
A NETWORKED LEARNING FRAMEWORK FOR EFFECTIVE MOOC DESIGN: THE ECO PROJECT APPROACH

Francis Brouns, Open Universiteit, Netherlands, José Mota, LE@D, Lina Morgado, Universidade Aberta, Portugal, Darco Jansen, EADTU, Netherlands, Santiago Fano, Universidad de Oviedo, Spain, Alejandro Silva, Universidad de Zaragoza, Spain, António Teixeira, Universidade Aberta, Portugal

In the past two years a lot of attention has been given by the European Commission, as well as the European open, distance and digital education community, to the development of an alternative, more collaborative approach to MOOC design that has the potential to represent a solid qualitative alternative to the most commonly used models today. These models, which basically follow a trend originated at the top US universities that is broadly identified in the literature as xMOOCs, are proving to be inconsistent with the European standards for formal higher education due to their low-level of learner support and lack of an enriched pedagogical approach. Within the framework of the EU-funded project *Elearning, Communication and Open-data: Massive Mobile, Ubiquitous and Open Learning* (ECO) a research team from a pool of institutions with experience in MOOC design conceived a model that attempts to meet the above-referred challenge. In this paper we present a description of the model and its most innovative features, its theoretical foundations and context of development, as well as scenarios of implementation. Through our definition of MOOCs and assumptions, principles and characteristics of the pedagogical framework it should become clear why a networked learning framework for effective MOOC design will be able to meet the ambition of European higher education institutions to develop an alternative, more quality-oriented and effective approach to a massive open online form of education delivery.

What characterizes an ECO sMOOC and what doesn't?

Wikipedia defines a MOOC¹ as:

“an online course aimed at unlimited participation and open access via the web. In addition to traditional course materials such as videos, readings, and problem sets, MOOCs provide interactive user forums that help build a community for students, professors, and teaching assistants”.

In fact, this definition is not strict and already led to many discussions about what a MOOC is and what it is not. The ECO project has adopted the definition that it is an online course

¹ http://en.wikipedia.org/wiki/Massive_Open_Online_Course

designed for large number of participants that can be accessed by almost anyone anywhere, as long as they have an internet connection, is open to everyone without entry qualifications and offers a full/complete course experience online for free. In our perspective, a MOOC includes educational content, facilitates interaction among peers (including some but limited interaction with academic staff), provides authentic activities and tests, including feedback (with well-designed rubrics for peer-assessment and AI engines for the integration of massive qualitative assessment), has some kind of (non-formal) recognition options and provides a study guide or syllabus.

ECO sMOOCs differ in several aspects from other types of MOOCs. ECO sMOOCs are “social”, since they provide a learning experience marked by social interactions and participation, and “seamless”, since ideally they should be accessible from different platforms and through mobile devices and integrate with participants’ real life experiences through contextualisation of content via mobile apps and gamifications.

Although we prefer courses with full access to full course content at all times (always accessible by anyone anywhere); ECO sMOOCs may have fixed starting and ending dates, depending on the institution’s choice. And although the definition refers to a potential unlimited number of participants, there can be a set limit due to availability of resources, as long as there is no enforced selection of participation. Most ECO sMOOCs provide an access route to credit-bearing curriculum as an additional service (to be paid for) next to other free recognition options, such as badges and/or a certificate of completion.

MOOCs should be inclusive and accessible to a wide diversity of citizens. They should allow a wide spectrum of approaches and contexts, accounting for a variety of languages, cultures, settings, pedagogies and technologies. ECO pays special attention to both people in risk of social exclusion and people with visual and hearing disabilities. The learning environment should enable mobile access, be available from every mobile device and allow for maximum usability.

ECO sMOOCs (and their platforms) are by definition multilingual, providing at least access in Spanish, English, Italian, French and Portuguese, and offer the possibility of contextualized learning through mobile technologies and gamification.

All contents in ECO sMOOCs have a creative commons licence (and are as such open educational resources). Open licensing policy is also preferred for the MOOCs platforms (open source) and for the data produced in MOOCs (open data) to improve learning and the educational offer.

