

Atypical: Analysis of a Massive Open Online Course (MOOC) with a Relatively High Rate of Program Completers

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Abstract

Massive Open Online Courses (MOOCs) have raised high expectations due to their potential for changing the relationship among students and professors, academy, and the general community. The terms “massive”, “open”, “online” and “course” have been redefined and reinvented so many times that it is difficult to offer a wide broad definition to cover the whole of their activity. Indeed, these terms may be misleading; for example, the term “massive” generally refers to the number of learners joined, but it does not refer to the equally massive desertion levels that have been associated with such programs. This document presents a comparative analysis for 11 MOOCs that obtained a terminal efficiency equal to or less than 11% and a MOOC whose calculated terminal efficiency was of 22.35%. This last MOOC, created as part of a teacher training strategy, was developed at Coursera’s platform, and enrolled 10,161 learners from 81 different countries. The obtained results describe the characteristics of the participants, the technological resources, and the tools and the didactic strategies implemented by the instructors. It is concluded that without a correct measurement of the final results, it is not possible to evaluate the success of a MOOC; therefore the institutions and consortia must establish indicators to focus the efforts in order to improve the quality of teaching.

Keywords

MOOCs, terminal efficiency, desertion

Introduction

On November 4, 2012, *The New York Times* declared 2012 as the year of the MOOCs (Massive Open Online Courses), due to the impact that they seemed to promise to bring to the process of teaching and learning (Pappano, 2012). Since their inception in 2008, this new

modality of sharing knowledge has positioned itself between the tastes and preferences of those

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interested in continuous education. However, it was in 2012 when a great tsunami offer of MOOCs took place (Hennessy, 2012), and they became present through a variety of education platforms. From then on, the way of transmitting knowledge, collaborating, and learning has been extended through these courses, which did not replace traditional instructional method, but, rather, complemented face-to-face formats. MOOCs tend to be geared toward those who seek additional material to strengthen their professional career, update knowledge, and acquire learning about areas of interest, although they also serve those who seek access to preparedness beyond high school education (Billings, 2014; DeSilets, 2013).

According to their evolving definition, MOOCs can be regarded as offering courses through the use of technology, housed in an educational platform, not linked to a formal registration at a certain university, with no deadline to register and no penalty for abandonment (DeBoerHo, Stump and Breslow, 2014). However, to date, each of the terms “massive”, “open”, “online”, and “course” has been redefined and reinvented on a number of occasions; hence, it is difficult to offer a fully covering definition. Usually when using the terms “massive” and “open,” the intent is to indicate that the course will be available to any person showing interest and self-motivation to register. However, these terms usually do not acknowledge the fact that in the same way, and MOOCs are likely to experience massive departures of participants at any time.

It is reasonable to say that those who register as participants in a MOOC are individuals who are self-motivated for learning, with varied reasons for electing to participate. Due to this component of variability and the fact that participation depends only on them and not on the University faculty who teach them, when

measuring the MOOCs’ success it is necessary to pay particular attention to how the parameter is calculated. In addition, this new method opens the door to be creative in the generation of new metrics to evaluate them (Jordan, 2014).

In this article, we will use the statistic named *terminal efficiency*, which refers to the percentage resulting from dividing the total number of participants who received Coursera’s declarative of achievement among the total of registered participants (Observatorio de Innovación Educativa, 2014).

This paper presents the results obtained when calculating the terminal efficiency for 12 MOOCs offered between 2013 and 2014 by a renowned Latin American University. The results indicate that some of the MOOCs offered by the University have a terminal efficiency above 6.5% which is the average recorded in the literature (Jordan, 2014); however, one of the courses reported an atypical terminal efficiency, when 22.35% of the joined participants completed the course, fulfilled the course’s activities and obtained the declarative of achievement. The detailed analysis for the MOOC that had an atypical terminal efficiency is presented. For this course, a description is included of the participants’ characteristics, the technological resources used, and the tools and teaching strategies implemented by the academic staff. The findings suggest that to evaluate the success of a MOOC it is necessary to generate metrics other than those employed in the evaluation of face-to-face or hybrid courses.

Theoretical Framework

This section presents briefly the concepts which sustain the research.

What are MOOCs?

