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University Supports for Open Access: A Canadian National Survey

Devon Greyson
University of British Columbia

Kumiko Vézina
Concordia University

Heather Morrison
BC Electronic Library Network

Donald Taylor
Simon Fraser University

Charlyn Black
University of British Columbia

ABSTRACT

The advent of policies at research-funding organizations requiring grantees to make their funded research openly accessible alters the life cycle of scholarly research. This survey-based study explores the approaches that libraries and research administration offices at the major Canadian universities are employing to support the research-production cycle in an open access era and, in particular, to support researcher adherence to funder open-access requirements. Responses from 21 universities indicated that librarians feel a strong sense of mandate to carry out open access-related activities and provide research supports, while research administrators have a lower sense of mandate and awareness and instead focus largely on assisting researchers with securing grant funding. Canadian research universities already contain infrastructure that could be leveraged to support open access, but maximizing these opportunities requires that research administration offices and university libraries work together more synergistically than they have done traditionally.

RÉSUMÉ

L'apparition de politiques provenant d'organismes de financement en recherches qui obligent les récipiendaires de rendre les résultats de leur recherche libre à l'accès, a un impacte sur le cycle de vie de la recherche académique. Ce sondage national en ligne explore les mesures prises par les bibliothèques et les administrateurs universitaires de la recherche oeuvrant dans des grandes universités du Canada pour appuyer le cycle de production de recherche dans une ère d'accès libre, et en particulier les mesures appuyant l'adhésion des chercheurs aux exigences d'accès libre de leur agence subventionnaire. Les réponses de la part de 21 universités canadiennes indiquent que les bibliothécaires sont fortement motivées à offrir des activités reliées à l'accès libre ainsi qu'à offrir de l'appui à la recherche, tandis que les administrateurs démontrent un engagement moins élevé à cet égard et se concentrent principalement à aider les chercheurs à obtenir des subventions. Les universités canadiennes de recherche possèdent déjà des infrastructures pouvant être exploitées pour soutenir l'accès libre. Cependant, afin de maximiser ces opportunités, cela nécessitera un travail partagé entre les bibliothécaires et les administrateurs de la recherche qui est beaucoup plus conjoint qu'antérieurement.

INTRODUCTION

In an attempt to improve the impact of research outputs and make the benefits of strategic research investments available to stakeholders and the world at large, major research-funding organizations have begun to require that products of the research they fund be made openly accessible. In Canada, the Canadian Institutes of Health Research (CIHR) is the largest among the funders that have adopted such a policy (Canadian Institutes of Health Research, 2007), and other major research council requirements may not be far behind. The advent of such research-funder policies on a sizable scale is likely to significantly alter the life cycle of scholarly research by involving new players, such as open-access repositories within and outside of universities, and creating new steps in the research cycle, such as self-archiving of published articles and data.

Canadian funding-body policies that require open access target individual grant recipients, rather than grantee home institutions. However, universities play a significant role in supporting their researchers throughout the cycle of research production by way of internal support institutions such as research administration offices, university libraries, university presses, and institutional repositories. The role of universities in supporting affiliated researchers' compliance with open-access policies has been unstudied to date. The aim of this project was to understand the approaches that Canadian research universities are taking in response to this shifting environment.

LITERATURE REVIEW

Previous research on the topic of open access within universities has focused on three main areas: the attitudes and activities of libraries and librarians; the state of specific open access-related supports, such as publishing services and institutional repositories; and faculty/author awareness, attitudes, and intentions. Notably, the vast majority of this literature has focused on the third category.

Focusing on the library context, recent surveys by U.S. research libraries, South African library and information science researchers, and U.S.-based academic librarians all found that libraries and librarians demonstrated high awareness of open-access issues and were actively incorporating open access-related activities into their work (DeBeer, 2004; Hood, 2007; Palmer, Dill, & Christie, 2009). Such findings indicate that librarians are supportive of open-access principles and are actively working to integrate open-access resources into libraries and the library literature.

A related genre of survey-based articles has focused on infrastructure changes required to archive and publish open-access research outputs. Issues highlighted in some of these studies have included the challenges of implementing institutional repositories, along with the economic and technical aspects of such undertakings (Bailey et al., 2006; Shearer, 2006). Others have explored barriers to disseminating scientific information (Ghane, 2006) or to adopting an open-access publishing model (Mann, Von Walter, Hess, & Wigand, 2009). Some have studied copyright and publishing agreement issues (Austin, Heffernan, & David, 2008; Gadd, Oppenheim, & Christie, 2003, and others have discussed author-pays publishing business models (Schroter & Tite, 2006).

The vast majority of descriptive research related to open access, however, has studied the knowledge, attitudes, and behaviours of researchers regarding open-access publishing and self-archiving. Alma Swan and Sheridan Brown's (2004, 2005) multidisciplinary author surveys, conducted on behalf of the Joint Information Systems Committee (JISC) and the Open Society Institute (OSI), found high levels of support for principles of open access among the academic community. Swan and Brown's survey results indicated a willingness to self-archive works, if required, which did not translate into voluntary archiving practices on the part of authors. Vézina (2006) produced very similar results by surveying faculty members from the Life Sciences departments within universities in Quebec.

