



# Gamification in MOOC Context. Documentary Analysis

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**Abstract.** Massive Online Open Courses (MOOC) have been set up as an alternative for teaching during the pandemic. Therefore, the current situation of this emerging technique is analyzed through documentary analysis, deepening in the general gamification characteristics of the courses offered in 10 MOOC platforms. The findings obtained have allowed to organize them into 4 groups of courses on gamification, showing that although conceptually it is centered in the definition of Deterding et al. (2011), there is still some confusion with respect to other definitions such as serious games and videogames; Besides, it is also prescribed that beyond courses entirely directed towards gamification, several disciplines, among them, computer science, education and business administration have used in their content the realization of particular units towards gamification. In conclusion, MOOCs have clearly served to increase the visibility, presence, and teaching of emerging techniques, promoting interest and understanding of the subject by users immersed in the digital ecosystem.

**Keywords:** Gamification · MOOC · Learning · Emerging technologies · Digitalization · Platforms

## 1 Introduction

Due to the health crisis produced by the pandemic, non-formal education represented through online courses has been envisioned as an educational alternative, which has reflected an exponential increase in new student registrations on these platforms [1]. The Massive Online Open Courses (MOOC) have been studied in depth within the academic community, reviewing design typologies [2], user profiles [3], combined with different learning methodologies [4], accessibility [5] and perception [6]. However, on this occasion, it is considered as a premise its involvement in the development of gamification, a trend that has permeated different areas of knowledge such as education [7], administrative sciences [8], marketing [9], etc.

Although there is evidence that gamification has been implemented in more MOOC platforms to improve the commitment [10] and participation of students [11] generating positive results in the learning experience. The approach of this research concentrates

on analyzing a different edge, focusing on exploring the offer and the exposed content of the gamification courses proposed in the MOOCs. This problematization arises because nowadays gamification is exhibited as an adaptable resource to be taught from different contexts, where we can observe faculties of computer science, design, marketing, education offering general courses about the use of game elements in non-playful environments or, failing that, proposing some unit related to specialized courses where gamification is involved. From there several questions arise: What kind of content is taught about gamification in these courses? What concepts and ideas of gamification are the most widespread? Is there a theoretical uniqueness in the gamification courses? How important are the practical cases for teaching gamification? What role plays the digitalization of gamification experience in the contents taught?

The gamification, as it happens with all those emerging technologies, becomes a favorable space for conceptual heterogeneity, diversifying in such a way that the vertebral construction of ideas is blurred, having repercussions a posteriori in the formative content presented in the courses. For example, the concept of gamification contains several general definitions [12] and [13] that differ from each other. This is even more so when the concept is determined by its etymology [14], or when notions specific to education [15], business administration [16] and information technology [17] are involved. These disjunctives demonstrate that, in effect, the innovative character of this research is oriented toward a detailed review of the composition of the training courses that are carried out on gamification or that this new strategy indirectly encompasses in their content.

## 2 Context of Gamification in MOOC

A typical MOOC is executed through an agreement in which the educational sector outsources the external services of providers of multimedia materials [18]. Reisman (2014) [19] assessed that these types of courses are based on the well-known Learning Management Systems (LMS) such as Blackboard or Moodle, adjusted to increase the number of students. LMS are considered pedagogically effective and supportive of satisfactory teaching practices [20]. In other words, MOOC are online courses offered on an LMS platform that has been expanded, and to which some social media tools are also added.

On the earlier years of MOOC – the most important and used platforms were Udacity, Coursera and edX [21]. According to data presented by Class Central, an online directory that lists MOOC courses and is a comprehensive source of information on the subject [22] in 2015 more people enrolled in MOOC than in the first three years of the movement [23], Dhawal Shah, founder and CEO of Class Central, estimated that based on the number of courses offered in 2015 the main platforms were Coursera, edX and Canvas Network. However, progressively more universities and institutions have joined this trend and have incorporated various types of software, design, and functionalities [24].

At the beginning of 2018, Shah (2017) [25] indicated that based on the number of students enrolled in their courses in 2017, the most relevant platforms were Coursera, edX and XuetangX; the latter is a Chinese platform developed by Tsinghua University. Table 1 shows the five highest-ranking platforms (based on the number of registered students and courses offered) for the years 2017, 2018, and 2019.

