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Title of project: Assessing the Potential of Open Online Learning Resources to Enhance SFU Teaching and Learning

Principal Applicant (e.g. professor, lecturer, limited-term, etc.):

Name: Mark Roseland

Position: Professor

Faculty: Environment

Department/School: Centre for Sustainable Community Development; Resource & Environmental Management

Course Information (if applicable)

Course code: SCD201, SCD301, and REM100

Semester & year: Summer and Fall 2015

Collaborator(s) (e.g. professor, lecturer, limited-term, doctoral student, staff title, etc.):

Name: Maria Spiliotopoulou

Position: doctoral student

Part I – Reporting your project findings

1. During the project, did you do anything differently than planned in your final grant proposal? If yes, please describe and explain why.

In our grant proposal, we had planned to pilot the integration of Open Educational Resources (OER) into at least two courses of the Sustainable Community Development (SCD) undergraduate certificate program. However the SCD certificate courses are offered by distance education and in the classroom in alternate semesters, meaning that usually only two courses are offered in person per semester. Therefore, instead of limiting our study to a few dozen students, we chose to additionally integrate OER into a first-year course in Resource and Environmental Management (REM). We made this change in order to collect more data and provide our study with more tangible and credible results; indeed, our sample was composed of 168 SFU undergraduate students.

2. Organize your findings according to the question(s) from your grant proposal. If you collected specific types of data (e.g. student surveys or learning assessments), your final report should include the actual analysis of this data (not just broad statements about what you found) and/or if your project was to deliver certain outcomes (e.g., instructional tools or documents), please provide these or a link to these with your final report.

Introduction

The Open Education Resources (OER) movement is now more than 10 years old and throughout this time thousands of teaching and learning products have been created and utilized in classroom and as support materials for students (Gurell, 2012). Several studies have discussed the positive impacts as well as the constraints related to the adoption of OER as teaching and learning support materials. Bliss et al (2013) studied the perceptions and preparedness of

students when OER were used in the place of traditional textbooks, and found that almost half of the students preferred the OER and that 60% of the instructors stated that students using OER were better prepared than those using the traditional textbooks. Feldstein et al (2012) reported similar findings following a study at Virginia State University; the majority of students agreed that the OER were “easy to use” and provided “more up-to-date material” than their traditional textbooks. Gurell (2012) pointed out that OER adoption has partially been hampered because of the educators' perception of OER quality or even the educator’s unawareness of such resources. Most studies indicate a tendency towards a wider adoption of OER in higher education and highlight both the increased interest and performance of students and the financial and other gains from using OER.

The objective of our project was to support SFU’s policies and plans in areas such as international engagement, experiential education, and use of non-traditional learning methods. In the evolving discourse over “bricks vs. clicks,” it is clear that postsecondary institutions must quickly come to grips with the presence of MOOCs (Massive Open Online Courses), other OER, and related changes in higher education. In the constantly evolving interdisciplinary field of sustainable community development, there are dozens of videos, open textbooks, and related resources from reputable institutions and “rock-star” level instructors that are freely accessible by learners around the world. A plethora of valuable and scientifically sound learning material is increasingly available and being promoted as free for use by educational institutions. The SFU Centre for SCD has always positioned itself as an open-minded research hub and is an ideal testing ground for this project.

We addressed the following research questions:

- How many and what kind of open online learning resources are there that can be used in the SCD undergraduate certificate program and in the REM undergraduate program?
- How do SFU students in the pilot courses perceive the benefits/drawbacks of enhancing their program with a specific open online learning resource?
- Do the learning resources support the learning of course content?
- Do faculty perceive that these resources improve student understanding of course content compared to prior courses taught without these resources? Do they think it is worth using these resources?
- What revisions can be made to the design of the pilot courses based on feedback collected from students and faculty?

The project was organised in two phases. During the 1st phase, we assessed the potential of SCD-related open online learning resources, such as MOOCs and open textbooks, to enhance current SFU classroom and online learning. We carried out extensive online research and developed an inventory of open online learning resources pertaining to four major sustainability themes. In the 2nd phase, we integrated some of the identified open learning resources into two courses of the SCD undergraduate certificate program and one course in Resource and Environmental Management. The objective was to collect data about the effectiveness of these resources from both the perspective of the students and the faculty involved. Please see more details below about the findings of both phases.

Project findings

With regards to our research questions, these are the project findings per phase:

Phase 1 findings

- How many and what kind of open online learning resources are there that can be used in the SCD undergraduate certificate program and in the REM undergraduate program?

