Gamification is considered a methodology were a story or an imaginary narrative is used as a leading thread to consolidate competences or learning goals using games or videogames mechanics (Flores-Aguilar, 2019). It emerges as an "antidote to the virus that currently infects Education" (i.e., amotivation, boredom, lack of responsibility) through the dynamics, mechanics and components of games (Llopis & Balaguer, 2016; Werbach & Hunter, 2012). Several authors believe that the rules and challenges that are created t promote students' motivation and responsibility (Cortizo, Carrero, Monsalve, Velasco, Díaz, & Pérez, 2011; Monguillot, Arévalo, Mon, Batet, & Catasús, 2015). Others insist that students tend to actively participate, because they become motivated thanks to the positive feelings and emotions generated (Hanus & Fox, 2015; Pérez-López & Rivera, 2017). Cortizo et al. (2011) add that games promote collaboration and problem solving skills and reduce students' fear to fail. However, Carrasco, Matamoros and Flores-Aguilar (2019) and Chan, Fui-Hoon, Liu and Lu (2018) warn that positive outcomes are not always achieved. This controversy highlights the need for more research on Gamification. Melchor (2012) believes that this framework is successful if it is attractive for students and promote students' interest and the Self-Determination Theory (Ryan & Deci, 1985) can play a significant role. Fernández-Río and Flores-Aguilar (2019) pointed that Gamification must promote a task learning climate (the goal should be to complete the task without thinking about outscoring others), where competence (learning takes place, and that is why formative assessment and immediate feedback are very important), relatedness (promoted by the work group), and autonomy (students can make decisions) are fostered. Perez-Pueyo and Hortigüela (2020) alert that there are inappropriate gamificated experiences,

focused on a large number of rewards, which favor individual and intragroup competition and promote extrinsic motivation. Based on these premises and in the search for a shift in students' attitudes towards PE, Gamification should be considered a pedagogical model that should hybridize with CL under the umbrella of formative assessment (Fernández-Río & Flores-Aguilar, 2019), the way it is going to be described later.

Finally, and despite the fact that Spain is the second country with the largest number of publications on Gamification (Kocakoyun & Ozdamli, 2018), recent reviews have showed that research is still very limited (Escarvajal & Martín, 2019; León, Martínez-Muñoz, & Santos-Pastor, 2019).

Cooperative Learning

CL is a pedagogical model where students and teachers learn and co-learn in a teaching-learning framework that promotes their positive interdependence and promotive interaction (Fernández-Río, 2014). Research has pointed that CL is fundamental to foster students' academic and motor learning, and to build prosocial behaviours, inclusion and diversity appreciation in PE classes (Fernández-Río & Mendez-Gimenez, 2016). In the same line, Goodyear, Casey and Kirk (2014) believed that students who experienced CL increased their motivation and engagement. This project tries to shed some light on this topic and implement CL and its five elements (Johnson, Johnson, & Holubec, 2013): positive interdependence (each group member's work is needed for the benefit of the rest and vice versa), face to face promotive interaction (students interact during the tasks to help each other), individual accountability (each student is responsible and has the duty to contribute), group processing (information needs to be processed by each member to be used) and social skills (students improve their interpersonal skills with the direct contact), as well as some of its basic techniques such as collective score or think-share-perform (Grineski, 1996; Orlick, 1982). As previously mentioned, research indicates that CL can create a working framework form Gamification that can help build a task class climate (Fernández-Río & Flores-Aguilar, 2019), but more research is needed to confirm this idea.