With regard to pedagogical characteristics, ECO sMOOCs are do-able and stimulating by dedicated design, applying connectivist, socialconstructivist learning and/or situated practices as the dominant approach. The pedagogical approach supports independent learning and is learner-centred. In fact, they will create collaborative learning opportunities through a networked learning strategy. The model also supports adaptive learning strategies and

ubiquitous, pervasive and contextualized learning. As a result of this, ECO sMOOCs have the potential to adapt to the changing intentions of participants during the course.

Pedagogical model assumptions

ECO sMOOC concept

The pedagogical model is aligned with the definition of ECO sMOOCs agreed upon and presented above. They are Massive, and Open, and Online Courses. They are a non-formal learning experience, although they will always have some kind of certification based on peer-assessment. Further formal accreditation that recognizes this learning experience may be obtained for a fee, but is not a part of the course itself.

A model as a framework

Because these courses can have a wide variety of target populations, purposes and local, contextual implementations, the model is designed as an open framework within which local and contextual choices are made and specified to make the courses effective. Contextual specified solutions that seem applicable to a variety of other contexts and found to enrich the pedagogical practices of these ECO sMOOCs can be later incorporated into the framework.

Pedagogical approach

Broadly speaking, the pedagogical approach draws on connectivism, situated learning and the general social-constructivist perspective that has always characterized online learning.

Participants are learners, not students

ECO sMOOCs are meant for adults, not for children or teenagers. We may refer to them as participants, individuals or learners, but not as students, since this is a term that defines a status/role in the context of formal education. People participate in this learning event becoming part of a learning community which, to some extent, is also a community of interests or a community of practice.

Not a classroom approach

The model is not designed for online learning in the context of formal education, nor for blended or technology enhanced learning in the same context. It is specifically dedicated to open courses, delivered online, that can theoretically have an unlimited number of participants. The context of reference is not the classroom, or the virtual class, but how people develop their learning by being part of online communities and networks.

Pedagogical principles

Learner is key

The learner has a central role. Due to the high heterogeneity characteristic of MOOC participants in terms of competences, prior knowledge, personal motivation and goals, and also because of the non-formal, community-like nature of these courses, the learners 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. Knowledge is built through reflection and practice (creation, production) and dialogue in a social collaborative context.

Success in this type of courses needs to be measured against participants' goals and intentions, and not against a rigid set of predefined learning outcomes. These may be defined to serve as a guide for participants in terms of knowledge or competences that can be acquired or developed in the course, but should not be the measure of success for everyone. ECO sMOOCs should also be able to adapt to the changing intentions of participants during the course.

Learning through interaction

Interaction takes place at various levels. It can happen with the materials and resources provided and those contributed and produced by participants; but also with other participants (in the learning community/network and/or in a group); and with community facilitators. Through these various types of interaction participants re-appropriate and recreate content, produce their own content, establish interconnections and interpersonal relationships, get and receive feedback, experience different perspectives and engage in the dialogue with others, which fosters real individual knowledge acquisition but also a shared construction of knowledge in a social context.

Flexibility

There need to be an articulation between autonomous and self-directed learning with a strong social dimension (collaborative learning), and also between the flexibility that online learners need with the pacing necessary to help them get things done. Very fixed and rigid learning paths, highly structured tasks with very fixed sequences (including rigid suggestions for time allotment), heavy interdependency of sequential tasks, or overuse of synchronous communication strongly reduce flexibility and increase transactional distance. Especially in the case of MOOCs, this can contribute significantly to the drop-out rate. Therefore, whenever possible, or to the extent to which it may be possible, an effort should be made to offer an alternate learning path (more focused on the interaction with the materials/contents, for example, for those who cannot keep the pace of ongoing interaction and dialogue around the current topic), reduce the dependency between different topics/activities, allow for choice in the way participants demonstrate their knowledge, allow for different ways of completing a task (individual, group, different formats, open ended tasks, etc.), offer optional challenges to

be completed at participants' will, and include synchronous events moderately, and only when they are relevant.

Digital inclusion

One of the challenges of 21st century learning and of providing a solid base for lifelong learning is to make learning available to as many people as possible, bringing these people into the digital online environment, where a crucial part of modern life happens, thus helping curb the digital divide.