To define the term MOOC, we refer to the *Connectivism and Connective Learning* course

taught by George Siemens and Stephen Downes in 2008 through the University of Manitoba. George Siemens is considered the creator of the theory of Connectivism, in which students have the freedom to create their personal learning environment (PLE) and build the knowledge through their collaboration at discussion and debate forums in a virtual environment (Marques & McGuire, 2013).

From the beginning, MOOCs used different technological resources so that participants could learn and be interconnected to collaborate. Similarly, MOOCs were steeped in the philosophy of making knowledge attainable and available to all people through the sharing of content (Billings, 2014). The learning theory that supports MOOCs derives from constructivist theory, which, for virtual learning spaces, establishes that it is through connections and collaborations at educational platforms that students build knowledge (Heredia-Escorza & Sánchez-Aradillas, 2013). Because of this, learning is seen as a personal and internal process where the teacher will be the person who guides or who will provide the means to learn (López-Zapico & Tascon-Fernández, 2013).

In the educational field, mobility in communication and collaboration technologies have made a difference in facilitating access to online content; they have also empowered the sharing of videos that enrich the process of teaching and learning (Hannon, Patton & Temperley, 2011). This, in conjunction with the accessibility of smartphones and tablets, as well as the high level of participation in social networks, have been positive factors with regard to the popularity of online education (DeSilets, 2013). Billings (2014) states that the great acceptance of the MOOCs by the continuous learning community rests in the freedom to choose how much they will be learning; this implies that participants decide their level of

engagement with the course based on a personal interest to learn. The author also notes that MOOCs have been rapidly accepted because they offer collaboration with people from the rest of the world through virtual space, an advantage that the face-to-face courses cannot provide.

There are currently various platforms that integrate resources for asynchronous interaction. The vast majority of them had the Khan Academy and iTunes U platforms as models for sharing knowledge. Today, the most acknowledged platforms for hosting of MOOCs are edX and Coursera (Scopeo, 2013); however, in contrast with the original idea creators of the MOOCs had, these platforms require registration periods (although registration is open during the weeks that the course is available) and content is under copyright, so it restricts the term "open" (Marques & McGuire, 2013).

On the other hand, based on the strengthening link between technology and education, as well as the opportunity created by this relationship of learning inside and outside the classroom, DeBoer et al. (2014), established that the predominant requirements for a course to be considered a MOOC are: that it is offered through the use of an educational platform; that the knowledge is available to anyone (i.e. it is not linked to a formal registration at a certain university); there is no limit or restriction for registration, and there is no penalty for abandonment. The authors stipulate that only when these conditions exist, can a course be considered a MOOC.

Terminal Efficiency

Terminal efficiency is the percentage resulting from dividing the number of participants who received the declarative of achievement from the educational platform, by the total of registered participants (Observatorio de Innovación Educativa, 2014). Jordan (2014) uses the term

completion rate to mean the same, and establishes its definition as the ratio between the total number of participants who met the criteria of the course for the declarative of achievement with respect to the total number of registrations.

In the research done by DeBoer et al. (2014), the authors also estimated the completion rate in this same way; however their conclusions suggested that it is necessary to redefine and clarify the way in which the MOOC achievement is measured. Ho et al. (2014) also suggested the need to rethink the metrics in the MOOC's calculation, taking advantage of the different types of information generated by these kind of courses; for example, the number of accesses to certain video or the number of downloads of a certain document.

According to Jordan (2014), the average total number of participants of a MOOC is around 43,000; of this amount, 6.5% complete the course. The author also establishes that there is a negative correlation between the total number of participants who complete the course and its length; that is, when the duration of the course extends, the number of participants who complete the course decreases. This situation gives rise to the explanation of the following key concept within the theoretical framework.

Dropout Rate

The term "dropout" is widely used in Latin America to refer to the abandonment of school as a multifactorial situation experienced by students who unregister (RAE, 2014). In online education, there are many factors that can influence the decision to leave a virtual learning space, including the level of prior knowledge required, the lack of certain necessary skills to take the course in a self-directed way, a change in the layout, a decrease in the level of self-motivation, or the loss in confidence at achieving

the expected result (Milligan, Littlejohn & Margaryan, 2013).