Recent surveys of faculty members around the world have begun to look at university supports for open access from the researchers' perspective. Such studies have found faculty members to be largely unaware of open access and the associated supporting infrastructure within their own universities (Committee on International Scholarly Communication, 2006; Fullard, 2007; Hajjem & Harnad, 2005; Joint Information Systems Committee, 2008; Vézina, 2006). An emerging pattern from these studies seems to be a lack of coordination between university administration and libraries, as well as limited effectiveness in the transmission of information to researchers regarding university supports for open access.

But what do we know about research institutions that *require* their researchers to make their scholarly works available in an institutional repository? Such institutions might be expected to have a more active strategy for raising researcher awareness, and early indications are that this is indeed the case. A 2006 study by Sale on the self-archiving rate of researchers within three academic institutions in the United Kingdom and Australia where the deposit of research articles is obligatory indicated that more than 80% of the authors had self-archived within six months of the publication date of their article. Sale concluded that efforts must be invested in promotion and follow-up for two to three years after the adoption of an institutional policy requiring open access, as the behaviour becomes routinized after this point.

The literature on open access in the university research setting is therefore characterized by a focus on libraries, publishing, and archiving and is dominated by surveys of the knowledge, attitudes, and behaviours of individual researchers. Results have indicated low awareness of open access among researchers for whom such knowledge is voluntary and have raised questions about how universities without internal open-access mandates are responding to this new environment. Are they developing strategies and initiatives to respond to granting agency policies that require open access? Which approaches might represent the most strategic investments for responding to the opportunities and obligations that individual researchers face when making their works openly accessible? To date, no studies have focused on understanding the efforts that universities, and more specifically Canadian universities, are making to support researchers' transition to this new world of scholarly communication.

APPROACH AND CONCEPTUAL MODEL

Our interdisciplinary, cross-provincial team of librarians and researchers came together with a common purpose: to explore and describe the structures and process used by Canadian universities to support their researchers both in complying with new obligations and in taking advantage of new opportunities posed by open access. We took a systems view of the university as a research-enabling institution, inclusive of affiliated researchers and internal structures and departments. Figure 1 illustrates our conceptual model of the life cycle of university-based research, a model that we see as evolving given that scholarship is just beginning to explore the full potential of the Internet and, therefore, open access.

In the life cycle, our systems approach puts the university at the centre of the scholarly research process. We conceptualized the research cycle operating around the core institution, often in concert with external forces, but largely enabled and supported by the university's institutional infrastructure. Elements of the infrastructure are many and varied, and they generally include IT services, research-ethics review, grant administration, library collections, university presses, internal research-funding streams, and, often, university archives and/or institutional repositories. Taking a pan-Canadian view of universities,

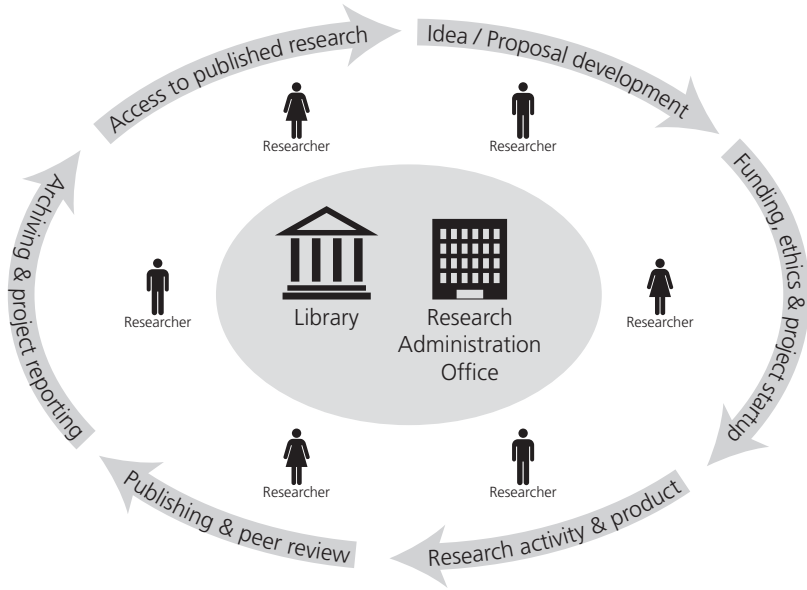

Figure 1. Conceptual Model

we found that at least two units or departments within the university – university libraries and research administration offices – were both intimately tied to the research life cycle and common in some form to all institutions. University libraries and research administration offices are major, well-established supports for the university-based cycle of scholarly research production and play similar roles in all research universities across Canada. Indeed, virtually every university-based and externally funded research project has contact with both the university library and research administration office at some point in the research-production cycle.

Researchers, in our conceptual model, are situated within their core universities, interacting with various elements of the university at different points in their research projects and processes and identifying with the university to varying degrees (ranging from highly institution-identified to loosely affiliated or with multiple allegiances). The researchers also commonly interact during the research life cycle with bodies external to the university: external research funders, such as CIHR; external publishers, such as learned societies; and external research archives and repositories, such as PubMed Central.

