
PROMOTING ENGAGEMENT IN MOOCS THROUGH SOCIAL COLLABORATION: COMMON LESSONS FROM THE PEDAGOGICAL MODELS OF UNIVERSIDAD GALILEO AND UNIVERSIDADE ABERTA

Rocael Hernández, Universidad Galileo, Miguel Morales, Universidad Galileo, Guatemala, José Mota, LEaD, António Teixeira, Universidade Aberta, Portugal

1. Introduction

Massive open online courses (MOOC) have been dramatically expanding online learning opportunities due to the emergence of new platforms and MOOC aggregators that facilitate access and search for courses according to the needs of each user, growing from a selection of specialist courses to an offering of hundreds of courses on major online platforms with millions of registered users [1]. All this has caused a very interesting debate about their influence in the future of higher education.

Initially, MOOCs were seen as a form of providing better education for all, offering the opportunity to study with the best teachers for free and promoting the development and management of specific learning communities for people with less access to education. However, different studies show that people who enroll and participate in a MOOC generally have higher education qualifications. Koller [2] indicates that 43% of students have an undergraduate level, 37% a master's level and 5.4% a PhD level. In another study by the University of Pennsylvania [3], students with a higher education qualification dominate again, at 83.0%. Of these, 44.2% have a post-graduate level. Data from the Telescope project, the first and currently only Latin American MOOC platform [4], [5] shows that 18% of its students are from pre-university level, 38% are undergraduates and 44% have a bachelor's or a master's degree.

Another strong criticism of MOOCs comes from their high rate of attrition, even if it may be seen with a positive connotation [6, 7, 8], because the millions of students enrolled in the same course have different training needs and motivations. A recent study of participants from three different MOOCs at Stanford [9] evidenced that the main reasons for enrolling in a course are having fun, meeting challenges and an interest in the subject matter. Hill [10] characterizes the different patterns of student behavior in four groups: observers, dropouts, passive and active participants.

On the other hand, MOOC's are considered open access, which means anyone can register and participate. They have a defined structure, but this structure must support and be helpful to thousands of people with different learning styles, accustomed to different forms, techniques and methods of learning, coming from different countries and cultures, having different customs and interests. It is also important to recognize that students may face problems of isolation and disconnection in the virtual learning environments used in the courses [11]. Learning online requires some autonomy and organization skills, and students may not be able to self-organize their work for various reasons, including not being used to control their own learning, or face difficulties to complete activities caused by the lack of validation and support from their mentors. All these factors are generally pointed out as the main contributors to the high dropout rate characteristic of MOOCs [12]. However, all the studies about this issue have not considered the analysis of the learning experience designed. It is evident that the traditional model of education does not adapt well to this type of courses.

Given these concerns, we have initiated a research collaboration between the Galileo University in Guatemala and the Open University of Portugal on issues of design and development of an educational model based on the use of learning artifacts, using cloud based tools to improve learning experience and achieve better results. This paper describes the main characteristics of the traditional teaching model of a MOOC, the general aspects of content delivery, learning activities, evaluation methods and communication. The rest of the paper is organized as follows: Section 2 presents a critical view on the traditional teaching model of a MOOC; Sections 3 and 4 describe previous experiences at the Open University of Portugal and Galileo University, depicting their respective Pedagogical Models for MOOCs, as well as the results of pilot testing; and Section 6 focuses on conclusions and future work.

2. Dominant Pedagogical Approaches in MOOCs

The acronym MOOC was coined in 2008 by Dave Cormier and Bryan Alexander while collaborating in the first MOOC, labeled "Connectivism and Connective Knowledge" (CCK08), which was organized by George Siemens and Stephen Downes [11]. The course was formally offered to 25 paying students from the University of Manitoba and informally to

about 2,200 students from around the world (Downes, 2012; Daniel, 2012; Watters, 2012), and it was an experiment in the application of Connectivism and networked learning, a modern alternative to classic learning theories (behaviorism, cognitivism, constructivism). Because of this “connectivist” approach on which it is based, this type of courses became known as cMOOCs. On the other hand, xMOOCs respond to a more traditional model of teaching, where the teacher is responsible for planning the learning activities and providing all resources necessary for the participant. These courses are based on a behaviorist pedagogy, focused primarily on the transmission of information and the execution of short tasks. Students acquire new knowledge through a series of lessons, mainly composed of short videos supported by PDF documents, combined with formative testing, automated or peer review. It is important to point out that by using the model described above, it is very difficult to get students to develop higher order skills, such as the ability to think critically (Bloom) - analyze, evaluate, or provide solutions – or inferential and creative thinking, to facilitate knowledge integration and construction, and to develop meaningful learning scenarios.