Billings (2014) indicates that among the disadvantages of MOOCs is the lack of sufficient information to identify the causes that lead to fewer than 10% of participants complying with all activities and finishing the course. Among the possible reasons the author mentions are the required improvements in the design and implementation of the MOOC, uncertainty on the recognition of the acquired learning (by universities and employers) and low adaptability to the e-learning model.

On the other hand, Ho et al. (2014) estimate the dropout rate as the complement to the percentage of active students on the platform, defining the latter as the ratio between the number of learners who have been active on the course during the last week and the total of registered participants. In addition to the above, the authors state that the dropout rate will be equivalent to the attrition of the course during the given period. As a result of their research, they found that about 35% of participants in a particular MOOC never check the contents of the course (momentary motivation for registration). In addition, only 50% of the remaining participants who do view the course's content actually access the first activity assigned in the course.

Method

The main objective of this investigation is to evaluate the terminal efficiency of the MOOCs offered by one of the universities of greater recognition in Latin America that is seen as a leader in providing distance education.

The following sections will describe the context of the research, the applied instruments, the dimensions of analysis and the participant population.

Context

Possessing an extensive infrastructure to offer online programs, the University housing the MOOC under study is a pioneer within the private universities in Latin America. This educational institution is governed by five values, three of which —Innovation, Global Vision, and Teamwork — are related to the proposed offering of massive open online courses.

Within this educational institution, much of the teaching staff and information technology personnel already have experience in the generation, management and administration of online courses; thus, creating a MOOC was a variant to what they have done previously. The staff knew that within the distance teaching-learning process, the student takes responsibility for self-direction and time management to meet the goal of approving the courses (Alemán & Gómez-Zermeño, 2012; Gómez-Zermeño, Rodríguez-Arroyo & Márquez-Guzmán, 2013).

The MOOCs offered by the University through Coursera cover different areas of study, including Mathematics, Physics, Innovation, Entrepreneurship, Latin American Culture and Strategic Educational management, to name a few.

The experience of the personnel involved in the design and implementation of the MOOC, in conjunction with the position of leadership that the University occupies, could be two major factors of influence for the terminal efficiency rate, which had an level considerably higher than the average reported in other research, with a calculated terminal efficiency of 22.35%. However, the foregoing has not been proved statistically and must await further investigation.

The analyzed courses in this research correspond to the MOOCs offered during 2013 and until the summer of 2014, all of them housed in the learning platform Coursera. Most of these courses were linked in some way to one of the face-to-face courses that the University offers, either as a material of self-study to withstand any instructor or as support to the studied material within the classroom. However, they were not closed for registration to only these persons, and because they were offered through the educational platform in a massive and open way, the students at the Institute were able to collaborate and share knowledge virtually with participants from all over the world.

The aim of the course that presented an atypical terminal efficiency was to strengthen leadership in strategic educational management, taking advantage of technology in the process of strategic planning, shared leadership, collaborative and responsible social participation and evaluation for continuous improvement. The course's body was made up of four units and aimed at all those interested in the subject. Participation in the course did not require previous knowledge.

Research Instruments

As stated above, in this research the definition for terminal efficiency corresponds to the percentage resulting from dividing the total number of participants who received the declarative of achievement from Coursera, among the total of registered participants (Observatorio de Innovación Educativa, 2014). The source of information is the panel of statistical analysis that Coursera offers on its Dashboard.

