

# If MOOCS are the answer, did we ask the right questions? Implications for the design of large-scale online-courses

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# **If MOOCS are the answer – did we ask the right questions?**

## **Implications for the design of large-scale open online courses**

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In this conference contribution we deal with the phenomenon of Massive Open Online Courses (MOOCs). Based on summary of the state of the art we discuss aspects of the learning design of MOOCs that have not been sufficiently studied. More specifically we discuss the issue of diversity and support facilities in MOOCs. We introduce the concept of learning networks and learner support services that have been developed to enable personalized learning scenarios in large-scale online environments. We report about a learning design for large-scale open online courses that has been evaluated and further developed in the last year. Last but not least we discuss future research.

Keywords: MOOC, technology-enhanced learning, learning networks, diversity, learner-support, learning design

### **Introduction**

Technology-enhanced learning (TEL) is an interdisciplinary research field to which several disciplines contribute (Kalz & Specht, 2013). Actors in this field of research and development are constantly innovating learning processes and learning opportunities for different stakeholders. Recently the discussion about so-called massive open online courses (MOOCs) has motivated higher-education organizations to rethink their strategy towards online-learning and to invest in the development of new and openly accessible

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formats. At the same time the scholarly discussion about this format is in a very early stage and most aspects are discussed via social media and not in scholarly publications.

Remarkably, the public discussion about large-scale open online courses is neither framed well in the longer history of the development of open educational resources (OER) nor in other open approaches for large-scale online learning opportunities like the concept of learning networks (Koper & Tattersall, 2004). In this paper we take a rather critical stance on massive open online courses and discuss their innovation character for the field of technology-enhanced learning and more specifically the shortcomings in their current learning design. In the next part we briefly summarize the scholarly discussion about MOOCs. Next we discuss the concept of learning networks and related support services. Last but not least we introduce the design and design criteria for an open online format called “online masterclasses” developed at the Open University of the Netherlands.

### **State of the art of MOOCs**

The concept of MOOCs has recently peaked in interest worldwide according to GoogleTrends. Figure 1 shows the search queries conducted on Google.com between 2011 and July 2013.



Figure 1: MOOC in GoogleTrends

According to Daniel (2012) the term MOOC has been used for the first time in Canada by Dave Cormier and Bryan Alexander to describe a course with 25 local participants and approx. 2300 students outside the institution who participated in the online course. This course has been designed on the basis of ideas by Illich (1971) and the so called de-schooling of society. Consequently, the course was a combination of a social network, a combination of tools and events and followed a learning design that builds on self-organized learners with high media literacy. Later, Stanford University has offered a large-scale open course about Artificial Intelligence for which 58 000 participants subscribed. Other high-profile universities have followed and some spinoff companys like Coursera, Udacity or edX have been setup to provide the technical support for other MOOC providers. With the support of these spinoffs higher education institutions around the world offer now MOOCs in the Stanford style. While the first course type was designed on the basis of self-organisation, peer tutoring and learning in a social network, the second course type followed more a classical top-down lecture style with recorded videos, embedded tests and interaction in a forum. This difference in design has later lead to the distinction between cMOOCs (stands for “connectivist” MOOCs) and xMOOCS (stands for the Standford style MOOCs).

Although MOOCs are a relatively new phenomenon, the first studies have recently been published. Kop & Fournier (2011) discuss cMOOCs in the light of self-directed learning. According to the authors cMOOCs consequently build on the idea of knowledge building as an active engagement of people with learning resources and other learners rather than a metaphor of knowledge transfer. Based on different data collection methods an analysis of the network emerging in a MOOC has been conducted. Besides demographic and geographic details the study reveals the high diversity of participants in MOOCs and the different expectations and requirements for

support and facilitation. Fini (2009) has analysed a different cMOOC in terms of the combination of tools used to realize the course. While some participants can handle this combination of tools like an LMS, a virtual classroom in combination with different social media services fairly well, some participants report about confusion and disorientation. This finding is in line with Yuan & Powell (2013) who criticize that the current enthusiastic discussion about MOOCs is “driven by a self selecting group of highly educated, IT literate individuals who are able to navigate the sometimes complex, confusing and intimidating nature of online learning”.

