The rationale for Open Access

Open Access (OA) is a means of disseminating scholarly and scientific literature over the internet free of charge to researchers and to anyone else who might benefit from accessing the results of publicly funded research. Open Access (OA) is a means of disseminating scholarly and scientific literature over the internet free of charge to researchers and to anyone else who might benefit from accessing the results of publicly funded research. Research libraries have lent their support to the open access movement as a way of extending their mandates to preserve and provide access to the world’s knowledge, but have also seen it as a potential solution to the problem of escalating journal subscription prices. From 1989 onwards the average scientific journal price had steadily risen by 315% by 2003. Prices have increased at a slower rate in recent years, however, they continue to rise by about 9% yearly.

But OA is not only about devising sustainable publishing and access models to research journal literature. Researchers and librarians also see it as a means to repair a scholarly publishing system that, although it has worked in the world of print-based dissemination, drastically limits the possibilities offered by the emerging networked research environment and the internet. If researchers cannot always access parts of the current research literature in their fields they are missing information that is potentially vital to their research, and the result is that the progress of scientific discovery is stalled. Open Access levels the field for researchers everywhere, in terms of accessibility, giving scientific literature the broadest possible dissemination so researchers can find it, interpret it, and build on it to help solve problems and challenges society faces.

This briefing paper describes the basic means of achieving OA, explains who benefits, and highlights some international and Canadian OA initiatives.

Primary methods of achieving Open Access

Open Access is not intended to replace journals as they currently exist nor does it aim to do away with peer-review which is vital to scientific communication. OA rather seeks to ensure publication costs are covered while the results of scholarship are free to access — that is free of charge, except for such costs that cannot be separated from accessing the internet. OA does not entail, as is sometimes believed, second rate or vanity publishing; it in no way seeks to curtail the necessary rigors of peer-review and the high editing standards expected from scholarly journals. An estimated 10% of the scholarly and STM journals are open access. PloS Biology, a journal published by the open access publisher Public Library of Science, is the highest ranked scholarly journal in its field.

There are many OA models, but the two chief approaches are open access journals and open digital repositories. OA journals provide free access to scholarly literature by covering the publications costs through a variety of alternatives to the predominant subscription model — institutional subsidies/grants/memberships, advertising revenue, article fees, combination of free online version with paid print subscriptions, etc. The second main route to Open Access is through article manuscript archiving in open digital repositories. This particular strategy compliments scholars’ practice of publishing the results of their research in vetted peer-reviewed research journals — it does not replace it. Researchers carry on their usual publishing activities, submitting to the most suitable journals in their field whether they are open access or subscription based. Just a few minutes and keystrokes at the keyboard (at no cost to the authors) enable researchers to make their work more visible, allowing for other researchers to find it and build on it. The accompanying metadata submitted with article manuscripts in open digital repositories is compliant with the Open Archives Institute Protocol for Metadata Harvesting (OAI-PMH) which renders such scholarly content easily findable in popular search engines like Google and Goggle Scholar as well as numerous automated harvesters of digital repository content.
The value proposition of OA to the higher education and scientific communities
Successful implementation of OA policies, programs and publishing models will require close collaboration between researchers, university research offices, libraries, research funders, and publishers, in order to “align the intellectual and economic models for scholarly publishing with the needs of contemporary scholarship and the benefits, including low marginal costs of distribution, of network technology.” These are highly desirable outcomes, however, the key goal of Open Access is to advance science by removing barriers scientists face in accessing other scientists’ work. Not only does OA help advance science, but it brings the potential to accelerate the speed at which it progresses [See Appendix A]. Open access is good for education and good for research; by broadening the dissemination of the results of scientific inquiry and discourse, it supports the core mission of the higher education enterprise – its ongoing commitment to the advancement of knowledge.

While there are numerous benefits to distinct groups, all having an interest in research, support for open access policies and mechanisms constitute a critical national investment, economically and socially. Recent research carried out by John Houghton and colleagues at the University of Victoria in Melbourne suggests that enhanced access to the results of publicly funded research will likely result in a greater return on investment in research and development, something that benefits any economy. It is by building on prior studies that greatly beneficial discoveries have been made [See Appendix B].