**Table 1.** Highest-ranking platforms offering MOOC, according to class central.

Classification	2017	2018	2019
1 <sup>st</sup> place	Coursera	Coursera	Coursera
Number of students	30 million	37 million	45 million
2 <sup>nd</sup> place	edX	edX	edX
Number of students	14 million	18 million	24 million
3 <sup>rd</sup> place	XuetangX	XuetangX	Udacity
Number of students	9.3 million	14 million	1.5 million
4 <sup>th</sup> place	Udacity	Udacity	FutureLearn
Number of students	8 million	10 million	10 million
5 <sup>th</sup> place	FutureLearn	FutureLearn	Swayam
Number of students	7.1 million	8.7 million	10 million

Knowing this, the problem that concerns this research, seeks to recognize the influence of gamification on MOOCs. The general objective of this study is examining the linkage between gamification courses and MOOC platforms. To this purpose, the following specific objectives were established: analyzing the overall characteristics of gamification MOOC courses; and determining the content prescribed by gamification modules.

### 3 Methodology

This study followed a qualitative research methodology. Considering a systematic approach for reviewing computer-based and Internet-transmitted material, the data was acquired through both documental analysis and non-participant observation; later the data was evaluated using a content analysis approach. Figure 1 depicts an overview of the process followed in this research.

#### 3.1 Documentary Analysis

Documentary analysis is a form of qualitative research that methodically examines published material; either in a printed or electronic presentation [26]. On this subject, indicates that documents are a valuable tool that help understand the research phenomena, establishing the accounts and background of an environment, the situations generated, and the regular and abnormal functioning of the studied phenomena. The document analysis approach includes the following phases: document sourcing, document selection, data collection and management, and data analysis. The first step, document sourcing focused on searching structured data through Internet engines in making information accessible [27]. For this study, the researchers considered two different but complementary sources to retrieve the MOOC in gamification. The first option was to access each of the eight platforms offering MOOC. Within each of these platforms, the authors



**Fig. 1.** Overview of the research methods

performed keyword searches for MOOC containing the keyword “gamification” (and its Spanish translation “gamificación” or “ludificación”). In most cases, the platforms retrieved a list of results that either contained those keywords in the title of the MOOC, as a descriptor of the course, or as a subtitle of one or more of the modules or sections within the course. The second option considered the Class Central directory (classcentral.com) to perform the same keyword searches containing the word “Gamification” (and its translations into Spanish: “Gamificación” or “Ludificación”). The results displayed general information about the MOOC, including the title of the course, the institutions and the platform hosting the course and its corresponding URL. This search technique took place from September 20<sup>th</sup> to the 30<sup>th</sup>, 2020.

The second phase, document selection, the authors created a set of inclusionary and exclusionary criteria to identify and retrieve those courses that would better fulfill the scope of the study [28]. The inclusionary criteria were courses containing the keyword “Gamification” (and its translations in Spanish “Gamificación” or “Ludificación”) that were either available or closed at that time. Excluded criteria involved courses that

**Table 2.** Number of MOOC that stemmed from the steps: document sourcing and document selection.

	Coursera	EdX	Udacity	FutureLearn	Swayam	XuetangX	MiríadaX	Iversity	Class Central
Number of MOOC with any keywords	11	10	51	0	0	0	4	2	25
Number of MOOC after “document selection”	2	3	0	0	0	0	2	2	10
Percentage of rejection	82	70	100	–	–	–	50	0	64

– although identified as MOOC – required a payment for enrollment. Additional inclusionary criteria were integrated depending on the characteristics of the platforms. For example, Coursera subdivides the courses into three categories (open courses, guided projects, and specializations); only “open courses” were included in the search because guided projects and specializations include fees. One interesting finding was that 73% of the MOOC retrieved during the Document Sourcing search were rejected after a thorough inspection because they were either not related to the study of gamification or required payment for enrollment (Table 2). A second interesting observation was that FutureLearn did not yield any MOOC with the keyword “gamification” but listed 22 MOOC related to “game”; from those results, nine were MOOC associated specifically with videogames (development, history, design, starting a business and data science).