Ubiquitous learning

In accordance, whenever possible or adequate, courses should support context information and tasks by ubiquitous, pervasive and contextualized learning through mobile technologies. This will reinforce learner-centeredness and flexibility, as well as increase the possibilities for interaction, creating a richer and more diversified learning environment whereby participants can resort to a wider variety of resources, contexts and situations to engage in the course experience.

Typical characteristics of the pedagogical approach

Access and registration

Courses are open to everyone who wants to participate. Registration is required to add contributions and publish in the learning environment, but all course contents are accessible to anyone.

Duration and structure

The course should run for about six weeks, a duration which seems, from empirical data, to work well. The first week should be dedicated to the familiarization process – a sort of “boot camp” to get participants acquainted and familiar with the environment, technologies and work and communication processes to be used throughout the course. This is a key phase in the process and may contribute significantly to a better retention rate, not only because it gives participants enough time to become sufficiently proficient to be able to work and communicate before starting to engage with course contents, but also because it fosters the development of the learning community that is paramount in this approach. The remaining weeks should be organized around topics, with suggested activities and resources tied to these activities to explore these topics and support learning.

Learning environment

The learning environment should be intuitive and require only a short adjustment period, which can be achieved in the introductory, boot camp week. If a typical virtual learning environment is used (VLE/LMS), it needs to be enhanced with social features, or combined

with a community/network-like environment to foster relationships and interactions. It is imperative to avoid “school-like” or “classroom-like” environments as the main space where activities take place and participants publish and interact. Some key features are: an activity stream, rich profiles, a personal writing space (blog or equivalent), a user dashboard, micro-blogging (like Twitter) or updates (like Google+ or Facebook), and the possibility for group creation by participants or by course organizers to support group tasks and social connections.

Learning process

Learning is learner-centred and based on the realization of e-tivities. Learning should be evidenced through the creation of artifacts (texts, videos, presentations, audio podcasts, mind maps, etc.), published online and freely accessible, that demonstrate the learner’s reflection, knowledge or competencies regarding the material studied and the topics being addressed. The learning process combines autonomous self-study and reflection with interaction with other participants in an open social context. Participants are thus expected to take an active role in, and be responsible for, their own learning, but also to actively engage in setting up a supporting learning community.

In a networked/community learning setting, collaboration does not mean “to work in a group”. Collaborative learning results from people sharing artifacts, either created by them or by others, providing links to relevant resources, aggregating useful information and taking part in the dialogue and interactions that develop within the network/community.

Teacher’s role

A non-formal, free course cannot rely heavily on teacher time and presence. Teacher participation in the course needs to be very well thought through. Learning support cannot be assured through direct and ongoing teacher intervention, nor through direct and systematic intervention of the facilitators. Teacher presence is created through the Learning Guide, the detailed instructions for the tasks, some resources (video and/or audio presentations) and a weekly feedback message, based on the information prepared by the facilitators’ team.

Learner’s role

Success in a MOOC needs to be measured against participants own goals, interests and satisfaction level, not against predefined learning outcomes. Given that the learning process lies on the participants and that they have a responsibility to sustain a learning community, it is important to maximize, recognize and reward the effort and contribution of the most interested and motivated users, so that they can serve as role models and incentivize others to be active. Whenever possible, badges and/or a “reputation” system should be put in place to stimulate and recognize/reward engagement by participants.

Facilitators team

A small team of volunteers should be recruited in order to collaborate with the teacher or teachers leading the course. This support team will gather information that may be relevant to better run the course and substantiate the teacher's weekly feedback, act as "community facilitators", monitor social or information networks for course related content and help out in setting and deploying the synchronous sessions, polls, peer assessment and other tasks considered necessary.

Activities

Typically, activities have a weekly schedule. Activities shouldn't be too rigid, with heavy dependencies between tasks and very structured paths, which makes it impossible for people to recover or come back in the course if they lag behind at some point. A variety of suggested tasks should be made available, supporting and scaffolding participants' exploration, reflection, production and dialogue. As far as possible, these tasks should be authentic, i.e. emulating or mobilizing real life settings, drawing on participants' personal and professional experience, flexible and open ended, which means participants should ideally have a fair amount of choice concerning the process of performing the task and its output. Group-based tasks can be an interesting and valuable strategy for some learning situations.