Our life cycle of scholarly research comprises six stages: access to published research; idea and proposal development; funding, ethics, and project start-up; research activity and product; publishing and peer review; and archiving and project reporting. Although these stages may not always be adhered to in strict progression, they do outline the general flow of the life of a research project. As researchers progress through the six stages, they interact with and are supported by both the university library and research administration office. The library, for

instance, provides access to research literature and may be involved with providing journal hosting and support services, as well as with an institutional repository for researchers' work. Research administration offices commonly support proposal development and project planning, facilitate research funding and ethical review, and support research reporting to ensure compliance with legal, institutional, and funder requirements. Many other university departments interact with researchers in the scholarly research life cycle, including academic/provost offices, faculties and departments, communications offices, and university presses. We chose to limit this study to libraries and research administration offices due to familiarity (most of the research team are librarians) and the potential synergies with research administration offices emerging from research-funding agencies' open-access policies. Future studies might broaden our understanding of research support by including other key areas of the university.

Several of the life-cycle stages of university-based research have undergone changes related to the advent of electronic publishing and open access; for example, published research may be available via both subscription and free routes, often online and right from a researcher's desktop. Some disciplines are experimenting with, or even developing expectations around, providing public access to research data and pre-print drafts of research outputs, in addition to archiving copies of published articles in online repositories for all to access. With external funding bodies placing open-access policy requirements upon grantees, individual researchers need to adapt the way in which they proceed through the phases of the cycle of research. Given that the university's infrastructure supports the researcher's progress through the cycle, the university and in particular the university library and research administration office may logically play a role in supporting this shift in practice.

Much of the previous literature on researcher transitions to open access-related behaviours has employed a knowledge-attitudes-behaviour approach common to social-behavioural change campaigns (Bettinghaus, 1986; Schrader & Lawless, 2004). Although knowledge and attitudes are significant markers of the dissemination of information, they alone are not sufficient to change behaviour much of the time. Researchers may know about open access and may view it in a favourable light, but unless adopting new practices is easy enough (or the consequences for not adopting harsh enough), compliance with open-access policies and requirements will typically remain low.

Diffusion of innovations theory (Rogers, 1995) focuses on facilitators for what has been popularly conceived as the "tipping point" (Gladwell, 2002) of mass uptake of a new behaviour by individuals; it finds that building a culture of acceptance of the new behaviour is critical. Research funder open-access policies and institutional infrastructure to support open access are both aimed at this mass culture change. Models of technology acceptance (Davis, 1989; Venkatesh, Morris, Davis, & Davis, 2003) often emphasize that a new technological process or device should also be simple, useful, and facilitated by environmental supports. Even though Canadian research funder open-access

requirement policies do not generally target the university as an institution, researchers' compliance with policies requiring them to adopt new technology-related processes can be greatly facilitated (or hindered) not only by attitudes and peer culture but also by how easy it is for them to comply with these obligations in their particular university setting. Thus, university infrastructure and supports for researcher open-access compliance can be a key enabling factor in the success of funder requirement policies.

Research Questions

Are librarians and research administrators aware of the new obligations placed on their university's researchers? Do they feel that it is their job to be involved in some way, even though policies apply specifically to research investigators rather than institutions? Are libraries and research administration offices acting in ways that support researchers' compliance with open-access mandates and, if so, how? Are they working independently or co-operatively to address these issues? Are coordinated approaches being developed across campuses, or are the approaches still largely piecemeal? To what extent are emerging innovations and best practices in the area of open-access support for researchers being developed at Canadian universities?

Given that researchers are supported throughout the research-production life cycle by their university libraries and research administration offices, the objective of our study was to explore how the major research-supporting institutions at Canadian universities are supporting the research production cycle in an open-access era and, in particular, supporting researcher adherence to funders' open-access requirements.

METHOD

Recruitment and Sample

We assembled a list of the 27 Canadian universities whose libraries were members of the Canadian Association of Research Libraries/Association des bibliothèques de recherche du Canada (CARL/ABRC) and whose directors of research administration offices or vice-presidents of research were members of the Canadian Association of University Research Administrators (CAURA) in 2009. CAURA members were also present in all CARL/ABRC member universities. Library director contact information was obtained from the CARL/ABRC website, and information on research administration directors was obtained from university websites and with the help of the UBC Office of Research Services.

These library and research administration office directors each received a personalized invitation letter (individualized for the two groups) via email (in text and as a PDF attachment) on May 26, 2009; the invitations were sent in French to francophone institutions. No material incentive was offered for completion of the survey, and personal information was collected for confidential verification and demographic grouping of responses only.

Survey invitation letters provided a brief explanation of the study, the estimated amount of time for completion, ethical review board approval information for the study, and a link to the secure site at which participants could view the consent form and begin the online survey. The recipients of these letters were also encouraged to pass the invitation along to a colleague within their library or research administration office if that person was better suited to complete a survey about open access at their institution. Lists of the survey questions were sent out upon request.

Reminder emails (without attachments) were sent to non-respondents on June 11, 2009, and final reminder emails were sent to persistent non-respondents on June 17. Reminder emails included the specific date and time at which the survey would close, and each was worded slightly differently from the initial contact email.