Scientific research is intended to benefit society through the creation of new knowledge. Universities, governments, industry, and other sectors invest enormously in research to meet current societal challenges and problems. Putting that research to its best possible use is contingent upon disseminating it as far and wide as possible and in a cost-effective manner, as is aptly put in a declaration in support of open access issued by the Association of American Universities, the Association of Research Libraries, the Coalition for Networked Information, and the National Association of State Universities and Land Grant Colleges:

> The creation of new knowledge lies at the heart of the research university and results from tremendous investments of resources by universities, federal and state governments, industry, foundations, and others. The products of that enterprise are created to benefit society. In the process, those products also advance further research and scholarship, along with the teaching and service missions of the university. Reflecting its investments, the academy has a responsibility to ensure the broadest possible access to the fruits of its work both in the short and long term by publics both local and global.

> Faculty research and scholarship represent invaluable intellectual capital, but the value of that capital lies in its effective dissemination to present and future audiences. Dissemination strategies that restrict access are fundamentally at odds with the dissemination imperative inherent in the university mission.9

Greater adoption of open access publishing models, activities, policies and mandates will challenge all parties with a stake in the dissemination of scholarship to find creative solutions to continue supporting scientific communication, but they need not compromise a successful balance of interests.10 The research community, as a whole, and publishers alike benefit from open access [See Appendix C].

Growing support for Open Access worldwide
At the grassroots levels academic librarians discuss scholarly communication issues with students and faculty to raise awareness of the shortcomings of the current dissemination system and of the importance of experimenting with models that will allow greater, more cost-effective access to scientific and scholarly information. Groups such as the Association of American Universities, the Association of Research Libraries, the Coalition for Networked Information, the Scholarly Publishing and Academic Resources Coalition (SPARC), among others advocate for public
access to federally-funded research to bring national attention to the matter of a sustainable scientific information environment that is accessible to every citizen.

At many universities, librarians, administrators and some faculty are coordinating library and university press services with a view to improving support and management of their institutions’ scholarly output. The Association of Research Libraries (ARL) calls for research institutions to “disseminate, manage, reuse, and preserve the products of their research enterprise.” Assuming that responsibility comes with challenges (e.g. overcoming faculty inertia and misgivings, reticence or outright hostility to these ideas on the part of some scientific or society publishers), however, it also presents the academy and everyone with a vested interest in scholarly communication a chance to reap significant rewards. Catherine Mitchell, Director, Publishing, California Digital Library, succinctly posits the matter concerning the research enterprise’s interest in a sustainable scholarly communication system: “We have an opportunity here as a community to put a stake in the ground, to work to protect our institutions’ investment in academic research by inserting ourselves, wherever possible, into the flow of scholarly communication.”

Several Canadian universities also recognize that opportunity and have begun to act on it. On April 22, 2010, Concordia University faculty passed a landmark Senate Resolution on Open Access that requires all of its faculty and students to make their peer-reviewed research and creative output freely accessible via the internet. Concordia is the first major university in Canada where faculty overwhelmingly supports a concerted effort to make the full results of their research universally available to the world in the university’s open digital Spectrum Research Repository. Some exemplary open access programmes, developed by libraries in collaboration with faculty and university administrations, have already been implemented at the University of Calgary, the University of Ottawa, and Simon Fraser University.

Granting agencies also have a pivotal role in improving access mechanisms to the results of scholarship providing the funds that enable researchers to conduct their work. Canada’s federal research granting agencies deem broad dissemination of the results of scientific research as widely available and accessible as possible a crucial part of promoting science, intellectual curiosity, critical analysis, and applying knowledge towards finding solutions to problems Canadians face. Through four shared guiding principles – to Advance Knowledge, Minimize Research Duplication, Maximize Research Benefits, and to Promote Research Accomplishments – the Canadian Institutes of Health Research (CIHR), the Natural Sciences and Engineering Research Council (NSERC), and the Social Sciences and Humanities Research Council (SSHRC) are “committed to developing a shared approach for improving access to publicly funded research in keeping with internationally recognized best practices, standards and policies for funding and conducting research.” Considering that best practices, standards, and policies are vitally important with respects to deriving the most benefit from investments in research, the third tri-council guiding principle - Maximize Research Benefits - bears noting: “Publicly funded research should be as accessible as possible in order to maximize the economic, social, cultural and health benefits for Canadians.”

