Canada's Contribution to the Commons

Creating a Culture of Open Education

A report by the Athabasca University Graduate Students' Association (AUGSA)

ATHABASCA UNIVERSITY
GRADUATE STUDENTS' ASSOCIATION

This report was created by the Athabasca University Graduate Students' Association (AUGSA). AUGSA is a student-run, diverse, and multi-faceted organization that aims to meet the needs of graduate students at Athabasca University. You can learn more about AUGSA at www.augsa.com.

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Executive Summary

Open Education is a collection of practices and principles that encourage collaboration among educators to create educational resources that can be freely shared and distributed for learning and further collaboration. The explosion of online social networks and user-driven content are transforming every major industry. Higher Education will be no exception.

Context

- In the last decade we have seen the number of free university course materials offered online grow from zero to over six thousand.
- Harvard, the Massachusetts Institute of Technology (MIT), Stanford, UC Berkeley alongside many more lesser-known institutions have begun to embrace and experiment with Open Educational platforms – placing entire courses online for free use.
- Canadian institutions are lagging behind the rest of the world in terms of our contribution, with very few institutions prioritizing Open Educational content creation
- The purpose of this report is to offer suggestions to institutions and stakeholders of higher learning in Canada on how to foster an Open Education culture.

How it Works

Opening up Higher Education means making educational materials used in universities and colleges publicly accessible, wherever possible. These materials include: audio and video lecture recordings, class assignments, class notes, and other learning materials. Other initiatives involve publishing open access textbooks and publishing in open access journals. Open source Learning Management Systems (LMS) can take the place over proprietary commercial ones. These initiatives create the conditions under where a variety of individuals within and outside higher education can access, review, collaborate, benefit from and build on the work of others.

Sharing educational resources like this involves extending the culture of peer review present in research to teaching, where instructors can adopt, build upon and critique the practices of other teaching faculty around the world – improving the quality of learning for all.

Challenges

Some of the major challenges include: quality control, intellectual property issues, establishing the necessary IT infrastructure, creating sustainable business models, certification and assessment needs, and creating inter-university systems that are easily navigable.

Key Players and Recommendations

- Administration: University and College administrators can reduce costs and improve the quality of learning with Open Education. They can promote Open Education by:
  - Providing education sessions around the benefits of Open Education institutional leaders;
  - Adopting Open Source Learning Management Systems;
  - Incentivizing the creation of OER and Open Access publications and provide IT support to allow easy sharing and distribution;
  - Exploring alternative business models for Open Education practices; and
  - Establishing forums for national and international discussions on open education to create and support platforms for the sharing, distribution and quality control of OER.
- Faculty: Open Educational content empowers teaching faculty to reclaim ownership over learning materials and improve their teaching methods through sharing, collaboration, and critique. Faculty can contribute to Open Education by:
  - Exploring open access alternative to commercial learning materials;
  - Collaborating to create OER with other instructors;
  - Publishing open access textbooks;

- Publishing research in Open Access journals; and
- Working with professional associations to establish quality control mechanisms.

• Students: Students benefit from Open Education through reduced cost of learning materials, improved quality of education, and in some cases more interactive classroom experiences Students can promote Open Education alternatives through:
- Expressing concerns to teaching faculty about the cost of commercial materials and a preference for OER options when the quality is comparable;
- Encouraging the university administration to take the steps noted above;
- Advocating for more collaborative learning and facilitative teaching practices.

• Governments: Governments have an interest in the cost savings and improved quality of learning that Open Education initiatives can provide at all levels of public education. Governments can encourage Open Education by:
- Exploring Open Access alternatives to traditional K-12 learning materials (Provincial);
- Subsidizing the cost of Open Access textbook development where no alternatives to commercial texts exist (Provincial);
- Providing competitive funding for the creation of open-access textbooks for higher education (Provincial and Federal); and
- Making research grants issued by government agencies conditional upon the open-access publication of research results (Provincial and Federal).

Table of Contents

Introduction

In this paper a vision for a future where Open Education (OE) culture thrives is presented. Open Education is a collection of practices and principles that encourage collaboration among educators to create educational resources that can be freely shared and distributed for learning and further collaboration.[1] A review of the importance and benefits of Open Education is conducted by exploring the basic principles and practices of Open Education. The growth of Open Education around the world is illustrated. The specific practices of Open Education using examples of places and spaces where Open Education is thriving are described. A commentary is provided on the challenges facing Open Education advocates in Canada. The primary focus of this report is to provide recommendations for post-secondary educational institutions on how they can adopt Open Education cultures.

There is much to be described about the state of Open Education today, which is still very much in its awkward adolescent years. Open Education's allure is not so much in its present-day state, but in what it offers to the learners and educators of tomorrow. So that is where we begin.

Vision for an Open Education Future

Imagine this:

An architecture student arrives home after a day of in-depth discussion and collaboration in the workshop space formerly known as the classroom. The students have been practicing how to apply the principles of energy efficient design in a role-playing exercise as the design team for a new building in the city center. The lecture now happens at home, while he is preparing supper. He rests his tablet computer on the counter next to the stove, and pulls up a video of a professor explaining the concepts required for tomorrow's workshop exercise. By the end of the meal he's heard the whole fifty-minute presentation, and is now looping a 4-minute segment of a difficult concept he didn't fully grasp the first time around.

Still challenged by the material, he pulls up the lecture again, accessible on an interactive learning commons networked with thousands of other schools, professors and hundreds of thou-

sands of students around the world. He follows a link shared by a professor of engineering at another institution that explains the same concept from an engineer's perspective using an interactive application the professor designed. He is drawn to this particular learning object because other users have rated the content as helpful, so it has been promoted and is easily visible. After running the app, he grasps the concept immediately.

He scrolls down the page and sees that a local engineering firm has been using the openly accessible content from this course to train employees in emerging technologies for energy efficient design. He can tell because they've shared a case-study from their firm, explaining how the theoretical concept he has just learned changed shape when he applied it to practice during the construction process of a nearby building.

The firm encourages collaboration in the open access commons, partly because of the benevolent spirit of its owners, but mostly because they know it helps their employees prepare for the workplace quicker – even the ones they haven't hired yet – while the company builds on its reputation as an industry leader.

Now he is ready for tomorrow's class. He brings an understanding, unique from his classmates. Each has explored the topic in a different way using the same vast network of content, but following different paths.

Pushing through the commons, students and instructors alike can follow the virtual footsteps and visualize the connections between their own classroom's content and the many other events and activities within other areas of the commons – which includes their local communities, post-secondary educational institutions business and government around the globe.

The following morning the professor for our architecture class ventures into the commons, and views the material her students found most useful in preparing for her workshop. This allows her to better understand her own strengths, improve in certain areas and understand why students are drawn towards certain materials. There are feedback portals for both students and other professors to contribute in real time to her development as an educator. The digital age has made the culture of peer-review a reality not only for research, but also for teaching, something that had previously been difficult to share widely. An assessment tool that tests students' mastery of the content provides her with an understanding of which topics need to be addressed before the workshop projects begin.