The third phase, data collection and management, means interpretation of any data requires reasoning and acknowledgement of the original intended meaning. In this study, the authors established that the purpose of the information shown through the platforms was to convince potential students to enroll in the MOOC; therefore, the information was concise and designed from a marketing standpoint. Thus, it presented, from origin, a pre-pattern of categories: name of the course, type of MOOC, offered by (institution), country, names of the instructors, duration, languages, level, objective, rating, and URL. During this phase, the authors also agreed on a classification [29] that later assisted them to interpret the information. The four classifications were:

- a) Group 1: Available MOOC about Gamification.
- b) Group 2: Closed MOOC about Gamification.
- c) Group 3: Available MOOC with a partial study of Gamification.
- d) Group 4: Closed MOOC with a partial study of Gamification.

While identifying the MOOC, the authors cross-referenced those found within the eight platforms with the Class Central directory to corroborate the results. Nine MOOC were identified directly from the platforms, which were also listed in Class Central.

However, an additional MOOC called “Instructional design and technology: learning theories” from edX was identified in Class Central and added to the final results. Accordingly, MOOC were organized into one main listing to proceed with the data analysis as described in Table 3.

**Table 3.** Group classification of MOOC after data collection and management.

Group	Name of the MOOC
Group 1: All available MOOC about gamification	Gamification (Coursera)
	Leading Change: Go beyond gamification with gameful learning (edX)
Group 2: Not available MOOC about gamification	Accessible gamification (edX)
	<i>Introducción a la gamificación a través de casos prácticos</i> (Introduction to gamification through practical cases) - 5th edition (MiríadaX)
	Gamification design 2015 (Iversity)
Group 3: Available MOOC that partially teach about gamification	<i>Claves para la innovación en la docencia universitaria</i> (Keys for innovation in university teaching) (Coursera)
	Tecnologías web emergentes para la enseñanza virtual (edX)
	Instructional Design and Technology: Learning theories (edX)
	Corporate digital learning (Iversity)
Group 4: Not available MOOC that partially teach about gamification	<i>Diseño, organización y evaluación de videojuegos y gamificación</i> (Design, organization and evaluation of videogames and gamification) (MiríadaX)

The last and fourth phase, data analysis, it was conducted in a “way that empirical knowledge is produced and understanding is developed” (Bowen, 2009, p. 34). To analyze the content of the identified MOOC that fulfilled the inclusionary criteria, the information was organized into the pre-pattern of categories and the four-group classifications described in the data collection and management. The authors implemented a non-participant observation technique to reach a more complete and sturdy analysis of MOOC platforms. It is worth emphasizing that the documentation analysis was conducted from March 25<sup>th</sup> to October 21<sup>st</sup>, 2020.

## 4 Results

The first part of this section describes the results for each of the group classifications. The second part offers the non-participant observation highlights conducted on the two

**Table 4.** List of available MOOC about Gamification (Group 1)

Platform	Name	Type and duration	Provider	Language
Coursera	Gamification	Course 17 h	University of Pennsylvania (United States)	English (subtitles in French, Ukrainian, Simplified Chinese, Brazilian Portuguese, Vietnamese, Russian, Turkish, English, Spanish and Kazakh)
edX	Leading Change: Go beyond gamification with gameful learning	Course 20 h	University of Michigan (United States)	English (transcripts in English)

MOOC that give a full emphasis to gamification (Group 1), and the four MOOC that partially taught gamification on a specific module (Group 3).

Group 1 contained all available MOOC about gamification. In these courses the registration process was open, and enrolled students would be able to visualize their progress. Additionally, in the case of Coursera, the students enrolled would receive a grade and feedback of their activities and projects. Table 4 contains the two MOOC included in Group 1; one offered by Coursera and another by edX. Both MOOC are offered by universities from the United States with English as the official language; although Coursera offers subtitles in ten languages, whereas edX only has transcripts in English.

