



Online teaching going massive: input and outcomes



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ABSTRACT

The proliferation of massive open online courses is a recent phenomenon in higher education. At the International Institute for Industrial Environmental Economics at Lund University in Sweden, emerging pedagogical approaches in e-learning have long been embraced, allowing for valuable experience with new educational technologies applied in education for sustainability. In 2014, the Institute was given a formal task to develop a massive open online course on “Greening the Economy: Lessons from Scandinavia”, thereby utilizing existing capacities and experiences while experiencing new challenges revealed by courses of larger scale. This article presents the background to the Institute's undertaking with massive open online courses and the range of expectations from the main stakeholders. The article discusses massive open online courses as a novel venue for e-learning in sustainability education as regards learning activities, design and content. It concludes that while the initial experience of such a course has been positive, in order to better cater to the learner groups, continued attention needs to be paid to course design, teacher capacity and in particular an examination of learner motivations.

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1. Introduction

Massive Open Online Courses (MOOCs) are a recently established segment of online courses offering new pedagogical tools for e-learning. A variety of MOOCs focussing on different features are already available including those that encourage learners to contribute to the course content (cMOOCs) and those that combine schedule-based and guided learning with open access in a global classroom (xMOOCs) (Rodriguez, 2013; Yuan and Powell, 2013). A common characteristic of MOOCs is that they build on connectivism (Flynn, 2013), the idea that knowledge is distributed across a network of connections and learning consists of the ability to construct and transverse those networks (Downes, 2008). With the availability of MOOCs, a larger spectrum of population groups in all regions of the world can acquire knowledge and skills to an extent not possible only a few years ago (Chin and Jacobsson, 2015). In response to the growing possibilities, platforms hosting MOOCs are constantly developing and trying new approaches and technologies, ranging from cohort sessions to self-paced courses and varieties of certifications and course credits.

The pedagogical qualities of online courses have long been discussed. For example, it has been argued that stronger learning

outcomes can be achieved when onsite and online courses are combined (see e.g. Patrick and Powell, 2009; US Department of Education (2010)). MOOCs are, as stated, the newcomers in the category of online education. MOOCs are distinct from other online courses primarily because of their massive scale and their open enrolment, resulting in a wide geographical classroom and the possibility to obtain decreasing marginal costs with repeated sessions. As stated, “graduating even 5% of 100,000 learners in a MOOC provides many instructors with substantially greater reach than an entire lifetime of teaching in a conventional classroom” (Koller et al., 2013). For learners, MOOCs can offer increased access to education, both for those unable to pursue formal degrees and for lifelong learners, as well as flexibility and the opportunity to build cross-boundary networks and communities (Yang et al., 2014; Chen et al., 2013).

While educational institutions have developed and launched online courses for a number of years, designing a high quality course and ensuring genuine learning experiences in this open and massive context is not without challenges. In this article we describe the practical experience from the International Institute for Industrial Environmental Economics (IIIEE) with curriculum design, production and delivery of a MOOC named “Greening the Economy: Lessons from Scandinavia”. The background, intended outcomes and main stakeholders are described, as are the experiences and actual outcomes. Moreover, the article highlights the special requirements and possibilities that MOOCs meant for the IIIEE and its staff.

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2. Background

Since 1995, the IIIIEE has offered Master's programs and courses on sustainability-related topics. Over the years it has educated students coming from close to 100 countries. For more than a decade the IIIIEE has also been actively engaged with online teaching. For example, since 2006, the IIIIEE flagship Master's program in Environmental Management and Policy (EMP) is delivered in part online with a demonstrated retention rate of about 80%. Also, for five years up until 2010 the IIIIEE hosted an online course called the Energy for Sustainable Development,¹ including 80 h of learning activities spread over 8 weeks. More than 400 energy/development professionals from over 100 countries completed the course. Moreover, during more than ten years, the IIIIEE hosted the Young Master's Program (YMP),² a global web-based education and learning network, involving over 20,000 students 16–18 years of age from over 110 countries. Finally, the IIIIEE has developed content for iTunes University, what could be argued to be a forerunner of MOOCs. The educational online efforts at the IIIIEE have been formally recognized. In 2010, the IIIIEE was awarded the eXcellence Label in e-learning from the European Association of Distance Learning Universities.³

In January 2014 a principal decision was taken at Lund University for a three-year project in which all faculties should be allowed to develop and implement a MOOC (Collberg, 2014). The stated intentions from the university board were to promote and highlight the university, contribute to the development of regular training and digital expertise and the infrastructure that supports e-learning, promote cross-border cooperation between faculties with regard to training, and, finally, to provide new large groups of course participants with worldwide access to research and education at Lund University (Collberg, 2014). The university wanted to introduce MOOCs gradually and began with a selection of three MOOCs based on applications from departments. One of the selected applications to develop a MOOC came from the IIIIEE, suggesting the topic and title "The Greening the Economy: Lessons from Scandinavia".