Our professor is able to explore how her course material fits in with other courses her students are enrolled in. She can self-limit the content she is able to see to that which is offered at her own university, her own faculty, and her own department. From looking at a students' past courses, she can assess whether material in previous classes has really prepared them for hers. With all of this information at her fingertips, she is ready for class.

Much to the relief of university administrators, the content has not been networked by an endless backroom of content programmers and web technicians, but instead by a series of well-maintained algorithms that track aggregate trends and tendencies of users within the commons. Behind the scenes, the code addresses questions like "Where did users end up after they used this material?" and "What other courses were users who accessed this material registered in?" or "How can we more quickly get users from the content they start with to where they end up most satisfied?"

Users can adjust their personal settings, choosing how much information they reveal to the algorithm of the commons. The more information a student chooses to share, the better the service is able to meet the educational needs of the student, based on past experience, and what students with similar backgrounds and interests found.

Much like the educational content found on this virtual learning commons, the programming that runs it is developed using principles of open source software development – allowing contributors from around the globe to "pitch" ideas that would make it run better by submitting code. A network of the world's leading universities is responsible for maintaining the code that ultimately governs the commons. Even still, a "thousand eyes" worth of collaborators from many institutions are constantly improving the "brain" behind the commons; submitting small innovative ideas, some of which get accepted as source code for the commons, and others which don't.

The aggregate of users of educational resources found on the commons are given the ability to drive traffic by "liking" certain learning objects, or collections of course material. The most

common routes within the learning commons are made apparent by the continually evolving programming. Not unlike a well trodden trail in the forest: users know when they're breaking from the path, stepping away from where most people navigated.

Open Education Defined

The example in the previous section highlights just some of the possibilities presented for students and educators in an Open Education world. Open Education, for our purposes is meant to describe a set of values and principles that already exist in academia. Richard Baraniuk, an Engineering Professor at Rice University, presents these values as ones that are shared by "a remarkably wide range of academics."[2] They are:

- Knowledge should be free and open to use and reuse.
- Collaboration should be easier, not harder.
- People should receive credit and kudos for contributing to education and research.
- Concepts and ideas are linked in unusual and surprising ways and not in the simple linear forms that today's textbooks present.

These principles are accepted to be self-evident - particularly in the case of Canada, where virtually all of our institutions of higher learning receive a sizable amount of public funding. Taxpayers should be able to expect a greater return from this investment – in the form of both access to educational resources, quality of learning, and faith that the public dollar is being spent effectively, and not redundantly.

A culture of Open Education – where there is acceptance of and support for the principles of sharing knowledge, for collaboration, and for the understanding of the interconnectedness of ideas -is one where the implementation and manifestation of these widely accepted principles can thrive. When these principles are considered alongside the scenario described earlier – where any information can be shared widely and easily connected to other bits of information – one realizes that the consequence of accepting these principles is a world where education ismuch different than the one we have right now.

The proposals presented here mean making public the access to educational resources used in the classroom: audio and video lecture recordings, class assignments, class notes, and other unlocked, non-commercial learning materials. It means choosing open access alternatives for publishing academic texts and journal articles. It means providing access to educational resources so that self-learners, past and prospective students, and faculty from within and outside the institution can access, review, collaborate, benefit from and build on the work of others. It means building innovative new business models that allow our public institutions to provide freely much of the content that is now only provided to fee paying students.

The following facts should compel institutions of higher learning to consider the alternative of Open Education. Two presumptions are made. First, universities and governments have a joint responsibility to ensure that access to higher education is equal among all global citizens. Second, forces outside of higher education (namely technological advancement) will have considerable affects on the way teaching and learning happens within and outside of the classroom. Consider the following facts:

- Many of the world's leading universities including Harvard, the Massachusetts Institute of Technology (MIT), Stanford, UC Berkeley alongside many more lesser-known institutions have begun to embrace and experiment with Open Educational platforms – placing entire courses online. Inter-university networks such as EdX, the OpenCourseWare Consortium, Open Educational Resources University (OERu) and Coursera offer complete and partial courseware to undergraduate and graduate courses.

Liberated content: content that can be repurposed, transferred between mediums and devices and be shared more widely than much of the content currently locked into digital texts produced by commercial publishers.

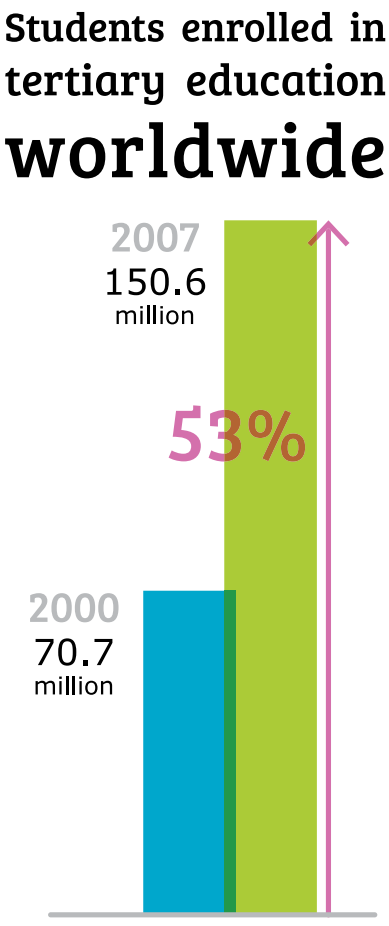
- In 2007 there were over 150.6 million students enrolled in tertiary education worldwide, a 53% increase since 2000.[3]

- There are over 30 million qualified people around the world who are unable to access to university. By 2017 that number is expected to grow to 100 million.[4]
- People are desperate for educational opportunity. In January of this year an 8,000 person crowd gathered outside the University of Johannesburg in South Africa after it was announced that 800 overspill spaces were available. When the gate was opened, 17 were injured in the trampling that followed and the mother of a potential student died.[5]
- Open Educational content increases access for many individuals in Canada and around the world who are:
  - Marginalized and financially disadvantaged individuals.
  - Working in careers that do not allow for re-education in traditional classrooms.
  - Self-motivated lifelong learners.
- Educators in primary and secondary schools have begun to use Open Educational Resources (OER) resulting in lower costs for students and schools on materials, improving student success by ensuring more students will access much needed content, and creating the opportunity for more teacher-pupil interaction.
- Journalism, politics, business and government are being completely transformed by realities of living in a Web 2.0 world of interactivity and socially driven content. Journalism is incorporating platforms like Twitter, Facebook and competing with citizen journalists and bloggers. Governments have been forced to adapt their approach towards governance to increased demands for transparency.

The nature of education in Canadian universities is generally still stuck in the Web 1.0 world – content is digital, but not yet liberated or presented in a way that allows an open, online discussion to occur around that content. The world's leading universities have jumped on board, simultaneously recognizing the influence a participatory internet is having on higher education, and using their elite status to shape what that influence looks like at the same time.

