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The concept of openness behind c and x-MOOCs (Massive Open Online Courses)

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Abstract

The last five years have witnessed a hype about MOOCs (Massive Open Online Courses) presaging a revolution in higher education. Although all MOOCs have in common their scale and free access, they have already bifurcated in two very distinct types of courses when compared in terms of their underpinning theory, format and structure, known as c-MOOCs and x-MOOCs. The concept of openness behind each of the formats is also very different. Previous studies have shown that c-and x-MOOCs share some common features but that they clearly differ on the learning theory and pedagogical model on which they stand. In this paper we extend earlier findings and concentrate on the concept of "openness" behind each format showing important differences.

Keywords: Massive Open Online Course, MOOC, Openness, Open Course, Open Learning, Distance Education

Introduction

Since 2008 a number of open online courses based on the philosophy of connectivism, known as c-MOOCs, have successfully been delivered attracting thousands of students. These courses represent an experiment in a new pedagogy, a new learning ecosystem, where people build contents and where learners are the course. Their subjects covered *Connectivism and Connective Knowledge* (CCK08), *Personal learning environments and networks and knowledge* (PLENK10), *Online learning for today and tomorrow* (EduMOOC 2011), *Education, Learning and Technology* (Change11), *Learning Analytics* (LAK12), *Current an Future of Higher Education* (CFHE12), *Openness in Education* (Oped12), the more technically involved on *mobile learning* (MobiMOOC 2011, 2012) and *Digital Storytelling* (known as DS106) from the work of Groom & Levine (2011).

In the fall of 2011 a course on *Artificial Intelligence* taught by two eminent computer scientists from Stanford University and Google Corporation was announced as a free online course. 160.000 students from nearly 200 countries registered and 20.000 successfully completed the course. Sebastian Thrun, one of the faculty members involved, shortly after founded Udacity, a for-profit start-up aiming to deliver similar open online courses. Other well-known US universities followed with similar projects. EdX is a joint partnership between MIT, Harvard and Berkeley. Coursera, another for profit start-up, claims at this writing that nearly 1.5 million students registered to their 200 course offering. More than 30 higher education institutions partnered with Coursera. These courses are collectively referred to as x-MOOCs.

The c and x-MOOCs terminology was introduced by Stephen Downes to draw out the distinction between connectivist MOOCs and the others, since they are based on very different pedagogical frameworks. The "x" is adapted from MITx and EdX.

There are a few academic studies of c-MOOCs but not of x-MOOCs, since there has not yet been time for systematic research. Most of their analysis has to be based on press articles and blogs. A recent study (Rodriguez, 2012) established that, although these formats share many common

features, they differ in their learning theory and the pedagogical model on which they stand. In this paper we extend the previous study (Rodriguez, 2012) based on more recent developments, especially with respect to x-MOOCs, and examine the concept of openness behind c and x-MOOCs.

Research methodology

The following courses have been selected for the present analysis: CCK08, PLENK2010, MobiMOOC (2011 and 2012), EduMOOC (2011), Change11, LAK12, CFHE12 and Oped12 for the c-MOOC format and the AI- Stanford, CS101 from Udacity and several courses from EdX and Coursera for the x-MOOC format.

As a researcher I took part in MobiMOOC (de Waard *et al*., 2011a, 2011b; Koutropoulos *et al*., 2012), EduMOOC, Change11, LAK12, CFHE12, Oped12 and concluded successfully the AI-Stanford course, CS101 (Building a Search Engine) sponsored by Udacity and *Introduction to Databases,* tutored by Stanford professor Andrew Ng.

During the courses I have been an observer focusing on their design and implementation, collecting qualitative and quantitative data through observation of activities and engagement. Data collection concentrated on the design of the courses, statistics and content from the social media tools (Google Groups, Twitter, Delicious, Crowdmap) and surveys given to participants during and at the end of the courses.

This information allows us to determine general demographic information, familiarity and use of technology and social media and participant satisfaction with the courses. The collected data was analyzed to validate the hypothesis related to connectivism, constructivism, openness and behaviorism.

c and x-MOOCS experiences described

MOOCs are different from more established models of online education in its scale and openness. Both concepts are challenging to harness within today's constrains. They represent global events. They go beyond the regional realm in which university courses usually happen. Being digital makes them not circumscribed by space constraints or by resource availability. The only requirement is broadband Internet access. The CCK08 c-MOOC had over 2.000 people registered to participate. The AI-Stanford x-MOOC had 160.000.

This creates challenges for instructors and students alike in terms of expectations. The conventions of role and interactions in a "classroom" context are deeply rooted, and when the scale of classroom relationships are so modified, the concept of what it means to be a class needs to be re-evaluated.

The pedagogical style of each of the formats is different. c- MOOCs are based on a philosophy of connectivism and networking (Downes, 2008, 2010; Siemens, 2012b), distinct from the behaviorist approach of x-MOOCs presently offered by elite US institutions.

c-MOOCs

Connectivism and Connective Knowledge (CCK08) was a course offered in 2008 to 25 fee paying students at the University of Manitoba which was also opened online and free of charge to anyone from the general public interested in participating. 2300 students registered (Fini, 2009; Fini *et al.*, 2009).

