Illustration of the impact of Massive Online Open Courses (MOOC) in Higher Education through the implementation of the ITyPA course

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Abstract

The significant development of Internet connectivity around the world and the proliferation of digital devices (computers, tablets, smartphones) give birth to new uses in the field of teaching and learning. Since 2008, there is a growing trend of online courses that are open to every Internet user and freely accessible: those are Massive Online Open Courses (MOOCs). They targeted a wide audience: the most popular MOOCs were followed by tens (even hundreds) of thousands of learners! These courses do not (yet) confer any diploma nor credit, but sometimes lead to a certificate issued by the organizing institution.

Two main pedagogical approaches are developed. The first one (cMOOC) takes its roots in the connectivism theory, popularized by G. Siemens, S. Downes and D. Cormier [Downes, 2007] [McAuley et al., 2010]. The course is then student-centric. Even if it is organized by a team of teachers and facilitators, each participant is invited, week after week, to conduct his own research, interact with peers, and publish his conclusions on the web-media of their choice. The second method (xMOOC) is more directive, and can be seen as the digitalization of traditional courses. Thanks to on-line videos, quiz and practical works, learners have to understand and practice by themselves. That is the approach adopted by American platforms such as Coursera [Coursera], edX [edX] and Udacity [Udacity].

From October to December 2012, we have created and hosted the first French MOOC entitled “Internet, Everything is for Learning” (ITyPA, acronym for the French title “Internet, Tout y est Pour Apprendre”) [ITyPA]. This course focuses on the question: “how to learn online?” The pedagogical objective is the following: at the end of the course, every participant should be able to define and build his how "personal learning environment". It focuses on a wide range of techniques, tools and methods to identify and discriminate information sources, and then to become proper contributors to increase the global knowledge available on the net. During this 10 weeks long course, participants are involved in active learning through interaction with facilitators and other registrants. They are invited to read, comment and publish their own resources. This results in very fruitful collaborations between learners.

More than 1,300 students take part in the ITyPA MOOC. The learners' profiles are very broad, coming from professionals who want to develop new skills to academic students curious with web technologies and tools. While most of learners live in France, a significant number are French-speaking people living in Africa or in North America. Asides from these participants from all over the world, 28 students from École Centrale de Nantes and 23 students from Telecom Bretagne followed this course as part of their academic program and had the opportunity to validate the associated ECTS credits.

In this paper, we propose a state of the art in the field of distance education, specifically in the area of MOOC. We present the pedagogical engineering we designed for the ITyPA MOOC. Finally, we develop several perspectives for such teaching methods, including the development of learners' autonomy, international collaborations and social openness.

The breakthrough of MOOCs

While distance learning raises lots of interest in emerging countries (but this motivation still needs to be compared to the technical - e.g. the restricted bandwidth - or political - censorship - constraints), the most successful approaches in this field are mainly conducted in North America. Young Americans get used to this type of teaching and learning process starting from the college [Picciano et al., 2009]: in the United States, more than one million students at college / high school had taken at least one online course in 2007-2008. Note that in France, the awareness towards this kind of teaching only begins when students arrive in higher education. And even then, the open and distance-learning (ODL) offer [CampusFrance, 2011] is quite reduced. There are very few distance-learning based curriculums in the field of engineering, particularly at a Masters level. The main fields of application of French distance learning courses are DU and Licenses, and rather in the field of humanities, social sciences and languages. It is the same in the United States, where ODL is rarely deployed in the context of complete curricula of higher education, much less in engineering (the situation is radically different in the field of humanities and social sciences where ODL offer is much wider). In the engineering sector, there are some certification programs, but no degree program [Bates, 2009]. The main reasons why there are so few ODL diploma courses in engineering are the following ones: on the one hand, national certification agencies require that students spend a lot of time in class; on the other hand, it is very costly and difficult to turn "real-life" lab works into ODL practices.

Nevertheless, there is a growing interest of the Ivy League institutions to provide distance learning engineering courses, which are opened to everyone. This is the large trend around MOOCs and initiatives such edX, Coursera, Udacity, ... A MOOC (Massive Open Online Course) is an online course open to all. It is aimed at a wide audience of up to several tens (or even hundreds) of thousands of participants. It does not grant any diploma, or credit, but leads to a certificate issued by the organizing institution. The very first initiatives in this area appeared in 2008. Since then, it has become a hot topic in the field of distance education. To give an overview of the success of these courses, let us consider the example of the "Machine Learning" MOOC from Stanford, given during the first half of 2012 [McKenna, 2012]:

- ☐ Approximately 104,000 students enrolled at the beginning of the course.
- ☐ Approximately 40,000 students participated in the work that was requested.
- ☐ Approximately 20,000 students have completed a job that is considered as "substantial".
- ☐ Approximately 13,000 students passed the module and obtained the final certificate.