Although the concept of openness is at the core of the MOOC concept, some authors question this aspect. While there is no access fee for participation in MOOCs, there is on the other hand also no accreditation foreseen without payment. Rodriguez (2013) discusses how different the idea of openness is realized for the two paradigmatic types of MOOCs. While for the one type openness is meant in terms of openness for participation and openness in terms of material used and reused, for the other type there are more restrictions with regard to participation and reuse of material. Yuan & Powell (2013) discuss the topic of openness between the concepts of an open curriculum, open assessment, open learning and last but not least an open platform to be used. Knox (2013) discusses the interpretation of openness as open access and the assumption of neutrality of the technology. He concludes that considerable “work is needed within the open education movement to unveil the processes involved in the production of technology, acknowledging the broad pedagogical, philosophical and political presuppositions already encoded in the systems used”. Clow (2013) introduces the “funnel of participation” in MOOCs. This concept describes the different stages in which learners get aware, subscribe and become participants of a MOOC. Based on approaches from learning analytics (Greller & Drachsler, 2012) the author presents

underpinning data from several MOOCs that help to explain partially the high amount of drop-out for MOOCs.

In a meta-review Liyanagunawardena, Adams, & Williams (2013) summarize existing research about MOOCs until 2012. The authors state that most studies to date have focused on case studies, the influence of MOOCs in higher education structure or educational theory framing. Although MOOCs generate a plethora of data the learner perspective is underrepresented in current research. McAuley, Stewart, Siemens, & Cormier (2010) discuss research challenges for future research about MOOCs. Several of them are directly related to the learning design, for example:

- the breadth versus the depth of participation
- identifying the processes and practices that might encourage lurkers, or “legitimate peripheral participants”, to take on more active and central roles
- specific strategies to maximize the effective contribution of facilitators in particular and more advanced participants in general

### **Reframing the discussion**

The summary of the current scholarly discussion shows that the research about the impact of MOOCs is still in very early stages. While there is some criticism about the quality, accreditation processes and goals of MOOC initiatives, the actual shortcomings of the learning design of current MOOC offerings are not sufficiently addressed in articles to date. From our perspectives the differentiation between the two archetypes xMOOCs and cMOOCs only represents two extreme positions without taking into account the real challenges of the learning design of such large-scale online courses. While the cMOOCs are relying on a high level of self-organisation, IT competences and goal setting by learners and offer little structure and directed support,

xMOOCs on the other hand represent a instructional paradigm oriented on classical lectures with very little interaction opportunities. In this regard, the learning design of xMOOCs is comparable to classical online courses or self-study modules that have been developed at the early stages of online learning. Table 1 shows a comparison of the learning design and interaction types of cMOOCs and xMOOCs.

	<b>Learning design</b>	<b>Interaction types</b>
<b>cMOOCc</b>	Open design (not fixed), emerging activities	Focus on learner/learner interaction
<b>xMOOCs</b>	Fixed design, repeated activities	Focus on learner/content interaction

Table 1. Learning design and interaction types of cMOOCs & xMOOCs

While cMOOCs are not fully fixed during runtime and there can be adaptations on the fly, xMOOCs are typically fully fixed before runtime without adaptations that can take into account for example feedback from learners. cMOOCs are building mainly on the interaction between learners. xMOOCs focus on the interaction of the learners with the learning content.

From our perspective, the high number of participants, no matter how the term “massive” in MOOCs is operationalized, leads to an issue that needs to be tackled with the learning design: diversity. Recent studies (e.g. Kop et al., 2011; Waldrop, 2013) provide demographic details about the participants of MOOCs. These studies show that there is a very large diversity in terms of country of origin, age, motivation to participate, prior knowledge, accreditation needs and cultural background of students. If a new educational format takes this diversity for granted, the current solutions for the learning design of a massive open online course are not adequate. Diversity is not tackled with methods from adaptation and personalization research (Brusilovsky, Kobsa, & Nejd, 2007) although there has been huge progress in these fields which can make online learning more tailored towards individual needs and diversity in the student

population. According to Lemire, Downes, & Paquet (2008) diversity is defined as a high level of heterogeneity in a collection of entities. This heterogeneity can be targeted in a learning design by typical means of (content) adaptation, by building sub-groups within the large collection to bundle entities more similar to each other or by offering adequate tutoring support for different needs.

A similar problem situation has been defined within the framework of learning networks (Koper, Rusman, & Sloep, 2005). A learning network connects actors, humans as well as agents, institutions and learning resources, which are organized in competence development programs. Information and communication technologies are used in such a way that the network self-organizes. The actors in the learning network share one common goal: furthering the development of competence by learners. In a learning network, roles are flexible and individuals can take different roles depending on the context. To overcome the problem of diversity in learning networks, several services for learner support in learning networks have been developed and evaluated. These are a so-called placement support service, a recommender service and last but not least a knowledge matchmaking service. The placement support service in learning networks supports learners to find the most suitable position for a learner based on their prior knowledge (Kalz, Van Bruggen, Rusman, Giesbers, & Koper, 2007). This position is defined by learning activities that can be omitted in the current context and learning activities potentially of interest for the learner. Based on this position a recommender service recommends suitable learning activities available (Drachsler, Hummel, & Koper, 2008). While the basic techniques for recommending learning activities or learning content to learners are similar to recommending products, there is a huge difference when it comes to finding a learning activity that fits to the preferences of a learner (Kalz, Drachsler, Van Bruggen, Hummel, & Koper, 2008). Last but not least the



