

THE IMOOC PEDAGOGICAL MODEL

Bridging the gap between non-formal and formal education

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Abstract—The introduction of massive open online education has offered a new range of exciting possibilities for widening access to quality education. However, most of MOOCs in offer today are not designed to empower learners and favour quality collaborative learning experiences, thus not being suited for use in a formal institutional setting. In this paper we present the iMOOC pedagogical model developed at the Open University of Portugal (Universidade Aberta - UAb.pt) and demonstrate how a synthesis between a connectivist approach and a more structured one enables true bridging between non-formal massive learning opportunities and formal higher education.

Keywords—MOOC; pedagogical model; online pedagogy; open education; assessment

I. WIDENING PARTICIPATION IN HIGHER EDUCATION

Access to quality education is a universal right. For the Open University of Portugal - Universidade Aberta (UAb.pt), this right consubstantiates a mission and a vision. The institution believes it should focus on contributing to widen full and continuous participation in Higher Education. Because of this UAb.pt tends to value each innovative way that allows to close even further the distance between people and academic life, integrating it in the dynamics of society. In the current context of scarce resources and an added need to capacitate people, Massive Open Online Courses bear a tremendous potential.

First appearing in 2008 as an evolution of the open education and the OER movement, these courses offer the possibility of accessing without restrictions and costs a quality informal university learning experience. Successful conclusion of these courses may lead to formal certification of the acquired competences. Aware of the relevance of this phenomena and faithful to its innovation creed, UAb.pt has decided to join a dozen other prestigious European universities and launch the first pan-European initiative on MOOCs, led by the European Association of Distance Teaching Universities and with support from the European

Commission.¹ It offered from the start 58 courses in 12 different languages.

However, UAb.pt went a step further than its partners and decided to develop an institutional pedagogical model for open online courses, thus creating a world first institutional standard practice model for MOOCs.

In fact, in face of the recent but fast growing interest on Massive Open Online Courses (MOOCs), many universities, both open and traditional, have been discussing strategies to implement this new format of educational delivery. The huge success of the experiences from the top universities in the United States have been an inspiration worldwide.

Most of the response from European higher education institutions and politicians to the MOOC phenomena has been characterized by a need to react to the tremendous success of the top US universities. This is clearly a wrong choice. The success of the North-American MOOCs relates to their specific regional and national contexts. In the case of the US, we cannot forget how OER can be a most valuable tool for the consolidation of the higher education sub-system of community colleges.

However, the dramatic social implications of the current economic scenario in Europe clearly challenge institutions as well as represent a major opportunity for massive open online forms of education. Even if experience has demonstrated online pedagogical traditions vary significantly across the continent, there's clearly ground for cooperation in Europe by sharing resources and joining institutional initiatives, up scaling their impact. UAb.pt's pioneering initiative demonstrates this possibility, by developing a specific institutional approach, highly embedded in its own pedagogical and organizational culture, but also closely articulating it with a network of European partner institutions, namely open universities, thus aiming at a much larger audience.

In this paper we present the main innovative features of the iMOOC pedagogical model and describe its design process

¹ The first experimental iMOOC was launched on 25th April 2013 in the framework of OpenUpEd (<http://www.openuped.eu>), the first pan-European federated provision of open education.

demonstrating how it contributes to facilitate the transition from non-formal education to formal education.

II. CONTRADICTION IDENTITIES OF MOOCs

Opposite to common belief MOOCs – Massive Open Online Courses – were not the creation of some high profile professors (Sebastian Thrun, Peter Norvig, Daphne Koller or Andrew Ng) from Stanford University. It's an historical fact that when Sebastian Thrun and Peter Norvig opened their “An Introduction to AI” course at Stanford, in the Fall of 2011, to anyone who wanted to take it for free, an impressive 16000 plus people registered for the course. This unexpected event, coupled with the reputation of the professors and the institution involved, set in motion what would become the educational phenomenon of 2012 (Daniel, 2012). Soon after Sebastian Thrun created Udacity, a for-profit organization through which MOOCs can be offered, and Daphne Koller and Andrew Ng created a similar company, Coursera. By late 2012, Coursera had managed to partner with more than 30 top-tier American universities (and some from outside the US) to offer MOOCs, and the two companies combined accounted for more than 1 million participants registered to take their courses. Also in 2012, MIT announced a partnership with Harvard (they were later joined by UC Berkeley) to develop EDx – a non-profit initiative to offer open online courses (Daniel, 2012). With venture capital supporting fast iteration and development and the media attention focussing on these high profile players, MOOCs became the hot topic of 2012 and are still going strong in 2013 in Higher Education.