Survey Questionnaire

After assessing previous surveys for models and finding none on this topic that was addressed to university systems, our team created a survey tool. The questionnaire was drafted by developing research questions to address each of the six stages in our conceptual model's cycle of scholarly research. These were tailored into two 15-minute online surveys, one directed at those who work in research administration settings and the other at those working in university libraries, each available in both French and English. Questions focused on the points of intersection between the university libraries or research administration offices and the stages of scholarly research production, as well as among the major players in the cycle. Through these surveys, we aimed to document the knowledge, attitudes, and behaviours of the two groups, their offices, and their institutions; we also aimed to highlight barriers to open-access supports and any unique or creative responses to open-access policies, such as the 2007 CIHR *Policy on Access to Research Outputs*. Full questionnaires (English only) are included in the Appendix. The online survey tool was created and implemented using the open-source LimeSurvey software and hosted by Population Data BC (2009) on servers located in a secure server environment in Vancouver, B.C., in compliance with section 30.1 of the 1996 B.C. *Freedom of Information and Protection of Privacy Act*.

Analysis

The bulk of our survey was analyzed using SAS 9.1.3. We first examined descriptive statistics of our sample and subgroups and then tested for differences in response patterns across key groups of interest (e.g., research administrators vs. librarians, French vs. English). Due to the small number of respondents and the resulting small cell sizes, we used Fisher's exact test (Fisher, 1922) to test for statistically significant differences; this test is typically used in place of a chi-square test when one or more cells has an expected frequency of five or less.

A minority of the survey questions asked respondents to volunteer free text answers about their experiences, activities, and plans. These responses were examined qualitatively to identify consistent themes and interesting exceptions to the evident trends.

RESULTS

Response Rate

Of the 54 individual contact letters sent to individuals at 27 universities, we received a total of 32 individual survey responses from 21 universities; 13 of those responses were from research administrators and 19 were from librarians, with two library responses originating from a single university. For a subset of 10 universities, we had responses from both a research administrator and a librarian. Our overall response rate was therefore 59% at the individual level and 78% at the institutional level. Response rates were higher for librarians (70%)[1] than for research administrators (48%). Among francophone institutions, there was a 100% response rate at both the individual and the institutional levels. Among anglophone survey recipients, 52% of individuals and 74% of institutions responded. Among universities with medical schools, there was a 56% response rate, and among institutions without a medical school, it was 64%. Research administrator respondents were primarily directors of research administration offices, with one assistant director and one grants officer responding. Among library respondents, nearly half were library directors, with most other respondents falling into the category of assistant university librarian or head of collections, and a small number recording specialized jobs such as scholarly communications specialist and e-resources librarian.

Awareness

All respondents indicated they had some familiarity with the term "open access" (see Glossary), with a majority of all respondents (66%) indicating they had "a clear idea of what it means" (Figure 2). However, research administrators and librarians reported differing levels of familiarity with the term, with research administrators indicating they had a less complete understanding than their librarian counterparts. More specifically, 38% of research administrator respondents indicated they had "a clear idea" of what the term means, 46% indicated they had "some idea" of what it means, and 15% had "heard of it but don't know what it means." None of the research administrator respondents self-identified as experts in open access. In contrast, of the librarian respondents, fully 11% self-identified as "an expert in open access," 84% indicated they had "a clear idea" of what the term means, and 5% indicated they had "some idea" of what the term means. These responses were found to be significantly different ($p \leq 0.005$) using Fisher's exact test. When asked to volunteer the source from which they first learned about open access, research administrators responded primarily by naming various funding bodies, whereas librarians cited scholarly communications and research library organizations and conferences.

As for knowledge of funding bodies that require or encourage grantees to make their research open access, 100% of librarian respondents and 77% of research administrator respondents indicated they were aware of such funding bodies. The Canadian Institutes of Health Research was most commonly cited by respondents, followed by the U.S. National Institutes of Health. Fourteen specific research funders were identified in total.

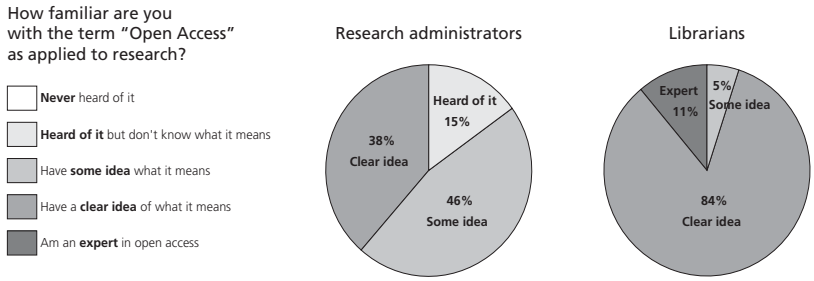

Figure 2. Familiarity Pie Chart

Perceived Mandate for Promoting Open Access

Among library respondents, there was very high support for the following specific responsibilities as falling within the mandate of their office (Table 1): educate researchers about open access (95%); help researchers self-archive their work (84%); educate researchers about open access policies of funding bodies (79%); and use open access to promote research conducted at their universities (74%). Support was lower for "make sure that researchers comply with funder open access policies" (32%) and "help researchers pay for open access publication fees" (37%).