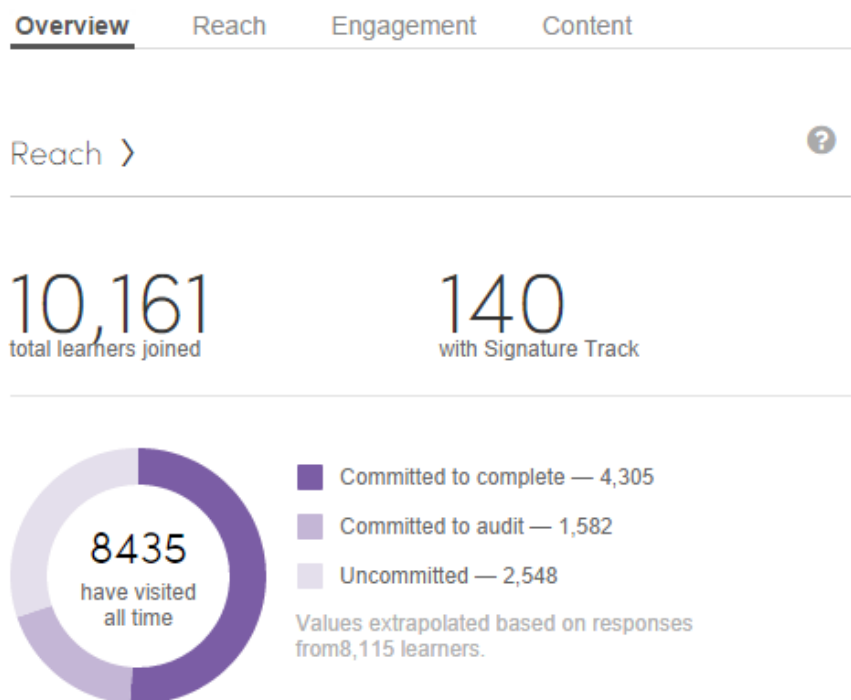


Figure 1. Dashboard of the learning platform Coursera.

Since the data required to estimate the terminal efficiency are provided by Coursera, the same criterion was used for all the analyzed courses, as the methodology has been standardized, and the source of the data is validated.

Dimensions of The Analysis

The educational platform Coursera hosted the university's MOOCs. This platform offers two different types of declarative of achievement for the participants who complete and approve the course. The *declarative of achievement* is awarded to participants who approve the course and the *declarative of achievement with distinction* is given to participants with an outstanding final average. Both the criterion of achievement and achievement with distinction are subject to the levels determined by the educational staff involved in the course design. There is a third option of declarative, one with a

cost, and its validity is supported by Coursera's process where official documentation validates the identity of the participant.

The aim of this article is the comparison of the terminal efficiency among the MOOCs offered by the University. Moreover, we also present a breakdown analysis of the atypical course by type of declarative granted, in order to submit a detailed analysis of the information collected.

Population and Sample

The maximum total of enrolled participants in the courses will be used for the calculation of terminal efficiency, being this total of people who signed up and never performed any activity (registration was the result of a momentary motivation), by those who were only reviewing the course content without performing any activity, by those who carried out some of the activities and by those participants who meet the

criteria required to obtain the declarative of achievement. For the atypical case studied, the terminal efficiency is calculated with respect to participants who remained active during the complete course.

Results

Between January 2013 and summer 2014, the University under study and Coursera, in conjunction, received 209,871 requests to participate in their 12 MOOCs. Academic authorities of the University indicated that for the August-December 2014 term, the academic institution had around 95,000 students formally enrolled in all the educational programs offered. Taking this statistic as reference, the total amount of participants in the offered MOOCs approximately equals to 220.92% of the total number of students enrolled in the institution. From the perspective of strategic positioning the University is implementing, the main goal of reaching markets not physically attainable has been covered successfully. Also it is fulfilling a social commitment to share knowledge and take a position as an innovative University in teaching-learning processes.

The findings presented below have been organized in the following manner. First there is a brief description of the atypical course, its subject matter and duration; then the analysis of terminal efficiency for the 12 MOOCs offered by the University between January 2013 and summer of 2014 is presented; finally, the characteristics' analysis of the participants of the MOOC whose terminal efficiency was the 22.35%. Finally, we present the technological resources, tools, and educational strategies of the MOOC with atypical terminal efficiency.

Course Description

The course with terminal efficiency of 22.35% established as its main objective strengthening the leadership in strategic educational management through the use of technology in the process of strategic planning, shared leadership, collaborative, responsible social participation and evaluation for continuous improvement. The course was divided into four units through which participants strengthened the educational management at their workplace, built a shared vision of school transformation, learned to identify the competencies required to work in collaborative and responsible manner and evaluated through reflection, the improvement in the quality of education.

The strategic educational management course was designed with a duration of 6 weeks, from June 2 to July 13, 2014; however, it remained open until August 6 since the participants requested it in order to conclude the activities.