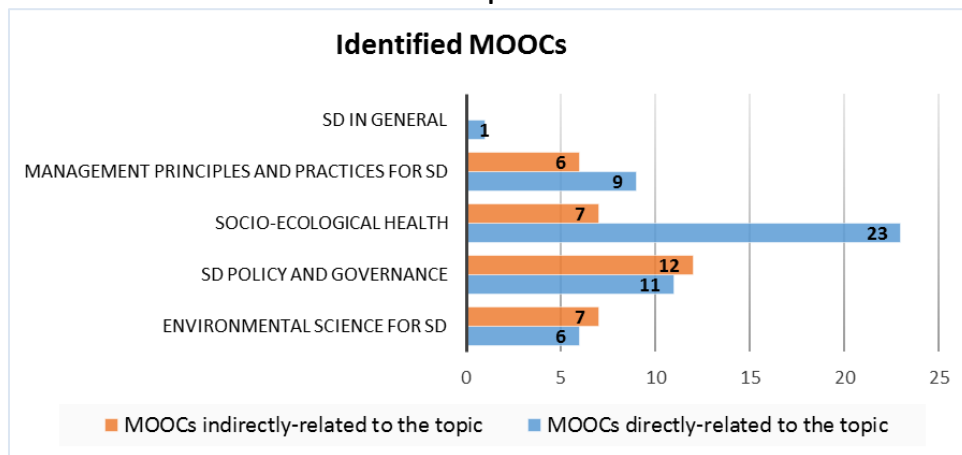
For our OER research, we focused on four major themes which we believe accurately cover sustainable development (SD) and sustainable community development: Environmental science for SD, SD policy and governance, Socio-

ecological health, and Management principles and practices for sustainability. In all four SD topics, two main categories of MOOCs were identified: those that pertain to the topic in general, i.e. provide basic knowledge usually for students without prior related studies; and those that tackle more specific issues within the scope of the topics. The vast majority of MOOCs are self-paced and include required and recommended readings, videos (some are freely accessible on YouTube), quizzes, and discussions in many formats (chats, hangouts, online Q&A sessions, etc.).

Generally, most videos are in lecture format, filmed often in a classroom but also at outdoor locations, while some are interviews, conversations or testimonials given by local people, entrepreneurs, managers, researchers or other experts. The videos have a wide range of duration, the shorter being around 2 minutes, and the longer ones reaching around 30 minutes, with a few exceptions. The majority of MOOCs require students to do weekly quizzes, final tests, several assignments, and be actively involved in discussions. Of course, all are free online courses although there is usually an option to pay for a certificate signed not only by the offering platform but also by the academic institution with which the instructor is affiliated.

All in all, our list at the end of the first phase included 50 online courses (one general and 49 more topic-specific) and one open textbook which presents the important sub-topics of sustainable development at the global level (see the complete list in Appendix). We should note here that the content of approximately 40% of the MOOCs identified intertwines with the content of other MOOCs and therefore, as shown in our table, several courses belong to more than one core topic (see Graph 1).

Graph 1



Graph 1 depicts the MOOCs that tackle only one of the four topics (“directly-related”) in comparison with the MOOCs that tackle more than one of the four topics and thus belong to at least two topics.

Source: created by project team member Maria Spiliotopoulou, August 2015.

The main challenges we faced regarded locating available resources and overcoming the limits of seasonal MOOCs. Even though web-based search tools become increasingly efficient, online and readily available knowledge is expanding at such a pace that identifying topic-specific OER can be challenging. Some web platforms (such as Coursera and open2study) offer a comprehensive list of available MOOCs but those which are offered only by individual universities and organizations are harder to locate. Also, seasonal MOOCs are offered only for a limited time and it is unknown whether and when each will be offered again. This has often been the case in our project, for example the course was no longer available when we located it or it was possible that it wouldn’t be offered when SFU students would need it.

Other challenges with using MOOCs include copyright issues, the multitude platforms (some user-friendly, others not), and alignment with SFU courses. It seems that there aren't any significant obstacles when it comes to individual use of an online course, however the use by SFU faculty might in some cases require special permissions by the offering institution and/or platform. Additionally, although the use of diverse platforms and formats could add variety and raise the interest of the students, it requires time to register on each platform and familiarize with each format, especially if students are being asked to use modules from various courses. After locating and filtering available MOOCs we found that sometimes single videos or other material may cover slightly different topics than what the description of the module or the course refers to, and for this reason we suggest that the material is carefully reviewed by the instructor before using it.

Phase 2 findings

- How do SFU students in the pilot courses perceive the benefits/drawbacks of enhancing their program with a specific open online learning resource?

The second phase of this project consisted of piloting the use of material from the MOOCs we identified in weekly modules of three undergraduate courses of the Faculty of Environment:

- REM100 – “Global Change”: an overview of global environmental change and its causes from a social science perspective, historically and at the present time.
- SCD201 – “Introduction to Sustainable Community Development”: an introduction to Sustainable Community Development (SCD) as a framework to meet current social and economic needs in local areas while ensuring adequate resources are available for future generations.
- SCD301 – “Sustainable Community Development Theory and Practice”: a more sophisticated theoretical foundation for understanding sustainable development at the community level globally and within Canada, including an integrated approach to environmental, economic, and social aspects of development.