In contrast, only a single item received support from a majority of research administrators: educating researchers about open access policies of funding bodies (62%). Just 38% of research administrators indicated they have a mandate to make sure researchers have complied with open-access policies, and 31% saw it as their mandate to educate researchers about open access in general. Helping researchers to pay for open-access publication fees, helping researchers to self-archive their work so it is openly accessible, or using open access to promote research conducted at the university were each indicated as mandates by 23% of research administrator respondents. Fully 15% of these respondents felt that none of the responsibilities on the list fell within their mandate. Responses from research administrators and librarians were statistically different in three of the six areas: educating researchers about open access in general, helping researchers self-archive their work, and using open access to promote the university's research.

Activities to Support Open Access

Of the library respondents, 63% indicated they were providing education in the form of printed materials (e.g., brochures, posters, leaflets) about open access; 58% indicated they were providing public lectures, information sessions, or seminars; and 26% indicated they were providing lectures or seminars for specific departments or programs. Further, 47% indicated they have carried out open-access activities in response to funder open-access requirements, while 42% indicated they have developed Web pages about open access. Finally, 74% indicated they plan to carry out open-access education activities in the next two years (Table 1).

Reported activities were much lower for research administrator respondents. Of these respondents, 15% reported they had Web pages about open access, and 15% indicated they had carried out activities in response to funder open-access mandates. Questions about other open-access education activities (general or department-specific public lectures, printed materials) received just one response (8%) in each of the categories, while 31% of the respondents indicated they plan to carry out open-access activities within the next two years. Responses from research administrators and librarians were statistically different in three of the six areas: providing public lectures, information sessions, or seminars; providing printed materials about open access; and plans to carry out open access-related activities within two years.

Support and/or Infrastructure for Open Access

Overall, 91% of respondents indicated their university has an institutional repository (IR), with 95% of institutions reporting they have an IR. Two sets of paired responses had one individual at the university reporting they had an IR, and the other respondent answering in the negative. According to 38% of research administrator respondents and 58% of librarian respondents, their university had either a designated individual or committee responsible for open-access issues. Overall, 16% of respondents indicated that formal open-access policies exist at either the department or university level (Table 1). Responses from research administrators and librarians were not significantly different within this set of items.

When research administrators were asked if they conduct checks for compliance with funder open-access requirements at the end of a grant, 8% indicated they undertake such a process.

Librarians were asked two specific questions relating to infrastructure for open access. According to 100% of these respondents, their library or university has open-access resources in the library catalogue or other "finding aid," while 84% indicated their library (or university) has open-access resources in the link resolver Knowledgebase.

Results from Subsets of Respondents

Sensitivity Testing

A parallel set of analyses on the subset of 20 responses from the 10 universities for which we had a response from both research administrators and librarians was conducted. Among this subset, we found response patterns similar to those presented; however, results were less likely to be significant, as they were related to small numbers.

Respondents With and Without a Medical School

We were interested in understanding whether universities with medical schools might have higher levels of awareness and be more aware of open access, in response to the CIHR policy. Accordingly, a parallel approach to that described above was used to test for differences. No differences were found in testing responses from individuals working at universities with and without a medical school.

French vs. English Respondents

We were also interested in determining if there were differences in awareness, activities, perceived mandate, and support or infrastructure across French and English respondents. No differences were found in testing responses from individuals working at francophone versus anglophone institutions.

Responses, Plans, and Barriers

Survey respondents were asked a brief series of open-ended questions about their specific responses to funder open-access requirements, plans for future activities related to open access, and barriers to open access they perceived to exist at their universities. With regard to funder policy response, librarians mentioned several educational activities aimed at raising awareness about funder open-access policies, as well as other open-access issues. Research administrators, on the other hand, mentioned developing infrastructure to remind researchers of their obligations and to support open-access archiving. Both groups articulated responses that could be classified as relationship-building responses, largely between the research administration offices and libraries but sometimes also involving other parties, such as faculty and grant managers.

Reported plans for the coming two years were many and varied, with research administrator respondents heavily emphasizing educational activities for researchers. Librarian respondents volunteered numerous plans, including educational offerings for faculty and graduate students, starting or expanding publishing and digitization programs, and creating or enhancing infrastructure to support open access (such as an institutional repository, funds to help pay author publishing fees, and new positions and task forces to support open access at the university). Relationships emerged again as a theme in these responses, with librarians planning to work with research administration offices and faculty senates in some institutions.

Table 1

Overall and Research Administrator- and Librarian-specific Responses to Survey Questions about OA Awareness, Mandate, Activities, and Infrastructure

	Overall results n=32	Research administrator- and librarian-specific responses (%)		
		Res Adm n=13	Lib n=19	Test for diff[1]
AWARENESS OF OA				
Funding bodies that mandate or encourage grantees to make their research OA	91	77	100	NS
PERCEIVED MANDATE FOR OA				
Educate researchers about OA in general	69	31	95	p<0.05
Educate researchers about OA policies of funding bodies	72	62	79	NS
Help researchers pay for OA publication fees	31	23	37	NS
Help researchers self-archive their work	59	23	84	p<0.05
Make sure researchers comply with funder OA policies	34	38	32	NS
Use OA to promote research conducted at your university	53	23	74	p<0.05
None of the above are within mandate	6	15	0	NS
ACTIVITIES TO SUPPORT OA				
Public lectures, information sessions, or seminars	38	8	58	p<0.05
Lectures, information sessions, or seminars for specific departments or programs	19	8	26	NS
Printed materials (e.g., brochures, posters, leaflets) about OA	41	8	63	p<0.05
Webpage(s) about OA	31	15	42	NS
Other	16	0	26	NS
Have carried out OA activities in response to funder OA policies	34	15	47	NS
Plan to carry out OA education activities within 2 years	56	31	74	p<0.05
SUPPORT AND/OR INFRASTRUCTURE FOR OA				
Formal policy supporting OA	16	15	16	NS
Designated individual responsible for OA	50	38	58	NS
Committee or working group on OA	50	38	58	NS
Institutional repository	91	92	89	NS
Checks for end-of-grant compliance with funder OA requirements	n/a[2]	8	--	n/a[2]
OA resources in catalogue or other finding aid	n/a[3]	--	100	n/a[3]
OA resources in link resolver	n/a[3]	--	84	n/a[3]