In light of the capacity building thus far, the desire at the IIIIEE to further strengthening its pedagogical approaches in e-learning was strong. After six months of work on design, content building and production the MOOC was launched in January 2015. Building on the intentions stated on the university level, the IIIIEE also formulated goals specific to the department. A first goal was decided to develop the educational program to include larger student groups and a greater use of open educational resources, thereby reaching and enhancing the impact of IIIIEE research and training. A second goal was to improve in-house capabilities in e-learning and a third goal was that the MOOC should be designed to allow for integration with the on-site Master's program.

The overall topic of the MOOC, "Greening the Economy", was selected due to its high theoretical relevance and applied dimension. The concept can be considered a more specific orientation of the broader concept of sustainable development. In the late 1990s, a green economy was outlined around technology innovation, resource efficiency, natural capital, ecological risks, and human development (Pearce et al., 1989). Lately, a green economy has been framed as low-carbon, resource efficient and socially inclusive

(UNEP, 2011). The topic is relevant in the IIIIEE education and research agendas and lends itself well to illustrate problems and solutions in the transition to a more sustainable society. The topic "Greening the Economy" was supplemented with "Lessons from Scandinavia", thereby using the Scandinavian setting to present current initiatives while allowing learners to reflect on their own geographical and political-economic contexts.

3. Design and content

The choice of design and components in the IIIIEE MOOC was in part influenced by the offerings from Coursera, the platform and portal selected by Lund University to host the three MOOCs. The choice was also guided by previous experience of the IIIIEE on e-learning in an international setting on the topic of sustainability. The course components included several main learning activities and to some extent also community building.

A number of studies on e-learning emphasize the importance of combining a number of different learning activities for the many groups of learners and thereby enhance connectivism (see e.g. Beetham and Sharpe, 2013; Conole, 2012; Goodyear and Retalis, 2010). This recommendation was adopted for the IIIIEE MOOC with a total of eleven different learning activities offered, of which two were graded based on participation, two were graded on performance, and seven were un-graded. The learning activities and grading policy of the IIIIEE MOOC are outlined in Fig. 1. The main activities among the non-graded ones were a course compendium and video lectures both containing the same material with the purpose to allow learning flexibility. Forum discussions and seminars were offered to supplement the learning development from the video lectures and compendium with the purpose to enhance understanding of the complexity of the many issues highlighted in the course topic.⁴ Finally, individual reflection and critical thinking was furthermore stimulated with the help of course assignments and peer assessment.

Fig. 1 outlines the learning activities in the IIIIEE MOOC as well as the grading policy. The course was designed give more focus on discussions than on rigorous examination. The final grade was determined by the score on five equally weighted quizzes, with each quiz worth 10% of the final grade, by a peer assessed assignment (worth 40% of the final grade) and by forum participation (10% of the final grade). Participation in the forum was considered key to the nature of the topic studied and in order to pass the course learners had to contribute to the forum discussions. The forum participation component was measured by the total number of posts in the course forums, with a maximum of 10 posts counted toward the final grade.⁵ The learning activities in the IIIIEE MOOC were interconnected to allow for synergies and learner flexibility. A course assignment was designed with the purpose to have learners to collect, describe and analyse selected green initiatives from their own regions and thereby applying the knowledge gained in the theoretical part of the course to real cases and beyond the borders of Scandinavia. In line with one of the stated goals from the IIIIEE, the outputs from the assignment were also intended to be suitable for analytical and discussion exercises in the regular education at the IIIIEE.

Production took place in-house with the help of an external film-team that advised and produced video based lectures that were considered suitable especially for the wide audience among

¹ The course 'Energy for Sustainable Development' was developed in partnership with the United Nations Development Programme (UNDP), the United Nations Environment Programme (UNEP), and the Global Network on Energy for Sustainable Development (GNESD) and it was funded by the Swedish International Development Cooperation Agency (SIDA). See: <http://www.e4sd.org/>.

² See: <http://www.goymp.org/>.

³ See: <http://e-xcellencelabel.eadtu.eu/>.

⁴ The seminars were broadcasted via the application 'Google Hangouts on Air'.

⁵ It should be noted that the quality of posts could not be measured however inappropriate posts not following the forum guidelines could be flagged by peers or community teaching assistants.

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