

Article

# Enhancing Fun through Gamification to Improve Engagement in MOOC

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**Abstract:** Massive Open Online Courses (MOOCs), regardless of their topic, are a perfect space to generate, through virtual learning communities associated with them, very valuable resources for their participants and, in general, anyone interested in the topic covered. If in the design of these learning spaces, elements specific to games are added to them, which is known as gamification, we can try to increase the engagement of the student towards the course and, therefore, towards the community. This paper presents an experience of a MOOC of Universidad Rey Juan Carlos (Spain) with a connectivist approach. Aspects such as fun and motivation have been worked on in the design, through the application of gamified activities and the use of elements from social networks, considered as gamification, with the aim of increasing participation and engagement within a Facebook group, used as a community to support the course. We have analyzed aspects such as enjoyment and motivation, the result of which has been active participation and high engagement within the MOOC community in the form of content and especially great interaction, highlighting the existence of continuous activity once the edition of the MOOC is finished, as a consequence of a habit generated in the student.

**Keywords:** gamification; MOOC; fun; social networks; virtual learning communities

## 1. Introduction

The generalization of Internet access and globalization have led to a change in aspects such as communication, work, leisure or business [1], requiring every individual to constantly update their knowledge, which is known as lifelong learning. This continuous learning and the existence of Internet requires new models that explain the way in which one learns. Connectivism [2] tries to explain the learning that takes place in the digital age, which is outside of the person, in the Web and the most important aspect will be the ability to create connections with the content and between different individuals. Siemens [2] emphasizes “as knowledge continues to grow and evolve, access to what is needed is more important than what the learner currently possesses”.

To respond to these constant needs for training and new forms of learning, universities are opening their content through various initiatives such as the pioneering OpenCourseWare (OCW) [3] or more recently, the Massive Open Online Courses (MOOC) that are offering university educational level since 2008 to thousands of people, with the only requirement of having access to the Internet [4].

Two approaches stand out within the field of MOOC [5,6], on one hand the cMOOC, based on a connectivist approach, in which its pedagogy promotes the social part of the course, try to focus it around the contributions of the students; on the other hand there are the xMOOC,

based on content and with features similar to those of a traditional online course, these are the most widely known. There is a trend towards hybrid solutions [7,8], which take advantage of the number of users of xMOOC platforms, with a space in which to manage users and content; and social spaces in which to develop the most connectivist part of cMOOC. The lack of control of information generated on the Web [2] favors the formation of specialized spaces or Virtual Learning Communities (VLC), and specifically in MOOC it is common to find them as spaces where their participants interact and generate conversation and resources. There are different options when choosing a VLC [8], being the most used digital social networks given their nature and which are used by the majority of MOOC participants, this makes them a convenient solution and with the possibility of having some participation.

New methodologies [6] are increasingly used to achieve better results in MOOC, in most cases focusing on one of the drawbacks of this course modality, the large number of dropouts. Gamification is one of the possibilities in which we work to improve these results, this consists [9] in applying elements of game design in contexts that are not games, in this case education. Although there are other interesting aspects in which it is possible to work using gamification, such as the VLC.

The aim of this research is to find out whether, through the application in one MOOC, with connectivism approach, of various gamification techniques, that increase motivation and fun, it is possible to achieve a greater engagement in terms of participation and generate a habit in the use of the VLC. With the purpose of increasing participation in the form of new content and conversations by the various members of the community associated with the MOOC. For the development of this work we have worked with a learning community on Facebook. As a first hypothesis, it has been considered that the very fact of participating in a digital social network such as Facebook and its elements are a way of gamification in itself. It has been analyzed which is the relation that the participants of the virtual community of learning have with the perception of the amusement and its engagement with it, relying on how they affect the characterization of participants according to these concepts, in order to obtain useful patterns of behavior to apply in future editions of the MOOC. This MOOC, from the Rey Juan Carlos University, lasted one month and was given during the month of September 2018, winning the First Award for Educational Innovation MiriadaX.

In the following sections the experience will be developed. In the "Background" section, a theoretical review is proposed about the main aspects of this work. In the following two sections, the design of the MOOC will be described and the main results obtained will be presented. Finally, this paper shows a discussion of the results obtained and ends with conclusions.

## 2. Background

### 2.1. Towards a Hybrid MOOC

MOOCs have appeared as a disruptive element in the field of education [10], within the higher education community, allowing thousands of people from all over the world to be trained in a diversity of contents [4,6,11] through Open Educational Resources (OER) and different pedagogical proposals. However, they also have some exceptions and dropout rates of between 60% and 90% of the students enrolled.

Within the philosophy of connectivism as a learning model, the first MOOC [12] appeared in 2008, known as cMOOC, in which it is the students themselves who construct the contents of the course. A new pedagogy that turns the student into the protagonist of the MOOC [8] where both the content and the discussion generated are totally distributed [4] as is the case with the Internet, where learning is produced by the fact of browsing and creates connections. It emphasizes the autonomy of the student, who uses his habitual digital tool to communicate. This supposes numerous tools and technologies associated to the MOOC and it will be necessary to dominate to be able to follow the course, reason why it is required of some advanced digital skills [4,8].

On the other hand, there are the xMOOC, which since its emergence in 2012 has grown rapidly [11] and are the best known and most common, with thousands of students and no limit on the number of enrolled. Their structure is similar to an online course [5], they are organized by modules, objectives, video lectures and have automatic evaluation tests (test) or between peers. Platforms such as Coursera, EdX, Udacity [4] or MiriadaX congregate the majority of users and are composed mainly of universities. It is common to find in these platforms a more traditional model in which the teacher is the expert and the student is simply a consumer of knowledge, as opposed to the cMOOC where roles are changed, and students are given greater protagonism.

Although connectivist MOOCs have an interesting pedagogical model, the main disadvantage is the distributed nature of the students' contributions, it is complex to follow this type of courses due to the number of communication tools used and to bring together their management, compared to the ease of xMOOC models. At the same time, one of the main limitations of xMOOC is the social part [10,13], being relegated to internal and closed forums, not very useful. At the same time, one of the main limitations of the xMOOC is the social part [10,13], being relegated to internal and closed forums for people who are not part of the MOOC. It is usual that they cannot be accessed after the edition is finished, losing all the conversations generated in them. Sometimes it is difficult to follow the conversations in them because of the students' lack of organization in writing their publications. For this reason, new tendencies appear that mix both types of MOOC [7,8], they are called hybrid MOOC or hMOOC, starting from the use of an xMOOC platform where the teaching team creates the structure of the course with the contents and manages the users. On the other hand, one or more external tools are used to complement the social deficiencies of these platforms, generally tools that favor the social part or that allow the application of new methodologies such as gamification [6] through different elements and mechanisms (badges, reputation, points, etc.).