MOOCs, however, existed even before the Ivy League and Silicon Valley investors took an interest in them. In fact, the first MOOC bearing that designation was offered by George Siemens, Stephen Downes and Dave Cormier at the University of Manitoba, Canada, in 2008 (Downes, 2012; Daniel, 2012; Watters, 2012). The term MOOC was coined by Dave Cormier, after registrations for the course went past 2000 participants (Cormier, 2008; Siemens, 2012a). The “Connectivism and Connective Knowledge” course (CCK08) drew on the recent experiences by Alec Couros² and David Wiley³ who, in 2007, decided to open the formal, for-credit courses they were teaching at their institutions to anyone who wanted to take part in them in a not-for-credit, informal way (Downes, 2012). So, in a sense, this first MOOC set itself in the larger context of Open Education and Open Educational Resources, following a practice of opening up to the world what were the results of regular academic work.

CCK08 was designed according to the connectivist principles of learning (Downes, 2012; Siemens, 2012c; Cormier, 2010). There was not a fixed body of content to be learned, “professors” teaching “students” or a single location where the course took place. Content resulted from the production of artifacts by participants, following their interaction with and their reflection upon a given set of resources (and other resources shared by them or by others), as

² EC&I 831: Social Media & Open Education - <http://eci831.wikispaces.com>.

³ INST 7150 Introduction to Open Education - http://opencontent.org/wiki/index.php?title=Intro_Open_Ed_Syllabus

well as the dialogue among participants around these artifacts; the organizers acted more as facilitators and providers of some necessary structure, with the “teaching” role being assigned to the learning community itself; and, while there was a course site, with the relevant information (weekly topics, list of suggested resources, synchronous session schedule, etc.) and Moodle forums where people could interact, the conversation was distributed by the participants’ own spaces (mostly individual blogs) and several social spaces (Twitter, Facebook, Second Life, etc.).

Several other MOOCs were offered afterwards that followed this approach - CCK09, CCK11, CCK12, Plenk10, Critical Literacies 2010, Change11, LAK11, LAK12, Future of Education 2012, to name a few (Siemens, 2012c) – and consequently MOOCs came to be associated with a connectivist (or connectivist inspired) view on learning, based on a participatory pedagogy and on networked learning.

The pedagogical principles and practices followed by these MOOCs and by those offered through Udacity, Coursera or EDx are quite different (Daniel, 2012; Siemens, 2012c; Watters, 2012). So different, in fact, that using the same name to designate them is confusing (Hill, 2012). Downes proposed a useful distinction, calling the former cMOOCs and the latter xMOOCs (Watters, 2012), which has since been widely adopted. While cMOOCs are connectivist in nature and understand “open” as it has been defined in the open education field (OERs, OEPs), xMOOCs follow a more traditional approach to learning and see “open” mostly as a synonym for “free of charge” (although even this might change in the near future). As George Siemens (2012b) puts it:

Our MOOC model emphasizes creation, creativity, autonomy, and social networked learning. The Coursera model emphasizes a more traditional learning approach through video presentations and short quizzes and testing. Put another way, cMOOCs focus on knowledge creation and generation whereas xMOOCs focus on knowledge duplication.

Lisa M. Lane (2012) proposes another interesting distinction aimed at accommodating other MOOCs, like ds106 – Digital Storytelling, that do not fit either “c” or “x” models – network-based (the cMOOCs), content-based (the xMOOCs) and task-based MOOCs (like ds106). Common to all types of MOOCs is that they are a developing field, with a lot of experimentation going on and many relevant questions to be answered (Watters, 2012). Completion rates are low in all of them (Jordan, 2013; Daniel, 2012; Hill, 2012; Holton, 2012;) and problems related with student satisfaction, learning support, technological environment and the quality of the learning experience are yet to be fully addressed (Daniel, 2012; Holton, 2012; Kop, Fournier & Mak, 2011; Siemens, 2010).