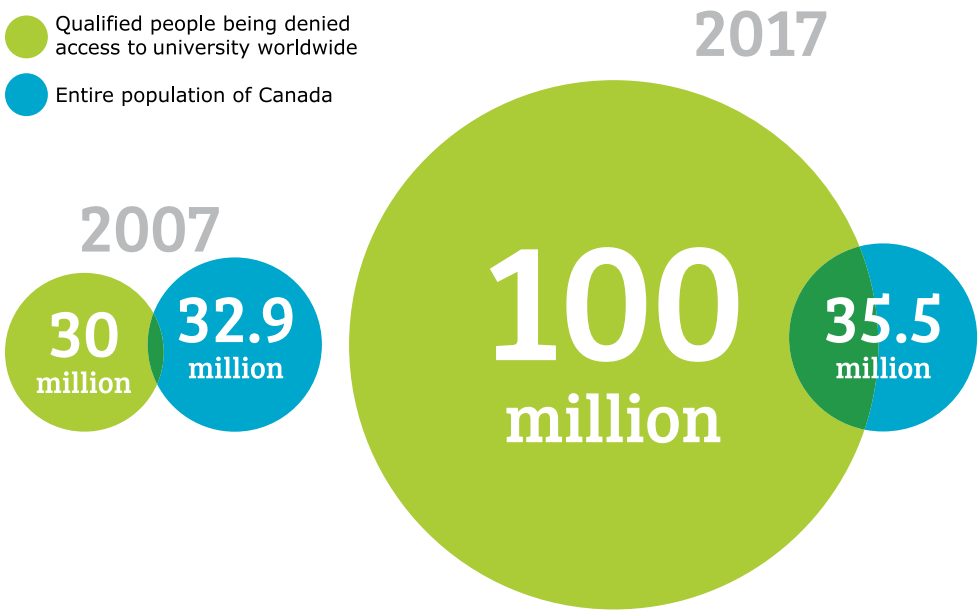
The state of Open Education Today

At the beginning of the new millennium there were virtually no OpenCourseWare offerings at universities around the world. In 2001, MIT president, Charles Vest announced that the school would be shelving the proposal for a pay-for-use online learning portal in favor of encouraging faculty to place all of their course materials online for free.[6]



Web 1.0: describes those websites that serve as a medium to communicate information that had previously been communicated elsewhere, namely print. User contributions were generally limited and content was published by webmasters. Most users access Web 1.0 sites for the "Three R's: Reading, Receiving & Researching."[56]

"OpenCourseWare looks counter-intuitive in a market driven world. It goes against the grain of current material values. But it really is consistent with what I believe is the best about MIT," said Vest in a press release at the time. "It is innovative. It expresses our belief in the way education can be advanced – by constantly widening access to information and by inspiring others to participate."[7]



Fast-forward to 2008 and more than 6,200 courses were being offered at institutions accessible via the international OpenCourseWare (OCW) Consortium. With a low-end estimate of 2.25 million visits to the network of OCW sites each month, there is a clear sign that the material is being accessed regularly. Data is limited on who is accessing it and how useful they are finding it.

OCW Consortium Members in The World & Canada

The quality of the content available in the OCW consortium is variable, as is the case in traditional university teaching. By browsing through these courses, one finds few sets of complete course materials and an inconsistent quality of lecture recordings. This should not be surprising, because the institutional support that would encourage quality content production is not yet present. The content being shared online is still being built for the traditional classroom. Without financial, administrative and cultural support for producing quality OER independently or alongside traditional educational materials, we shouldn't expect broadcast quality material from the online consortiums. Universities in Canada have been paltry contributors to the Open Education movement to date. Knowing, however, that progress in useful content development has been slow, there is time for Canadian institutions to catch up, and even position themselves as leaders in the field.

Canada's participation in the world of OCW can only be described as laggardly. There are 185 listed institutional members of the OCW Consortium across the world. Only one Canadian institution is on the list: Athabasca University.[8] In the summer of 2011, ten years after MIT made its commitment to their OCW initiative, Athabasca University followed by claiming the title "Canada's First OER University".[9] Athabasca had long been identified as an open university,

Courses accessible via the OpenCourseWare consortium

2001 **0** 2008 **6,200**

which traditionally meant accepting students in undergraduate programs without any prerequisites in other words, allowing them to enroll in courses they felt capable of mastering content in. Their new title reflects the institution's commitment to OCW offerings by, its membership in international OCW networks and foundations, and the administration of The Athabasca University Press that provides open access texts of published works in digital format online.

The University of Toronto recently announced it will pilot five free online courses on the online startup "Coursera." They join Ivy League schools and others from across the United States as the first Canadian institution involved in Coursera. It is still unclear whether the Coursera platform, which markets itself as a startup company, will be accepted into the Open Education community or if it will seek to generate a profit from online learning in the future.

Open Education Practises

Until now the broad term Open Education has been used to describe what many are calling the new knowledge "ecosystem" of teaching and learning.[10,11,12] This section describes some of the concrete tools used in Open Education, their attributes, and benefits.

Open Educational Resources (OER)

Open Educational Resources (OER) are "... teaching, learning and research resources that reside in the public domain or have been released under an intellectual property license that permits their free use or repurposing by others. OER include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials or techniques used to support access to knowledge."[13] These are the core product of the Open Education movement happening around the world. By creating an Open Educational Resource, the creator provides all users with some of the rights that, under traditional copyright, were granted only to the creator him/herself. This is usually done under a creative commons license, which allows users to update, improve, build upon, repurpose and remix content. That content can be anything from course materials to a recorded song. The term OER can be used to cover any of the descriptions that follow.

OpenCourseWare

OpenCourseWare (OCW) is "a free and open digital publication of high quality college and university-level educational materials. These materials are organized as courses, and often include course planning materials and evaluation tools as well as thematic content."[14] Hundreds of universities have published and liberated the materials for thousands of courses now available as OCW. The OCW Consortium has catalogued the content from their 185 member institutions around the world. Meanwhile, many more institutions who are not members of the OCW Consortium have published collections of course content freely online. Some of the benefits of creating OCW include:

- Students can access low-cost (and generally no-cost) course materials.
- Teaching faculty can borrow from, build on and remix each other's course materials to suit their own purposes.
- The redundancy of efforts in developing course materials is reduced.
- A culture of peer-review beyond research can emerge, where educators in similar fields can review each other's teaching methods, resources and assessment tools to ensure clarity, effectiveness, accuracy and that content is up to date.
- Collaboration among faculty teaching similar courses is encouraged and made easy.
- Faculty members and students can observe how material in one course relates to another.
- Future students can be better informed when selecting courses and judge them for relevance to their interests, future career and difficulty level.
- Past students retain access to course materials, including regularly updated content, new information and new context considerations.

Open sharing of course materials begins with the understanding that all institutions seek to

provide the best possible education for their students. The Open Education approach proposed here recognizes that no single institution or educator can create the best possible education alone, and approaches common challenges in education with the same ethic of collaboration and critique that is present in the peer-reviewed research practices that many faculty already participate in.