Comparative Analysis Between MOOCs

Mathematics, Physics, Innovation, Entrepreneurship, Latin American Culture and Strategic Management Education are some of the disciplines of study that encompass the content of the MOOCs offered by the University and studied for this research. In equal magnitude of diversity is the rate of terminal efficiency calculated for each of them, results showed rates from 1.2% to the 22.35% (Figure 2).

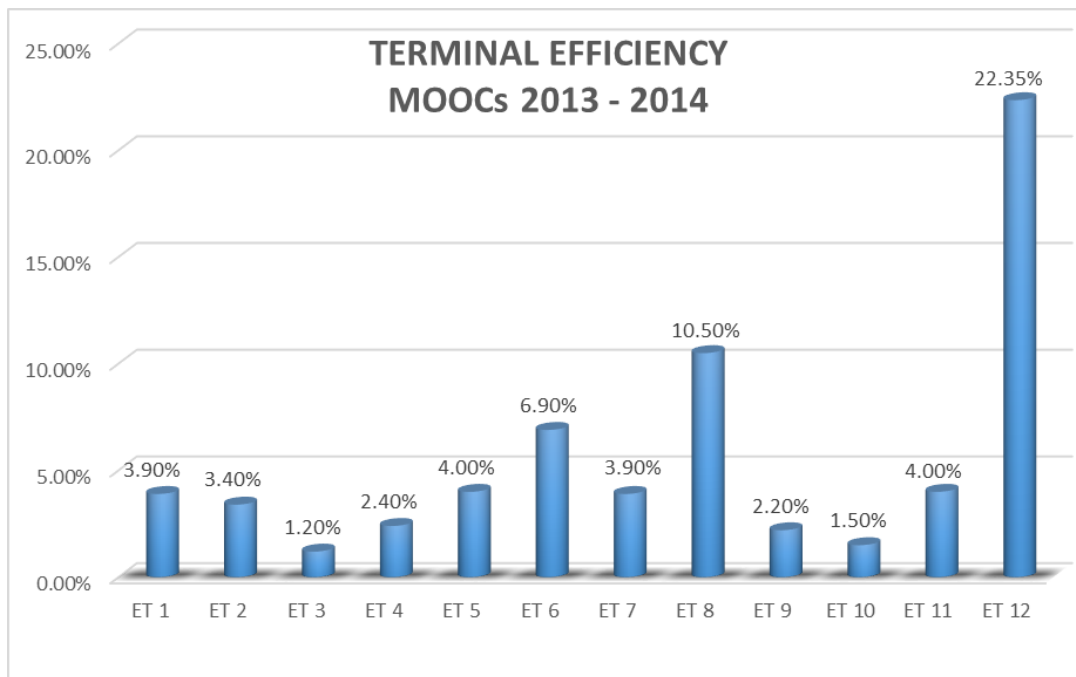


Figure 2. Rate of terminal efficiency with respect to the registered total per course maximum.

It is important to note that the average terminal efficiency for the MOOCs offered by the University is 4%, a percentage equal to that documented by the Graduate School of Education at the University of Pennsylvania in their recent research on MOOCs (Penn GSE, 2013).

Leaving aside the atypical case, the terminal efficiency calculated for the rest of the MOOCs is between the interval of 1.2% and 10.5%. The courses with the lowest and highest terminal efficiency correspond to the two courses with the higher amount of participants: MOOC 3

records 35,901 and MOOC 10 with 24,262 participants registered. However, although it seems that a 1.2% of achievement for MOOC 3 is a low rate, when this percentage is multiplied by the total number of participants at the course, the quantity of 431 participants meeting Coursera's achievement declarative is obtained.

Figure 3 shows the MOOCs composition with respect to the 209,262 registered in the educational platform.