3. The Experience at the Open University of Portugal

3.1 Building a compromise: The iMOOC Model

UAb.pt’s model for MOOCs builds upon the four main pillars of the university’s pedagogical model: learner-centeredness, flexibility, interaction and digital inclusion. There’s a combination of autonomous and self-directed learning with a strong social dimension. It also articulates flexibility with the pacing necessary to help students get things done in face of their pressing everyday commitments.

There are elements in all types of MOOCs that are interesting and useful, but none of them fit exactly UAb.pt’s pedagogical model. In accordance, UAb.pt’s model incorporates elements from existing MOOCs but adds other relevant aspects that derive from our experience with online learning and its integration in the larger context of the institution’s pedagogical model, as well as the work that has been done regarding open educational resources and open educational practices. MOOCs in this pedagogical model, following the current terminology, can be labeled iMOOCs, with their focus on individual responsibility, interaction, interpersonal relationships, innovation and inclusion.

In this model, courses are open to everyone who wants to participate. Registration is required for publishing in the institutional spaces but all course contents are accessible to anyone. Learning is learner-centered and based on the realization of activities. Courses start with a “boot camp” module, that can last one or two weeks, meant for participants to get acquainted with the spaces, tools and services, as well as with the processes of work and communication that will be used in the course.

Learning should be evidenced through the creation of artifacts (texts, videos, presentations, slidecasts, mind maps, mash-ups, etc.), freely accessible online, that demonstrate the learner’s knowledge and competencies regarding the material studied. The learning process combines autonomous self-study and reflection with interaction with other participants in an open social context. Participants are expected to take an active role in and be responsible for their own learning, but also to actively engage in helping build a supporting learning community.

Learning support rests in the learning community, through collaboration, dialogue, peer feedback and active engagement from participants in the learning process. Resources provided as a starting point for the realization of the activities are licensed as Open Educational Resources or freely available on the Internet. Formative assessment can take the form of self-correction tests and also of peer feedback regarding the artifacts produced in the learning activities.

Although there is a central place for the course (website, wiki, blog, LMS, etc.), where all relevant information is provided (content, resources, schedule, instructions, etc.), most of the work and interaction should benefit from a networked learning perspective, whereby students use their own personal learning environments to manage their learning, publish their artifacts and engage in the conversation with other participants. A small team of collaborators can be used to support the implementation of UAb.pt’s iMOOCs – gather relevant information to be used to monitor and perfect the ongoing process, serve as community facilitators, monitor social or information networks for course related content, elaborate weekly summaries, etc.

3.2. The importance of facilitating the transition

As stated above, a critical element of the Model is its contribution to facilitate the transition from non-formal education to formal education through certification. This is majorly played by the way certification options are embedded in the courses.

In the iMOOC Model, graded assessments are included for participants who want to receive a certificate of completion of the course. In this case, at least two of the artifacts produced as evidence of learning by participants will be assessed and graded through a peer-review system – those who wish to participate in the peer-review assessment will grade the artifacts produced by 3 other participants and have their artifact graded by three other participants. The final grade will be the average obtained in the 3 grades given. E-portfolios can also be used for grading purposes where they are considered adequate. The assessment follows the same peer-review procedure. Every assessment will be based on a detailed rubric provided by the professor or professors leading the course.

But, in order to fulfill its purpose of bridging the gap between non-formal education and formal education, the Model also allows for participants who want it or need it to go a step further. Thus, UAb.pt's iMOOCs offer participants the additional option of obtaining formal credits, for a fee, after the completion of the course. Those credits (ECTS) will be awarded following an evaluation by a professor or tutor comprising the two (or more) graded artifacts and an e-portfolio presented by the participants with the most relevant elements of their work in the course. This can be combined with a final, face to face exam when deemed adequate.