## 2.2. Virtual Learning Communities

VLCs are spaces or groups of people with interests that focus on a common theme and that allow interaction and dialogue in digital spaces [14,15].

Advantages of VLCs include [6] synchronous and asynchronous communication; permanence of publications for later review; ease of communication between different geographical areas; connection with potential clients or people interested in other people's publications; and unlimited interactivity. The added value of using social networks is that it makes it easier to share content and generate discussion forums [16] with the most organized content, its use being better known by most students. They are increasingly used in the field of education, such as Facebook groups [8,10] that allow the creation of discussion and interaction spaces in a synchronous and asynchronous way.

## 2.3. Gamification Principles

Games are an element that is increasingly present in today's society, in part due to the rise and possibilities offered by new technologies that allow these games to be applied through numerous devices. There is a tendency to reuse design principles in other contexts that have nothing to do with games such as marketing, health or education. If one extracts those elements of design, key for the success of a game, and they are applied in these new contexts is when one will be able to speak of Gamification [17,18] and especially in education [19]. In the specific case of MOOCs there is a growth in the use of this methodology [20–23] applying gamification to achieve greater engagement of participants.

One of the current problems in education [24] is the lack of commitment and motivation of students, the application of gamification in education has great potential for improving performance, motivation, engagement or fun [22,23] of training activities. This will enable students to improve their skills and knowledge [24] by devoting more time to study and with greater involvement. It should not be forgotten that emotions and feelings [6,25] have a great impact on learning processes, generating

greater engagement or on the contrary even reaching frustration within the course, it will be important to take them into account for proper management.

When talking about design it is complex to find a single framework that defines the different existing elements or dimensions [26] without finding a consensus when talking about terms such as mechanics, dynamics or components. Depending on the author, elements such as narrative, challenge, emotion, collaboration, badges, and dots will appear related to these terms.

#### 2.4. Gamification and VLC

The use of digital social networks in education as VLC is becoming more widespread, given the impact it has on learning, with aspects such as motivation, engagement, satisfaction, and interaction [27] enabling online sharing and collaboration. Another aspect to study is the feelings generated when an interaction takes place, through discussions or comments in these networks, which is an important element when related to the activity of users in the MOOC [25].

If one analyzes the inherent elements of social network platforms such as Facebook or Twitter, which promote increased activity on them, one perceives a direct relationship with the gamification elements themselves. For example, the fact of receiving “likes” in a publication is related to aspects such as points and positive feelings related to status or even enjoyment, which Facebook allows to different degrees when indicating that we like a publication. The same happens with the phenomenon of being “followed” in a social network or when our publications are shared. On this aspect authors such as Hansch, Newman, and Schildhauer [26] propose a framework when talking about gamification design, in which they include another aspect that features prominently in online learning and knowledge sharing: the social/interactive dimension.

Using these elements of social networks in VLC, we are able to apply gamification without the need for other technologies, not only for the fact of working the social dimension, but also for the use of other dynamics. Specifically, the digital social network Facebook has a tool called “Groups” that allows creation of workspaces, with different privacy settings. This platform is committed to the educational use of these groups and within these, elements closely linked to gamification stand out, such as these:

- Progress bar, associated with the additional functionality of the groups, “Units”, which serve to organize the collection and ordering of group publications, managing the chaos that often occurs with so much published information. Members of group are able to mark the publications of each unit seen, checking in the bar its level of progress.
- Digital badges that Facebook itself automatically associates according to the degree or type of participation of members in the group. These, when obtained, are associated with the name of the member who has obtained it, appearing in all the publications made within group. Facebook Groups currently offers 10 different badges [28].
- Different degrees of “likes” (I like it, I love it, it saddens me, etc.), comments and reshares. Although these options are not specific to groups, they are interesting as gamification elements.

### 3. Materials and Methods

#### 3.1. MOOC

The MOOC analyzed, “Empower yourself with social networks” from Universidad Rey Juan Carlos, was offered in 2018 on the Spanish platform MiriadaX for one month (29 August to 25 September). It obtained First Award for Educational Innovation MiriadaX from the same platform in 2018 [29]. Over 4 weeks and 5 modules, the MOOC works on aspects such as personal branding on the Internet. Each module consists of a series of lessons that work on specific topics through video, text, links of interest, and exercises. The first week introduces the course learning guide (module 0) and contextualizes the course theme (module 1) emphasizing aspects such as professional digital identity. The next two weeks is where they see different social networks, from those more general as Facebook or Twitter (module 2) to others more specialized, such as LinkedIn (module 3). The fourth and final

module works tools such as video, web analytics, and the concept of Personal Branding as the final result of the MOOC. All contents of the MOOC were accessible from the first day, except exams of each module which were opened one per week. In this way the students could review the material at their own pace, although through e-mail communications was set a rhythm and order, for those who needed a more guided modality.

The proposed design is based on a hybrid philosophy [7] called gcMOOC, already used in other works by the authors [21], which takes advantage of the infrastructure already created, such as the MiriadaX platform (xMOOC), and which has more than 6 million registered users [30], to offer a cMOOC approach through external elements [8]. The objective is to achieve greater student involvement and increased interaction in the MOOC in the form of new resources, thus following the connectivist principles, where priority is given to the content provided by those participating in the MOOC. For this, it was necessary to use a virtual learning community in which to generate a connectivist part. The key to the proposed model is the use of gamification, especially taking advantage of the social part of it, from a digital social network such as Facebook, and its own gamified elements that seek greater engagement.

Therefore, the MOOC is divided into two spaces, the platform where the course is, and the VLC where the activity is generated. In the following sections the proposed model will be analyzed: both the virtual learning community created and those gamification elements introduced.

### 3.2. Virtual Learning Community (Facebook Group)

In order to encourage participation, a virtual learning community was created on the Facebook platform, specifically a public group. The advantage of groups is that they organize publications on a wall where any member of the group can publish content appearing in the first place each publication, unlike Facebook pages, where only appear on the wall the publications of the administrators. Groups have very complete statistics for the teacher and also have interesting features for education: units, badges, publications with styles (bold, italics, numbering, etc.), hashtags, different roles of members and systems for approval of publications or searches within the community.

The VLC created for the MOOC is totally public and presents a set of rules of conduct previously defined in a corresponding section. In addition, in the MOOC, there is a lesson within module 0 that links to the community and explains how it works through a video tutorial. The link to the community is constantly quoted in e-mails sent to students and in various MOOC lessons.