Notes

1. Statistical tests for difference were conducted using Fisher's exact test, with results reported as not significant (NS) or p<0.05.
2. This question was directed to research administrators only.
3. These questions were directed to librarians only.

The barriers identified by research administrators and librarians were quite similar. The barriers commonly articulated fell into the categories of costs related to open access (e.g., journal business concerns about converting to open access, author publication fees, and lack of staff to carry out open-access educational activities), lack of faculty awareness about open access, perceptions about the value of open access (e.g., tenure and promotion committees' reliance on metrics that do not favour new publishing models or value open access), and misconceptions about the credibility of open access (e.g., open access is incompatible with peer review).

DISCUSSION

Our study has contributed a baseline assessment of the status of institutional support for open access through libraries and research administration offices across major Canadian universities. As such, it may form the basis of comparison for future surveys of the same type, studies that attempt, for example, to link open-access author practices with their institutional supports, to investigate supports for open access through other university departments or organizations such as funding agencies, or to compare institutional support for open access across jurisdictions. The focus on the university and associated infrastructure as a determinant and an enabler of researcher behaviour, rather than on the researchers alone, is new, as is our conceptual model that identifies the university library and research administration office as primary university supports for the transition to open-access research throughout the research-production life cycle. The collaborative, interprovincial, and interdisciplinary research team that came together over this project created a bilingual, pan-Canadian survey, which enjoyed a good response rate and allowed us to collect a "snapshot" of open-access supports in Canadian universities.

Study Limitations

Because the study response rate was not fully 100%, subtle response bias may be present. No attempt was made to control for social desirability response bias, as recommended by Van de Mortel (2008), which may have resulted in over-reporting of awareness about open access. We estimate that this is more likely to have positively represented open access and university activities related to supporting researchers in complying with funder open-access requirements, since individuals who are less familiar with open access may have been less likely to respond to a survey on the topic. Thus, our survey results may overestimate the degree of understanding, knowledge, and activity among Canadian universities as a whole. Given that respondents were those considered most qualified to speak to open-access activities at their respective research administration offices and university libraries, they should not be considered representative of all librarians or research administrators. Further, as our survey was conducted with major research universities, results may not reflect the situation among smaller universities in Canada.

By virtue of the investigative medium we chose – the online survey – we were necessarily restricted not only in the number of questions but also the depths to which we could explore. As well, it is possible that by focusing on university libraries and university research administrators, we missed key players in institutional responses to funder open-access policies, such as provosts, deans, or discipline-specific research administration supports.

Awareness

A high basic degree of awareness about open access and about funding agency open-access policies was reported by both research administrator and library respondents. Library respondents reported significantly higher levels of expertise, with the vast majority having a clear understanding of open access, and two self-reporting as experts, compared to fewer than half of the research administrator respondents reporting a clear understanding of open access. This significant difference in expertise likely reflects the different contexts within which the library and research offices work. For the library, scholarly communication is a central activity, and one that has received considerable attention in recent decades due to the serials crisis. For the research office, the function of disseminating research, while essential, has until recently been fulfilled adequately by traditional scholarly publishing.

Until funding agencies began to develop open-access policies, there was no compelling reason for research administration offices to focus on open access or scholarly communication. CIHR (among other Canadian funding agencies) now has an open-access mandate policy, which will impact increasing numbers of health researchers as grants awarded after the access policy's 2008 start date are completed and results published. More Canadian funding agencies, such as SSHRC (Social Sciences and Humanities Research Council) and NSERC (Natural Sciences and Engineering Research Council), are anticipated to follow suit, with similar open-access policies of their own. As the percentage of university-conducted research that is impacted by open-access requirements grows over the coming years, open-access expertise among research administration offices may grow as well. Alternatively, it may turn out that basic awareness is sufficient for many research administration offices, with the knowledge that in-depth questions can be referred to the library.

Mandate

That the library and the research administration offices appear to have different, and perhaps complementary, perceptions of their mandate with respect to open access may be fitting. It is possible that libraries have more diffuse mandates, in general, than research administration offices. In our survey, library respondents were much more likely to identify responsibilities as within their mandate compared to their research administration colleagues. Librarians nearly all considered it a library mandate to educate researchers about open

access, and a solid majority saw the library as having a mandate to carry out several other open access-related activities in support of research. In contrast, educating researchers about open-access policies of funding bodies was the only item to receive support from a majority of research administrators. Notably, a higher proportion of library respondents than research administrators felt this responsibility fell within their mandate. However, a greater proportion (albeit still a minority) of research administrators than librarians felt it was within their mandate to ensure research compliance with open-access policies.