**Table 5.** List of closed (not available) MOOC about Gamification (Group 2)

Platform	Name	Type and duration	Provider	Language
edX	Accessible gamification	Course 12.5 h	Georgia Tech (United States)	English (transcripts in English)
MiríadaX	<i>Introducción a la gamificación a través de casos prácticos</i> (Introduction to gamification through practical cases) - 5th edition	Course 20 h	Universitat Oberta de Catalunya (Spain)	Spanish
Iversity	Gamification design 2015	Course 10 weeks	Springer Nature (international)	English

Group 2 enclosed the not available MOOC about gamification. Table 5 shows the three MOOC included in this classification. The first one was supported in the edX platform and offered in English by Georgia Tech from the United States. Even though the registration process is closed, interested students are able to examine materials without receiving any feedback or open communication from the instructors. The MOOC offered by MiríadaX had specific sign-up dates; when closed, potential students are not able to review the content from the different modules. The only information available is a video presentation on the website; where it can also be observed that the course is taught in Spanish by the *Universitat Oberta de Catalunya* (Open University of Catalunya), and required 20 h for completion. The last course in this group classification was offered by Iversity. That MOOC was offered in 2015 and is no longer open for registration, nor available to examine materials or browse the educational videos.

**Table 6.** List of available of MOOC that partially teach about Gamification (Group 3)

Platform	Name	Type and duration	Provider	Language	Unit
Coursera	<i>Claves para la innovación en la docencia universitaria</i>	Course 12 h	Universitat de Barcelona (Spain)	Spanish	Week 7 is a module called “Gamification”
edX	<i>Tecnologías web emergentes para la enseñanza virtual</i>	Course 18 h	Universidad Galileo (Guatemala)	Spanish	Lesson 2: contains information about MOOC and gamification
edX	Instructional Design and Technology: Learning theories	Course 40 h	University of Maryland (United States)	English	Week 6 is called “Learning approach models: experiential learning, project-based learning, and gamification”
Iversity	Corporate digital learning	Course 4 modules	KPMG (international)	English	Chapter 3 (unit 3) contains a module called “Gamification in corporate digital learning”

Group 3 contains the available MOOC that partially address a subject or a module about gamification. Table 6 contains the four MOOC included in this group classification; one is available through Coursera in Spanish, two by edX (one in Spanish and one in



English), and one by Iversity in English. The MOOC offered by Iversity is managed by KPMG corporation, an international network of accounting, taxing, and auditing firms with worldwide presence. The MOOC from this Group 3 could be further divided into two areas: MOOC within the educational industry, and MOOC with a business objective. As such, the approaches given to gamification widens. In addition, the same table contains the specific location (or week) of the gamification module in each of the four courses.

Finally, Group 4 contains the MOOC that partially address a subject or a module about Gamification but are currently closed. Only the MOOC “*Diseño, organización y evaluación de videojuegos y gamificación*” (Design, organization and evaluation of videogames and gamification) was included in this group. Although this particular MiríadaX MOOC indicated that students could browse through the material without any expectation of interaction, the authors were unable to sign-up or access the contents of this course. However, its description indicates that the MOOC is a six-week Spanish-speaking content offered by *Universidad Europea* from Spain with an emphasis in computer science.

## 5 Conclusions

The following research has summarized multiple significant advances, in which, in addition to answering the research questions, the specific objectives determined during the research are also met. Firstly, it is evident that gamification has been extended through the main MOOC platforms, and it is possible to infer that gamification is oriented to formalize the basic and general knowledge of this technique. Nevertheless, courses have also been built to teach disciplines such as education, computer science and business administration, which incorporate in one of their units the teaching of gamification in its theoretical development. In short, gamification is one of the emerging trends that, catalyzed by the influence of new information and communication technologies have managed to establish themselves in digital training spaces, forming new ways to involve and attract more users in their development. Similarly, it is worth mentioning that although the concept of Deterding et al. (2011) has been established as a conceptual pillar of gamification, some courses have been confused in combination with other concepts such as serious games and videogames. While the teaching of gamification through the MOOC is denoted as a didactic path, the situation produced by the pandemic could involve its digital prescription in greater detail, especially by including elements of play during the learning sessions. In fact, it would be worthwhile to see if other didactics such as inverted classroom, project based learning, problem based learning contain such frequency in the MOOC platforms.

In short, the authors propose 2 recommendations, the first one that gamification courses presented in MOOC platforms should present clearly and transparently the information of the subject and the approach, in that way, the users will be able to select with more diligence the course that more adapts to their needs and in second instance, It is recommended that researchers proceed with future cyber-ethnographic analyses that will allow them to know more closely the didactics applied in the teaching of the MOOCs on gamification, as well as to know the repercussion and impact of these MOOCs on gamification on the users, evaluating their feedback and use in their environment.

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