The “Units” tool of the group has been used, which allows the teacher to organize those publications that he considers appropriate within the units. In the case of the MOOC they were used as tips or pieces of advice, to get the most profit from each module. Four units or tips were created, within which the teacher organized all the publications of the team, to avoid that these were lost in the time line of the group between so much publication of the participants. The units allow to make them obligatory, in such a way that they appear to the student as incomplete in a progress bar that as the reading seeing will be completed. Figure 1 shows on the left a unit, one can see the bar that indicates graphically and numerically the number of publications of the unit viewed and an example of publication, at the end the option can be seen “done” that the user can mark once viewed; to the right is the information message that appears to each user after finishing a unit and below the general bar that every user sees in the group, indicating the number of completed units.



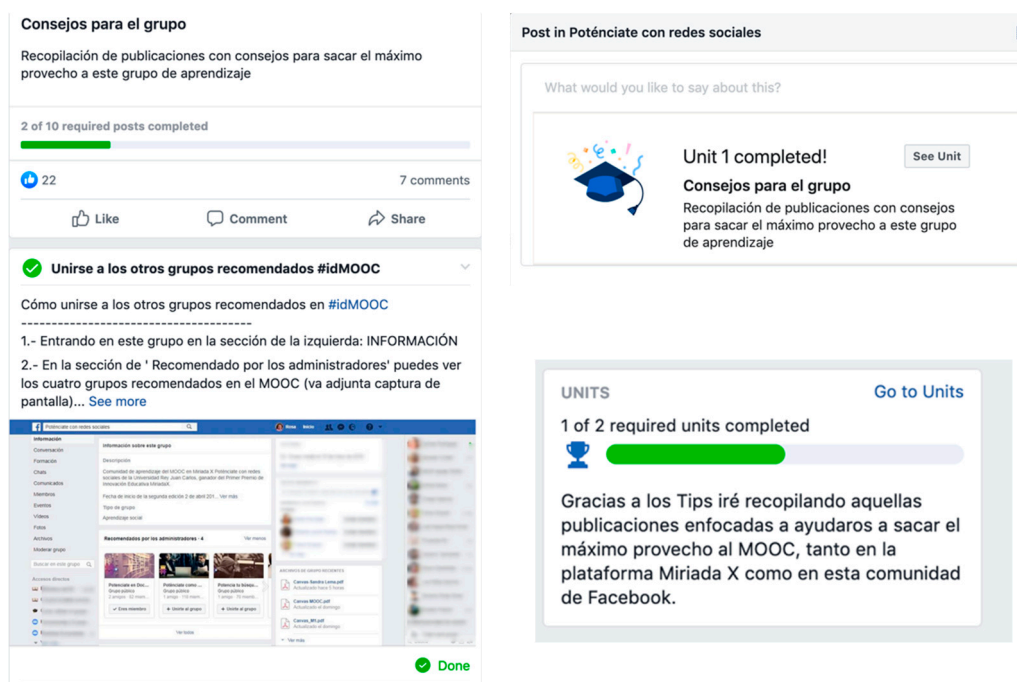


Figure 1. Screenshots of units in Facebook Groups.

### 3.3. Applied Gamification

The xMOOC models are the most massified and therefore generalized. In these courses most users choose to make use of content and individual learning; few go beyond and work a more social and connected part. Hybrid approaches, such as this model, with external communities where most MOOC activity takes place. The drawback is, on the part of MOOC students, ignorance of their existence, lack of interest or digital skills, this will mean that they do not access these spaces or do not make the most of them.

In this work, through gamification, we seek to motivate and generate new habits in the student to see the usefulness of the VLC and become accustomed to access and work in it. To this end, the two spaces have been worked on: the MOOC and the VLC.

#### 3.3.1. MOOC and VLC gamification

In the first place, it has been decided to use challenges that involve the student through voluntary activities in which they can put into practice the theoretical concepts set out in the MOOC and, on the other hand, encourage participation in the VLC sharing the results. They were divided into two types:

- Asynchronous activities: A total of 12 exercises distributed within the lessons, in which the student can put into practice what he has learned in the lesson at his own pace, and which encourage him to share the result in the form of a publication in the virtual learning community, thus seeking a flow of content from the MOOC to the VLC [8,31]. They were proposed activities such as creating a profile in the social networks explained and sharing it in the VLC, or looking for additional information about the contents, also sharing it.
- Synchronous activities: 4 interactive live activities were proposed, in form of a broadcast via YouTube video platform, using “Hangouts on-air” [32] live videoconferencing option. Any student with the link could view the live event and participate in the chat on the right side of the video.

Within these synchronous activities, the novelty with respect to other initiatives of the team has been the design, seeking a very active participation and protagonism of the student within the activity and to feel part of this. This is the summary of the events:

1. “Building digital identity”: In this event, the professor proposed a collaborative analysis of what actions are carried out on the Internet that leave their mark on the digital identity of any person. We used the chat of the YouTube retransmission through which to participate live; the professor was working on the ideas he was reading written in the chat.
2. “What about us on Internet”: In this case was made use of the Kahoot! platform of questions, which allows to use it to apply gamification, given its format of a contest. It was used live, allowing anyone to participate who entered the platform, via web or mobile app, and wrote the specific code provided during the live event for the space created. Through a survey, the activity proposed to participants to make different Internet searches about their name and surname, and to see what information appeared from them, analyzing the results the teacher and contributing ideas.
3. “Interview with...”: The last two events had the same configuration, they were two interviews, one per week, to experts in the subject of each week module. The event was designed for maximum participation and protagonism of the students. Four days before the event, a link was sent to a space in the Sli.do questions and answers platform, where any MOOC student could write a question on his or her behalf or anonymously, leaving the question published for anyone to see and vote for. The most voted questions were those that were asked to each one of the interviewees.

On the other hand, the use of a digital social network as a support to the VLC and from the point of view of the applied gamification, not only allows the use of a more social and collaborative dimension, it also offers its own elements (likes, units, shares, and badges) that could be adopted within the gamified design of the MOOC, which tend to be unnoticed in the literature. These kinds of elements encourage dynamics such as socialization, participation, debate, status or progress. Figure 2 shows an example of how badges associated with a profile would look (admin and visual storyteller).

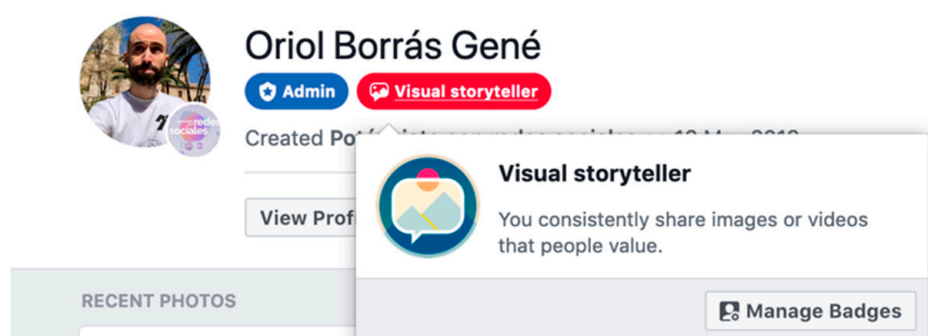


Figure 2. Digital badges in Facebook Groups.