As awareness about open access grows, synergies between libraries and research administration offices may become apparent at many a university. For example, both groups responded with a strong affirmative regarding a mandate to educate researchers about open-access funder policies. As these educational programs grow and become more refined, it is possible that collaborative programming will emerge as more efficient than duplicating offerings. Alternatively, the library and research administration offices may be able to reach different audiences within the university and thus could decide to take a coordinated approach to educate multiple audiences with a unified message.

Although the number of departments volunteering to assume a role in paying open-access publication charges is — not surprisingly — low, another possible synergy could develop out of the combination of research administration expertise to help researchers take full advantage of any funds for this purpose that may be available under research grants. Moreover, some funding contributed by either the research administration office or the library, or both, may go a long way toward providing support for researchers who wish to take advantage of publishing in open-access journals that charge publication fees (to date, a minority of open-access journals).

Activities

Open access-related activities reported by libraries and research administration offices differed considerably. The majority of libraries are involved in a variety of educational activities, from public lectures and seminars to department-specific lectures to printed materials and websites. Although some research administration offices are involved in similar activities, the percentage is much lower, which is in accordance with the differences in mandate discussed in the previous section. The difference here may well reflect the different focus of the library and the research office, with libraries tending to see education about scholarly communication as a natural extension of their role and a good fit with their liaison and information literacy activities, while research administration offices may naturally and understandably tend to focus on activities relating to helping researchers secure grant funding. Both library and research administration office respondents indicated a higher level of activity to come, which seems logical given the growth in open access globally and in Canada. Social desirability bias or optimism of the respondent that may not be borne out by the institution as a whole cannot be ruled out, however, and an indication

of additional activities in the works would be fertile ground for follow-up communications to see what is actually in place two years down the line.

Support and/or Infrastructure for Open Access

Nearly all of the responding institutions reported having an institutional repository, a significant infrastructure that is required to support self-archiving. It further appears that the majority of institutions have a designated individual or committee with responsibilities relating to open access. Library respondents indicated a high degree of integration of open-access resources into systems that provide access to materials. In contrast, rates of monitoring compliance with research funding agency open-access policies were very low. This is an area that may change in the future, as more funders implement open-access policies and particularly if funders implement forceful end-of-grant compliance checks. In such a scenario, infrastructure to support internal university monitoring of researcher compliance might become more desirable.

Response, Plans, and Barriers

Research administrators, in keeping with their focus on granting agencies, appear to be starting to implement supports for researcher compliance with funder open-access policies. In what may be a complementary set of activities, libraries have been attempting educational outreach to faculty about these new funder policies. Both groups of respondents plan to carry out more educational activities in the future, but libraries intend to maintain their diffuse approach to open access and work on multiple areas of infrastructure and support as well. The general emphasis on relationship building between the two groups and sometimes beyond is promising. At times, this relationship may act to merely appraise each other of existing activities, plans, and available resources, while in other cases, there appears to be the beginning of more robust collaboration. Given that the barriers to open access identified by librarians and research administrators were virtually identical, some common elements of common understanding and goals are present, which bodes well for future co-operation.

CONCLUSION

Together, Canada's research university libraries and research offices appear to have a high degree of awareness of open access and the open-access policies of research-funding agencies. However, there are differences in how libraries and research administration offices perceive their mandates with respect to open access. Libraries are more likely to see themselves being involved with overall education and promotion about open access. Although research administration offices often also see education about open access as their role, they are much more likely to focus specifically on the open-access policies of funding agencies. Educational activities related to open access are present at a majority of Canadian universities, and plans are underway for expansion of

such activities in the coming two years. Very few Canadian universities appear to see checking for compliance with research funders' agency policies as falling within their mandate. A minority of university libraries and research administration offices are willing to consider support for paying open-access publication charges. Canada's major universities already have infrastructure in place that can be used to support open-access mandate policies, with most having an institutional repository and a majority having a designated individual or committee in charge of open access and/or scholarly communication. However, the extent to which such infrastructure is actively being used to support archiving of faculty research in support of open-access policies is not clear.

Canadian national funder open-access policies have been targeted at either the individual researcher level (the CIHR policy) or the journal level (the SSHRC model), and Canadian universities are beginning to respond to these policies as well. This institutional response is necessary for mass compliance with policies that require open access to research outputs. The CIHR policy has caused a shift in awareness in the Canadian research and research-funding environment that provides an impetus for changes to the way universities support researchers through the cycle of scholarly research. Today's landscape is rich with opportunities for universities to be entering the world of open access and reaping its benefits – by creating platforms and structures that support the movement of their own researchers' scholarly products out into the world in a significant way. Maximizing these opportunities, however, requires research administration offices and university libraries to work together more synergistically than they have done traditionally. Fortunately, this work appears already to have begun.

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GLOSSARY

ARL: Founded in 1932, the Association of Research Libraries is a not-for-profit membership organization comprising the libraries of the major North American research institutions; it operates as a forum for the exchange of ideas and as an agent for collective action, such as making scholarly literature more affordable. There are currently 123 members.