3.3. Results of pilot testing

The iMOOC Model was subject to a pilot test run in May 2013. UAb.pt developed a pilot course *Climate Changes: The Context Of Life Experience*¹, following the principles stated above. Moodle (version 2.4) was used to centralize the main information regarding contents, resources, suggested activities, schedule, etc. It also harbored the discussion forums, one of the places where participants could interact and debate on relevant aspects of their learning process. This was integrated with Elgg (version 1.8), an open source social networking platform to be used as an institutionally supported Personal Learning Environment (PLE). The course ran from May, 6 to July, 1st, with a total duration of 8 weeks. The first week was dedicated to the boot camp module. The remaining 7 weeks were divided into 5 topics.

The pilot course attracted 1.016 registered participants, of which over two thirds actually started the first learning activities according to the schedule. Access levels were high during the first half – first three to four weeks - of the course, with a regular decrease as the course progressed. This was already expected and confirms a typical phenomenon in this kind of courses.

Also of particular significance was the fact that interactivity levels were untypically high in the first four weeks. According to our interpretation, this phenomenon resulted from the successful introduction of the initial facilitation boot camp module. In fact, this innovation allowed for the community to establish all its basic communication networks and also to build a community spirit and some sort of shared identity even before participants got in touch with the course contents and actual learning activities started.

A high volume and quality of interaction amongst course participants was one of the main features of the iMOOC pilot course run. The total number of wire posts published during the first half exceeded one thousand (1155). Plus, over seven hundred blog posts (717) and four hundred files (410) were also published.

The transition to week 5 in the course brought a sudden and steep break in presence and participation. Despite some attempts to revive the very good dynamics and overall activity levels of the first half – we launched some challenges and did a Google hangout with an expert, among other things – the numbers relative to the second half of the course are significantly lower when compared those of the first half, as shown in the Table I below.

Table I – Number of items published in the social learning environment

Elgg - Number of items published – first 4 weeks			
Wire posts	Blog posts	Favorites	Files
1155	717	431	410
Number of items published by course end (8 weeks)			
1497	952	506	487

We cannot say that we have hard data to account for and explain this sudden change, but we identified some aspects that we think may have been responsible for this:

¹ The Course was based on available OER produced in the framework of Lech-e (LECH-e – Lived Experience of Climate Change E-Learning - <http://www.leche.open.ac.uk>), an EU-funded project led by the Open University.

1) This fifth week coincided with the final school year week in our secondary schools, and an important part of participants were teachers. This is an extremely busy week, followed by another with assessment meetings, and many participants may have felt overwhelmed and incapable of juggling this kind of responsibility and workload with the participation in a free course.

2) It was the week of the first graded artifact, through a peer-assessment process, for those who wanted to get a certificate of completion. Although the peer-assessment process was mandatory only for these participants, it may have helped increase stress levels and the last drop like perception, especially among participants who were already struggling with managing their time, that they couldn't keep up with the course, leading them to quit.

3) People can only maintain the extra-level of effort and workload that a course adds to their daily professional and personal life for a given period of time. After that, it becomes increasingly difficult to keep up, especially in the case of a free course that, because it has less "hard" incentives than a formal, paid course, can drop very quickly in the list of priorities and be dismissed in face of the mounting pressure or unexpected trouble (work emergencies, family health, etc.).

That is why, as a result of the experimentation phase, the typical duration of courses in the iMOOC model was decreased to six weeks. Furthermore, we are considering the relevance of having graded, peer-assessed artifacts in all courses, or only in those where that is deemed very important, using peer-assessed eportfolios instead in the other courses for the certificate of completion. Finally, and this is not always possible or feasible, we think more attention needs to be paid to the course schedule, avoiding specific times of the year that may be obviously busy or difficult for a big part of the expected participants.

102 participants answered the final questionnaire, describing their participation as follows: participated throughout the whole course (39%); was a peripheral participant, following the activity but not engaging (much) in the interaction or the tasks (33%); started the course but had to quit after a while (22%); registered for the course, but never accessed it (7%).

