

Contributing to SDG implementation by MOOCs: lessons and opportunities for Université Laval

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1. The first MOOC at Université Laval and SDG 4

Since 2007, Université Laval has been implementing a policy to integrate sustainable development in all its actions through a multi-year action plan including projects to be carried out in all units and faculties. It was awarded a "STARS" gold standard (an international accreditation in sustainable development) by The Association for the Advancement of Sustainability in Higher Education (AASHE). It also became a carbon neutral campus in 2016. Also, since its creation in 2005, the *Institut Hydro-Québec en environnement, développement et société* (Hydro-Québec Institute on Environment, development and society) has been aiming to develop a global view of issues related to environment and sustainable development by promoting collaborations between disciplines and fields at Université Laval. The institute brings together approximately 90 researchers and 400 students from ten faculties and schools on campus.

In 2015, Université Laval launched its first MOOC entitled "Sustainable development, issues and trends", directed by Professor François Anctil, Institute director from 2011 to 2016. It also benefited from the collaboration of 14 of the Institute's members and was coordinated by the author of this article. This was the pilot project for the development of a wider MOOCs offer, which is currently underway.

This text aims to share some thoughts on the results of the first two editions of the MOOC in which there were nearly 10,000 participants from 107 countries. This reflective thinking is part of current questions concerning the role of MOOCs in education and, more specifically, their potential contribution to Goal 4 of Sustainable Development Goals (SDGs), which aims to:

“Ensure inclusive and quality education for all and promote lifelong learning.”

And in particular concerning next targets:

- “By 2030, ensure equal access for all women and men to affordable and quality technical, vocational and tertiary education, including university
- By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations
- By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and

appreciation of cultural diversity and of culture's contribution to sustainable development."¹

2. State of knowledge

Ongoing research on MOOCs encompasses many educational and social issues. Part of the thinking furthers the research on distance learning: What are the impacts of the different educational resources; how can the acquisition of knowledge be verified; what is the role of different educational supports, of demographic factors and of motivational factors in learners' success? Other research focuses particularly on the capacity of this type of open education to foster the democratization of education and question the MOOCs' civic mission, and their ability to promote better access to education. The volume of data generated by this type of training which has been followed by thousands of participants in many countries (with the number still growing) has produced a large number of articles and studies. However, we must not lose sight that this is a recent phenomenon which is still evolving. We must remain cautious and avoid generalizations.

If MOOCs are seen as a great opportunity to promote access to education and vocational training through the use of new information technologies that facilitate the dissemination of training offered by the best universities in the world (Pappano, 2012; Lewin, 2012), many researches have shown that the main beneficiaries were young people, mainly men from industrialized countries, already employed and with a fairly high level of education (Christensen et al., 2013). Trying to understand this gap, other research has examined the factors ensuring that underrepresented population could have better access to MOOCs and enjoy their benefits (Dillahunt et al., 2014). The authors draw attention to the importance of techno-pedagogical support, but also to external factors such as promoting training opportunities aimed at a wider audience.

Achieving SDGs requires reinforcing links between science and public policy as well as major ownership by civil society. For their role in research and education, universities are called to occupy a major place in the two-fold process. MOOCs have a huge potential for furthering SDGs and particularly the SDG 4 by promoting access to quality higher education, improving skills and employability of participants and helping to create better conditions for more equitable economic growth. For their first mission, universities may also encourage more widespread consideration of all SDGs as an integral framework of reference for the actions of everyone, in order to build a more sustainable society.

There are three types of MOOCs contributions that we can identify that help in achieving SDGs:

1. The first is to promote access to currently underrepresented populations: people from developing or least developed countries, of any age, women, people with lower levels of education and those who are not presently employed.
2. The second is recognition of knowledge and skills. Without validation and social recognition of acquired knowledge, the role of education may not lead to improved employability and to a contribution to all SDGs.

¹ <http://www.un.org/sustainabledevelopment/education/>

3. The third aspect concerns the promotion and teaching of values, knowledge and skills necessary for social transformation towards more sustainable lifestyles.

3. Analysis of the MOOC "Sustainable development, issues and trends"

The content of this training, all in French, was designed and produced entirely for this purpose. The main objective was to introduce the concept and main issues related to sustainable development by answering the question: What are the elements that each of us should know and understand in order to actively participate in debates and actions to transition towards sustainable development? The material was developed in order to reach the public of all the countries part of the *Francophonie*, which includes a large number of developing countries and least developed countries. Training includes seven modules and combines a historical approach with scientific vulgarization around three key concepts: the obligation to meet an entire population's basic needs; the earth's bio-geo-chemical limits; and Sustainable Development Goals (SDGs). Participation is free and does not give academic credit, but it does provide a certificate of achievement. For the second edition, participants having achieved the results required for success must pay \$30CAN to obtain the certificate.