Formative assessment in higher education

Real or significant learning depends, greatly, on assessment (Gibbs, 2003). First, we must clarify that assessing is not grading. Both concepts are frequently confused and this still causes disastrous effects on students (López-Pastor, 2009; Palacios, López-Pastor & Barba, 2013). Most assessment is still limited to a final summative grade (Martinez & Flores-Aguilar, 2014). Formative and shared assessment seems to be the best type, since its goal is to improve the teaching-learning process based on transparency (students know from the beginning when, how and on what are they going to be evaluated), students' active participation (space for dialogue, reflection and decision-making are created), and the feedback that it is generated (constant feedback based on outcomes), among other elements (Barrientos & López-Pastor, 2015; López-Pastor, 2009). Based on the changes that the European Higher Education Area brought, formative assessment became one of the central axes for the change

(Martinez & Flores-Aguilar, 2014). There are many published studies on the successful implementation of this type of assessment in Initial Teacher Training, especially on PE (Castejón, López-Pastor, Julián, & Zaragoza, 2011; Gallardo & Carter, 2016; López-Pastor, Pérez, Barba, & Lorente, 2016). Formative assessment improves the professional competences of future teachers, their commitment (Álvarez, Grau, & Tortosa, 2010) and, therefore, their academic performance can be positively influenced (Montero, Villalobos, & Valverde, 2007). Formative assessment can generate promote students' responsibility, commitment, participation and control in their own learning (Boud & Falchikov, 2007; Rodríguez & Herrera, 2009), through self and co-assessment procedures (Castejón et al., 2011).

GOALS

The main goal of the present study was to assess students' thoughts on a gamificated experience called: "Super Mario Bros", based on their experiences along a curricular subject. The idea was to deepen on the students' perceptions and appreciation, evaluating: a) The effects on their motivation, commitment, performance and learning; b) The basic characteristics of the three pedagogical pillars: Gamification, CL and formative assessment; and c) degree of satisfaction (strong and weak points), besides other global reflections.

The outcomes will allow researchers to assess the gamified experience's suitability, to be able to refine each one of its elements in future semesters to increase students' motivation towards the subject, and, consequently, improve learnings during their initial teacher training. Moreover, another goal was to help future PE teachers experience Gamification as a pedagogical framework for their professional development.

Finally, based on the scientific gap previously mentioned (Pérez-López, Rivera, & Trigueros, 2017; 2019), this project tried to shed some light and contribute to the challenge that innovation in education in the 21st century demand, in this case at the college level (Flores-Aguilar, 2019).

MATERIALS AND METHOD

Participants

The sample included a total of 76 students (68 males and 8 females) with an age range of 21-27 years, enrolled in the third year of the bachelors' degree on Sport and Physical Activity Science in a university in eastern Spain. All of them agreed to participate. They attended the compulsory course: PE Pedagogy II (six ECTS credits) two days a week (3 hours/week) during the second semester of the 2017/18 academic year. None had experienced Gamification previously. On the contrary, the teacher was an expert with a solid training on this pedagogical approach and had conducted similar programs in similar contexts at the university level prior to the beginning of this project. However, he had never taught this group of students. An *ex-post facto transversal simple* research design was followed (Montero & León, 2007), where a group of

participants, that hold a special characteristic (in this case, attend the abovementioned course) is selected to be studied to obtain information at a certain time (in this case, at the end of the intervention program).

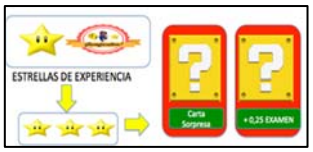
Procedure

During the first lesson of the previously mentioned course, the teacher explained all students enrolled that the instructional framework that was going to be used in the face-to-face type of enrolment (students must attend daily class) was going to be Gamification. An initial, explanatory video was showed and they were allowed to shift to the non face-to-face type of enrolment that followed a traditional approach (i.e., teacher's lectures, notes, group assignments, final exam). This possible change was maintained during the whole course. Some may think that this procedure could hold some ethical dilemmas, but the possibility for the students not to participate or abandon the study at any time and shift to the traditional framework solves the possible dilemmas adequately. On the other hand, the idea of using the whole group-class responded to the researchers' aim of investigating the effects of Gamification in a real, natural, non-modified context, to assess its impact and suitability. The teacher that conducted the course was also part of the research team.