The main reasons for not participating much, quitting the course or not accessing it at all were lack of time and unexpected, force majeure circumstances, as shown in the Table II below.

Table II – Low participation, drop out or not take part in the course

	Peripheral participation	Drop out	Never accessed
Lack of time	60%	33%	33%
Unexpected circum.	----	23%	56%

Overall, the levels of satisfaction expressed in the answers to the questionnaire were very high. Of a total of 94 respondents to this question, 90% said that they would recommend the course to other people, and 84% would take another iMOOC course, if they had the chance. When asked to evaluate the overall quality of the course, 38% of the 95 participants who answered this question rated it as excellent, while 45% rated it as good. 54% of 95 respondents totally agreed that the "boot camp" week had been an essential phase in the course, and 37% agreed with this statement.

Questions related to the course content and objectives were also very positively valued. When presented with the statement "The course contributed to change my personal attitudes regarding environmental issues", 35% of 95 respondents totally agreed, while 41% agreed. As for "After this course, I believe that the consequences of climate change are an inescapable reality", 54% totally agreed and 32% agreed.

The pedagogical support and methodologies throughout the course were very well rated. The Learning Guide was considered very useful in scaffolding and supporting learning (totally agree, 43%; agree 53%); the detailed instructions for the tasks were clear (totally agree, 63%; agree, 30%); the suggested activities were interesting (totally agree, 38%; agree, 60%); and the learning support was adequate (totally agree, 48%; agree, 43%). Finally, the learning environment was considered good (42%) or very good (36%).

4. The Experience at the Galileo University

4.1. Building up from the x-MOOC approach

Motivated by our previous experience in implementing a massive virtual course related to "Producing Webpages" [12], we started in 2012 our first two MOOCs, "iPhone Development" and "Introduction to e-Learning" [4]. We based these courses on the xMOOC model, which is more close to traditional virtual education, and were able to, through our previous experience in the field, adapt resources and means in a natural way. Both MOOCs were implemented in the .LRN [4] platform, with the development of several adaptations and improvements to meet our needs. OSQA (Open Source Questions and Answers System) was integrated with the system to handle the massive posting and a gamification approach was used [11], giving users badges to highlight the main contributions, the more active users and the "hottest" questions in the forums. Furthermore, the method of evaluation of our native platform was adapted to permit peer-assessment. Each learning activity was accompanied by an assessment rubric and students used it to evaluate their peers. If a student was assessed on more than one occasion, the platform calculated an average final score from the different assignments. Additionally we used the same tools that the platform provides for traditional virtual education.

The MOOCs were structured in learning units, typically distributed per week. Each unit had between 8 to 10 short videos, with an average duration of 8 to 10 minutes, accompanied by an activity and assessment associated with each topic. All learning activities were designed with the support of a range of cloud-based tools to foster in students the development of skills and knowledge required in real life scenarios [13]. Each MOOC began with an introductory week, where the general aspects and the methodology of the course were described, in order to familiarize students with the learning environment and the overall course structure, concepts, performance, assignment types, media and evaluation methods. Each learning unit had a set of learning objectives and learning activities and students must complete a series of tasks that led to the completion of a final project.

Although initially based on an xMOOC approach, our model proposes several strategies that seek to promote a more rewarding and meaningful learning experience and to improve outcomes. Moreover, it adds design components which are not present in xMOOCs, such as the Boot Camp, the strong social dimension that aims to create learning communities and the production of learning artifacts using cloud based-tools. Each of these components will be described in the next section

4.2. Result of pilot testing

The experiences presented correspond to the "Community Manager" MOOC, implemented during May 2014 with more than 9,000 enrolled students from over 20 countries. The majority of the participants were based in Spain (31%), Guatemala (18%), Colombia (9%), Argentina (8%) and Mexico (6.5%). For 61.5% of the students, this was their first MOOC experience. 57% of the enrolled participants were men and 43% were women, with an average age of $M=35$ ($\sigma=11$). 35.43% of participants had undergraduate level, 11.74% mastery level and 33.44% were university students. The main objective of the course was to develop the skills to manage brands through social networks such as Facebook or Twitter, for example, and other resources required in competitive situations in today's market. The results obtained in relation to the participation of the students are summarized in Table III below.