### 3.3.2. Gamified Model

After reviewing the different actions in the two main spaces of the MOOC, Figure 3 shows the resulting design. At the top is the hybrid MOOC model that uses a VLC to support the most connectivist and social part. In order to increase engagement, gamification is applied in this work, the result being checked in the lower part of the figure.

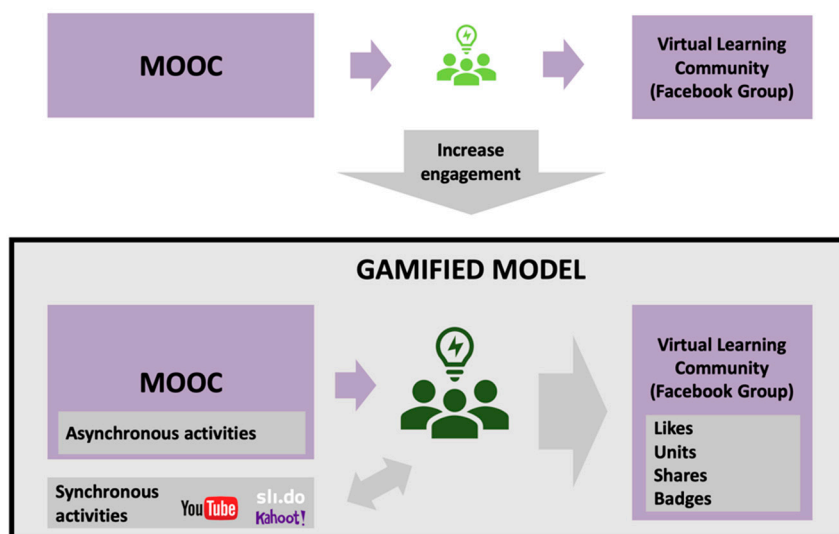


Figure 3. Gamified model (Massive Open Online Courses (MOOC) and Virtual Learning Communities (VLC)).

The most structured and organized part is associated with the MOOC (left) and is where both asynchronous activities are proposed, within the lessons, and synchronous activities, at different moments of the edition, which make use of external tools. The result seeks to generate an increase in publications and greater interaction within the virtual community of learning, on the right of the figure is shown this community and what gamified elements within it also encourage motivation to participate and interact within.

Table 1 summarizes the features, tools, and platforms used to apply the gamification in MOOC edition (Figure 3).

Table 1. Relationship between gamification activities and technologies used.

	Technologies	
Asynchronous Activities	MiriadaX (MOOC platform)	
Synchronous Activities	Kahoot!	
	Sli.do	
Virtual Learning Communities	Facebook Group	Likes
		Shares
		Units
		Badges

### 3.4. Data Collection

In order to obtain data, we used the statistics provided by the platforms on which MOOC was designed and all its activities:

- MiriadaX allows you to know the number of students enrolled, how many have started and how many have finished.
- Facebook Group offers very detailed statistics, showing information such as active members in the group, number of publications detailed by date, or visits and reactions to publications.
- YouTube allows to know in a very complete way the visualizations of the videos and of the live broadcasts.
- Sli.do and Kahoot! also provide statistics of participation, although they are very basic, for the purpose of the experience have been enough.



At the end of the MOOC, a satisfaction survey was sent to all enrolled, based on the validated SEEQ survey [33], already used in other experiences of the same team. Specific questions were added related to specific aspects to be measured on the MOOC the VLC, such as the tools used or the perception of learning and fun. A total of 63 Likert type questions with a range from 1 to 5 (Strongly disagree to Strongly agree) were posed. In some questions the option “I don’t know him” was added to make include this possibility for the specific case of tools used.

#### 4. Results

The research presented in this article works with the data extracted from student activity in an MOOC designed and delivered by the teaching team over the 28 days, comparing them with a satisfaction survey sent after completion.

Table 2 reflects the overall results of the completion of MOOC and the virtual learning community on the last day of the edition (25/09/2018). The number of completions corresponds to students who passed at least 75% of the assessment activities and video lectures viewed. The percentages of finalization have been calculated in relation to those who registered and also to those who started the MOOC, this number is more significant, bearing in mind that the platform considers as initiated any user who has accessed at least once during the course period, as opposed to the 3980 registered users who did not enter even once during the edition, and therefore did not see any video or content.

**Table 2.** Results of MOOC’s participation in the MiriadaX platform and Facebook group.

<b>MOOC (MiriadaX)</b>				
<b>Enrolled</b>	<b>Started</b>	<b>Finished (100%)</b>	<b>% (Enrolled)</b>	<b>% (Started)</b>
8532	4552	1359	15.9%	29.8%
		<b>Finished (75%)</b>	<b>% (Enrolled)</b>	<b>% (Started)</b>
		1655	19.4%	36.3%
<b>VLC (Facebook Group)</b>				
<b>Members</b>	<b>Publications</b>	<b>Comments</b>	<b>Reactions</b>	
2540	1980	2746	13,333	

As for the VLC, this table shows the total values after completing the course, highlighting a large interaction of users with respect to publications with comments and reactions. The latter refer to the Facebook “likes” of both publications and comments, taking into account the different likes options offered by the social network.

All events have been supported by Hangouts on air from YouTube, broadcast live. Table 3 shows a summary of the activity of these four events. This table shows, for each event, the Youtube information, in time ranges, from the day of the event, until the end of the edition and until the day before the second edition of the MOOC began. The values obtained are from the day of recording. The average duration was 30 min, and you can see the fall of users who saw them, and therefore engagement in the MOOC, as the edition progresses.

##### 4.1. Live Events

Throughout the MOOC different types of activities were proposed, as seen above. The results of the synchronous gamification activities and the tools used to interact with the students will be analyzed below.

Table 3. Live events summary.