During the first month of classes we worked with the instructors and the teaching assistants (TAs) to design the incorporation of OER material in one weekly module for each course. We planned to test the flipped classroom concept and assess learning through observations, quizzes, and qualitative surveys. Most of the material we assigned to the students was part of MOOCs offered by the Sustainable Development Solutions Network (www.sdsnedu.org) and presented by SDSN Director and Professor at Columbia University, Dr. Jeffrey Sachs. We also used sections of the online textbook “Sustainability: A Comprehensive Foundation” and an article from the online magazine “Making Waves”, published quarterly by the Canadian Centre for Community Renewal.

In October and November 2015, we conducted our research with a total of **168 undergraduate SFU students**. Here are some demographic data we collected:

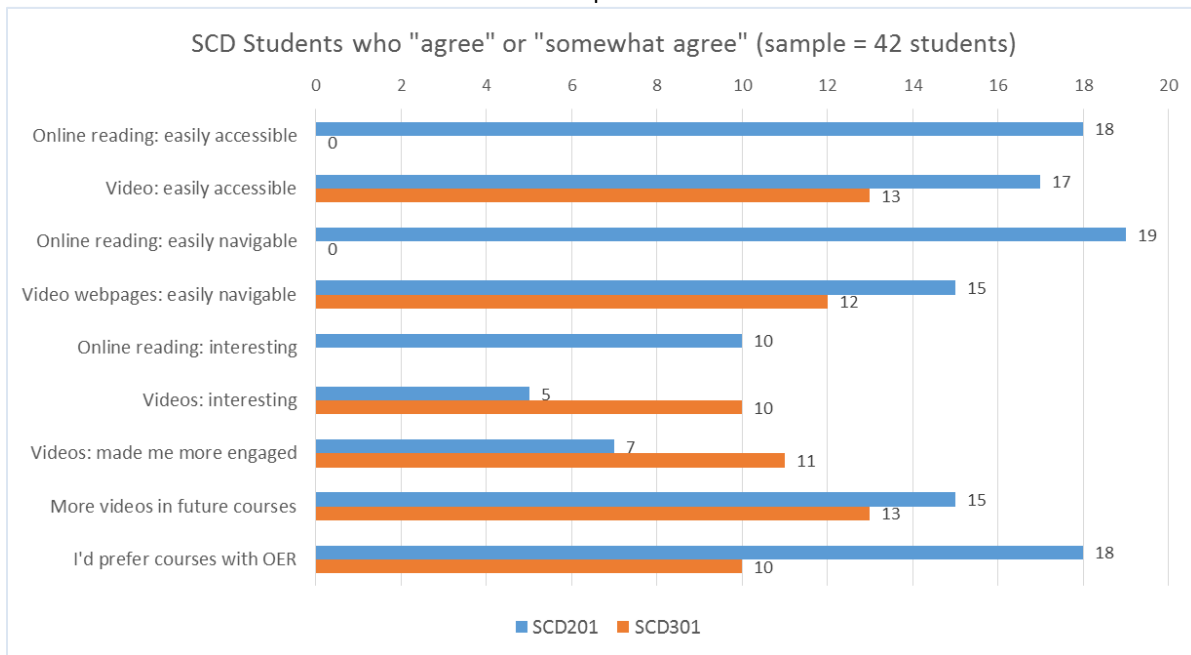
	REM100	SCD201	SCD301
Number of participants	126	23	19
Male – female – No reply	62 – 63 – 1	8 – 15 – 0	9 – 10 – 0
Age (median)	19.8	21.5	24
Courses taken in the same semester (range)	2-5* *75% enrolled in more than 4 courses (fall 2015)	2-5* *61% enrolled in more than 4 courses (fall 2015)	3-5* * 68% enrolled in 3 courses (fall 2015)
International students (# out of total)	16/126	4/23	2/19

With regards to how the students used the OER assigned and in response to the question on how much of the online reading they did, 65% of the REM100 students and 48% of the SCD201 students read more than half or the entire reading. It was interesting that 39% of the SCD201 students didn't read it at all (SCD301 students were not assigned any text). We found similar results when we asked about how much of the online videos they watched: 51% of the REM100 students watched more than half of the videos or all of them, but the percentage goes down to 38% for students from both SCD courses. We want to note here that when analysing the data on the videos, in conjunction