Dave Cormiere and Brian Alexander coined the term MOOC to describe the CCK08 course facilitated by George Siemmens and Stephen Downes. Today, connectivist MOOCs is the name

associated with courses based on the philosophy of connectivism (Siemens, 2005, 2006). Their implementation requires a conceptual change from the facilitators and learners (Kop & Hill, 2008; McAuley, 2010).

x-MOOCs: The AI-Stanford course, udacity, EdX and Coursera

In the words of their creators, the 2011 graduate level AI-Stanford class was "A bold experiment in distributed education". It was offered free and online to students worldwide from October 10th to December 18th 2011. The course included feedback on progress and a statement of accomplishment.

Udacity is a for-profit company with the aim to create a menu of high-quality courses offered free and online that can be re-run and improved with minimal involvement from the original instructor. The name is a mash up of *audacity* and *university*. The first courses concentrated on computer science. It has now expanded to other disciplines including engineering, physics, and chemistry.

EdX is a not-for-profit enterprise. Its founding partners are Harvard University and the MIT. Its main objective was set to provide learning designed specifically for interactive study via the web. Not only does EdX offer online courses but the institutions will use it to research how students learn and how technology can transform learning both on-campus and worldwide. It is at present directed by Anant Agarwal, former Director of MIT's Computer Science and Artificial Intelligence Laboratory. EdX is based in Cambridge, Massachusetts. Students enrolled through EdX have the option of getting their learning validated with a proctored final exam administered by the Pearson VUE service, which has more than 450 testing centers in more than 110 countries.

Coursera is a social entrepreneurship company that partners with the top universities in the world and that provides an online education platform. It was founded by two Stanford University computer scientists, Daphne Koller and Andrew Ng. By March 2012 it had reached with its original partners—Michigan, Princeton, Stanford and the University of Pennsylvania—more than 680,000 registered students in 43 courses. In the following weeks more than 12 other universities signed on as partners. Coursera has not yet offered credit for their courses, in many cases just a "statement of accomplishment" and a grade. But soon this might change. For example, the University of Washington is planning to offer credit for its Coursera offerings. Other online ventures are also moving in that direction. One idea stated by David P. Szatmary, their vice provost, is that, to earn credit, students would probably have to pay a fee, do extra assignments and work with an instructor. One of Coursera's goals is to have global access. Through Coursera for example EPF Lausanne offers courses in French which are of open access to students in half of Africa. It is up to each university to design and produce their own courses and decide whether to offer credit. The way the partnership is established is that Coursera does not pay the universities nor the universities pay Coursera. At present both incur substantial costs. The established deal is that if a revenue stream emerges, Coursera and the universities will share it.

How x-MOOCs will be self-sustaining is not yet clear. Some ideas state that it might be by charging students for credentials, providing *premium* services or by charging corporate recruiters for access to the best students. Still it does not represent a pressing concern for those involved.

Theoretical and conceptual underpinnings and the concept of openness behind c and x MOOCs

Connectivist MOOCs are deeply immersed in the discourse of openness. In a distributed environment a learner has to be able to put his or her ideas forward. The way he does this is so that others can see and engage with, even if those ideas are not yet fully thought out or refined. Participation

is a *locus* of knowledge building. Learners help other learners by openly exposing both their ideas and their challenges.

Stemming from the work of Siemens (2005) and Downes (2005), the idea of courses needed to be modified from a traditional structure—where, in closed groups, learners totally depend on the guide of a tutor—to self-directed learners that interact within an open network. Within the distributed connectivist model the course contents form a cluster of resources within a certain topic. Those that participate create their own material and share it to the network.

Downes (2005) suggested that the fundamental characteristics of connectivist courses are autonomy, diversity, openness, and connectedness and interactivity. Autonomy permits those that participate to choose where, when, how, with whom and even what they are interested in. Diversity enables group thinking and echo-chambers by having a diversity of participants engaging in a variety of sources, discussions and settings. Openness allows for all degrees of involvement of learners. The information and knowledge creation is exposed freely through the network. Connectedness together with interactivity is what allows all this to happen.

In c-MOOCs readings and presentations freely available on the web become supplemented with materials and presentations contributed by the facilitator and invited experts. Learners also share openly their contributions enhancing a collaborative creation of knowledge (Siemens, 2006).

c-MOOCs are characterized for being open and invitational. Everyone who wishes to participate can do so; people, according to their individual interests, negotiate the extent and nature of their participation. This is independent of whether those needs are defined by personal interest or work-place requirements. This creates a very broad form of "legitimate peripheral participation" (Wenger, 1998), which permits individuals to be immersed into the community of practice at whatever pace they feel comfortable. This framework provides access to large numbers of learners who might otherwise be excluded for reasons ranging from time to geographic location, formal prerequisites or financial hardship.