Recognizing the worldwide momentum favoring the development of efficient and sustainable information systems that maximize the impact of public investment in scientific research, the [U.S.] Office of Science and Technology Policy (OSTP) issued a call in December 2009 for input regarding “Public Access Policies for Science and Technology Funding Agencies across the Federal Government.” The request for feedback garnered a tremendous amount of responses from organizations and individuals which the OSTP is analyzing to craft policy recommendations.

In the United Kingdom ten leading organizations from the HE and Research sector are joining efforts to drive the implementation of Open Access in the U.K. at the policy level but also to foster a deeper understanding of the
opportunities it offers the country in terms of maintaining its reputation and impact in the world. Likewise, in its Statement on Open Scholarship, the Council of Australian University Librarians (CAUL) asserts that communicative and publishing systems that enable rapid, affordable dissemination of research outputs as well as the scholarly record’s preservation and future use are the elements that advance open scholarship. CAUL describes open scholarship as “reflecting the increasingly open nature of access to information, research collaboration, and the sharing and re-use of data.” Like many library associations and other organizations with a vested interest in sustainable scholarly publishing and dissemination, CAUL intends to work with all stakeholders to move Australia closer to an open access knowledge ecosystem.

Everyone benefits from Open Access
Open Access enables cost-effective, unrestricted flow of ideas and information and underpins excellence in research while also bringing down barriers to learning, building informed communities, and fostering international collaboration and understanding. A transition to open access is possible if government, research institutions, researchers, publishers, and librarians engage in open dialogue and collaborate towards a shared understanding of the principles, practices and benefits of open access [See Appendix G]. In addition to providing and maintaining the required infrastructure components, including robust open digital repositories, that facilitate access to and preservation of scholarly research, librarians must engage administrators and researchers in discussion about institutional policies for stewarding institutions’ intellectual capital and about modifying reward and recognition mechanisms “that encourage the broadest possible dissemination and use of new knowledge.” Cooperation with publishers will be an equally important part of the transition by way of adjustments and experimentations with open access publishing models as well as accommodation of article manuscript archiving practices. Government can play a catalyzing role by implementing policies that facilitate access to the results of taxpayer-funded research. Open dialogue and cooperation among all parties, including the public, will go a long way to deriving the highest possible return from public investments in scientific research which, crucially, is to all of society’s benefit. Open access provides scholars with the means to make good on their public mission to advance knowledge by removing access barriers to the products of their efforts, accelerating research, enriching education, making scientific literature as useful as it can be, and laying the “foundation for uniting humanity in a common intellectual conversation and quest for knowledge.”

End notes:

1 See definition of open access in Budapest Open Access Initiative http://www.soros.org/openaccess/read.shtml


3 Budapest Open Access Initiative http://www.soros.org/openaccess/index.shtml

4 The impact factor of PLoS Biology for 2008, as calculated by the Institute for Scientific Information (ISI), was 12.6. Putting this in context, it is the highest-ranked journal in the ISI category 'Biology'. ISI Journal Citation Reports http://admin-apps.isiknowledge.com/JCR/JCR?RQ=HOME

5 SHERPA/RoMEO, Publisher copyright policies & self archiving http://www.sherpa.ac.uk/romeo/statistics.php
6 Open Archives Initiative Protocol for Metadata Harvesting [http://www.openarchives.org/pmh/]

7 An Open Letter to the Higher Education Community, April 23, 2010
http://www.provost.harvard.edu/reports/FRPAA_Open_Letter.pdf

8 Houghton, J., and P. Sheehan. 2006. The economic impact of enhanced access to research findings. CSES Working Paper number 23, University of Victoria, Melbourne, as cited by Swan in Open Access and the Progress of Science.