"If our primary goal as a public higher education community is to provide a quality education for the largest number of learners, then we are going to have to take advantage of OER and move away from a 'not invented here' mindset to a 'proudly borrowed from' point of view," says Cable Green, Director of eLearning & Open Education for the Washington State Board for Community & Technical Colleges.[15]

Open Access Publishing

Textbooks

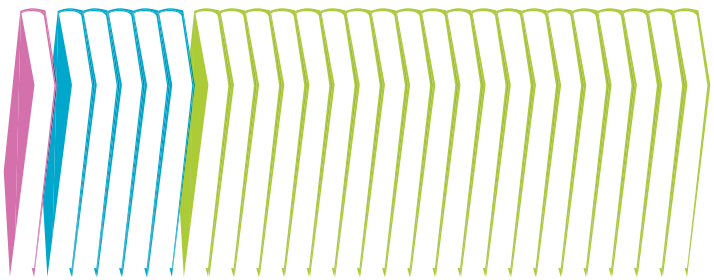
One common OER is the Open Access textbook. A group of teaching faculty might collaborate to create a textbook, perhaps to be used in a course they all teach at separate institutions. The text is published under a creative commons license that allows users to download it for free or create a hard copy at the cost of printing a single copy. Students and educators are given the rights to access the text on their preferred medium, which makes the text more accessible to students with disabilities.[16] Other educators can choose to edit, remix and repurpose the text to meet specific course needs or update it with the up to date information on the topic. With the development of wikis, there is the possibility to engage a large number of experts in the creation and regular updating of open-access textbooks on an ongoing basis, similar to the contributory model of online encyclopedias like Wikipedia.

This is a logical alternative to what has become the norm, where a few commercial publishers produce a textbook on a course topic, often contracting a university academic to do much of the writing, and then sell the textbook to theirs and other instructors' students at an incredible markup. In the United States textbook costs have been climbing at four times the rate of inflation.[17] Open Access textbooks can help resolve many of the cost and accessibility challenges faced by students, and can empower teaching faculty to regain control of the material presented to their students.

Open Access: "Open-access (OA) literature is digital, online, free of charge, and free of most copyright and licensing restrictions."[59]

It is estimated that the cost of printing an open access textbook can run from 5%[18] - 25%[19] of the price of a commercial equivalent. The Utah Open Textbook Project pilot tested several open access science textbooks with 1,200 students under the direction of seven public high school educators. Printing costs were just $4.25 USD per textbook, compared to the $80 USD texts the schools had been purchasing. Student success with the open access texts was measured against a control group using traditional texts and no significant difference in learning outcomes were observed.[20]

You can print 5 to 20 open access textbooks for the cost of one commercial equivalent.



Washington State has set an example for other state and provincial governments to reduce the cost of textbooks and other resources that is borne by governments (for K-12 education) and students (in post secondary education). The State Board for Community and Technical Colleges in Washington has approved a policy that mandates any software, educational resources or knowledge produced through grants at community and technical colleges carry an open access

license.[21] In a similar move, the Washington state senate recently approved legislation to support the adoption of Open Access textbooks created under rigorous quality control standards by the non-profit CK-12 Foundation that freely provides K-12 textbook content throughout the United States.[22] This legislation is expected to save tens of millions of dollars annually, in a state where $130 million is currently spent on commercial textbooks.

In California the governor has supported the creation of Open Access texts for K-12 public schools, knowing that $400 million is currently spent on commercial textbooks annually.[23] This is one case where provincial governments in Canada can follow the lead of American states to save money, be leaders in Open Education and at the same time improve the quality and accessibility of content for students in primary and secondary schools.[24]

Open Access Journals

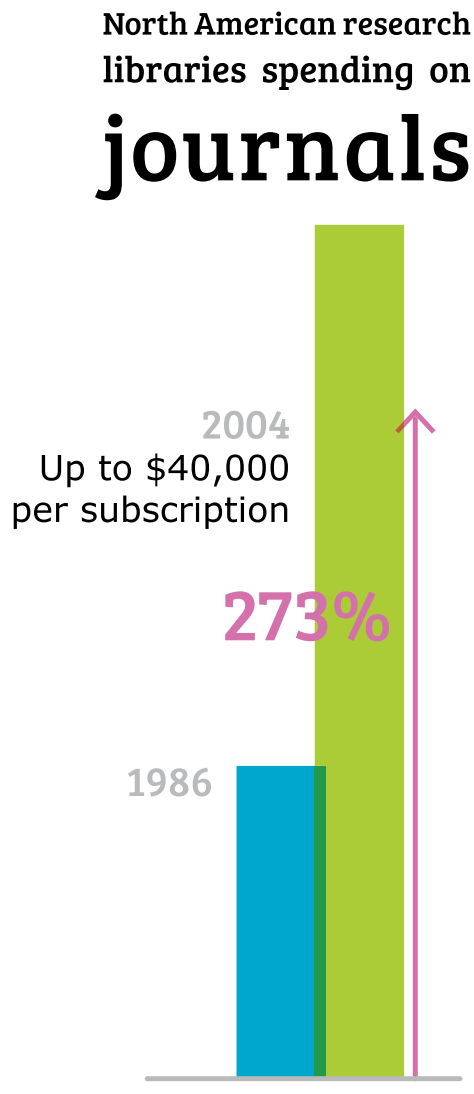
The value of open access journals is best understood juxtaposed against the costliness of the dominant commercial pay-wall journals. A journal subscription for a university can cost anywhere from $10,000 – $40,000 annually.[25] Between 1986 and 2004 North American research libraries have increased spending on journals by 273%.[26]

Now consider the fact that commercial pay-wall journals are completely reliant on the benevolence of university faculty who volunteer to write articles, peer review the works of others and serve on the editorial boards of these journals without compensation. Of course, these volunteers receive reputational benefits from publishing, reviewing and helping to set the direction of journals who have become the gatekeepers for what gets noticed in the academic world.

The overwhelming majority of research published in these journals is supported directly by government research grants, and indirectly by subsidizing the salaries and overhead of researchers through university funding. The chief product of this research – the published article – is kept behind a pay-wall, which neither the research funder (the taxpayers) nor the institutions where the research is actually conducted (the universities) can access without purchasing the article or subscribing to the journal. Lastly, and most importantly, the profit margins for these companies are huge. Elsevier, the largest publisher in the business, reported profit margins of 37% this past year, $1.2 billion in earnings on $3.28 billion in revenue.[27]

The system we have is one where those in the academic community are sitting atop the world's most pristine glacier, chipping away at the ice, melting and bottling it into water, giving it away for free all before it is bought again at higher and higher prices each year.

Thankfully, open access journals provide an alternative to this system. Thanks to the Internet, the cost of sharing information is quickly approaching zero. There are few barriers to establishing a new publishing alternative. So few,



in fact, that the Directory of Open Access Journals now provides users free and open access to 8,087 journals covering virtually every subject.[28] The Faculty Advisory Council at Harvard University recently issued memorandum urging their faculty to move away from submitting to pay-wall journals and to consider submitting to open access ones instead. Recognizing that many of the pay-walled journals play a pivotal role in reputation building, the Harvard memorandum issues a challenge to academics: "move prestige to open access."[29]

Athabasca University has enacted policies with similar sentiments. Stopping short of fully encouraging publishing in Open Access journals, the institution requests it's researchers deposit an electronic copy of any published research articles in a university repository that, depending on contracts with publishers, is accessible either to the public at large, or solely to the internal university community.[30]

"... move prestige to open access."