The whole course was implemented hybridizing Gamification and CL within a formative assessment framework called "Super Mario Bros". It meant an important methodological shift in the course, since it had always been conducted under a traditional approach (i.e., teacher's lectures, notes, group assignments, final exam), but it did not modified the contents. Competences and learning outcomes were the same for both approaches. Table 1 outlines the main elements of the intervention program, using as the leading thread some of the elements of Gamification described by Werbach and Hunter (2012). It is important to remember that the basic elements of CL (Johnson et al., 2013) were also using to develop and conduct the intervention program. For a more detailed information, please see Flores-Aguilar (2019).

Table 1. Descriptive summary of the key ingredients of the "Super Mario Bros" project.

Ingredients	Description	Illustration
1. World-Narrative	Mythical videogame "*Super Mario Bros*"	
2. Mission-Challenges	The final goal was to beat *Bowser* (teacher's role in the final challenge of the game), which is in a castle with princess *Peach*. To do it is necessary to pass a set of challenges (19 in total) at different levels.	
3. Levels	Based on the real game, 3 levels or phases have been created before the final battle. Each levels involves one topic of the course, and each one of the challenges are tasks and activities of the course (linked to the topics and the learning outcomes)	

4 – 5. Avatars, players and teams	Small, heterogeneous games (based on gender and grades on the previous course: PE Pedagogy I) were formed. Each group represented one character of the game, but they had to "personalized it" in a token that used to identify the group in the board game	
6. Rewards	*Coins:* at the end of every challenge, they were awarded to each team based on results of the task. To move to the next level, a certain number were needed. When a group did not obtain the needed ones in the time allocated, extra time was awarded to pass the challenges (to modify the work and turn in a correct one). *Secret keys*: at the end of every level, a secret key has awarded to each group (they had a message written with invisible ink), which allowed the group to enter the new level and get closer to the final battle.	  
7 – 8. Experience points and extra rewards	Each extra task (not compulsory) awarded *stars* (three in each level). Three became a *surprise card* with exclusive benefits that could be used in the final written exam.	
9. Classification	Teams and levels were visible in class in a panel (board). It did not highlighted winners and losers. It only showed each player in which level he/she was during the game.	
10. Special events	There were five: on-campus star search, surprise *kahoots*, active breaks, pyramid challenge (battle between groups) and *Breakout-Edu.*	
11. Medals	Final awards to all the teams that rescued the princess were awarded, but also to all participants. The last day, an award ceremony was held (trophies made out of cardboard) and specially designed diplomas were handed.	

Instruments

Questionnaire

The research team elaborated an *ad hoc* questionnaire to assess the intervention program. It included eight subscales with 41 items and other questions related to age, gender or the teacher's role. The first subscale, four items, was designed to assess students' motivation towards the subject (i.e., "Do you think that the Mario Bros project positively influenced your motivation towards the subject?"). The second one, three items, asked about students' commitment towards the subject (i.e., "Do you believe that the Mario Bros project positively influenced your commitment in the subject?"). The third, three items, asked about students' academic performance in the subject (i.e., "Do you feel that the Mario Bros Project has positively influenced your academic performance in the subject?"). The fourth, three items, asked about students'

learning (i.e., “Do you think that the Mario Bros project has help students strengthen their learning in this subject?”). The fifth, nine items, asked about different elements of Gamification and their suitability (i.e., “Please, assess the suitability-importance of the following elements of Gamification used in the Mario Bros project: missions, levels, rewards…”). The sixth, two items, asked about the use of e-tools (i.e., “Please, assess the suitability-importance of the following e-tools: class-dojo, kahoot…”). The seventh, six items, asked about the five basis elements of CL (i.e., “Indicate how present were the basic elements of CL in your group: individual accountability…”). Finally, the eight, 11 items, asked about formative assessment (i.e. “Assess the suitability-importance of the following assessment elements present in the project: self-assessment….”). Participants responded in Likert scale (one= nothing, two= little, three: quite a bit, and four= a lot) to show their identification with each item. Cronbach’s Alphas were acceptable, showing that the subscales could be considered reliable; that each item was related to the others and can contribute to a single score: “motivation towards the subject”= .697, “commitment towards the subject”= .775, “academic performance”= .811, “learning”= .861, “suitability of the elements of Gamification”= .880, “use of e-tools”= .540, “CL”= .795, and “formative assessment”= .871. Only the subscale “use of e-tools” showed an inadequate Cronbach’s Alpha. Its limited number of items (just two) could be considered the problem (Vincent, 2005).