10 Open Letter, op. cit.


12 As quoted by Andy Havens and Tom Storey, The Future of Publishing: Libraries and the changing role of creators and consumers, NextSpace, No. 16, August 2010

13 Concordia University Opens its Research Findings to the World, April 22, 2010

http://www.science.gc.ca/default.asp?Lang=En&n=9990CB6B-1

15 Joint Information Systems Committee, Call for sector to unite behind open access, October 29, 2010
http://www.jisc.ac.uk/news/stories/2010/10/openaccess.aspx The group consists of senior representatives of two UK universities (Edinburgh and Salford), Universities UK, Research Libraries UK, the Society of College, National and University Libraries (SCONUL), JISC, the UK Research Councils, Wellcome Trust, the Association of Research Managers and Administrators UK, and a leading open access publisher in the Public Library of Science.


18 Budapest Open Access Initiative [http://www.soros.org/openaccess/read.shtml]

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Appendix A

In physics, where open access has been commonplace for over a decade, the OA digital repository arXiv, hosted at Cornell University, provides free access to copies of almost every article published in most fields of physics (e.g. high-energy, condensed matter, astrophysics, etc.), deposited by authors for anyone to use. A study from Southampton University (U.K.) has measured the time between article deposits into arXiv and when citations to these begin to appear. The research has shown the interval to be shrinking as the online repository has come into near-universal use among physicists taking advantage of the immediate access to their colleagues’ research results. This system shortens the research cycle, accelerating progress and increasing efficiency in the area of physics. / Alma Swan, Open Access and the Progress of Science, American Scientist, Volume 95, May-June 2007 http://www.americanscientist.org/libraries/documents/2007327142636_307.pdf

Appendix B

ARL comments to OSTP, January 15, 2010 / The discovery of the structure of DNA, the development of penicillin, and the development of radiation therapy to treat cancer patients all originated from researchers’ ability to interpret and build upon the work of other researchers. The cost of providing free open access to taxpayer funded research is a mere fraction of the money invested in science. In the United States, the National Institutes of Health (NIH) spends several million dollars a year ingesting roughly 80,000 articles into the free PubMed Central digital repository which, via the National Library of Medicine, provides free access to biomedical literature. That is a small amount compared to the $30 billion dollars the NIH spent on research in 2009, and to the great value presented by having it publicly available to be used and re-purposed. The PMC database is one of a suite of public resources that more than 2 million users access daily. http://www.arl.org/bm~doc/ostp-15jan2010.pdf

Appendix C

The present system of scholarly communication does not always serve the best interests of researchers, higher learning institutions or of the general public that should enjoy the benefit of accessing the results of the research activities it funds. OA, as previously stated, seeks to ensure publishing costs are met while extending numerous benefits to those with a stake in the scholarly communication ecosystem:

Researchers

- Potential for greater exposure for their work
- Greater access facilitates discovery and use of research beyond traditional disciplinary boundaries leading to interdisciplinary scholarly convergences that yield more discoveries and innovations
• Opens the door to future collaborations at various levels (local, regional, national and international)
• Greater control over intellectual property, by negotiating balanced copyright agreements with prospective publishers
• Greater flexibility over how they use the products of their own research
• In the case of open digital repositories, a useful tool to track their own research record, a useful cv building tool (e.g. simple creation of lists of publications, presentations given, data sets and learning objects created)

Universities

• Particularly with open digital repositories: showcases the institution’s creative/intellectual output to the world, increasing the visibility of its research programme
• Higher visibility of the universities research output offers great potential to draw several constituencies’ attention: prospective staff, prospective collaborators from other institutions, prospective students, and other possible stakeholders in the public and private sector
• Provides a workspace and collaborative tools for large scale research projects and works in progress
• Presents an institutional commitment for long-term curation and preservation of the University’s digital intellectual outputs
• Greatly facilitates multi/cross-disciplinary approaches to research that, in turn, lead to more innovations and discoveries thus increasing the institution’s research output
• Provides a useful tool in measuring research and teaching activities at the institution

Students

• Coursework and thesis research greatly facilitated by improved access to research literature
• No need to worry about being on campus network or not since all that is needed is an internet connection
• Access to peer-reviewed article manuscripts or open access monograph chapters a viable alternative to course packs / or could help drive down the costs through inclusion of materials that do not require payment of royalty fees
• Time saved by not having to wait for inter-library loan for research material
• Access to research material after graduation