In addition, a collection of "challenges" should be made available. If they have the time or want to do some extra work, participants can choose some challenges from the bank to complete. They can obtain badges for successfully completing these challenges and later include them in their e-portfolios. This adds flexibility and diversity to the learning experience.

Learning materials

Resources provided as support for learning are presented in the context of a learning activity, not as items in a repository. All resources and materials should be licensed as Open Educational Resources or freely available on the Internet. Ideally, the video and audio resources provided, besides being available through streaming, should also be made available for download in formats compatible with most devices. Artifacts produced by participants as evidence of their reflection and learning become part of the course materials, i.e. they are available for other participants to learn from. Participants should be encouraged to use an open license for their artifacts, but ultimately they will be licensed according to the authors' preferences.

Communication

Communication needs to be carefully planned. Regular messages, such as the weekly feedbacks, help to maintain the focus and the "teaching presence". Video or audio can be used sparingly to increase the perception of "teacher presence".

Two key elements to support and scaffold learning are a) the learning guide and b) the detailed guidelines for the suggested tasks. The learning guide aggregates all the necessary information participants need in one single place/document. The detailed guidelines describe for every task the learning goals, workload, outcomes and instructions on how to perform the task.

Feedback and assessment

Formative assessment with self-correction should be made available (through tests, quizzes, etc.), focusing on relevant aspects of the topics being discussed or important elements in the resources provided. Participants must also be encouraged and are expected to discuss and give feedback to one another throughout the learning activities. A regular, more general feedback on the work done each week should be provided by the teacher. Additionally badges for completion of tasks or challenges, and the points/status/likes/pluses etc. gained from reputation systems, can be used. Self-assessment quizzes can also be used as diagnostic, to anticipate relevant content presented in a resource.

The gamification element

Kapp (2012) defines game as “a system in which players engage in an abstract challenge, defined by rules, interactivity, and feedback, that results in a quantifiable outcome often eliciting an emotional reaction”. Gamification, at higher or lower levels of implementation and complexity, depending on the needs and intent of course organizers, can be used to enhance communication and interaction in the learning community and provide a more rewarding and meaningful learning experience.

- Story Mode / Challenges: contents and objectives are structured under a story-like narrative that encourages emotional engagement to the course material.
- Badges, Levels and Points: Badges could be awarded to participants when completing special course actions. Achievements are mainly designed to encourage interactivity and engagement in the course.
- Karma System: Karma is a numeric indicator of the participants’ level and quality of course engagement. It could be developed in two ways:
 - Forum Karma: Thumbs-up/thumbs-down in forums to encourage interactivity and high quality submissions.
 - General Karma: An additional algorithm that includes forum karma, badges/points and achievements could be created to provide a user’s general karma.

Scenarios for possible implementations of the ECO sMOOC model

ECO targets teachers, tutors, learners, institutions and industrial players. One of its main target groups consist of teachers, teacher trainees and teacher trainers. On the one hand, teachers need to be educated and trained in the design and use of MOOCs, in their role of

learners. On the other hand, these teachers will also design and provide MOOCs, in their role of teachers and tutors. The main aim is to present new forms of accreditation of knowledge concerning processes of communication, creation and utilization of MOOCs.

ECO also aims to bridge the gap between social classes in their access to education and support them, in particular, in developing key competences such as digital skills. MOOCs can attract participants who might otherwise not be able to attend traditional on-campus instruction because of work, family and other obligations. The diversity among MOOC participants is very high, attracting people with different cultures, motives and intentions. Moreover, they don't always come with clear, well defined learning goals, and their personal objectives might even change during the course.

The model can be implemented using an instructional design approach based on the different characteristics of *personas* within these target group(s) as, for example:

- Persona for an ECO MOOC designer/teacher;
- Persona for a MOOC participant;
- Persona for a group / subnetwork;
- Persona for a MOOC teacher/participant with high risk of exclusion due to special needs;

Scenarios for possible implementations offer more concrete and more detailed examples of how particular courses, or particular strategies and solutions, can be designed and implemented within the framework of the pedagogical model, depending on the specific nature, needs and intents of these courses.