Open questions

At the end of the questionnaire, three open questions were included to obtain qualitative information of the impact of the intervention program: a) Highlight the weak points of the project that you just experienced; b) Highlight the strong points of the project that you just experienced; and c) Express your feelings, ideas, thoughts… about the program that you just experienced.

Both instruments (questionnaire and open questions) were build on-line for an easier use. In the last class, participating students were asked by the teacher to answer, at that time, the questionnaire using their mobile devices (i.e., phone, tablet, laptop..). Anonymity and confidentiality were guaranteed. They were encouraged to be fully honest, because their responses were not going to influence their grades. They were told that they could withdraw, but also that their answers were very valuable.

Data analysis

Quantitative data obtained through the on-line questionnaire was analysed using the statistical package SPSS, 22v. First, internal consistency of each one of the eight subscales included in the questionnaire was assessed via Cronbach’s Alphas. Second, descriptive statistics were also obtained.

Qualitative data obtained from the open-ended questions of the questionnaire was analysed with the help of NVivo 12 software to code the main themes or topics. Later, the number of times they came out were registered. This information was analysed by the first author through constant comparison

(Guba & Lincoln, 1994) and analytic induction (Patton, 1990) to identify and extract categories and patrons of common responses.

RESULTS

Quantitative

First, means and standard deviations of each subscale were obtained (Table 2). We would like to highlight that all of them obtained scores very close to maximum (4). Therefore, the experience could be considered very highly valued in all the elements assessed.

Table 2. Means and standard deviations of each subscale.

	Mean	Standard deviation
Motivation towards the subject	3.17	.48
Commitment towards the subject	3.22	.55
Academic performance	3.09	.63
Learning	3.06	.64
Suitability of the elements of Gamification	3.19	.51
Use of e-tools	3.34	.54
Cooperative learning	3.22	.42
Formative assessment	3.31	.43

On the other hand, participants were asked to assess different individual elements: *teacher's role* = 3.58 ± .52, *importance for secondary education PE* = 3.54 ± .55, *global satisfaction* = 3.33 ± .59 and *group formation* = 2.66 ± .96. Again, it could be considered noteworthy that all scores were very high (very close to the top score that was four), except group formation. Participants were also asked to grade the subject (from cero to 10), and the mean score was 8.08 ± 1.13. Finally, all data were analysed based on gender, but no significant differences were obtained.

Qualitative

Participating students' satisfaction was obtained assessing the project's *weak and strong points* highlighted. Regarding the *strong points*, "*Increased motivation towards the subject*" was the most frequently mentioned, followed by "Innovative characteristics of the project" and "*Group work*". "*Increase in students' individual and group commitment and implication*", "*Teacher's role*" and "*Narrative*" (videogame Mario Bros) were also highlighted. To provide a more objective view on data, results are presented in Table 3, including the number of quotes (meaningful extracts) and the percentage of the total number.

Table 3. Project's strong points.

	Words – Themes	Number of quotes	Percentage
Strong points	*Increased motivation towards the subject*	21	27%
	Innovative characteristics of the project	12	15.7%
	Group work	6	7.9%
	Increase in students' individual and group commitment and implication	6	7.9%
	Teacher's role	4	5.2%
	Narrative	3	4%

A few quotes are presented here to exemplify the *strong points*:

> "The experience keeps students motivated and involved at all times" (Motivation, Pablo).
> "Motivation and willingness to learn with the Gamification. It makes you part of the learning process: fun and entertaining" (Motivation-Implication, Lourdes).
> "Motivation to reach the last level is maximum. This can help motivate amotivated students to study" (Motivation-Implication. Kevin).
> "The global framework of the Project is innovative and original" (Innovation, Sam).
> "Cooperative learning and willingness to work together to achieve stars and coins" (Group work, Sasha).