Publishers

• Learned societies’ and commercial publisher’s role in reviewing, editing and distributing research is not diminished by transitioning to open access models and practices
• As researchers share the results of their work more widely more research and scholarship is created; publishing professionals are still needed to manage the selection and vetting of high quality research
• Brief embargoes of six months to a year, allow for the maintenance of healthy publishing programs
• Since the National Institutes of Health public access mandate came into effect in 2008, many publishers work with the NIH in depositing final, published versions of articles because of (1) a preference that readers use the published versions, (2) this provides authors a competitive advantage and a vital service, and (3) publishers’ final versions also offer the possibility of driving users to their websites for additional or similar material (ARL comments to OSTP, January 15, 2010)
• Greater readership from broader access and visibility

Libraries

• Presents opportunities for the library to partner with researchers, research offices, research presses, enabling librarians to position themselves as key stakeholders in the research lifecycle
• Extends the mission of the library to support timely, enduring, and cost-effective access to scholarly/scientific information
• Extends / Affirms the library’s role as key steward of the scholarly / scientific record
• Gives the library flexibility in striking a balance between licensing and buying certain content, on the one hand, and participating in the creation and preservation of other content on the other, particularly the intellectual, research and creative output of students and researchers at its home institution

Research funders / Policy makers

• A greater return on the research they invest in, allowing it to have the greatest possible impact that accrues from other researchers’ ability to find and build on it
• A means of tracking the research they fund
• Avoidance of research funding duplication
• Through use of tools that can search both the full text and the references contained in research articles, and which can index those citations, it is possible to calculate the impact of individual pieces of research; such tools can help track the evolution of ideas, facilitate analysis of research trends, help predict which research areas are waxing and waning, and enable more informed planning decisions in the interest of scientific progress

The general public

• Access to the research resources they have paid for and which may be important in their daily lives and educational interests
• Access to a fuller array of information resources enables the public to make contributions in all arenas
• Opens the door to contributions to science from citizen scientists as well as private sector and public sector researchers working outside of academia
• Access to information that provides a better understanding of current societal challenges: e.g. climate change, alternative energy sources, the current global economic downturn, etc.
• Access to scientific or technical information vital to small business startups
• Discoveries and applications resulting by building on or repurposing prior research

Appendix D

The Center for Scholarly Communication, launched on April 1, 2010, at the University of Calgary, blends a full suite of publishing services to support the life cycle of research. The University of Calgary Press will play a leading role in the Centre, offering peer-reviewed Open Access, eBooks and print-on-demand publishing services. The Open Access Authors’ Fund, the first of its kind in Canada, provides funding for authors publishing their research in hybrid or open access journals. Digitization and preservation services, as well as copyright consultation services, support new approaches to scholarly communication [http://wcmprod2.ucalgary.ca/scholarlycommunication/].

At its January 2010 meeting, the Simon Fraser University Senate Library Committee adopted recommendations to support a variety of open access publishing ventures in as broad a range of disciplines as possible. SFU has also created an OA Central Fund to encourage SFU authors to publish in OA Journals. The fund will pay the author processing charges for SFU authors who lack additional sources to cover these fees. This is part of the SFU Library’s Open Access Strategy, which includes: continuing support for the Public Knowledge Project (PKP) and its open source software, further development of SFU’s Institutional Repository where authors can share research output, including reports and raw data, and making OA journals more accessible. The PKP has developed free, open source software - Open Journal Systems and Open Conference Systems - for managing, publishing, and indexing of journals and conference proceedings while reducing publishing costs. The SFU Library develops the PKP which has gained application internationally with more than 5000 journals using it worldwide.

The University of Ottawa’s open access program includes: a commitment to make the University’s scholarly publications accessible online at no charge through the University’s repository, uO Research, an author fund to help researchers defray some open access publishers’ article processing fees, a fund to support the creation of digital educational materials available to everyone online at no charge, support for the University of Ottawa Press’s commitment to publishing a collection of open access monographs; and a research grant to support further research on the open access movement. The University of Ottawa was the first Canadian university to join the Compact for Open-Access Publishing Equity (COPE), adding its name to a list of prestigious institutions including Cornell University, Dartmouth College, Harvard University, the Massachusetts Institute of Technology and the University of California at Berkeley. The signatories of this compact have committed to supporting open access journals that make articles available at no charge to everyone while providing the same services common to all scholarly journals, services such as peer review management, production and distribution.