Table III – Implementation of the MOOC

Registered participants	9,138
Students' Participation:	
a) Did not start the course	5,006 (54.78%)
b) With at least one login	4,132 (45.21%)
c) Watched at least one video	2,148 (51.98%)
d) Delivered the first task	680 (16.45%)
d) Completed the course successfully	324 (7.84%)
Final grades of students who completed the course successfully	$M=80.94$ ($\sigma=9.87$)
Forum activities	753 people active in the forum. 1891 questions/8937 answers

All courses begin with a "boot camp" module with the duration of one week, supported by resources and tutorials for participants to become familiar with the Virtual Learning Environment, tools and services to be used, as well as the methodology of work, evaluation methods and the media to be applied in the course. The content developed for the boot camp week was built using Google presentations, with a downloadable pdf format. The study of the 36.73% of participants who successfully completed the "Community Manager" course shows that 82.35% them strongly agreed

with the content presented in the boot camp week, pointing out that it allowed them to function in an appropriate manner during the remaining of the course.

The learning process in this approach combines self-study and self-reflection with interaction with other participants. Our model uses forums as the main tool of mass communication. 72.8% of the respondents who completed the course indicated that the use of forums in the course was useful and enhanced their learning experience. Currently social networks are used as tools of communication and socialization for the "Community Manager" course. On Twitter we use the hashtag #cmtelescopio to encourage participants to share resources of interest on each topic of the course. This hashtag appeared in 2545 tweets, 30% of which were related to concerns about the development of tasks or content presentation, while 34% were useful resources for the participant. An interesting data about using Twitter in this course is the fact that participants resorted to it for a faster response. Another tool used for creating a learning community related to the course was a Facebook group, organized with the aim of resolving general doubts about the course, share resources and support participants. The group had 546 members, who published 294 posts and made 119 comments.

To promote interaction between faculty and participants in real time, we organized two Google Hangout sessions throughout the course, where a summary of the week's events was presented, followed by a questions and answers period. The average attendance in these sessions was 385 people, and they were subsequently viewed offline by more than 600 people in total.

The purpose of web 2.0 (cloud-based) tools in the "Community Manager" course is for the learning activities to reach the instructional objectives by fostering conceptual demonstration, structured knowledge representation and the completion the assignments. An additional benefit for students is that they learn how to use a set of web 2.0 tools that they can then apply to different contexts (other learning experiences, work situations, etc.). Therefore, the learning should be evidenced through the creation of artifacts (texts, videos, presentations, slidecasts, mind maps, mash-ups, etc), that demonstrate the students' knowledge and skills in relation to the material studied.

In order for students to develop higher order thinking skills, it is necessary to use learning strategies that foster critical and reflective thinking, creative thinking, and operations at the levels of analysis, evaluation, problem solving and synthesis. Some web 2.0 tools as, for example, Google Docs and MindMeister are proposed, since they seem to support effectively these strategies. 42.6% of the respondents agree that tasks such as making a summary in Google Docs or building a mental map in MindMeister improved their learning process.

The use of these cloud-based tools seems to increase motivation, focus on task, reflection on the learning taking place and to improve the quality of students' work. 45.59% of the participants indicated that they learned a lot from the course and 49.6% expressed their interest in continuing to learn in this learning environment. 97.4% of the respondents indicated that they would be interested in taking another course in MOOC format in the future.

The MOOC courses from the Galileo University presented in this papers proved to capture learners satisfaction. They registered a high enrolment rate and in spite of the high drop-out rate, 45.59% of the participants those answered the post-test indicated that they learned a lot from the course. Moreover, 49.6% of those participants expressed their interest in continuing to learn in the online environment used. 97.4% of the respondents indicated that they would be interested in taking another course in MOOC format in the future.

5. Conclusions and Future Work

As stated in the introduction to this paper, although MOOCs have become a worldwide success, capturing the attention of academia, the media and public in general, they have been subject also to strong criticism based on their high rate of attrition. This is basically an expression of the prevalence of an old and inadequate traditional academic expectation regarding the potential of open education and in particular MOOCs. As the experiences of both the Open University of Portugal and the Galileo University prove, independently of the basic pedagogical approach used, learner satisfaction and, most importantly, the success of the learning experience cannot be measured by completion rates. This cannot be a quality indicator for non formal open forms of education delivery. In fact, participants in MOOCs are typically non homogeneous groups of learners with quite different backgrounds, expectations and ultimately aiming at different learning outcomes.