		Live Events (Synchronous Activities)			
		Building Digital Identity	What about Us on Internet	Interview with... (1)	Interview with... (2)
<b>YouTube</b>					
Streaming duration (min:sec)		32:25	26:05	33:01	27:41
Event day	Day	04/09/2018	11/09/2018	18/09/2018	25/08/2018
	Views	798	803	270	381
	Peak concurrents	182	157	83	78
	Unique viewers	599	534	214	319
	Likes	71	41	59	48
	Shares	19	8	6	7
	Chat messages	373	-	-	-
Until end of MOOC (25/09/2018)	Period	22 days	15 days	7 days	1 day
	Views	2834	1333	608	515
	Unique viewers	1963	886	444	412
	Likes	110	52	70	53
	Shares	83	12	14	8
After finishing MOOC 26/09/2018 to 01/04/2019	Views	3290	1407	672	664
	Likes	112	55	70	57
	Shares	96	12	10	8
	Comments	46	32	5	3
<b>Kahoot!</b>	Participants	-	88	-	-
<b>Sli.do</b>	Participants	-	-	49	41
	Questions	-	-	50	36
	Likes	-	-	102	52

As for the interaction generated in the events, different elements were used to allow the participation of the spectators. For the first one we used YouTube's own chat, with a total of 373 live conversations. Kahoot!, a very interesting application used in education to gamify, got a total of 88 participants, 10% of the viewers, who answered the 8 questions posed. The last two events asked for a previous participation through Sli.do. In the 4 days prior to each event MOOC students proposed 50 and 36 questions respectively for the interviewees, and these obtained 102 and 52 likes. Sli.do allows anonymous questions to be published or the name to be written, and only 36% were anonymous at both events.

#### 4.2. Participation in the VLC

In this section the specific results obtained in the Facebook community will be analyzed. Figure 4 shows the generated activity in a graphical way. At the top of the graph you can see the evolution of the publications (red), this shows a downward trend as the end of MOOC edition approaches, versus the interaction (comments and reactions) between members that has been more constant. It emphasizes that the number of active users remains constant throughout the edition. The lower part of Figure 4

shows the evolution of community members, which has been growing even at the end of the edition. During the whole edition, both students who started at different times, even at the last minute, and new enrollees were incorporated into the community, as the platform allows registration until the end of the edition.

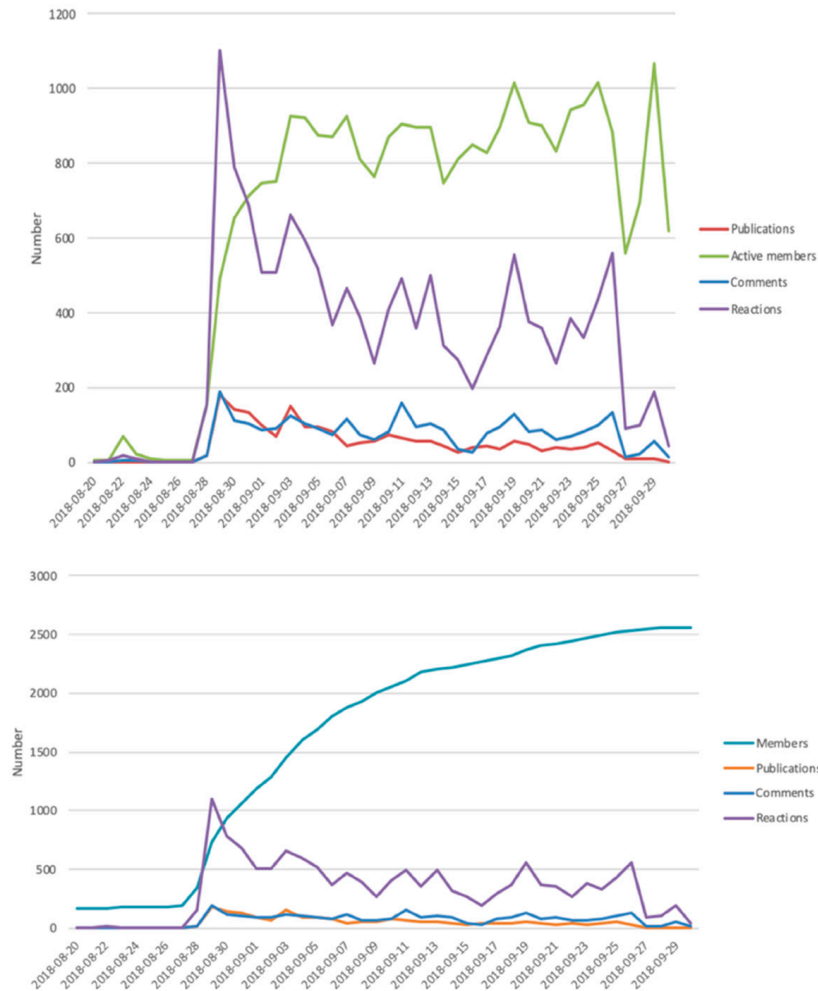


Figure 4. VLC publications (top) and members evolution (bottom).

In order to check whether a compromise had really been achieved and to create a habit in the use of VLC, independently of MOOC, Facebook group was analyzed as soon as the edition of MOOC had been completed, without any kind of community dynamization or emails encouraging participation. Figure 5 shows the result of the activity between 26 September, 2018 and 1 April, 2019, the day before the start of the second edition of the MOOC. The result was an increase of 425 new members, 387 publications, 605 comments, and 2755 reactions. An average of 53.4 active members per day, albeit with a large deviation (196.4).

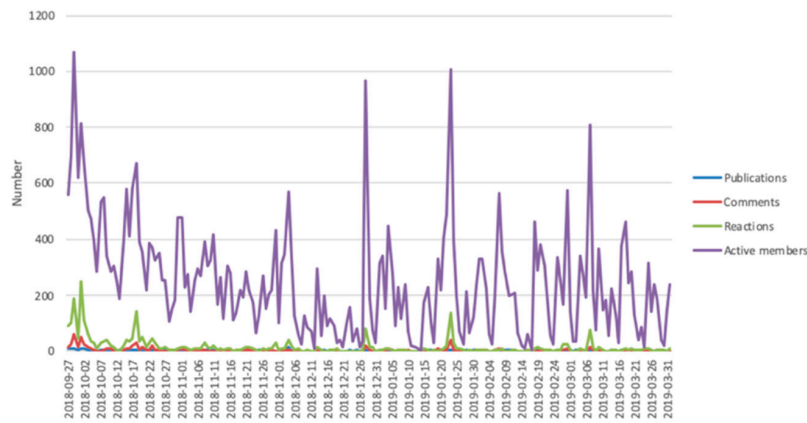


Figure 5. VLC activity after MOOC edition.

### 4.3. Satisfaction Survey

After completing MOOC, a survey was sent to find out the assessment of students, answered by a total of 480 individuals, that is, 10.5% of those who started the course. Although the survey had a total of 63 questions, the seven most representative questions in relation to this work, summarized in Table 4, have been selected.

Table 4. Selected questions from the satisfaction survey for the study.