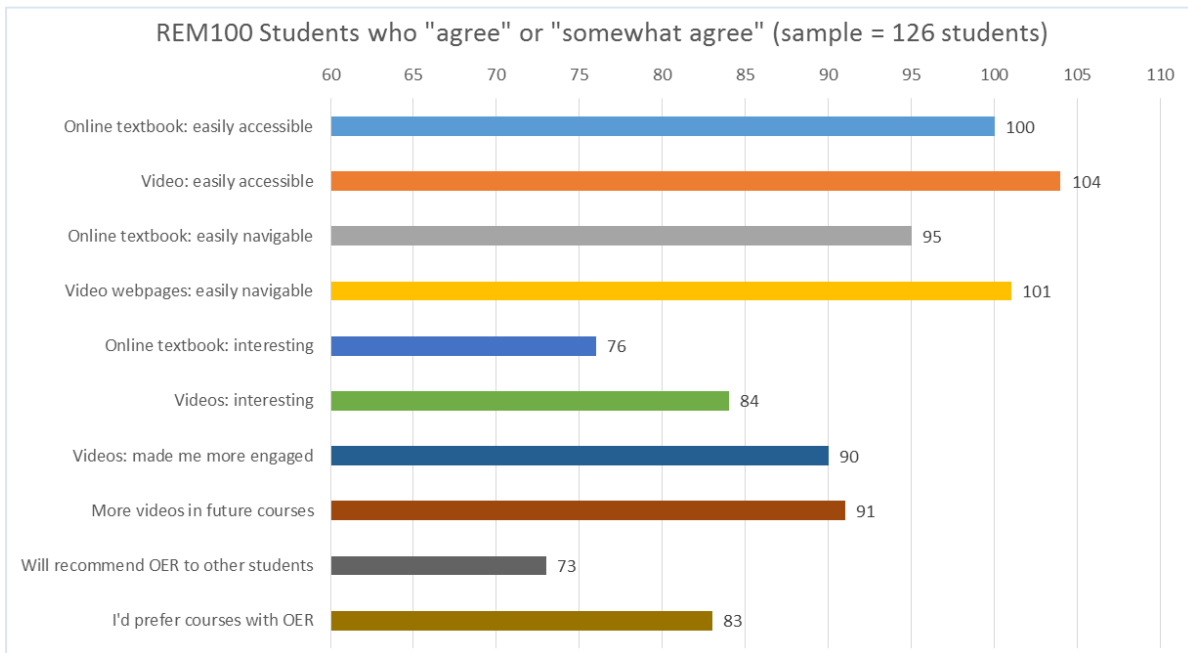
with the feedback we received from students and faculty, we recognized the existence of a confounding factor that limited student interest: most videos (part of a specific MOOC) were unanimously considered as “dry” and “not engaging” – even though the content was full of images and data considered scientifically accurate and was presented by a renowned professor and leading expert in sustainable development. This observation is connected with other findings presented and further discussed below.

The students were also requested to state their level of agreement with several statements and the results are again interesting; once more, in the interpretation of some data we need to take into account the video narrator’s potential lack of communicability. As can be seen in the graphs below, students rated the accessibility and the navigability of online OER highly and would like to see more videos in SFU courses in the future. At the same time, in their comments, students clearly request OER that is interesting, informative, interactive, “intriguing”, reasonably short, and with more visuals, and for presenters that are “passionate” and engaging. Also, many students acknowledged and appreciated the existence of subtitles in the videos and the amount of new information they received.

Graph 2a

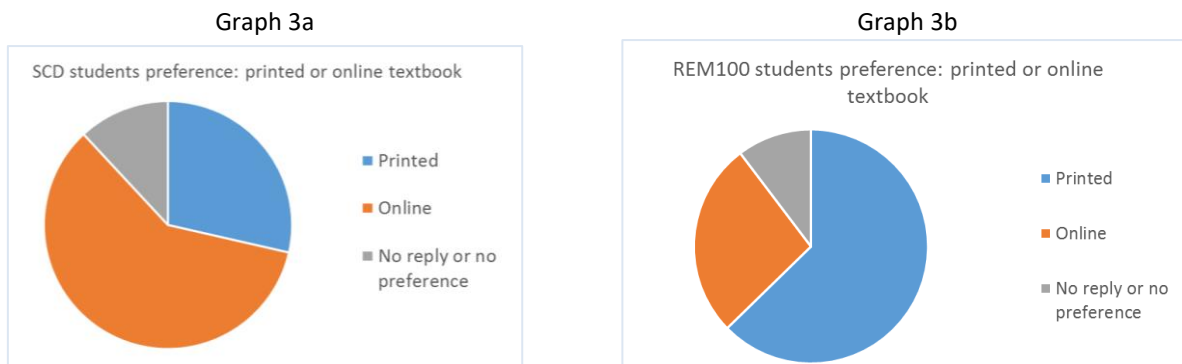


Graph 2b



Graphs 2a & 2b show the numbers of SCD and REM100 students who agree or somewhat agree with the statements on the left. Source: created by project team member Maria Spiliotopoulou, January 2016

Another result that stood out related to the number of students who reported preferring printed textbooks over online ones: even though 30% of the SCD students stated that they prefer printed textbooks, it was astonishing to see that 63% of the REM100 students prefer printed textbooks (see graphs 3a & 3b below).