Conclusions and future research

In the last three years MOOCs have become a viral phenomenon in higher education. Their rapid success has drawn many institutions worldwide into developing courses, most of them lacking any consolidate expertise and experience in open, distance or online learning or applying inadequate theoretical frameworks and established practices to the emergent new field. Similarly to what happened in the historical development of the Open Educational Resources (OER) movement, after a first enchantment with the potential of this new concept, a disillusion with actual results of the learning processes has arrived. As with OER, research needs to develop new practice models built upon appropriate foundations. New models that respect the principles of open education and take the most out of the new networked social environments. Moreover, in order for practice to be really effective, these new models must be embedded in a new educational and institutional culture. Otherwise its implementation will not bring substantial change and will not contribute to the improvement of the actual learning experiences provided.

The framework developed by the pedagogical research team in the ECO partnership recognizes this challenge and has embraced it. We have designed a solution that relies heavily on a compromise between actual innovative practices of the partners involved, who have a

relevant experience in networked learning and/or have been providing MOOCs based on the same pedagogical principles, so there is some evidence as to its validity.

We are still at an early stage and thus there aren't any real experiences with the ECO pedagogical framework yet, since the ECO sMOOCs are being presently designed and developed and will be launched in November, 2014. However, the scope and scale of the experimentation will feed extremely significant results to test the validity of our assumptions. In the remainder of the project the quality and validity of the aims of ECO and the pedagogical framework will be evaluated. There are ten providers, each offering at least one sMOOC, with a total of some 20 sMOOCs being made available. The aim is to get a minimum of 50,000 participants involved in these sMOOCs and, additionally, train 4000 teachers to create their own sMOOCs. These pilots should offer sufficient data to conduct a careful evaluation of the pedagogical model, including the conditions for sMOOCs, the inclusiveness of special groups at risk, and reach of intended target groups. Each sMOOC will be run three times. Findings of each run will be used to improve the pedagogical framework.

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References

1. Downes, S. (2013). *What makes a MOOC massive*. Retrieved April 15, 2014 from <http://halfanhour.blogspot.pt/2013/01/what-makes-mooc-massive.html>
2. Downes, S. (2006). *Groups vs Networks: The Class Struggle Continues*. Conference presentation at eFest. Wellington, Nova Zelandia. Retrieved April 15 from <http://www.downes.ca/presentation/53>
3. Dron, J.; Anderson, T. (2007). Collectives, Networks and Groups in Social Software for E-Learning. In T. Bastiaens & S. Carliner (eds.), *Proceedings of World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education 2007*, (pp. 2460-2467). Chesapeake, VA: AACE.
4. European Commission (2013). *Vassiliou welcomes launch of first pan-European university MOOCs*. Retrieved February 5, 2014, from http://europa.eu/rapid/press-release_IP-13-349_en.htm
5. Haggard, S. (2013). *The maturing of the MOOC: Literature review of massive open online courses and other forms of online distance learning*. Research paper number 130. London.

6. Jordan, K. (2014). Initial trends in enrolment and completion of massive open online courses. In *International Review of Research in Open and Distance Learning*, 15(1).
7. Kapp, K. (2012). *The Gamification of Learning and Instruction: Game-Based Methods and Strategies for Training and Education*. San Francisco: Pfeiffer.
8. van Rosmalen, P.; Sloep, P.; Brouns, F.; et.al. (2006). Knowledge matchmaking in Learning Networks: Alleviating the tutor load by mutually connecting Learning Network users. In *British Journal of Educational Technology*, 37(6), (pp. 881-895).
9. Teixeira, A.; Mota, J. (2013). Innovation and Openness through MOOCs: Universidade Aberta's Pedagogical Model for Non-formal Online Courses. In the *Proceedings of EDEN Conference 2013*, (pp. 479-488). Oslo, Norway.
10. Yuan, L.; Powell, S. (2013). *MOOCs and Open Education: Implications for Higher Education. A White Paper*. JISC CETIS, available from:
<http://publications.cetis.ac.uk/2013/667>