III. THE iMOOC PEDAGOGICAL MODEL

UAb.pt has in place since 2007 a Virtual Pedagogical Model that establishes the standards for all its educational offering. Its design and implementation was part of the institution’s strategy for innovation in distance education and played an inducer role of institutional transformation in the

framework of UAb.pt's transition process towards becoming a fully online university. The model is patented and consists of a cluster of institutional-wide pedagogical standard practices each dedicated to one type of educational programme or course. In face of the most recent developments in online educational practices, UAb.pt decided to review its model more extensively. Thus, a new variant of the model specifically dedicated to open online courses was designed and is now under testing. This initiative marks the pioneering design of the first institutional pedagogical model for MOOCs.

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 "bootcamp" 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.

IV. 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.

V. 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*⁴, 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

⁴ 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.

integrated with Elgg, an open source social networking platform to be used as an institutionally supported Personal Learning Environment (PLE).

The main goal of the pilot course was to introduce the concept of climate changes in the context of sustainable development, relating it to the experiences lived by each one of us of how to adapt to them and curb their effects, be it floods, water shortage, rise in the sea level or coastal erosion, to name a few. Some of the key issues addressed in this course were:

- How do climate changes influence our society and our life today and in the future?
- How can we evaluate what we are told about what to do regarding climate changes so as to make our own informed decisions?
- How can our choices and behavior influence the future of our society and our planet?

The author's intention when designing the course was not to determine what should be done in terms of climate change, but to prepare participants to understand and analyze critically a diversity of perspectives on the topic. During the course, the learning community looked at scientific, political, economic and social components of climate change, as well as their connection with sustainability.

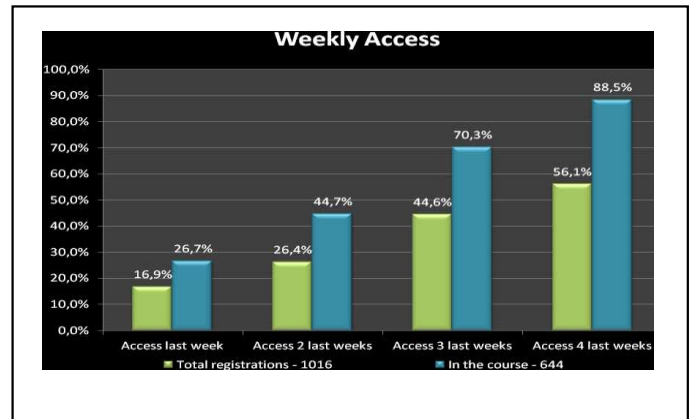
The course ran from May, 6 to July, 1st, with a total duration of 8 weeks. The first week was dedicated to the familiarization module. The remaining 7 weeks were divided into 5 topics:

1. Introduction. What science tells us about climate change?
2. Economy and climate change.
3. The politics of climate change: a political science perspective
4. The sociological perspective on climate change.
5. Climate change: Integration of perspectives in the ambit of Sustainable Development.

The pilot course attracted 1.016 registered participants, of which over two thirds actually started the first learning activities according to the schedule. As can be seen in figures 1 and 2, 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, as shown in figure 3. According to our interpretation, this phenomenon resulted from the successful introduction of the initial facilitation «bootcamp» 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.

Fig. 1. iMOOC on Climate Change weekly access in the first four weeks

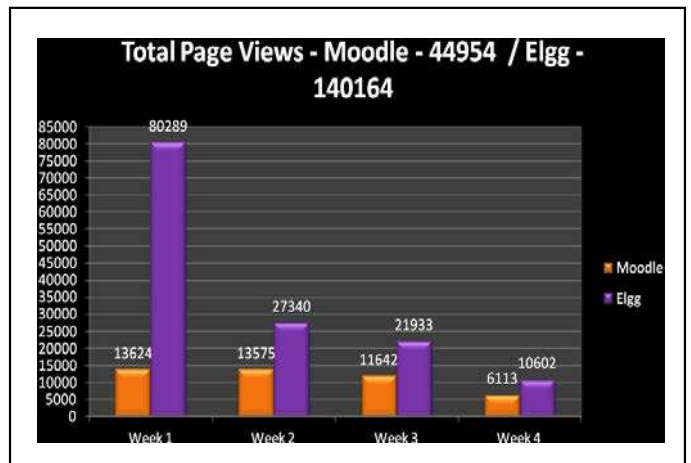


Fig. 2. iMOOC on Climate Change total page views in Moodle and Elgg in the first four weeks