Q1. Enjoyment	I had fun with the MOOC
Q2. Gamification	I felt like I was in a game in the MOOC
Q3. Participation	I have shared in the Facebook community the proposed activities of the course
Q4. Participation (a, b, c, d e)	Participation in the Facebook group (a) reading, (b) publishing, (c) commenting to others, (d) likes and (e) sharing publications
Q5. Motivation (a, b, c)	It encourages me, when I publish something, that my publications: (a) have comments, (b) are shared and (c) have likes
Q6. Engagement	I have felt part of the community
Q7. Completion	I've passed the MOOC

Firstly, the students' perception of three aspects related to the MOOC was analyzed: enjoyment and gamification; directly related to questions 1 and 2 respectively. Figure 6 shows each of the three aspects related to question 7 on whether the MOOC was completed at 100%, 75%, or not.

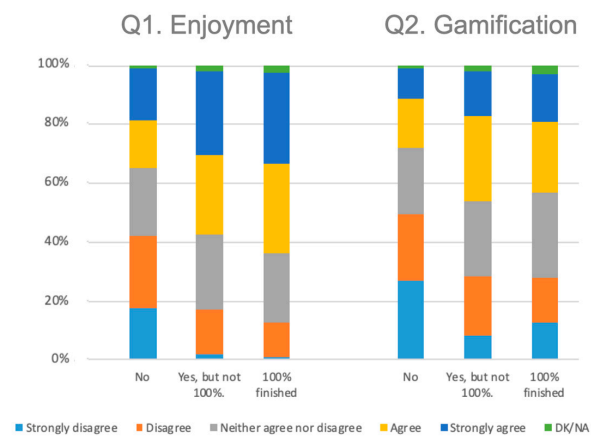


Figure 6. Relationship between learning, enjoyment, gamification and completion of MOOC.

The aspect of enjoyment or fun again highlights that those who have had the most fun have been those who have finished at 100% with 61.6%, and 75% with 55.6%. In both cases, those students who have completed the MOOC consider that they have had fun, an aspect that was sought to be promoted. As for the applied gamification, they were asked if they had felt like in a game, in this case the value as expected decreases, since a complete gamification was not applied, for example to MiriadaX platform itself, even so more than 40% of those who finished the MOOC, have had this perception.

Continuing with these two aspects, Figure 7 shows the relationship, in this case, with respect to the age of the students.

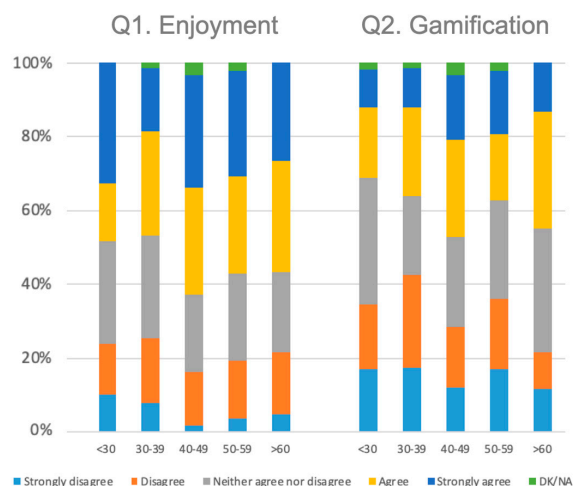


Figure 7. Relationship between learning, enjoyment, gamification and age.

For fun, the values are around 45.3% of the 30–39 age group and 48.3% of those under 30; and the maximum values of 59.5% for the 40–49 age group and 56.7% again for those over 60. The other aspect, most related to gamification, only the age range between 40–49 with 43.9% and over 60 with 45% have felt in a game. As expected, those under 30 were the most skeptical with 29.3%.

Secondly, the aspects related to the VLC on Facebook and the MOOC have been analyzed. On the one hand to check if the applied gamification has increased the participation and on the other hand to check if its elements have really achieved a real commitment of its members with the community and can be considered as motivating elements.

Figure 8 shows the answers given to the degree of participation in the Facebook group using its different elements.

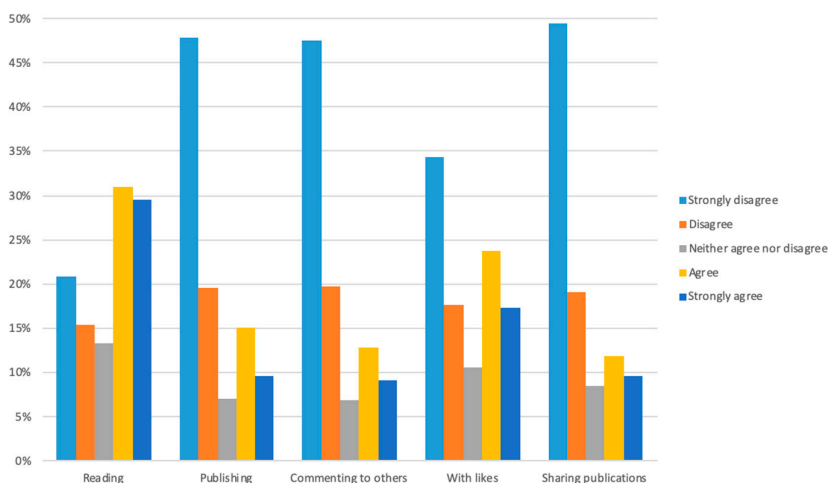


Figure 8. Participation in Facebook group: reading, publishing, commenting, likes, and sharing (Q4).

In general, members of group have read the publications of others, drastically reducing the rest of participative actions, where almost 50% of those asked not shared publications, commented on others or published; although it stands out that between 20% and 24% have actively carried out these actions. The second most common interaction was the use of “likes”, with just over 41%.

The following graph (Figure 9) analyzes the results related to motivation in the VLC, from question 5, in order to know how it affects the interaction of others on the subject’s participation in the community when publishing.