Among the *weak points* extracted from the analysis, one stands above the rest: "G*roup formation*". Participating students indicated male and female group members not motivated or committed, and the effort that it has generated in the rest to continue in the project. The second category was "*No weak points*", and the third and fourth categories are "Increased or excessive workload" and "Global confusion" of some students. Finally, "Length of the project: short" was also mentioned by some students. Again, to provide a more objective insight on data, results are presented in Table 4, including the number of quotes (meaningful extracts) and the percentage of the total number.

Table 4. Project's weak points.

	Words – Themes	Number of quotes	Percentage
Weak points	*Group formation*	22	29%
	No weak points	13	17%
	Increased or excessive workload	7	9.2%
	Global confusion	7	9.2%
	Length of the project: short	3	4%

A few quotes are presented here to exemplify the *weak points*:

> "Group formation… at this age, individuals who are amotivated, remain amotivated and they harm the work of others" (Group formation, Sonia).
> "Groups should be elected by the students to be able to work properly" (Group formation, Antonio).
> "From my point of view, there is not a single weak point to highlight. It is original, innovative and motivating" (No weak points, Rosa).
> "Individual and group workload at times during the subject" (Increased or excessive workload, Federico).
> "At the beginning, it was confusing. It was difficult to follow the thread" (Global confusion general, Luciano).

Lastly, participating students also expressed a set of feelings, ideas, thoughts and personal reflections on the project. They are presented in Table 5, including the number of quotes (meaningful extracts) and the percentage of the total number

Table 5. Global reflections on the project.

Words – Themes	Number of quotes	Percentage
Increased motivation	25	33%
I enjoyed the experience	14	18.4%
Transference to the schools	9	12%
Fun	8	10.5%
Innovative	8	10.5%
Formative project: we have learned more	5	6.5%
Group formation by the students	5	6.5%
Nothing	5	6.5%
Personal satisfaction: happy	4	5.2%
Teacher's role: very good	3	4%
Grateful to the teacher	3	4%

Similar to what happened with the *strong points*, "*increased motivation*" was highly mentioned. Moreover, many "enjoyed the experience": they liked it and felt happy with it, maybe because they found it a fun, original and innovative experience":

> "This experience has made me change my vision on the subject. Initially, it was not appealing or motivating, but thanks to the originality and innovation of the project, things have changed and I found it very interesting" (Motivation-innovation, Salvador).
> "I enjoyed very much the experience […] for me, it has been a fun and motivating experience that has allowed me to understand the concepts of the subject" (I enjoyed the experience, Marc).

Super Mario Bros is also valued as "an experience that can be transferred to the schools", because the students believed that "they have learn more thanks to it". The group also highlights "the role of the teacher", "being grateful to him":

> "I find this system very interesting as the future teacher I want to become" (Transference, Kevin).
> "It is a good idea to change how PE is taught in the schools" (Transference, Sandra).
> "A new way of learning more and better. Thank you very much" (Grateful, Luis).
> "I want to give thanks to the teacher for becoming so involved and make us learn as if we were playing" (Grateful, Magdalena).

Lastly, some highlighted again how important was to let "Group formation to the students", while others do not want to make any comments:

> "Globally, it was ok, but I believe that if we [students] make the groups, the work will be better" (Group formation by the students, Oriol).

DISCUSSION

The main goal of the present study was to assess students' thoughts on a gamificated experience called: "Super Mario Bros", based on their experiences along a curricular subject. The idea was to deepen on the students' perceptions and appreciation, evaluating of: a) The effects on their motivation, commitment, performance and learning; b) The basic characteristics of the three pedagogical pillars: Gamification, CL and formative assessment; and c) degree of satisfaction (strong and weak points), besides other global reflections. Both quantitative and qualitative results showed that the project was highly valued globally, but also their identity pillars: Gamification (dynamics, mechanics, components), CL and formative assessment. However, weak points have also been identified such as group formation, increased autonomous workload and global confusion.