It is interesting to have a look at the profile of learners:

- 60-67% of students came from the international community
- The majority of students were professionals who wished to broaden their skills.
- The courses also attracted students from other universities, but who cannot follow a similar course in their native institution.
- The rest of the participants consists of individuals profile, ranging from 13-years of retired grandmothers.

As was mentioned in the introduction, there are two main educational models for these MOOCs.

- The first model, entitled xMOOC, is based on a classical transmissive pedagogical approach. This is the model that the majority of American institutions chooses. It is an adaptation of classical courses in terms of distance learning. Its specificity is that it targets a large number of learners.
- The second model, named cMOOC, is less prescriptive. This model comes from connectivism popularized by G. Siemens, S. Downes and D. Cormier [Downes, 2007] [McAuley et al., 2010]. It is based on the abundance of resources and discussions between participants.

From a practical point of view, MOOCs provide educational materials, with video segments, work to be done every week, access to discussion forums, quizzes, and / or mid-term exams and final. Assessment (when this component is included in the course, which is not always the case) can be composed of a mixture of peer-reviewed and automatic (multiple choices**,** case studies, …) evaluation.

Design and implementation of the ITyPA MOOC

Convinced by the potentialities of open courses, we wanted to offer a completely open and free course on the same model, in French. This is how the first French MOOC was given birth to. Entitled "Internet, Everything is for Learning" (ITyPA) [ITyPA], this MOOC aims to encourage participants to develop their own learning networks, produce online resources and co-construct their knowledge and skills.

The course is divided into ten weeks, with synchronous sessions delivered every Thursday evening. During these synchronous sessions, we - as facilitators of the MOOC - welcome at least one expert to review the topic discussed during the past week. The participants of the MOOC then have the opportunity to interact with experts through chat channels such as IRC, Twitter or forums. The videos of these weekly interventions can obviously be viewed online later for people who cannot be available during synchronous sessions. However, they lose the advantage of being able to react directly with the rest of the community.

Counting both students Centrale Nantes and Telecom Bretagne, more than 50 engineering students (among a total of 1,300 persons enrolled) take part in the ITyPA MOOC as part of their studies. Students from these schools show a clear interest for the approach to learning to learn, and we are currently conducting research to analyze, among others, their motivation, and the evolution of it over the weeks. This work will help us to analyze how MOOCs can be used as a part of a general curriculum.

Discussion

The current context in the higher education world lies in the diversification and massification of online courses. The success of Khan Academy and its 3200 educational videos [Khan Academy] and the launch of TED-Ed [TED-Ed] illustrate this trend. Even if it is difficult to give a precise analysis of how these open courses will reshape teaching and learning at a long-term perspective, we can already identify some limits of these methods and emphasize on their merits.

The main limitation of these distance-learning approaches is the fact that it only impacts those whose primary motivation is to acquire new knowledge and skills. In other words, this type of course is not very effective with those who are only motivated by obtaining credits. In addition, we cannot foresee whether the huge number of enrolments will stay stable or decrease once the "newness" effect of these courses will disappear. Finally, MOOCs are not a panacea for a degree, because a degree also includes a large range of skills (such as proof of ability to community life, going back and forth between teachers and students, etc.), which are more difficult to assess in an ODL context, especially with xMOOCs.

Aside these limits, MOOCs bring new and exciting advantages. We observed a real and deep interest of learners, whether or not engineering students, to follow such open courses. This is because many MOOCs adress topics learners would not have had the opportunity to study through their initial training. Moreover, learners enjoy the freedom they have in the organization of their own learning, even if this freedom requires self-control and maturity. This freedom is one of the sources of their motivation. This results in very positive side effects, e.g. the integration in a global and open community of learners that can self-regulate. The activity of this community helps to absorb the large mass of learners. Finally, the international context enriches the discussions and opens these courses to new audiences (e.g. people who would not have had the financial means to travel to follow specific higher education classes).

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