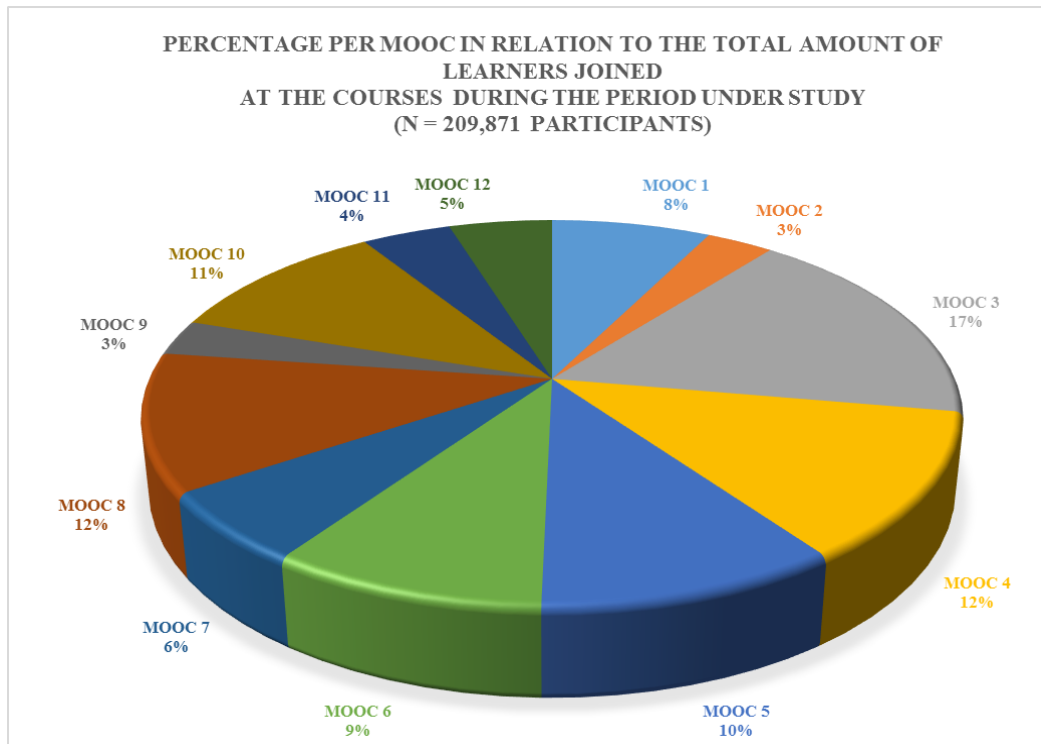


Figure 3. Percentage of enrolled by MOOC with respect to the total number of records in the MOOCs offered by the University

In the specific case of the atypical course that had 10,161 enrolled participants (MOOC 12), 2,271 received the declarative of achievement; 506 participants obtained the *declarative of normal achievement* and 1,765 participants received *declarative of achievement with distinction*. It is important to mention that for this particular course, the required criteria for receiving the *declarative of achievement with distinction* included the participant's compliance with all assigned activities and also a final average equal to or higher than 90%; to obtain the *declarative of normal achievement* instructors set a final average equal to or higher than 70% and below 90% and the submission of all the activities. With the above information, it can be concluded that with respect to the maximum total of enrolled participants, 17.37% of them presented a high level of commitment to the course, as demonstrating by their attaining the *declarative of achievement with distinction*; 4.97% of the maximum total of enrolled

participants obtained the *declarative of normal achievement*.

In recent studies, one of the most commonly identified issues is the urgent need to define new ways to measure the success of the massive open online courses. Both in the article published by DeBoer et al. (2014) and in the one published by Jordan (2014), the researchers concluded that a better metric for determining the rate of compliance (statistically equivalent to terminal efficiency) is to consider the percentage of declarative of achievement with respect to the registered population that remained active throughout the duration of the course. The learning platform Coursera provides the data of total number of students who visited the course's page; for the particular case of the atypical course (MOOC 12), 8,435 participants were registered as continuously active. Redefining the terminal efficiency as the percentage of enrolled participants who obtained the declarative of achievement with respect to the total of continuously active registered participants, the

calculated terminal efficiency is 26.92%. It is also possible to calculate the dropout rate, for

this course was of 16.98% since 1726 records showed no activity in Coursera (see Table 1).

Table 1.