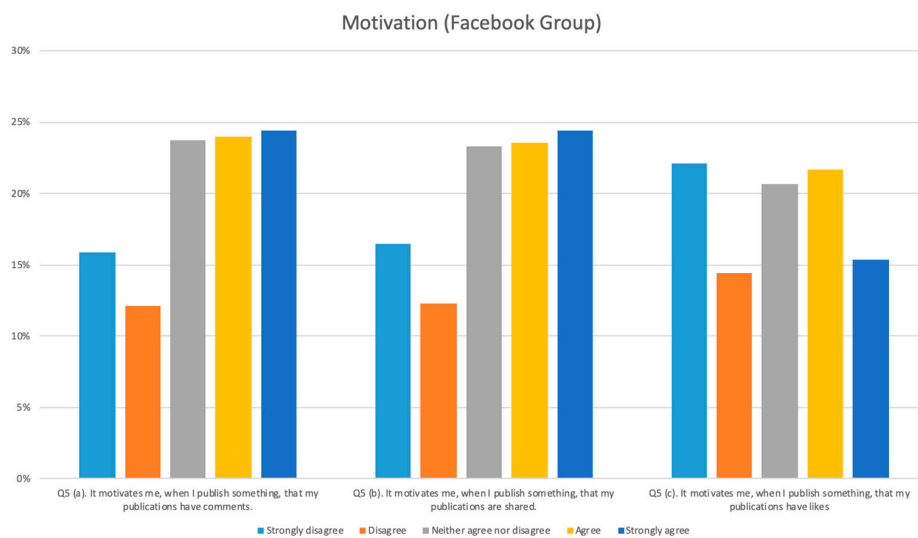


Figure 9. Motivation in Facebook Group (Q5).

Answers to this fifth question reveal that, in general, members of the group are motivated when someone comments on their publications with 48.3%, that they share with 47.9% and that they get “likes” only 37%.

In order to obtain an overview of the results of the previous graphs, Figure 10 proposes a more complete analysis of question 5 from the point of view of the ages of the participants. In this way, the aim is to understand in depth the motivation for a user that others interact with their publications.

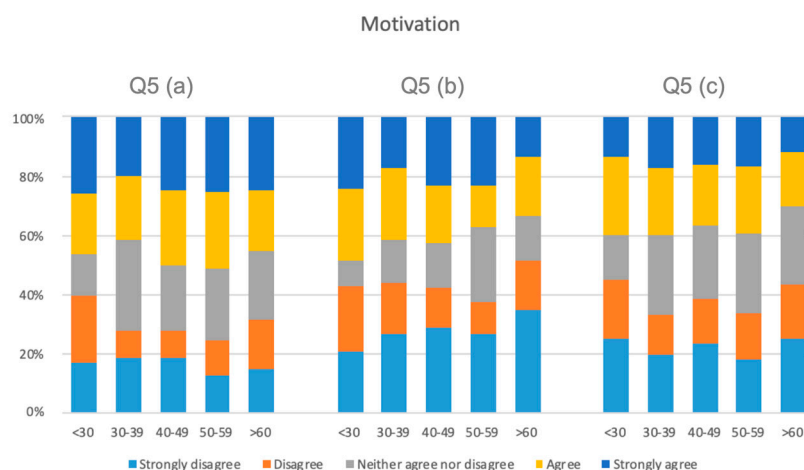


Figure 10. Motivation in Facebook Group (Q5) age analysis.

After the results shown in the graph, it is the participants between 50 and 59 who are most motivated to share and comment on their publications around 51%, being in turn the least important and motivators seem to them the “likes” with only 36.5% interest in them, along with those over 60 who are even less interested with 30%. In general, the rest of ages are motivated with more than 41%



to comment and share with them, being the age groups under 39 who have more attraction for “likes” with 40%.

Finally, fun has been studied as a key element to generate an engagement in the MOOC and, as a consequence, a greater participation in the learning community. Table 5 shows a comparison between the student’s perception of fun when performing the MOOC (Q1) and the questions that refer to the feeling of being in a game (Q2), being part of the community (Q6), and about participation in Facebook (Q3 and Q4 (d)). The most representative values of the results have been highlighted in bold, which will be reviewed below.

**Table 5.** Relationship between gamification, community engagement and fun.

		Q1. I had Fun with the MOOC				
		Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
Q2. I felt like I was in a game in the MOOC	Strongly Disagree	16.82%	39.19%	10.53%	4.72%	2.26%
	Disagree	20.56%	47.30%	30.70%	9.45%	1.50%
	Neither Agree nor Disagree	25.23%	12.16%	50.88%	36.22%	12.03%
	Agree	17.76%	1.35%	7.02%	<b>48.03%</b>	<b>31.58%</b>
	Strongly Agree	18.69%	0.00%	0.88%	<b>1.57%</b>	<b>50.38%</b>
Q6. I have felt part of the community	Strongly Disagree	73.91%	14.86%	1.75%	0.00%	0.75%
	Disagree	26.09%	44.59%	21.05%	5.51%	1.50%
	Neither Agree nor Disagree	0.00%	37.84%	56.14%	23.62%	1.50%
	Agree	0.00%	1.35%	16.67%	<b>47.24%</b>	<b>24.06%</b>
	Strongly Agree	0.00%	1.35%	4.39%	<b>22.05%</b>	<b>67.67%</b>
Q3. I have shared in the Facebook community the proposed activities of the course	Strongly Disagree	<b>86.96%</b>	51.35%	34.21%	36.22%	22.56%
	Disagree	8.70%	21.62%	22.81%	23.62%	14.29%
	Neither Agree nor Disagree	0.00%	17.57%	24.56%	21.26%	22.56%
	Agree	4.35%	6.76%	13.16%	<b>10.24%</b>	<b>20.30%</b>
	Strongly Agree	0.00%	2.70%	5.26%	8.66%	<b>20.30%</b>
Q4 (d). Participation in the Facebook group [Likes]	Strongly Disagree	<b>73.91%</b>	47.30%	32.46%	37.01%	21.05%
	Disagree	13.04%	22.97%	21.05%	19.69%	12.03%
	Neither Agree nor Disagree	4.35%	16.22%	16.67%	9.45%	4.51%
	Agree	2.17%	7.43%	17.54%	23.62%	28.20%
	Strongly Agree	6.52%	6.08%	12.28%	10.24%	<b>34.21%</b>

It is verified that those participants who have had more sensation of being in a game (Agree or Strongly agree in Q2) are those who have had more fun (Agree or Strongly agree in Q1), the same relation that exists with the feeling of being part of the community (Agree or Strongly agree in Q6). About sharing publications, the 86.96% that have not shared publications (Strongly disagree in Q3) are those that have less fun in the MOOC (Strongly disagree in Q1). The surveyed participants that more actively share their publications (Agree or Strongly agree in Q3) are those who have had more fun (Agree or Strongly agree in Q1). At last, those participants who have put more likes (Strongly agree in Q4), have also had fun (Strongly agree in Q1), being these close to 35%. Almost 74% of those who did not put likes (Strongly disagree in Q4) did not have a perception of fun with the MOOC (Strongly disagree in Q1).

## 5. Discussion and Conclusions

In general, MOOCs are known and criticized for the low student numbers that complete them. Although this value has not been demonstrated to be dependent on the quality of the contents [1], neither is the objective of this research to improve it, if it is true that it can be used to get an idea of the degree of commitment to the course on the part of the students. It is common in MOOCs to find a high drop-out, around 90%–95% [5], compared to the results obtained in this work with 19.4%, which double the most common values. Specifically, 15.9% saw all the contents and surpassed all the activities to 100%.