Unfortunately, much of the research the academic community depends on will be locked up for decades in the virtual chambers of pay-wall journals. As Guardian columnist George Monbiot puts it, "You can start reading open-access journals, but you can't stop reading the closed ones."[31]

The benefits of publishing new research in Open Access journals are twofold:

- Universities and the academic community as a whole will gain significantly more control over the academic publishing market.
- The public, including alumni, businesses, and government researchers gain access to the results of the research we pay for.

The Flipped Classroom

Salman Khan was working for US hedge fund when he decided to begin making YouTube videos in his spare time as a way of tutoring his cousins studying high-school calculus. His humor and easy-to-understand communication style were a hit with his cousins. They admitted to learning more from Khan's videos – which they could pause and replay – than from their in-person tutoring sessions with Khan himself.

One of the chief concerns of critics of Open Education is that releasing education materials for free will disrupt and undercut the business model many schools have built foundations on. The example of the Khan Academy show us that while it does change how the classroom operates, it does so in a way that creates a more interactive and humanistic classroom.

When his videos began to go viral he left his job and founded the Khan Academy, a non-profit that produces videos and interactive learning tools with the goal of "changing education for the better by providing a free world-class education for anyone anywhere."[32] "I started receiving letters from educators: 'We've used your videos to flip the classroom,' they said, 'You've given the lectures … so now what I do is assign the lectures for homework," Khan explains to an audience at the 2011 Technology Entertainment and Design (TED) conference in Long Beach California[33], "and what used to be homework, I now have the students doing in the classroom.'"

This "flipped classroom" approach frees up teacher's valued classroom time to allow them to spend more time practicing facilitative teaching. Facilitative teaching happens when educators step away from the notion of class-time as lecture-time, and in it's place incorporate discussion, student responses to content, feedback for students and one-on-one interaction with learners.[34] Educators who incorporate facilitative teaching into their practice have long been shown to have greater student success in the areas of academic achievement, attendance and level of engagement with classroom material.[35] This is exactly the type of teaching educators using the flipped classroom model are empowered to employ.

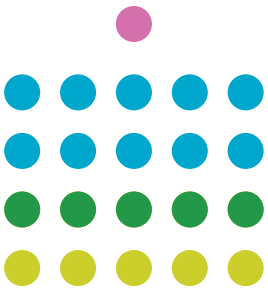
While the content delivered in university and college differs from the primary and secondary classrooms Khan produces content for, the things that we value – affordable learning materials, improved student success and greater teacher-pupil interaction are very much the same. We can improve the work of universi-

Lecture

Excercises

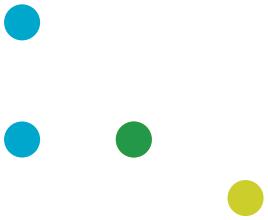
Traditional Classroom

In Class



- The teacher explains the subject material in class.
- Some students understand the lecture.
- Some students have difficulty with the subject.

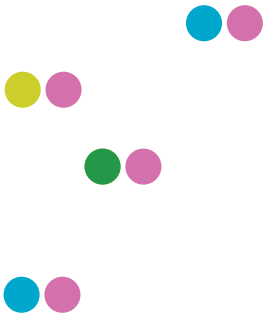
At Home



- The teacher is notably absent.
- Some students finish all the assignments.
- Some students are able to find extra help to finish their assignment.
- Some students have no extra resources and fall behind the rest of the class

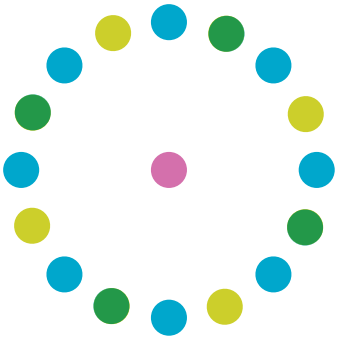
Flipped Classroom

At Home



- The teacher explains the subject material online.
- Some students understand the lecture.
- Some students have difficulty with the subject.

In Class



- The teacher is equally available to all students.
- Some students finish the assignment unaided.
- Some students finish the assignment with the help of fellow classmates.
- Some students have access to the extra help they need to learn a difficult subject.

ties and colleges in each of these areas through adoption of the "flipped classroom" model, as the teacher's using Khan' which has been central to Open Education's success so far.

The flipped classroom model builds on many of the benefits of creating and sharing OER (particularly video OER) in two key ways:

- It allows students to explore course content at their own pace, stopping and pausing when necessary, reviewing content as necessary making the most efficient use of their time and teacher time. It allows educators to practice facilitative teaching.
- It is worth mentioning that the flipped classroom is just one way educators can make use of OER to improve their teaching practice. Like any of the OER listed here, experimentation with OER can involve as many or as few of these approaches as the professor and institution is comfortable with.

Open Source Software: this type of computer software allows developers to access the source code. Users can view, modify, repurpose and fix bugs in existing software, provided their creations remain open to other developers to do the same. Some well-known open source creations include: Mozilla's Firefox browser, Linux and Ubuntu operating systems, and the WordPress blogging platform.[58]

Learning Management Systems

Most universities use some form of Learning Management System (LMS) to organize content for specific courses and allow students and faculty to congregate in a closed online space for discussion and class announcements. Institutions often rely on for-profit companies to provide this service, but that trend is shifting. The 2011 Campus Computing Survey shows that the dominant player in the LMS market, Blackboard, is losing clients in droves. Of the 496 American institutions who responded to the survey, only a slim majority (50.6 percent) remain with Blackboard, down from an overwhelming 71.0 percent in 2006 and 57.1 percent in 2010. Free and open-source alternatives – such as Moodle and the Sakai Project – are gaining market-share, along side several smaller for-profit providers.[36]

Open source alternatives were previously dismissed as incapable of meeting the demand of large academic institutions, but now appear to be a suitable alternative that meets the needs of educators and students while saving the institution money. Under the open source model, universities save on software licensing fees but still must absorb the cost of hosting fees.

The Sakai Project, for instance, provides both LMS and project collaboration software to schools. Institutions are encouraged, but not required, to join the Sakai Project as foundation members for an annual fee of $2,000 – $10,000 which engages them in the governance of the foundation.[37] Foundation members are encouraged to contribute staff and faculty time to the ongoing development of the software. This provides three key benefits:

- Institution staff can contribute to the development of software that better meets the needs of their own educators and learners.
- Resources are pooled so that the collective can achieve much more than any single institution could achieve by developing an LMS alone.
- Institutions save on LMS licensing fees and are less reliant on costly proprietary software that cannot as easily be adapted to institutional needs.

OE Practises Summary

Institutions are using Open Education to save costs, increase accessibility and improving the quality of learning and student experience. Teaching faculty are taking advantage of OE initiatives to improve their practice and build their reputations as skilled educators. The culture of Academia is becoming more collaborative and cooperative. With leading institutions boldly embracing the spirit of Open Education, this much is clear: to remain relevant in this new culture, to compete and be innovative, institutions of higher learning must properly

understand Open Education and how it fits into their long term strategies, business models and approach to teaching and learning. This new culture of Open Education is one of sharing, collaboration, and the discovery of unlikely and surprising connections.[38]

Challenges

A move to Open Education culture is not an insignificant one. For many institutions it will mean a change in existing practices, if not a shift in the philosophies underlying those practices. As such, several predictable challenges will likely arise. These challenges can be categorized as: real practical challenges, and perceived challenges.