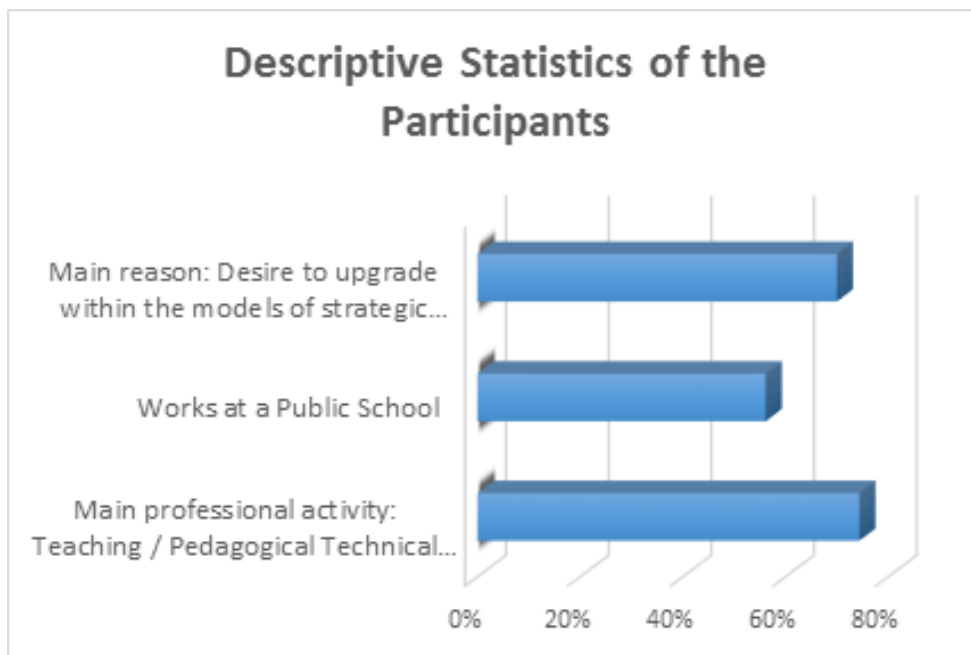
Descriptive statistics of the course with atypical terminal efficiency

Total amount of enrolled participants	10,161
Total amount of continuously active participants	8,435
Total amount of enrolled participants with declarative of achievement	2,271
Terminal efficiency with respect to the total amount of enrolled participants	22.35%
Terminal efficiency with respect to the total amount of continuously active participants	26.92%

**Characteristics of the Participants:
The Atypical MOOC**

The reported characteristics for the participants of the MOOC with an atypical terminal efficiency are calculated from the survey that was part of the registration process to the course. Some of the descriptive statistics obtained are: 40.6% are male and 59.4% female; 38 years old is the participant’s average age; 65.1% of the participants reside in Mexico (country where the University’s headquarters are located) and

34.9% outside Mexico. Also, 71.8% of participants have as main professional activity *Teaching / Pedagogical Technical Advisor* and 56.20% work at a *Public School*. Finally, 31.1% of the survey’s participants identified themselves that the main reason for participating at the MOOC was the desire to upgrade within the model of strategic educational management. See Figure 4.



For the specific case of the atypical course, 96.03% of respondents in the survey expressed their intention of completing the course; this can be taken as an attitude of commitment since they hoped to receive a successful learning experience. That same survey shows that 18.2% of respondents expressed as one of their main expectations to get a certificate of participation in a course taught by the University. This result can be used as an estimate for the institution's market positioning.

Technological Resources, Tools, and Instructional Strategies of the Atypical MOOC

During the design stage of the MOOC with atypical terminal efficiency, special attention was given to generating the technological resources for sharing the course's contents. The preparation of all the explanatory videos that would serve as a support to the participants required a large amount of time from the designing team. For example, within the technological resources employed in the atypical MOOC, animated readings and interactive activities were included. Other technological resources within the course were discussion forums, self-assessments or questionnaires, and explanatory videos prepared by the instructors. The technological tools used by participants during the MOOC's collaboration were the ones included at Google +; through these, participants generated e-mail accounts, created a profile, formed a virtual community for their school and collaborated asynchronously.

The instructors and administrative staff implemented a number of motivation strategies, including focusing on a close communication policy through the course's announcements section, maintaining close contact with all the participants either through the virtual community or by email, providing reminders of the weekly activities to be done and the due

dates. These strategies were used for motivating participants to complete the MOOC's four units.