[University of Ottawa among North American Leaders as it launches open access program, December 8, 2009
http://www.media.uottawa.ca/mediaroom/news-details_1824.html]

Launched on April 28, 2010, PubMed Central Canada, the result of collaboration between CIHR, the Canada Institute of Scientific and Technical Information (CISTI) and the [U.S.] National Library of Medicine, will help researchers with CIHR funding to comply with the Policy on Access to Research Outputs via the PMC manuscript submission system. PMC Canada will provide Canadians a freely accessible national digital repository of the latest peer-reviewed health and life sciences literature at their fingertips. It is a vital part of Canada’s research infrastructure giving researchers desktop access to a searchable, permanent and freely accessible archive of Canadian health research enabling them to translate that knowledge into solutions to important health issues. PMC Canada builds on PubMed Central (PMC), the archive developed by the US National Library of Medicine, and joins UK PubMed Central (UKPMC) as a member of the larger PMC International network.

[Canada joins international network providing free access to health research, April 28, 2010

Appendix E

The Canadian Institutes of Health Research (CIHR) have led the way in Canada for open access policies at the research funder level with the Policy on Access to Research Outputs which came into effect in January 2008. Under the policy grant recipients are required make every effort to ensure that their peer-reviewed research articles are freely available as soon as possible after publication, and no later than six months, by publishing in open access journals or depositing final article manuscripts in open digital repositories. The driving idea behind the policy is that all Canadians – the general public, healthcare practitioners and researchers - should enjoy increasing free access to publicly-funded Canadian health research through the Internet. Timely, unrestricted access to research findings is a defining feature of science, and is essential for advancing knowledge and accelerating understanding of human health and disease.


Appendix F

Office of Science and Technology Policy, Public Access Policy Update, March 8, 2010
http://www.whitehouse.gov/blog/2010/03/08/public-access-policy-update / On the heels of the OSTP’s request for feedback on public access policies, Rep. Mike Doyle (D-PA) and a bi-partisan host of co-sponsors introduced the Federal Research Public Access Act of 2010 (FRPAA) in the U.S. House of Representatives on April 15, 2010. The proposed bill would build on the success of the first U.S. mandate for public access to the published results of
publicly funded research at the National Institutes of Health (NIH), and require federal agencies with annual extramural research budgets of $100 million or more to ensure the public benefits from online access to research article manuscripts stemming from funded research no later than six months after publication in a peer-reviewed journal. The bill is seen by many to recognize the need and opportunity to use digital technology to increase the pace of innovation.

Appendix G

All stakeholders in higher education and research stand to benefit from seriously exploring how they might help foster open access by way of new publishing initiatives, OA policies, practices and institutional mandates. Work towards advancing open access in Canada could be manifested in but not necessarily be limited to:

- Collaboration between university research offices and libraries to educate researchers on copyright and author rights
- Consultations between all interested parties on the development of institutional mandates that will enable the university community to broadly disseminate the full range of its scholarly and creative products in a cost effective manner
- Consultation between granting agencies with a view to harmonizing open access policies that make it easy for researchers to render their research freely available on the internet whether that be by submitting article manuscripts to an open access publisher, depositing post-refereed article manuscripts in an open digital repository, or using part of their funds towards article processing fees in a hybrid journal
- Initiation of a dialogue between various parties on campus – research administrators, researchers, librarians, to come to an agreement about the best way to modify current research, rewards and recognition mechanisms, and intellectual property policies in a manner that is consistent with the broadest possible dissemination of faculty research
- Dialogue between researchers, university administrators, librarians, granting council representatives, and publishers to arrive at an agreement over modification of publishing contracts permitting immediate or delayed access to peer-reviewed research as well as placing embargoes (e.g. six months, twelve months) all in a manner that does not threaten the viability of journal publishers nor limit access to and use of research
- Investing in shared dissemination infrastructure where such opportunities may exist
- Fostering partnerships between university research offices, libraries, and university presses to experiment with low cost/broad dissemination models
- Experimenting with open access author funds

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