tutoring and support perspective needs to be addressed in large-scale open online environments. In the learning networks framework one of the most important requirements was the setup of a support service without increasing the tutor load. Therefor a so called knowledge matchmaking service has been developed and evaluated that one the one hand brings together learners with open questions and learners who should be able to provide support, on the other hand this support requests are balanced not to overload the most knowledgeable actors in the network with requests (Rosmalen et al., 2006). The combination and application of these services would address the diversity in large-scale open online courses via intelligent personalization techniques. Besides addressing the diversity on a technical level, the whole design of a large-scale online course can be adapted in a way that it can address different needs and interest of its participants.

### **Online-masterclasses and its design imperatives**

As discussed above the learning design of MOOCs based on the two archetypes cMOOCs and xMOOCs fails to address the real issues of large-scale open online courses and does not take into account earlier approaches to address diversity in large-scale open online learning environments. While in the learning networks framework dedicated services have been developed to allow a personalized starting position and route through the different learning activities, an alternative option is a recursive design of large-scale online courses that is partially fixed and can partially be adapted during the runtime.

Based on the current shortcomings of existing MOOC formats we have recently reported about an alternative design for the development of large-scale open online courses that has been implemented and tested in a series of 18 events with approx. 2000 participants at the Open University of the Netherlands (Rubens, Kalz, & Koper,

submitted). This format is called “online master-classes” and the design principles were motivated by the requirements for continuous professional development, namely:

- Learners should have full control about the intensity of participation and involvement in different learning tasks
- The professional experience of participants should be used as input for the online-master class
- The interaction of experts and non-experts should be enabled
- Three different interaction types should be supported: Learner – expert, learner - learning resources and learner – learner
- The learning design should enable active participation and the application of acquired knowledge to the daily professional practice of participants

The goal of this new educational format was to attract new learners to the study opportunities at the Open University of the Netherlands and to offer a flexible method to stay up-to-date in the professional career. This new format has been developed in an iterative design process. Four design and adaptation phases have been conducted with accompanying evaluation of satisfaction and the collection of qualitative feedback. Each new iteration was based on input from an earlier iteration. An assessment of the needs of participants after the first few online-masterclasses has led to a learning design that had the target to balance two different criteria: A.) Flexibility with regard to time investment and B.) the diverging interest of participants interested in applied topics or academic topics. These requirements have led to a format combining different components:

- Scientific and professional literature to have a common ground for discussion

- 2 preparatory days of learning tasks including interaction with other learners via a forum/message board
- a one-hour live-session designed as a moderator-and-expert-discussion that takes into account the discussion in the forums and offers the possibility to submit questions for the session directly to the moderator
- another day of voluntary learning activities to wrap up experiences in the week
- 2 live paper presentations by PhD students including Q&A possibility
- Self-tests to assess one's learning progress
- Different accreditation options



Figure 2: Screenshot live-session online-masterclass.

The format takes an in-between position between cMOOCs and xMOOCs since it is partially pre-structured but is oriented at the experiences by participants and therefore adapts to the requirements of the participants. Different interaction directions (learner-content, learner-learner and learner-expert) are an integral part of the design. The orientation at the input by learners for the expert session ensures that there is coherence between preparatory activities, live-sessions and the wrap-up of the online-masterclass.

With this format we could attract a completely new group of students to our courses oriented at professional development based on latest research results. Overall we could realize a completion rate that was 3 x higher than the usual 10% of the MOOC format (Daniel, 2013). This higher completion rate might not only be related to the learning design, but also to the difference between markets (English vs. Dutch) and the lower diversity in terms of cultural and educational backgrounds of participants. The mixture between instructional components, social exchange opportunities, different interaction types and scientific and applied knowledge has led to a stable satisfaction pattern among participants.

### **Discussion and conclusions**

In this conference paper we have discussed the state of the art of the current discussion about the Massive Open Online Courses (MOOCs). The diversity of large-scale open online formats has been identified as a key component for the learning design of such educational formats. This aspect is not sufficiently covered in the current discussion about large-scale open online formats. In the future, services like introduced from the learning networks context hold a huge potential to break down the “massive” aspect of MOOCs in smaller sub-groups that are all served within the course based on their individual preferences and support needs. This will lead to more participants who actually finish the course and do not count as dropout. While we have not covered this aspect in this paper, the question of an economic model behind the ongoing use of large-scale open online courses in traditional higher education institutions is not yet answered although this will be critical if the concept of MOOCs should have a longer future than other comparable hypes that are intensively discussed but never implemented on a larger scale.

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