The results of the first two editions, 2015 and 2016, show a fairly high success rate (see Table 1) relative to rates reported in current literature on MOOCs (fewer than 10%). We want to understand the reasons for this result, in order to identify and transfer learnings to other MOOCs that are in preparation. Our results were analyzed in the context of the contribution of MOOCs in achieving SDGs based on the three previously mentioned criteria.

Year	Registered	Active	# of successes	Success rate	# of countries
2015	5765	3490	960	16.6	93
2016	3719	2508	583	15.6	81
Total	9484	5998	1543	16.2	107

Table 1. 2015 and 2016 results

3.1. Access for underrepresented populations

Let's remember that the participants from countries that are part of the UN's list of "least developed countries" or that are considered to be "developing countries" are underrepresented in MOOCs studied to date. In our case, participants from these countries represented 40% in 2015 and 45% in 2016. As for the participation of women, it was 45% and 35%, respectively. Regarding the level of study, 60% of participants reported having an undergraduate university education diploma (see Table 2). We will focus here primarily on the question of participants from developing and least developed countries given that this concern was one of the initial objectives of the training.

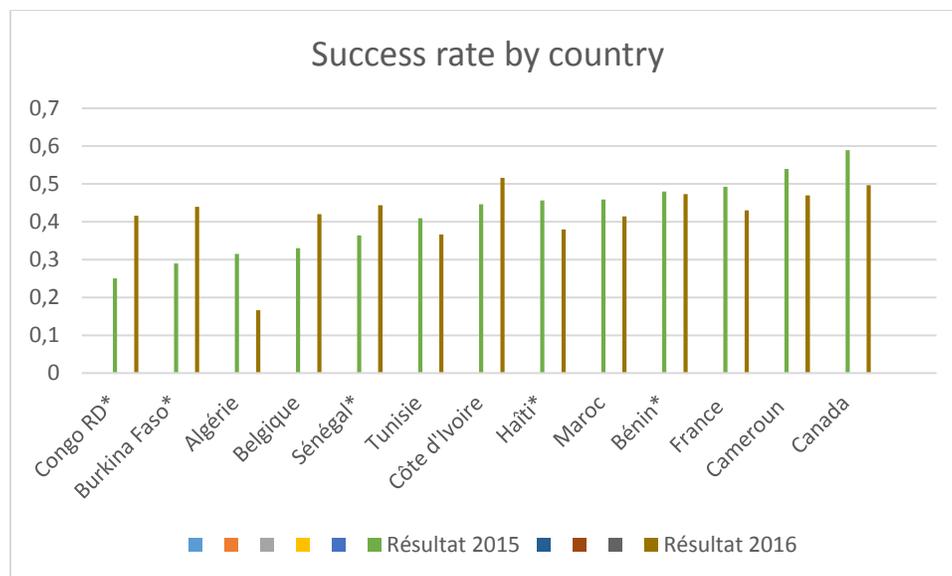
Year	DC & LDC	Men	Women	Bachelor	Master	Doctoral	Age: 21-40
2015	47%	64%	33%	43%	31%	4,5%	72%
2016	46%	65%	35%	33%	44%	3%	77%

Table 2. Profile of participants

Most of the research conducted to date on the impact of MOOCs focuses on data from developed countries and shows that they mostly join a customer base of "recreational learners" that do not see MOOCs as a useful tool for personal and professional development (Mintz, 2016). Recent research specifically focused on the impact of MOOCs in developing countries showed that, contrary to participants from rich countries, learners from developing countries further aimed to improve their employment opportunities and job skills (Garrido & Koepke, 2016). This difference in motivation to follow this kind of training is reflected, among others, on better success rates that in some cases are up to 25% whereas they reach an average of 5% for users from developed countries.

Another case, specifically concerning French-speaking countries, shows a different performance of participants from developing countries. In the case studied by Roy & al. (2015) participants from Haiti performed less well than those from Canada. These results are explained by the authors by more difficult conditions pertaining to access to education and Internet access for participants from Haiti.

To clarify whether our MOOC corresponded to one of these two situations, we proceeded to analyze separately the results per country (see Table 3). We found that the success rate of participants from all countries was very similar, with some differences from one year to another for some countries.



Graph1. Success rate by country

This result is very encouraging as per the relevance and effectiveness of our training. It allows us to demonstrate that it is possible to break a first barrier representation: that of developing and least developed countries. Indeed, not only do participants from these countries represent nearly 50% of the whole, but we see that even the participants from least developed countries performed as well as those from developed countries.

This analysis allows us to identify some factors that seem strategic in improving access of underrepresented populations to this type of training. Three major stages are identified: design, dissemination and teaching.

The design of a MOOC must be based on the targeted or expected audience. Knowing that we will reach a diversified clientele, with very different training bases and coming from countries with multiple contexts, the choice of themes, their delimitation and the approach to discuss topics must be adapted. Part of this can also be explained by the language used, which allows itself access to a population excluded by most existing MOOCs. We must not overlook the fact that language is the first factor which determines access or exclusion for a great part of the population.