Graphs 3a & 3b show the responses of students to the question “Would you prefer to use a printed textbook or an online textbook?” Source: created by project team member Maria Spiliotopoulou, January 2016.

This could be a possible explanation: our sample is by and large part of a “transition” generation in that they grew up in the second half of 1990s and went to school in the early 2000s, and therefore are probably more used to reading from a conventional, printed textbook. This may also be the case for those international students who were born and raised in developing countries or regions where the use of digital/online learning material was not common until recently – and in some cases still isn’t. However, most students provided a number of reasons (presented below but not prioritized) that explain their preference:

- In favour of *online* OER (especially textbooks):

- o Less waste, saving paper, “better for the environment”;
- o Less weight to carry around;
- o Less expensive or even entirely free;
- o Easier to access;
- o Portable – especially for those with a long commute;
- o Allows for interaction and Googling.
- In favour of *printed* OER (especially textbooks):
 - o Doesn’t strain the eyes like when reading long texts off a screen;
 - o Possible lack of focus when reading online, lots of distractions;
 - o Used to highlighting and taking notes on the margins;
 - o Internet and/or a computer is not always readily available or reliable;
 - o More helpful in building vocabulary and writing skills;
 - o Simply, preference for physical, tangible books – feels “more personal”.

A few students also commented that they would prefer a mix of printed and online material, for instance printed text and online videos or other interactive resources.

- Do the learning resources support the learning of course content?

In order to answer this research question, we asked the students to respond to a short “true/false” quiz that we created based on the online resources they were assigned for that week. When we assessed these assignments, we found that the results were not particularly revealing, but rather expected: in each course there were a few students that scored lower than the class average, with the average grades ranging from 6.95 out of 10 (SCD301) to 8.38/10 (REM100). That said, we noticed that none of the REM100 students scored below 50%, whereas 6 out of 41 SCD students (~15%) did score below 50%. This may be related to two other findings: 1) as mentioned above, 51% of the REM100 students watched more than half of the videos or all of them, but only 38% of SCD students did the same, and 2) 71.5% of the REM100 students felt more engaged after watching the videos, compared to only 42.8% of the SCD students.

In conjunction with other findings, we would say that online resources, thanks to their accessibility, (usually) easy interface, and other user-friendly elements, have the potential to improve learning outcomes as long as these resources are engaging, interactive, and overall interesting to the student. The findings that answer the following two questions tackle this issue in more detail.

- Do faculty perceive that these resources improve student understanding of course content compared to prior courses taught without these resources? Do they think it is worth using these resources?

The REM100 instructor and teaching assistants and the SCD courses instructors provided us with detailed feedback on their perceptions of student learning and on the use and usefulness of MOOCs and other OER. Regarding the specific OER assigned, their feedback was consistent with that of the students: although the material was scientifically sound, easily accessible, and user-friendly (e.g. use of subtitles and graphs), it was overall not “extremely exciting”, but rather “dry” and not “as engaging as a good lecture”.

However, not all instructors and TAs agreed on how helpful the OER used was in improving student understanding – especially compared to the course taught without these resources. On the one hand, one instructor noted that some of the material was an overview of material previously taught in the course and therefore the students were able to review course concepts and integrate their learning. On the other hand, other instructors’ responses ranged between not being sure whether this material helped the students (mainly due to the limitations stated above) and confirming that the students were given an additional perspective with new or controversial issues to discuss. Similarly, in

response to the question regarding the worthiness of using OER, although one instructor indicated that in-class, interactive learning may be more effective, most agreed that if the OER complies with several conditions and requirements (see next question) then it can be a better option for student preparation and learning.

- What revisions can be made to the design of the pilot courses based on feedback collected from students and faculty?

With 67.5% of the students and about 50% of the instructors involved in this project showing interest in using OER in their future courses, the question that remains to be answered relates to the quality of open resources. Our research findings suggest that instructors who want to integrate OER in their courses need to be mindful of the challenges and shortcomings of OER that we mentioned throughout this report, but also take into account the promising features and the plethora of existing online opportunities.

Based on the feedback we received (several notable comments are quoted here), the resources should above all be free, engaging, “captivating”, and interactive; “online resources can and should be so much more than simply stating information”. For enhanced communication, they should include storytelling and ample visuals and other multimedia to “capture and keep attention”, and take advantage of “online capabilities such as cross linking”. Last but not least, OER have to contain accurate, peer-reviewed, and complete information, and be developed and offered by reputable institutions.

Part II – Implications and dissemination

3. Have you changed anything (or plan to change anything) in your teaching of particular courses or in general, because of your experiences in conducting this project? Please provide examples.