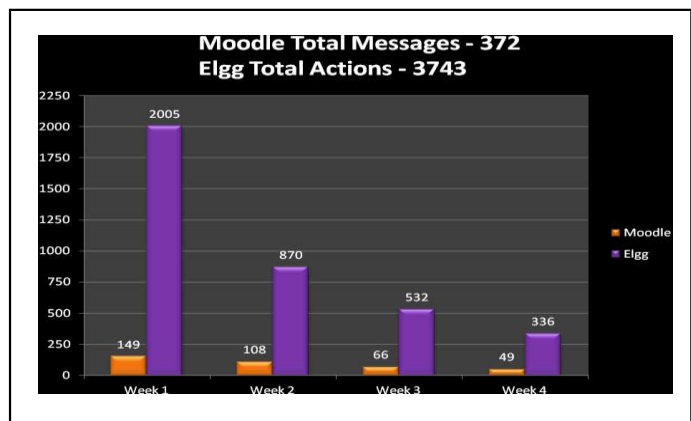


Fig. 3. iMOOC on Climate Change total messages and other communication actions in Moodle and Elgg in the first four weeks

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 below.

TABLE I. NUMBER OF ITEMS PUBLISHED IN THE SOCIAL LEARNING ENVIRONMENT

Elgg - Number of Items Published During First 4 Weeks			
Wire posts	Blog posts	Favourites	Files
1155	717	431	410
Elgg - Number of Items Published by Course End (8 weeks)			
Wire posts	Blog posts	Favourites	Files
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:

- 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.
- It was the week of the first graded artefact, 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.
- 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 below.

TABLE II. LOW PARTICIPATION, DROP OUT OR NOT TAKING PART IN THE COURSE

	Peripheral participation	Drop out	Never accessed
Lack of time	60%	33%	33%
Unexpected circumstances	---	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%).

VI. DISSEMINATION OF THE iMOOC MODEL

The iMOOC model is being further developed in the framework of two ongoing EU-funded projects: EMMA (European Multiple MOOC Aggregator) and ECO (Elearning,

Communication and Open-data: Massive Mobile, Ubiquitous and Open Learning). A total of four courses are being developed by UAb.pt using the model in conjunction with different learning environments. Furthermore, both projects are developing their own pedagogical models which at a large extent have been inspired in the iMOOC approach and experience. The continuous development of the iMOOC model is therefore benefiting from the critical input of many expert practitioners from several European universities.

It should also be noted the iMOOC model has been selected by the University of Lisbon to be used in an innovative course experience in the framework of the project ESVIAL (Educação Superior Virtual Inclusiva - América Latina).

In fact, the project partners have designed a two-version (closed-open) strategy for teacher training on the creation of accessible educational content. The idea was to complement a blended learning approach and a massive open online one. As a consequence a set of high quality OERs has been developed on the topic which will be independently used as basic course materials in two different contexts: a close blended learning one designed for intensive and practical training of selected teachers staff and a open massive environment intended for a wider outreach of the course content and awareness raising on the topic purposes.

VII. CONCLUDING REMARKS

MOOCs offer a new range of exciting possibilities for widening access to quality education since they allow for the creation of very large communities of practice. However, most MOOC offering just follows a very directive instructional approach, basically focusing on the quality of content and in the outreach of its distribution system.

The iMOOC model allows for a better integration of a massive outreach with collaborative online learning institutional practices. As shown before, the «boot camp» module allows for a rapid and precocious establishment of a learning community. This promotes a much higher level of interaction and dialogue among participants throughout the learning process. Finally, the dynamics of the learning process are enhanced by the higher communication levels and the high degree of transparency of the course activities.

Another important aspect is that the model is platform independent, thus allowing for a great variety of multiple simultaneous communities being established from various platforms and converging on a networked environment.

Most importantly, the iMOOC pedagogical model is designed to facilitate the transition from non-formal education to formal education. As the pilot test run showed, the certification options embedded in the courses allow participants to manage their own learning experience, determining the kind of final output that is best suited for their learning needs. This includes the possibility of their non formal learning experience being subject to formal accreditation.

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