The real practical challenges are ones that will need to be addressed strategically. These challenges include:

- Quality Control
- Intellectual Property and Copyright
- Technical Support
- Business Modeling
- Certification and Assessment
- Optimal Teaching and Learning Methods
- Relevance and Accessibility of Content
- Searchability and Interoperability

The solutions to each of these challenges will no doubt involve reallocations of staff and institutional resources, and the creation of new policies, which will lead to negotiations within institutions, between institutions, with governments and with funding partners. Comprehensive solutions to these challenges are not provided here, but they are identified and guiding insight is offered. These challenges will ultimately have to be addressed by decision makers and stakeholders at the various institutions involved. The perceived challenges noted here stem from challenges that have arisen in other universities, often the result of poorly communicated or poorly understood intentions of those driving Open Education initiatives.

"... Because of the internet, information is now free..."

Real and practical Challenges

Quality Control

There are two models for quality control that are prominently discussed in the Open Education community. The first is the Open Source approach. Most readers will be familiar with the example of Wikipedia – the online encyclopedia – authored and edited not by paid researchers, but instead by the users of the site itself. The model is adopted from the Open Source Software model, where experts self-identify and collectively use the "thousand eyes" of the internet to fix and make better the creation of others. This is precisely how Learning Management System software like Moodle and the creations of the Sakai Project have developed. Adopting this model for the creation of educational resources online is certainly one extreme of a spectrum of options for quality control being proposed, but not without some skepticism from the academic community. Concerns arise around the qualifications of contributors. Advantages are that information changes are made quickly and made available for viewing almost immediately after the update. Further, content can be published in areas so specific and unique where it has never before been feasible for knowledge to be collected and shared widely.

The second approach for quality control is the opposite extreme, a "carefully vetted, top down authoring system"[39] that would be more reflective of the peer-review publishing process adopted by academic journals. Accredited experts would continuously vet, accept and reject educational content, with a standard of excellence being developed over time. Naturally, this model is more labor intensive for those involved in reviewing content, and the number of people who see themselves as competent contributors will likely be smaller. Such a model would produce educational content that would be more academically robust, but the rate of content production would likely be slower than the first model described.

Open Educational practices can not only improve access to and the exchange of educational content, but can also double as a non-intrusive

approach to quality control, regardless of the approach used: open source, or a top-down authoring system.

Quality control is a challenge that institutions and faculty members will have to consider as Open Education practices develop. How can the global higher education community harness the expertise of verifiable experts and educators around the globe and still make use of the collaborative potential of a "thousand eyes" in the ways open-source software developers and websites like Wikipedia have done?

Intellectual Property

Intellectual property and copyright law is a major hurdle that must be overcome in order for the OER movement to be sustainable. One concern is that commercial publishers could take advantage of OER for profit, despite the non-commercial use clauses present in many creative commons licensed works.[40] David Wiley, Associate Professor of Instructional Psychology at Brigham Young University, predicts that the next few decades of development in Open Education will be wrought with legal battles between content creators and commercial publishers.[41]

The creative commons has developed licenses that allow creators of original works to offer some rights – like remixing, repurposing, and changing the medium of delivery – to other users of the content. One challenge for institutions wanting to expand their OER offerings is educating faculty on intellectual property and copyright law as it relates to the materials they produce for the classroom. There is likely a large amount of content that could be made public, but confusion around the logistics of licensing may prevent this from happening.

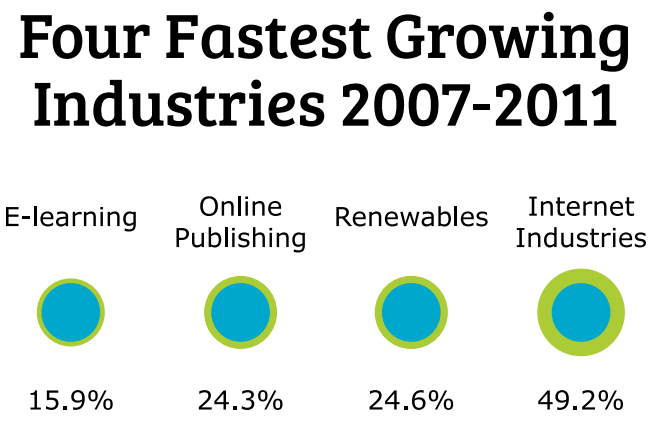
Technical Support

Institutions serious about producing OER will need to provide systems that support educators to distribute their content easily. This will involve publishing content that is currently restricted from public viewing and password protected. This will require putting the infrastructure in place for recording lecture content – audio and/or video – and the support needed to edit and publish this content.

Business Modeling

Institutions that choose an Open Education model should consider how this would change their business model. It is beyond the scope of this report to propose a new business model, but it is recognized that offering part of what universities typically charge money for has the potential to disrupt a traditionally successful business model. The following points are offered for consideration in this necessary discussion.

Firstly, it is worth noting that a large number of the worlds leading institutions are adopting an Open Education model of doing business. MIT, Yale, UC Berkeley, Carnegie Mellon and others produced a significant amount of freely available course content – from class notes to full on video lectures.[42] With the world's most respected universities and educators offering for free the same course content many Canadian institutions offer for a price, one must question the sustainability of the traditional business model. If the fear is that some students will no longer attend our schools because content is free, then those students are already likely to by lost to a "free" Ivy League education over a costly education in a local classroom anyways.



Rather than thinking about "Why are we giving this away", educational leaders should be thinking, "What kind of example can we set, so that we might encourage others to share materials we cannot access or produce on our own?" If the observations about the benefits of Open Education are generalizable to a global-scale, once the movement lifts off, the benefit to any single institution and instructor will be huge. Each will have access to a quality of content that they did not previously have the ability to produce. This

content can then be reworked as necessary for local contexts, and then delivered to students in a way that meets their needs better than the content that a single instructor could ever create.

Dan Brown, a popular YouTube contributor and University of Nebraska dropout, has become one of the Internet's unofficial spokespeople for Open Education. He offers his thoughts on Open Education in his trademark video "An Open Letter to Educators:"

> *Throughout all of human history there's a particular trend that has remained constant: the value of information has consistently been going down … With the advent of the internet, the monetary value of information is fast approaching zero … Because of the internet, information is now free and by free I don't just mean doesn't cost any money, I mean it has been liberated … Most societal entities are reinventing themselves to prepare for this revolution. The music industry has embraced iTunes, governments have taken significant steps towards transparency. Successful businesses are looking less like Dilbert and more like Google. But what has education done to reinvent itself?*[43]

Ultimately, universities will need to develop business models that recognize the growing amount of content available freely on the internet. The day is coming when university leadership will need to wrestle seriously with the role of the university in a world where information is freely and widely available. Economic reports tell us that two of the five fastest growing American industries between 2007 and 2011 were E-Learning (+15.9%) and Online Publishing (+24.3%), trailing renewable resources (+49.2%), and Internet industries (+24.6%).[44]

The largest universities in the United States (Phoenix University) and the United Kingdom (The Open University) are ones that have adopted a distance-based online learning model.