Results are similar to those obtained in previous experiences (Monguillot et al., 2015; Pérez-López & Rivera García, 2017, 2019) and they all showed that students' motivation towards the subject and their commitment increased after a gamified experience, as expressed by the participants, and they contradict those obtained by Carrasco et al. (2018) and Chan et al. (2018). In line with the arguments of Kapp (2012) and Zichermann and Cunningham (2011), one of the strengths of Gamification is its effect on individuals' motivation, and the results obtained in the present study, quantitative and qualitative, reinforce this idea.

Results also showed positive effects on the students' academic performance and learning, which was also highlighted in previous studies (Castejón et al., 2011; Cortizo et al., 2011; Goodyear et al., 2014). However, in line with the idea expressed by Perez-Lopez et al. (2017), students' previous learning experiences (traditional, teacher-centered) could have made them not fully understand and appreciate this new instructional approach. To counterbalance this trend, more innovative experiences are needed in Teacher Education (Berné et al., 2011).

In the same positive trend, the basic elements of the three basic pillars of Super Mario Bros has also highly valued. Previous studies reflected that Gamification success depends, greatly, of the correct use of its key components or ingredients (Flores-Aguilar, 2019; Melchor, 2012). In the present study, the narrative, the challenges and the missions designed helped generate positive emotions among the participating students (i.e., happiness, joy). Similarly, and in linea with previous works (Quintero, Jiménez & Area, 2018), the use of e-tools also produced positive outcomes, specially the use of the App Clasdojo (Flores-Aguilar, 2019).

Regarding CL, results showed very high scores, which indicated that this pedagogical model was well integrated in this experience. However, participating students considered group formation one of the weak elements of the experience, despite it is considered a key element in CL (Velaquez, 2015). Nevertheless, group work also came out among the strong points of the program. This contradiction is noteworthy: being future teachers, participants were not willing to share work with other students that are not their friends. Maybe, participants' limited experience with CL partially explain it (Leon y Matas, 2007). Similar results were observed in previous studies (Perez-Lopez et al., 2017).

Regarding formative assessment, participants' responses also portrayed a very positive view on this type of assessment. This indicated that it is needed in Gamification, because, as pointed by previous authors (Boud & Falchikov, 2007; Rodríguez & Herrera, 2009), its correct use improves students' commitment and learning. As it happened with CL, participants also indicated a weak point: increased autonomous workload. As previously mentioned, college students are not used to non-traditional frameworks that require a superior autonomous commitment (Perez-López et al., 2017). More intervention programs based on this methodological approaches are need in Teacher Education to help student view them as normal.

Therefore, results obtained on the three basic pillars of the intervention program showed how important is to view Gamification as a pedagogical model that should be hybridized with CL within a formative assessment framework (Fernández-Rio & Flores-Aguilar, 2019; Flores-Aguilar, 2019).

On the other hand, participants' global satisfaction on the gamificated experience was very high. The teacher's role was of special interest, because it was highlighted by the students. This is in line with previous research (Perez-Lopez et al., 2017) and matches the ideal of a university teacher (Romero & Perez-Ferra, 2009). There seemed to be a clear idea among the participating future teachers of the importance, even the will, to transfer these gamificated experiences to the PE lessons, answering the demands of incorporating progressively Gamification in the 21st century school (Fernández-Río & Flores-Aguilar, 2019).

CONCLUSIONS

Globally, the experience “Super Mario Bros” has highly valued by the participating students, both regarding its impact and its basic pillars.

The intervention program generated desirable effects on the students’ commitment, academic performance and learning, but above all, in their motivation, thanks to its three basic pillars (Gamification, CL, and formative assessment).

Despite highlighting several strong points, the level of global satisfaction was so high that the participating students underlined the need to increase the number of this type of experiences in the schools (transference), which was a transversal goal of this project that sheds light to an increased presence of Gamification in PE at the secondary level in the future.

Regarding the problems with groups formation, results showed the urgent need to increase and improve the presence of CL in all educational levels (primary, secondary, university), but, above all, in Teacher Training. This is the only way to solve the problems found in this study.

Despite the risks faced when there is a bet for a methodological change like the one explained in this study, we hope that the outcomes will encourage and help other interested.

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