This research has analyzed the convenience of applying gamification actions in a hybrid MOOC model, where special importance has been given to the social part, promoting those characteristics of a cMOOC, to increase engagement, fun and create a habit when using the VLC, in order to generate new content and conversation.

Two types of activities were proposed in the design, giving rise to a particularly active community with almost 2000 publications during the 28 days of publication. There has been a great deal of interaction between community members with over 2500 comments and 13,000 interactions. Asynchronous activities, associated with content within the MOOC, in which the student was encouraged to publish the results in the community, as well as in other team initiatives in previous MOOCs [21,32]. Synchronous activities, through live events, were quite seen, although with the classic curve of fall in the participation of the MOOC [7] and in them the audience participated, even though they had to make use of different technologies like Kahoot! or Sli.do, we must not forget that the type of MOOC student is very heterogeneous and does not always have advanced digital competences [4,8]. Participation is remarkable in these activities, to a greater or lesser degree, with 1963 visitors who during the MOOC entered the first event, 43.1% of those who started the course, up to 9% of those who saw the last event, as shown in Table 3. This participation is quite high, bearing in mind also that these were voluntary activities and meant that the student had access to a space other than the MOOC platform. Participation has been quite high, bearing in mind that these were voluntary activities and meant that the student had access to a space other than the MOOC platform. Within these events, except the first where the interaction was simple, through the chat of the video itself on YouTube, the rest had mainly viewers in front of students who participated actively entering platforms where the activity was performed as Kahoot! or Sli.do. It should not be forgotten that these types of initiatives require some digital skills, and although its use was a novelty with respect to other MOOCs, its use was minority.

Figure 5 shows that there has been activity, once the edition of the MOOC is finished, both in publications and in interactions, therefore, it has been possible to create a habit and for the members to see the usefulness of participating in this type of communities. Gamification promotes socially desirable learning behaviors [27], in this case the use of the social network itself as a learning space in which to share content.

Based on the satisfaction survey, the students' perception of the sensation of being in a game and having fun participating in the MOOC and the VLC has been analyzed. Figure 6 reveals that those

who have had the most fun are those who have finished the MOOC at 100% with 61.6% and 75% with more than 50%, fun is an important element when promoting engagement [23] and to take into account when designing a gamified model [21]. Regardless of the ending, if we focus on age, and reviewing the two graphs globally, we can see that in general the groups that have had the most fun have been from the age of 40. And more specifically, only those over 40 have really had some perception of being in a game, as opposed to those under 30, which as expected have a different concept of game, familiar with mobile applications or real videogames.

From the point of view of motivation, another key element to achieve greater engagement in the model presented, participation in the Facebook group (Figure 8) reveals how students have worked within the community. Highlighting the reading and decreasing the rest of the actions within Facebook, being giving “likes” to others, over 41%, what has been used most, followed by commenting and sharing publications. But, if we change the focus and look at the motivation to receive this type of recognition in the publications or interactions that the student makes, the results change, (Figure 9) with almost 50% to those who do motivate the fact that they are commented or shared. These feelings generated by the interaction (comments, likes, etc.) have a relation with the activity of the students in the MOOC [25]. Within this point of view, it is interesting how the participants are predisposed to give “likes” but only 37% are motivated to receive them. Looking at the age analysis in Figure 10, as expected, the younger generations under 39 are the most motivated to receive likes (41%), to share their publications (40%–45%) and to comment (46%–48%) on generations more habituated to the use of social networks [34], as opposed to those over 60, of which only 30% were interested in receiving likes. The younger generations, who have shown a greater interest in these elements, are more susceptible to what is known as gameful experience also in contexts that are not games [35], having a predisposition to greater engagement when applying these proposals.

Analyzing this type of elements, typical of social networks such as likes, comments or the possibility of sharing other people’s publications, offer a “visible status” and a “social engagement” [36]. The ability to follow each other’s learning progress, upvoting other peers [26] can harness these motivational aspects of gamification to stimulate participation and engagement with learning contents and with other participants [27], as has been shown in this work. The use of VLC is more and more common in education [27], making use of social networks such as VLC it will be possible, in an indirect way, to take advantage of the use of these own gamification characteristics [26].

The findings shown in Table 5 reinforce this relationship between fun and social part, from feeling in a community where those participants who have had the most fun have also felt a greater degree of community with 67%. On the other hand, no direct relationship has been found between the degree of fun and the sharing of MOOC activities in the community. Finally, there is a certain relationship among the participants who have used “likes” the most and those who have had the most fun with 45%, seeming to them an attractive element, and we consider that it could be associated with the gamification points and the sensation of happiness that it produces, as other authors [26,27].

It is clear that those participants who have had the greatest feeling of being in a game (Q2) are those who have had the most fun, the same relationship that exists with the feeling of being part of the community. Of those surveyed, 23.13% took an active part in sharing their publications, of which around 30% thought it was fun, as opposed to those who did not share anything and did not perceive any fun in the MOOC. Finally, those participants who liked it the most also had fun, being close to 45%. Almost 74% of those who did not put likes did not have a perception of fun with the MOOC. Participants that agreed or strongly agreed with having fun with the MOOC shows higher levels of gamification (Q2), community feeling (Q6), and participation (Q4). However, there is no direct relation between having fun and sharing MOOC activities in Facebook. Therefore, the participation of students in sharing their own activities is not enhanced through having fun. Other actions to motivate sharing activities should be implemented.

As a main conclusion, through the use of gamification, by using two types of activities (synchronous and asynchronous) from a MOOC, and the elements of digital social networks themselves (Facebook),

we have achieved greater engagement and generation of content for the VLC. It has been proven that users have had fun and active participation in the community, creating a habit beyond the edition of the MOOC. Fun can be key to achieving greater engagement both in the course, with a higher degree of completion, and in the community.

This increase in motivation to participate in a social network is thanks to attractive elements that can be used as gamification by their own nature, as opposed to more restrained spaces such as online course forums. It has been proposed that members of the community receive an incentive to publish, with this type of interest sample towards their contributions.

With respect to previous experiences, we have worked more on the interaction with the student, to make it more active, incorporating tools such as Kahoot! or Sli.do in live events, although with an extra difficulty for certain users due to lack of digital knowledge, as well as inconvenience when having to use more tools.

The next line of research will seek to deepen the students' perception of the usefulness of the content generated, increase the number of interactive activities in which to apply gamification, incorporating new digital tools. We will also work on the design of activities that are more fun and attractive for students.

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