Digital Locks: encryption tools used by copyright holders that allow them to prevent or limit copying, transfer of data between mediums and the number of times content can be moved.

Web 2.0: describes those websites with a strong, built in social component. Much of the content is user-generated, where users can create content, rate the content of others, and easily share and discuss ideas. The Three R's are replaced with the "Three C's: Contributing, Collaborating, & Creating."[57]

Between the two universities over 750,000 students are currently enrolled.[45,46] The popularity of these institutions suggests that any institution or system of higher education must provide the flexibility of offering academically rigorous learning opportunities through online learning in order to remain relevant and responsive to the changing demands of student populations.

Critics of Open Education will inevitably wonder, how is releasing educational materials good for the bottom line of the university. Won't universities be giving for free something that is core to their mission, and enterprise? The movement towards an Open Education culture in Canada should not sidestep the necessary national and provincial discussions on what is an appropriate cost (if any) for post-secondary education. Rather we must recognize, like the entertainment industries for music and film, that pedagogic cultures need to adapt in order to succeed in the age where information is not only becoming free, but "liberated", which is to say that it can be repurposed, transferred between mediums and devices and be shared more widely than the content currently locked into digital texts produced by commercial publishers.

A business cannot be made through selling a resource that is not scarce or limited in some way. Because access to an internet connection is providing so many around the world with access to learning materials they never before could access, we must understand that for many it will replace the unrealistic motivation to go to university. This is likely especially the case with people for whom attending university is a much greater sacrifice of time and money – those with greater than average family responsibilities and those who must take out larger than average debts to pay for university. Universities have a responsibility, as the purveyors of knowledge, to shape and purify a quality-controlled form of online content to the users of the internet, lest those users be lured towards existing lower-quality informational literature available freely online

Universities, to their credit, have kept pace with technological change through online courseware systems that allow registered students to partake in classroom discussions. Unfortunately, this does not allow educators or students to harness the full collaborative power of the Web 2.0. The same algorithmic forces that are being used on social media to promote citizen driven content, to drive and support innovation, could be used in a global classroom. In the last half-decade we have seen the social power of the internet used to overthrow governments in the Middle East.[47] We have seen thousands of musicians who have never met perform chilling choral arrangements together on YouTube from the comfort of their own homes.[48] We've seen massive global movements like Occupy Wall Street using Web 2.0 technologies to self-manage their own uprising with minimal political infrastructure or funding.[49] Bloggers and tweeters continue to reshape the nature of how news is reported and analyzed.[50] The once exclusive development and networking conferences TED made the leap to begin freely sharing videos of keynote speakers (the core of a TED conference), only to see the demand for conference tickets skyrocket beyond their capacity to deliver.[51]

Certification and Assessment

If universities take a huge leap forward and begin publishing all of their course materials online, why not also provide certification for students who choose to challenge the course assessments? Is it truly "Open Education" if universities cannot provide credit for learning and content mastery for those learning accessing content online? These are questions very much related to those around new business models. Students, predictably, may begin demanding assessment options, where they pursue the course material independently and subsequently pay a nominal fee to challenge the course for credit. This issue requires much further analysis and discussion as the Open Education movement evolves.

Relevance and Accessibility of Content

Much of the current material available on OER is too general. Specific regions, campuses and professors will have different needs for educational materials. Since improving access to educational content is a primary motivation to pursuing OER, consideration must be paid to how useful this material will be to those outside of the institution who are supposed to benefit from such initiatives.

Some initiatives in OER development in other jurisdictions have been made to target specific populations of learners. For example the Tertiary Preparation Program is an OCW initiative of the University of Southern Queensland in Australia intended to create learning opportunities for Aboriginal peoples, women in non-traditional areas, and many of the learner types listed above. However, some have criticized the program for being too targeted and not tailored to more general contexts that would allow educators in other countries to easily adapt it to other conditions.[52]

If OER are to be as useful as they have been suggested to be in promoting lifelong learning and access to education for those who lack it, Canadian leaders in Open Education will need to consider which populations should be targeted when making educational materials more accessible, and how useful this content will be for others who wish to repurpose it.

Optimal Teaching and Learning Methods

In this paper the lecture method of teaching has been treated as the primary tool for delivering educational content. As one of the oldest educational methods, leaders in higher education should be explore whether this method is still (or ever was) the optimal methods for educators to facilitate learning for students. If the goal of the university is to continually improve the quality of education for students, we should explore alternatives – such as interactive applications and content made specifically for the web – that may be more effective at introducing students to new subjects.

Searchability and Interoperability

Vast networks of knowledge should contribute to the elimination of silos where redundancy is happening between and within institutions. There is great value in a variety of approaches

and educational resources being made available to students and educators. As such, networked systems where these resources can be accessed should be well connected so that users might easily navigate between related content, and not duplicate efforts to create "new" content that does already exist, but is just difficult to find.

Interoperability: The ability to easily exchange and use information between distinct systems.

The interactive learning commons explored by our imagined class of young architects class at the beginning of this paper represents our vision for the future of searchability and interoperability. We expect it will take a considerable commitment of resources, and buy-in from all levels of the global higher education community to make this a reality.

Perceived challenges:

The Loss of the Classroom Experience

One of the most frequent critiques of Open Education initiatives is that it takes what is happening in a classroom and moves it to a computer screen, where the student is at risk of losing out on the "traditional classroom experience". The traditional classroom is, and has been changing. We know that around the world, an increasing number of students are choosing accredited distance education learning options, because they are the options that best meet their needs. And for those students who continue to enroll in the traditional classroom, open educational content – particularly lectures, interactive teaching modules and data-aggregating assessment tools – are being used to improve the classroom experience, as illustrated by the flipped classroom model of learning.

Faculty's Role in Choosing Educational Content

At institutions where Open Education is working, administration-led Open Education initiatives had sometimes been misinterpreted as a move to take decision-making power away from faculty in choosing course content. It is our assertion that teaching faculty should remain the ultimate decision makers when deciding what materials to present in the classroom. It is important that university and government leadership support the production of OER, and this approach should be a systems-oriented one. Many faculty members currently choose high-cost commercial resources either because they perceive those to be the only ones available, or because they are the only resources available for a particular topic.

The role of leaders within the university administration and government is to incentivize and support those developing OER, as well as spread information about the value of OER. At the end of the day, faculty members will remain the final decision makers for content to be used in the classroom, and they will have a wider breadth of options to choose from because of the development of OER.

Recommended Next Steps

The above sections have illustrated a vision for open education, illustrated the growth of the Open Education movement in the past decade, and illustrated the benefits of a more open approach to teaching and learning. The complexities and challenges described in the last section illustrate that this culture shift cannot happen overnight. In this section some necessary next steps that advocates of Open Education take are presented. These recommendations are divided into the four categories of stakeholders: university administration, teaching faculty, the student body and governments (particularly provincial ones). Leadership from each of these groups is necessary to bring about the Open Education future illustrated here.