The courses operate on a true "teacher as learner as teacher" model (Siemens, 2006). As stated by McAuley *et al.* (2010, p. 11):

> Participation in a MOOC is emergent, fragmented, diffuse, and diverse. There is no credit or certificate offered for completion. Facilitators of MOOCs volunteer their time, and comment on participants' input, but it is expected that the community of participants will be the primary source of feedback for the majority of work contributed. This is in keeping with the participatory collaboration and commenting norms within social media.

c-MOOCs are also characterized by openness of criteria for participation. Since there is no central organizational structure, the credentialism, which tends to put limits in participation, does not exist in c-MOOCs.

Cormier and Siemens (2010, p. 32), in relation to c-MOOCs, point that:

> The word open is in constant negotiation. When learners step through our open door, they are invited to enter our place of work, to join the research, to join the discussion, and to contribute in the growth of knowledge within a certain field. The openness of the academy refers to openness as a sense of practice. Openness of this sort is best seen as transparency of activity.

x-MOOCs have shown impressive technology deployment, rapid course production, huge list of high standard partners and potentially disruptive and interesting certification alternatives from those now available in the education market.

Although announced as open, the concept of openness is more restrictive than in c-MOOCs. For example, the course materials are made available under a custom copyright license. Coursera's terms of service (2012) indicates:

Coursera grants you a personal, non-exclusive, non-transferable license to access and use the Sites. You may download material from the Sites only for your own personal, non-commercial use. You may not otherwise copy, reproduce, retransmit, distribute, publish, commercially exploit or otherwise transfer any material, nor may you modify or create derivatives works of the material.

The following is the description of their courses by Coursera (2012):

When you take one of our classes, you will watch lectures taught by world-class professors, learn at your own pace, test your knowledge, and reinforce concepts through interactive exercises. When you join one of our classes, you'll also join a global community of thousands of students learning alongside you.

They also mention that their courses are

designed based on sound pedagogical foundations, to help learners master new concepts quickly and effectively. Key ideas include mastery learning, to make sure that you have multiple attempts to demonstrate your new knowledge; using interactivity, to ensure student engagement and to assist long-term retention; and providing frequent feedback, so that you can monitor your own progress, and know when you've really mastered the material.

The teaching methods used by most of x-MOOCs so far are based on behaviorist pedagogy. They rely primarily on information transmission, computer marked assignments and peer assessment. As stated by Bates (2012)

Behaviorist pedagogy has its value, especially where there are right and wrong answers, facts or procedures that must be learned, or students lack higher level cognitive processing skills. In other words it works reasonably well for certain levels of training. But it is extremely difficult if not impossible to teach higher order skills of critical thinking, creative thinking, and original thinking using behaviorist pedagogy, the very skills that are needed in a knowledge-based society.

Discussion and conclusions

c and x-MOOCs represent very different formats of massive open online courses. Their pedagogical foundations, the different way in which social interactions happen during the courses sets them apart. x-MOOCs fall into the cognitive-behaviorist pedagogy category and the c-MOOCs into the connectivist The former take a more traditional approach to learning, with videotaped lectures, online quizzes and weekly assignments. They follow the structure of existing educational practices. Their primary innovation is scaling.

The concept of openness in which each of the formats stands has also a different meaning. In c-MOOCs the learner´s autonomy, peer-to-peer learning and social networking are emphasized. x-MOOCs are based on a tutor-centric model that establishes a one-to-many relationship to reach massive numbers, as has been affirmed by Siemens (2012a):

The Coursera/EdX MOOCs adopt a traditional view of knowledge and learning. Instead of distributed knowledge networks, their MOOCs are based on a hub and spoke model: the faculty/knowledge at the centre and the learners are replicators or duplicators of knowledge.

c-MOOCs establish a many-to-many relation to develop massive interconnectedness. Multiple spaces, tools, technologies and a distributed interaction govern c-MOOCs. The role of the facilitator is to govern knowledge coherence and then the learners form/transform it via exploration and deepening the exposed ideas. x-MOOCs can be viewed as learning managements systems bundled with high quality content. In c-MOOCs a vital concept relates to what learners do for themselves with tools from a digital world and networking. They promote a self-regulated, highly motivated and autonomous learner. The knowing part of learning (epistemological development) and becoming a certain type of person (ontological development) go hand in hand. From an

epistemological viewpoint generative and declarative knowledge characterize c-MOOCs and x-MOOCs respectively.

In the post by Haywood (2012), "No such thing as a free MOOC", in the context of Edinburgh University and Coursera, he states:

> Currently we know little about MOOC learners, about how to design and deliver successfully in a range of subjects, and most importantly at a range of levels (e.g. final year undergrad). Is the experience helpful to learners, and do they get value from their certificates of completion? Much more research is needed, and perhaps JISC might find this a useful area in which to support the UK HE community.

Despite their differences, the technological advances which include the quality of online delivery platforms, the ability to personalize material and the capacity to analyze huge numbers of student experiences to see which approach works best, make c and x-MOOCs more than a promise in the quest to open higher education to millions of people.

In the present study we have compared two distinct course formats, c and x-MOOCs, that have been applied with great success showing that the concept of openness is different in each format. Although these courses represent a huge step in open online education, many issues and questions remain open and need to be addressed in future research.

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