We plan to integrate more online resources in the SCD courses and other courses we teach, so as to offer a more diverse experience and a variety of perspectives to the students. For now, we incorporated a few educational videos in the syllabus of SCD/REM 403 “Leadership in Sustainable Community Development”, which is taught in classroom in the spring semester 2016. The group consists of a dozen fourth-year students who are already familiar with online OER, demonstrate great interest in SCD issues, and actively engage in discussion; we therefore practice and test the flipped-classroom model. Generally, we expect that the use of the investigated OER and this project’s findings will enhance the curriculum of the Sustainable Community Development undergraduate certificate program and be of interest to other programs in the Faculty of Environment.

4. We asked that you share information about your project with close colleagues either in a formal or informal way. How did you share your findings with colleagues?

So far, we have shared this experience and some project’s findings with colleagues within the Faculty of Environment, such as Drs. Pascal Haegli, Gretchen Hernandez, and Sean Markey. This semester, we aim to discuss the project with colleagues in other Departments and Faculties, as similar projects have been unfolding at SFU and knowledge exchange would be beneficial to all parties.

5. Have you become involved in other activities or projects (e.g., departmental committees, curriculum projects, other grant projects) because of having conducted a grant project or because of the findings of your project?

Thanks to our team members discussing the project with graduate students from other departments within SFU, halfway through the project the team grew to include a master’s student from the Faculty of Education who is

currently working on a similar project with audiovisual educational material and related software development. We have not been directly involved in their project, however there is potential for cooperation. Additionally, as the Centre for Sustainable Community Development, we recently proceeded to a preliminary agreement with UN Sustainable Development Solutions Network members for further exploration of the use of MOOCs on sustainability in university courses.

6. If you have presented your project at a conference or have a publication about your project, please provide the citation. We would like to accurately record and promote the work of project grantees.

We haven't presented or published about this project yet.

7. Do you have plans for future dissemination of your project?

Apart from the preliminary agreement with SDSN members mentioned above, we aim to further disseminate within SFU by presenting our project and findings at the next Annual Symposium on Teaching and Learning (date TBD), as well as beyond SFU at related fora whenever there is such opportunity.

We have 'heard' from a number of project research assistants that they very much valued their experience and the support provided. We would like to collect this feedback more systematically and have developed an anonymous survey for this purpose. We would like to send this survey link to the RA(s) who worked with you. Please provide contact information.

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References

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Feldstein, A., Martin, M., Hudson, A., Warren, K., Hilton III, J., & Wiley, D. (2012). *Open Textbooks and Increased Student Access and Outcomes*. European Journal of Open, Distance and E-Learning.

Gurell, S. M. (2013). *Measuring technical difficulty in reusing open educational resources with the ALMS analysis framework* (Order No. 3553426). Available from ProQuest Dissertations & Theses Global. (1314994164). Retrieved from <http://search.proquest.com/docview/1314994164?accountid=13800>

Appendix: Inventory of OER related to sustainable development

	Title	URL	Topic	Overlaps with...	Offering institution	Access	Duration	Seasonal or Self-paced
1	The Age of Sustainable Development	https://www.coursera.org/course/susdev	SD/SCD in general		Coursera and Columbia University	Free	14 weeks	Seasonal
2	Turn Down the Heat: Why a 4°C Warmer World Must be Avoided	https://www.coursera.org/course/warmerworld	Environmental science for SD/SCD		Coursera and the World Bank	Free	4 weeks	Seasonal
3	Africa: Sustainable Development for All?	https://www.futurelearn.com/courses/africa-sustainable-development	SD/SCD policy and governance		University of Aberdeen	Free	6 weeks	Seasonal
4	International Women's Health & Human Rights	https://lagunita.stanford.edu/courses/GlobalHealth/IntWomensHealth/Jan2015/about	Socio-ecological health	SD/SCD policy and governance	Stanford University	Free	9 weeks	Seasonal
5	Greening the Economy: Lessons from Scandinavia	https://www.coursera.org/course/greentheeconomy	SD/SCD policy and governance	Environmental science for SD/SCD	Lund University	Free	5 weeks	Seasonal
6	Introduction to Environmental Science	https://courses.edx.org/courses/course-v1:DartmouthX+DART.ENV5.02X+2015_T1	Environmental science for SD/SCD	Socio-ecological health; Management principles and practices for sustainability	edX and DartmouthX - Dartmouth College	Free	6 weeks	Seasonal
7	Options and Pathways for Action: Stakeholder Engagement	https://gc21.giz.de/ibt/var/app/wp385P/2413/	SD/SCD policy and governance		Economics of Land Degradation Initiative, Deutsche Gesellschaft für Internationale Zusammenarbeit, United Nations University Institute for Water, Environment and Health	Free	8 weeks	Seasonal
8	Engaging Citizens: A Game Changer for Development?	https://www.coursera.org/course/engagetcitizen	SD/SCD policy and governance		Coursera and the World Bank	Free	4 weeks	Seasonal
9	The Governance of Nonprofit Organizations	https://www.coursera.org/course/nonprofitgov	SD/SCD policy and governance		Coursera, SUNY, and Uni of Albany	Free	16 weeks	Seasonal