University Leadership

The administrative leadership of both the university and faculty members will share equally in their contribution to creating an Open Education culture on campuses in Canada. The responsibilities of the former will be addressed in this section.

The recommendations in this section should be considered in stepwise order beginning with education initiatives for key decision makers and moving towards specific actions and initiatives that will foster Open Education practices.

University and college administrations with a commitment to Open Education should:

- Provide comprehensive education sessions for leaders at all levels of the university on Open Education – including board, executive, staff, faculty and student leadership. These sessions should cover the benefits of Open Education initiatives, alongside the challenges, opportunities and current global trends of Open Education of which there is ample literature.
- Work towards establishing a consensus around generally accepted principles and values supporting Open Education at the institutional level (centered around sharing and collaboration) before implementing specific OER initiatives.
- Explore access-oriented business models that support Open Education initiatives.
- Make sure teaching faculty members do not have to do the heavy lifting. Provide A/V recording support for lectures, create systems that make distributing this content as simple as uploading material to a closed source website.
- Implement open-source courseware systems like Moodle and Sakai Project software in place of proprietary courseware systems that cost more and are less flexible to institutional needs.
- Provide incentives and rewards for faculty who choose to create OER. Provide faculty release time for OER production. Provide consideration of OER activities during tenure review and promotion processes.
- Incentivize participation in open-access journals without a pay wall. And support those journals where necessary through author's fees and other mechanisms. This will gradually reduce an institution's dependency on subscription-based journals for university community guarantee public access to research results.
- Establish a national forum for discussing Open Education in Canada, including faculty associations and student groups. The forum can be used to act as a platform to craft an Open Education Charter for Canada The charter should encourage universities and their faculty to build on and contribute to the development of existing platforms that exist for open-learning.
- Begin partnering at a global level with other Open Education institutions and organizations to create common systems that are well networked to provide easy-access to educational resources.

Faculty

Progress in Open Education has been primarily fueled by the grassroots leadership of faculty members at institutions around the globe. Many have recognized that a move towards Open Education is really no more than an extension of the widely held support for the practice of peer review in scholarly research.

It is clear that Open Education can create opportunities for faculty to build their reputation as educators, improve their teaching, reduce their workload, and be more interactive with students in the classroom.

Faculty with a commitment to Open Education should:

- "Develop strategies that swiftly integrate professional and learned societies (e.g. the National Science Educators Association) into the OER quality control procedures."[54]
- Explore existing open-access alternatives to commercial texts.
- Collaborate with one another to publish open access texts and other resources that meet local classroom needs and can be repurposed by others.
- Publish in Open Access journals.
- Take a leadership role in educating and informing their faculty association membership about the benefits of publishing OER.

"The idea of open sharing has deep roots in academia, but particularly at MIT, where sharing preprints, open source software, and the World Wide Web were quickly accepted ways of disseminating materials … This active engagement in increasing the flow of knowledge was a critical factor in the acceptance of OCW at both the institutional level and among large segments of the faculty."[60] – MIT Faculty Members: Lerman, Myagawa & Marguilles

Students

The benefits of an Open Education culture are clear for students whether they are inside or outside of the classroom. It is another tool that the university can use to ensure students have the highest quality education possible. It means that teaching methods will be continuously improved, built upon and shared for the benefit of learners. It means the resources used inside and outside of the classroom remain accessible both in price and in format.

Students, however, as the ultimate consumers of a post-secondary education, are in a sometimes-powerless position when it comes to choice about the materials we are told to use during our education. Many students do not see their course content or the materials used in their class as negotiable, yet outside of the classroom often use online resources to augment or replace these materials. Students need to make teaching faculty aware of the resources being used outside of provided course materials to help their educators understand the usefulness of prescribed materials.

Students with a commitment to Open Education should:

- Regularly communicate concerns about the cost, quality and interoperability of textbooks and other course materials with professors.
- Express preferences for OER materials when the quality of available OER materials is comparable or better.
- Communicate with professors about how learning inside and outside of classrooms happens. Ensure professors understand where you are getting your information and why.
- Question university leadership about why commercial Learning Management Systems are being used (when applicable), and propose open-source alternatives.
- Understand that the student body is almost always the largest stakeholder at any institution, and use this strength to push faculty, university leadership, and government to explore the feasibility of Open Education practices, software and business models.
- Advocate for more collaborative learning, facilitative teaching, and more affordable educational resources.

Governments

Governments have a purposefully distant role from anything to do with academic materials and content in university classrooms, and in some cases community college classrooms. At the primary and secondary classroom level, however, Governments, specifically provincial ones, play a decisive role in the creation of curriculum and selection of course materials across Canada, and can take advantage of the economies of scale by creating open-access educational materials for their jurisdiction, as evidenced by the example of public schools in the State of Washington, cited earlier. The effect on higher education here is indirect. Government action sets an example for institutions of higher learning.

Governments, as the primary funder of much of the research happening in universities, can also create open-access stipulations for federally and provincially administered research grants.

Governments with a commitment to Open Education should:

- Assess the cost of current K-12 teaching materials (textbooks specifically) against the cost of creating open-license content.
- Examine existing offerings for open-license textbooks to see if existing materials meet the needs of local curriculum.
- Where economical, subsidize or absorb the cost for creation of open-access textbooks and other OER at the public school level.
- Pursue collaboration with other provincial departments of education and learning to create content that is both general to common needs, specific to individual ones and with the ability to be repurposed.
- Provide funding for the creation of open-access materials for higher education.
- Publicly encourage collaboration in the creation open-educational resources among faculty at provincially funded universities.
- Collaborate with university and college educators, where appropriate, who are the decision makers for what is used as course material in a university classroom (and

must remain so). The government could fund the development of university level textbooks and OER that are openly licensed for repurposing, and reprinting.
• Reinvest cost savings into the classroom, out of recognition that OER should be considered complementary to traditional education, and not a replacement.
• Make research grants issued by government agencies conditional upon the open-access publication of those results – either through submission to open-access journals or publishing on agency websites.
• In the case of provincially owned universities and colleges enact a policy that mandates any software, educational resources or knowledge produced through grants at these institutions carry an open access license.[55]

Conclusion

There is a global movement towards a more open culture of education, where educational resources are shared freely. Collaboration in the Open Education future happens as much in the classroom as it does in the laboratory today. By supporting and encouraging sharing and collaboration in the development of educational resources students and educators are better able to understand what they are learning about and how it connects to the world around them. In this report the impact of Open Education initiatives on quality of learning and improving access to educational opportunities has been described. Some likely challenges likely for those embarking on Open Education initiatives have been described. Recommendations are offered based on an understanding that the responsibility for expanding Open Educational offerings in Canada is shared between universities, teaching faculty, students and government. Recommendations specific to each of these groups are offered to enable them to exercise their responsibilities.

In the spirit of openness – sharing resources, collaborating and creating surprising connections – we invite other individuals and groups to join the conversation we are hoping to start with this report.

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