Dissemination certainly has a crucial influence on the populations we can reach. The dissemination strategy used in our case, using well-established networks in Francophone countries such as the International Organisation of La Francophonie, surely contributed to our result. When targeting a less educated or a specific population group, it is important to establish collaborations with networks or organizations that can reach that specific population. Certain agreements can be made with universities or local training centres to have them serve as information distribution points, so as to promote this type of training, but also to act as access points for those without adequate Internet connections.

Education encompasses all techno-pedagogical aspects and has been the centre of most reflective thinking concerning MOOCs. This is done to ensure easy use of the platform and to offer adequate access to the training material at all times. Efforts to make available the material by means other than video streaming (books, PDF and audio slides, for example) are important to users in countries and regions where ICTs are less available. An effective and permanent technical support in a language accessible to participants is a key success factor.

Having secured these three aspects may help to explain the high success rates and the representation and success of participants, regardless of their country of origin. It is therefore important to keep these winning conditions for future editions and for new MOOCs. It is also important to monitor the development of global trends by considering the possibility that MOOCs have penetrated other populations in recent years, changing the profile of the participants which corresponded to the early adapters listed in the first MOOCs studies.

Beyond the question of representation and the success of participants from developing and least developed countries, several questions remain to be clarified to understand how to overcome the barriers of gender and prior access to education, without forgetting the digital literacy barrier. Other factors explaining the outcomes still need to be explored: factors such as motivation, educational background or the quality of the Internet. However, despite the availability of massive amounts of data collected in all MOOCs, this data does not provide very detailed demographic information about participants, about their access to education opportunities, or about the link between the learners' motivation and their success. Most research conducted so far on these topics should collect information through surveys carried out thereafter, but their participation rates do not provide satisfactory data. Standardizing the initial data for a significant number of cases could prove useful to gain better knowledge about the global impact of these training sessions.

3.2. Credential recognition

Validation and social recognition of knowledge and skills acquired through MOOCs are major challenges in contributing to SDGs. We received testimonies from participants in

our MOOC for which this experience has influenced the choice of an employer, allowing them to obtain a position. However, it is not possible to get an overall picture of the impact of a MOOC on professional opportunities for its participants without detailed tracking of these participants, considering their basic profile. It is therefore important to articulate MOOCs to a wide range of studies on continuing education opportunities, not only in universities that offer the MOOC, but also through agreements with training centres and local universities. They can allow learners to complete the MOOC by way of practical learning using local experiences, in addition to offering the ability to ensure recognition of knowledge via more accessible degrees offered by local institutions. This avenue is being explored within the framework of existing agreements between Université Laval and African universities.

Other collaborations between universities through global networks like SDSN could also promote the complementarity of content and recognition of knowledge and skills. These collaborations could also promote information sharing to achieve demographic analyses and better monitoring of the affected customers.

3.3. Promoting the values and principles of SDGs

The contribution of MOOCs to the dissemination and promotion of SDGs is not easy to assess. However, we can say that a crucial step for the implementation of the SDGs is to disseminate all of their contents as broadly as possible. Without claiming to be exhaustive, we can establish some mechanisms to measure the direct and indirect results that will be generated. Among the direct results, we can report improved knowledge recognized by participants in questionnaires. Indirectly, making this knowledge available has had a non-measurable effect that potentially affects all those that could read or download the material, even if they did not complete the evaluations (see the number of “active” participants in Table 1). Note that the training material remains accessible on the Web site for one year after the start date for all those registered.

4. Conclusion

Our thinking suggests that the MOOC phenomenon is still very new and too diverse for us to identify general trends, much less definitive ones. It remains, however, a powerful tool that can be modulated to achieve positive results to reach desired objectives. Unlike the supposed “MOOC disillusionment” which was hastily promoted in 2013 and which is still frequently cited, there is no evidence concerning the failure of this tool to reach customers belonging to very different specific contexts, with different scholars and cultural experiences and with different motivations. However, improving the impact of MOOCs on education calls for a better understanding of participant profiles. Secondly, the learning objectives must be properly defined and adapted to the expected participants.

We can also say that the potential of MOOCs for furthering SDGs should be explored further. To do so, it is important to define specific strategies to reach these goals. Three minimum conditions should be provided: the production of content specifically designed for each training session, appropriate promotion, and greater accessibility of material in all circumstances and technical and educational support which is at least equivalent to that offered for credited courses.

Beyond business models defined by each university to ensure the sustainability of this type of offer, collaborative strategies between universities through networks like SDSN could help improve the impact of MOOCs in the quality and accessibility of education everywhere, in an inclusive manner and throughout life. This objective is one of the most important levers for mainstreaming the general framework of SDGs as a common framework for all stakeholders in society.

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