10	Contemporary Issues in Ocean Governance	https://www.open2study.com/courses/contemporary-issues-in-ocean-governance-090215-090215	SD/SCD policy and governance	Environmental science for SD/SCD	Open2Study and University of Wollongong	Free	4 weeks	Seasonal
11	Governance & Policy Advice: How Political Decisions Come to Life	https://iversity.org/en/courses/governance-and-policy-advice-how-political-decisions-come-to-life	SD/SCD policy and governance		iversity and Hertie School of Governance	Free	11 weeks	Seasonal
12	Water Supply and Sanitation Policy in Developing Countries	https://www.coursera.org/course/water	SD/SCD policy and governance	Environmental science for SD/SCD	Coursera and University of Manchester	Free	6 weeks	Seasonal
13	Introduction to Environmental Law and Policy	https://www.coursera.org/course/envirolaw	SD/SCD policy and governance	Environmental science for SD/SCD	Coursera and University of North Carolina	Free	6 weeks	Seasonal
14	The Biology of Water and Health - Part 1	https://www.edx.org/course/biology-water-health-part-1-oecx-ph241x-0	Environmental Science	Socio-ecological health; Management principles and practices for sustainability	edX and Open Education ConsortiumTufts University	Free/certificate at \$50	4 week	First offered July 7th 2015
15	Urban Water	https://courses.edx.org/courses/course-v1:UBCx+Water201x_2+2T2015/courseware/de4f2830d3b84942aa9b68cbfded5d70/d158c1d25ce242b49a73921c52313258/	Management principles and practices for sustainability	Policy and Governance, Socio-ecological health, Environmental Science	edX and University of British Columbia	Free	6 weeks	Seasonal
16	Epidemiology: The Basic Science of Public Health	https://www.coursera.org/learn/epidemiology	Socio-ecological health		Coursera and The University of North Carolina Chapel Hill	Free	6 (modules)	Self-paced
17	Climate Change Policy and Public Health	https://www.coursera.org/course/ccandph	Socio-ecological health	Environmental Science	Coursera and the University of Wisconsin–Madison	Free	4 weeks	Seasonal
18	Mental Health: A Global Priority	https://www.coursera.org/course/mhglob	Socio-ecological health	Policy and Governance	Coursera and The University of Edinburgh	Free	5 weeks	Seasonal
19	The Challenges of Global Health	https://www.coursera.org/learn/global-health	Socio-ecological health		Coursera and Duke Global Health Institute	Free	5 (modules)	Self-paced
20	Health Literacy and Communication for Health Professionals	https://www.coursera.org/course/healthliteracy	Socio-ecological health	Policy and Governance	Coursera and the University of Nebraska	Free	8 weeks	Seasonal

21	Health Leadership	https://www.coursera.org/course/healthleadership	Socio-ecological health	Policy and Governance	Coursera and The University of New South Wales	Free	6 weeks	Seasonal
22	Global Health and Humanitarianism	https://www.coursera.org/course/health	Socio-ecological health	Policy and Governance	Coursera and University of Manchester	Free	6 weeks	Seasonal
23	Principles of Public Health	https://www.coursera.org/course/publichealth	Socio-ecological health	Policy and Governance	Coursera and University of California, Irvine	Free	5 weeks	Seasonal
24	An Introduction to Global Health	https://www.coursera.org/course/globalhealthintro	Socio-ecological health		Coursera and the University of Copenhagen	Free	8 weeks	Seasonal
25	Community Change in Public Health	https://www.coursera.org/course/communitychange	Socio-ecological health	Policy and Governance	Coursera and Johns Hopkins University	Free	6 weeks	Seasonal
26	An Introduction to Population Health	https://www.coursera.org/course/population	Socio-ecological health	Policy and Governance	Coursera and University of Manchester	Free	6 weeks	Seasonal
27	Global Health: An Interdisciplinary Overview	https://www.coursera.org/course/globalhealthoverview	Socio-ecological health		Coursera and University of Geneva	Free	8 weeks	Seasonal
28	Understanding Research: An Overview for Health Professionals	https://www.coursera.org/course/researchforhealth	Socio-ecological health	Management principles and practices (maybe)	Coursera and the University of California, San Francisco	Free	6 weeks	Seasonal
29	The Social Context of Mental Health and Illness	https://www.coursera.org/course/mentalhealth	Socio-ecological health		Coursera and University of Toronto	Free	6 weeks	Seasonal
30	Global Perspectives on Sexual and Reproductive Health and Rights	https://www.coursera.org/course/globalsrhr	Socio-ecological health		Coursera and Lund University	Free	5 weeks	Seasonal
31	Nutrition, Health, and Lifestyle: Issues and Insights	https://www.coursera.org/course/lifenutrition	Socio-ecological health		Coursera and Vanderbilt University	Free	7 weeks	Seasonal
32	Childbirth: A Global Perspective	https://www.coursera.org/course/pregnancychildbirth	Socio-ecological health		Coursera and Emory University	Free	6 weeks	Seasonal
33	Chemicals and Health	https://www.coursera.org/course/chemicalhealth	Socio-ecological health	Environmental Science	Coursera and Johns Hopkins University	Free	7 weeks	Seasonal