As the experiences of the institutions presented in this paper demonstrate, the improvement of the quality of MOOC offering lies in how flexible they can mold the learning opportunities they provide. According to the results of these experiences, the real success factor in a MOOC is the level of engagement obtained from course participants. This can be highly improved as compared results show from the use of learning artifacts, as well as cloud based tools.

An additional conclusion points to the fact that independently from the different academic environments, the regional cultural setting or the pedagogical approach characterizing each institutional provider, common learner engagement strategies can be developed and implemented amongst institutional providers. This leads to our future work. In fact, the researchers team at the Open University of Portugal and the Galileo University intend to explore how the common trend identified in this study can lead to the emergence of a hybrid pedagogical model for MOOC design in the coming years. A model which stresses the importance of an extended use of cloud-based social media tools to allow enriched networked interaction between course participants.

References

1. Jordan, Katy (2014). Initial trends in enrolment and completion of massive open online courses. *International Review of Research in Open and Distance Learning*, 15(1) pp. 133–160.
2. Koller, D., & Ng, A. (2013). The online revolution: Education for everyone. Seminar presentation at the Said Business School, Oxford University, 28th January 2013. Retrieved from <http://www.youtube.com/watch?v=mQ-KsOW4fU&feature=youtu.be>
3. Emanuel, E. J. (2013). Online education: MOOCs taken by educated few. *Nature*, 503 (342). Retrieved from <http://dx.doi.org/10.1038/503342a>
4. Hernández Rizzardini, R., Gütl, C., Chang, V., & Morales, M. (2013). MOOC in Latin America: Implementation and Lessons Learned. In *The 2nd International Workshop on Learning Technology for Education in Cloud, KMO 2013*, pp. 147-158. Springer Netherlands, 2014.
5. Hernández Rizzardini, R., Gütl, C., Chang, V., & Morales, M. (2013). MOOCs Concept and Design using cloud-based Tools: Spanish MOOCs Learning Experiences, in Foley A. (ed), *Proceedings of The Sixth Conference of MIT's Learning International Networks Consortium (LINC)*, Jun 16-19 2013. Cambridge, USA: MIT.
6. Kizilcec, R. F., Piech, C., & Schneider, E. (2013, April). Deconstructing disengagement: analyzing learner subpopulations in massive open online courses. In *Proceedings of the Third International Conference on Learning Analytics and Knowledge* (pp. 170-179). ACM
7. Pardos, Z.A., Bergner, Y., Seaton, D., Pritchard, D.; In Press (2013) Adapting Bayesian Knowledge Tracing to a Massive Open Online Course in edX. In *Proceedings of the 6th International Conference on Educational Data Mining*. Memphis, TN
8. Veeramachaneni, K., Derroncourt, F., Taylor, C., Pardos, Z., & O'Reilly, U. M. (2013, June). MOOCdb: Developing Data Standards for MOOC Data Science. In *AIED 2013 Workshops Proceedings Volume* (p. 17).
9. Deconstructing Disengagement: Analyzing Learner Subpopulations in Massive Open Online Courses
10. Croft, N., Dalton, A., & Grant, M. (2010). Overcoming Isolation in Distance Learning: Building a Learning Community through Time and Space, *Journal for Education in the Built Environment*, 5 (1), July.
11. Siemens, G. (2012). MOOCs are really a platform. Elearnspace, last edited July 25, 2012. <http://www.elearnspace.org/blog/2012/07/25/moocs-are-really-a-platform/>. Accessed 15 Feb
12. Hernández R, Pardo A. and Delgado C. 2007. Creating and Deploying Effective eLearning Experiences Using .LRN. *IEEE Trans. on Education*, 50(4), 345-351, November
13. Hernández R, Gütl C, Amado-Salvatierra H (2014) "Cloud Learning Activities Orchestration for MOOC Environments" In the 3rd International Workshop on Learning Technology for Education in Cloud, *accepted, to be published*, 2014.