Results in this study show that out of the 12 MOOCs offered by the University, one of them attained a terminal efficiency of 22.35 %. This atypically high terminal efficiency may be due to a number of things; we believe that the special care placed on the MOOC's design, as well as the active communication carried out by the teaching staff during the course, played a big role in achieving it. Distance education students often feel alone during their time spent in online courses (Kaplan, 2000), hence the importance of applying motivational strategies that let students know they are not alone. MOOC 12 provided tools that allowed the interaction between participants and between participants and teaching staff, a key concept in connectivism, as well as a critical element in the learning process in online learning environments.

Conclusion

The presence of educational platforms has led universities from different countries to be part of the philosophy of sharing knowledge free of charge, or at a low cost when a validated certification is expected. Offering MOOCs is often a part of positioning strategies, of attracting national and international talent for projects of educational innovation and social commitment. However, like any other project, there must be parameters to evaluate success. In the case of the MOOCs, an example of these parameters is the terminal efficiency rate, statistical analysis which is employed by one of the leading universities in Latin America, and determined as the percentage of students scoring the declarative of achievement with respect to the maximum total number of registrations.

The present document analyzed terminal efficiency for 12 MOOC offered by the University and hosted on the learning platform Coursera. Results show that the terminal efficiency average for the considered courses is equal to the average reported in the literature for *completion rate*,

statistically equivalent to the terminal efficiency rate employed by the University. We conclude that overall, the efficiency of the University as a whole is within the standards that the literature indicates. Individually, one MOOC had a terminal efficiency close to 1% of the total number of participants (more than 35 thousand people), so the academic authorities must assess these findings concerning positioning and image policies.

Within the statistical analysis, the composition of courses for the 209,871 participants of MOOCs offered by the University between January 2013 and summer of 2014 was broken down. The analysis for the terminal efficiency minimum and maximum rate in relation to the number of participants enrolled at the MOOCs showed that a low terminal efficiency expressed as a percentage is still attractive to the academic authorities in terms of total number of participants.

Descriptive statistics of those who were registered in the course of strategic educational management were reported. Among the most noteworthy finds is the terminal efficiency rate of 22.53%, well above that reported by other courses at the same University, or even above that generally reported in the literature (Jordan, 2014).

The participants' profile shows that it was a group of people with high interest in the subject matter of the course. Therefore we highlight the fact that in the registration survey 98.04% of the respondents expressed their intention to complete the course. On the other hand, when they were questioned for the reasons motivating their participation in the MOOC, 36.81% expressed the expectation of obtaining a certificate from the University.

An analysis of this atypical MOOC allows for the identification of certain specific strategies that likely contributed to its high terminal efficiency. These include a careful process of course design to include attractive technological resources (animated readings and interactive

exercises) and the use of practical tools (various Google + Tools), in conjunction with the different communication strategies that were implemented by the teaching staff throughout the duration of the course, in order to motivate participants to continue engaging with the contents of the MOOC and answering the exercises.

Future research is proposed to expand the knowledge base of how to increase terminal efficiency in a MOOC. One area of suggested future research is the statistical validation of the correlation between the initial intention and the terminal efficiency rate. A concern arises due to the fact that instructors and academic staff were involved during the design and implementation stages on motivational and tracking activities for participants. Resources were allocated to keep updated announcements and to procure a pleasant and enriching collaboration through virtual communities. The hypothesis to be tested is the positive effect over the terminal efficiency when the course has a faculty committed to the care, attention and companionship of enrollees.

Also, unlike the proposals of Jordan (2014) and DeBoer (2014), we propose to calculate the terminal efficiency of MOOCs considering only participants classified in the platform as "committed to complete" and "committed to audit", with the intention of "debugging" the database of registered participants by eliminating the participants that the educational platform reported as "uncommitted", i. e. participants who reviewed a low percentage of the course's content and also did not carry out the activities assigned. Thus, we concluded that to evaluate the success of a MOOC, it is necessary to generate metrics other than those employed in the evaluation of face-to-face or hybrid courses.

Massive open online courses have generated great expectations because of their potential to change the relationship between students and teachers, the Academy and community in general. This research presents

important points in that, unlike previously documented in the literature, one of the studied MOOCs presented a terminal efficiency considerably higher. With this information we seek to expand the knowledge base of how to increase terminal efficiency in a MOOC, and in this way have an impact on their quality and contribute to the improvement of education.

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