34	Sustainability, Resilience, and Society	https://courses.edx.org/courses/course-v1:UWashingtonX+ANTH378x+2T2015/courseware/84ebf0e3cc04998b481db724e1a7cf1/d0fb505a8b8744c8b9733f12505cb8ca/	Environmental Science	Socio-ecological health/ Management principles and practices	edX and University of Washington	Free	5 weeks	
35	Food, Nutrition & Your Health	https://www.open2study.com/courses/food-nutrition-and-your-health	socio-ecological health		Open2study	Free	4 weeks	Seasonal
36	Understanding Common Diseases	https://www.open2study.com/courses/understanding-common-diseases	Socio-ecological health		Open2study	Free	4 weeks	Seasonal
37	Fundamentals of Management	https://www.coursera.org/learn/fundamentals-of-management	Management principles and practices		Coursera and University of California, Irvine	Free	4 modules	Self-paced
38	Entrepreneurial Strategic Management	https://www.coursera.org/course/entstrategicmgmt	Management principles and practices		Coursera and the University of New Mexico	Free	6 weeks	Seasonal
39	Sustainable Agricultural Land Management	https://www.coursera.org/course/sustainableag	Management principles and practices	Environmental Science	Coursera and University of Florida	Free	9 weeks	Seasonal
40	Supply Chain Management: A Learning Perspective	https://www.coursera.org/course/supplychain	Management principles and practices		Coursera and KAIST	Free	8 weeks	Seasonal
41	Emergency Management	https://www.open2study.com/courses/emergency-management	Management principles and practices		Open2study	Free	4 weeks	Seasonal
42	Negotiation and Conflict Resolution	https://www.open2study.com/courses/negotiation-and-conflict-resolution	Management principles and practices		Open2study	Free	4 weeks	Seasonal
43	Leadership: Identity, Influence and Power	https://www.open2study.com/courses/leadership-identity-influence-power	Management principles and practices		Open2study	Free	4 weeks	Seasonal
44	The European Union in Global Governance	https://iversity.org/en/my/courses/the-european-union-in-global-governance-may-2015/announcements	SD/SCD policy and governance		iversity	Free	6 weeks	Seasonal

45	Climate Change Policy and Public Health	https://www.coursera.org/course/ccandph?action=enroll&sessionid=974168	SD/SCD policy and governance	Socio-ecological health/Environmental Science	Coursera and University of Wisconsin–Madison	Free	4 weeks	Seasonal
46	Global Public Health	https://www.sdsnedu.org/learn/global-public-health-march-2015	Socio-ecological health		SDSN and Public Health Foundation of India and other instructors	Free	12 weeks	Seasonal
47	Global health Masters in Development Practice (MDP)	http://mdpglobal.org/sites/ei.civicaaction.net/files/repository/GlobalHealthMDPModulesGuideForWeb.pdf	Socio-ecological health		Global MDP	Free	10 sessions	Self-paced
48	Forests and Livelihoods in Developing Countries	https://courses.edx.org/courses/UBCx/Forest222x/1T2015/courseware/43a7a6f350b74f4bb12ad183e9d933bd/	Environmental Sciences of SD/SCD	Management principles and practices for sustainability; Governance and Policy; Socio-ecological health	edX and UBC	Free	6 weeks	Self-paced
49	Foundations of Development Policy: Advanced Development Economics	https://www.edx.org/course/foundation-s-development-policy-advanced-mitx-14-74x	Management principles and practices	SD/SCD policy and governance	edX and MIT	Free	12 weeks	Seasonal
50	Civic Ecology: Reclaiming Broken Places	https://courses.edx.org/courses/CornellX/ENVSCI1500x/1T2015/info	Environmental Sciences of SD/SCD	Management principles and practices for sustainability; Governance and Policy; Socio-ecological health	edX and Cornell University	Free	6 weeks / 12 modules	Self-paced
51	Sustainability: A Comprehensive Foundation (<i>open textbook</i>)	http://cnx.org/content/1741effd-9cda-4b2b-a91e-003e6f587263@43.5:1/Foreword	Management principles and practices for sustainability; Governance and Policy; Socio-ecological health; Environmental Sciences of SD/SCD		Tom Theis and Jonathan Tomkin, Editors	Free		