CARL/ABRC: The Canadian Association of Research Libraries / Association des bibliothèques de recherche au Canada was established in 1976 and today includes 28 major academic research libraries across Canada, plus Library and Archives Canada, the Canada Institute for Scientific and Technical Information (CISTI), and the Library of Parliament.

CAURA: Founded in 1971, the Canadian Association of University Research Administrators is a national forum for research administrators that provides a critical interface between all stakeholders in the management of the research enterprise.

CIHR: Created in 2000, the Canadian Institutes of Health Research is the major federal agency responsible for funding health research in Canada; it integrates a network of researchers through an interdisciplinary structure made up of 13 "virtual" institutes brought together to focus on important health problems.

Funder open-access requirements: Researchers who receive grants from funders who have open-access requirements are required by the funder to make the published results freely accessible immediately after publication or at some time after the publication date (usually within six months).

Gold open access (Gold OA): Open-access journals. One way to make research material available through open access is by publishing in an open-access journal. As with traditional toll-access journals, open-access journals follow a publication process and a peer-review system. However, an open-access journal article becomes freely available to all upon publication, which increases readership and use.

Green open access (Green OA): Self-archiving scholarly products (pre-prints or post-prints). Another way to make research material available through open access is by self-archiving scholarly works, free of charge, in an institutional repository or open-access archive, thus increasing readership and use.

Institutional repository: Digital collection that preserves and provides access to the intellectual output of an institution.

JISC: The Joint Information Systems Committee is an advisory committee to post-16 and higher-education funding councils in the United Kingdom. Established in 1993, JISC supports UK education and research by providing leadership in the use of digital technologies.

Link resolver: This behind-the-scenes system enables users querying index databases to seamlessly link to the full-text version of an article if it determines that the user's institution has subscription or ownership rights to the content in question. By using the Open URL standard, the link resolver tries to match the information from the citation found in the index database to the institution's Knowledgebase, which contains all the information pertaining to its electronic resources collection. If a match is found, the institution is deemed to subscribe or own the content and the link resolver will seamlessly direct the user to the full-text version.

Open access (OA): Immediate access to scholarly literature that is digital, online, free of charge, and free of most copyright and licensing restrictions (Suber, 2007).

Open-access publication fee: A method of subsidizing the costs of free online access to scholarship. If a journal has already accepted an article on its merits, then, instead of charging the readers, it might charge the author a fee to make the article freely available to everyone online. Most research funders see publication fees, whether open access or traditional page charges, as allowable research expenses within their grants.

Peer-review process: Scholarly research papers are subjected to independent assessment, anonymously, by other qualified experts (peers) to ensure they meet certain specific criteria before they are made public.

Post-print: A scholarly paper in its final form, after having gone through the peer review/refereeing process.

Pre-print: A draft of a scholarly paper that has not yet been published in a peer-reviewed journal.

Repository/archive: An open-access collection or repository of digital works of scholarship.

Research administrators: Provide assistance to university faculty and staff in identifying funding opportunities and with proposal development and the financial administration of awards in support of the university's scholarly activity and research mission.

Research funders: Associations, institutions, or government agencies that cover a multitude of disciplines and offer funding for scholarly research through the provision of grants, fellowships, prizes, and awards.

ROARMAP: The Registry of Open Access Repository Material Archiving Policies keeps track of the open-access policies of institutions that adopt the principle of open access put forth by the Budapest Open Access Initiative, the Berlin Declaration, and the Berlin 3 meeting report.

Self-archiving: The practice of scholars depositing their works online, for all to access freely, in their institutional repository or in a subject-based open-access archive.

Subject-based repository/archive: An open-access collection or repository of digital works of scholarship in one specific field or area.

Toll-access journal: To cover the costs of peer review and publication, traditional journals charge subscription fees for access to their content. Universities and research institutions pay the fees so their researchers can access and use the peer-reviewed research output of other universities and research institutions.

University library: The academic library's main purpose is to support its university's teaching and research by providing information services, research collections and resources in digital and print formats, and online catalogue and databases for the university community (i.e., students, faculty members, and staff), as well as for various other individuals.

APPENDIX: SURVEY TOOLS (ENGLISH VERSION)

University Supports for Open Access: Research Administrator Survey

Consent

Your participation in this study is entirely voluntary and you may refuse to participate or withdraw from the study at any time without jeopardy to your employment or relationship with us.

By selecting "I have read the consent form and agree to participate in this survey," you imply that you have fully read and understood this consent form, and that you give permission to be surveyed. You imply that you understand how the information will be used, as per the terms above.

By selecting "I have read the consent form and agree to participate in this survey," you imply that you consent to voluntarily participate in this study.

Please choose *only one* of the following:

- o I DO NOT agree to participate in this survey
- o I have read the consent form and AGREE to participate in this survey

Name

Please enter your full name, for verification purposes only. Your name will not be publicly disclosed or in any way associated with your survey responses.

Institution

Please enter the name of your university here. University names will only be used for verification purpose and demographic grouping of responses.

Job title

Please enter your job title. Job titles will only be used for verification purpose and demographic grouping of responses.

Term "Open Access"

How familiar are you with the term "Open Access" as applied to research? Please choose *only one* of the following:

- o Never heard of it
- o Heard of it but don't know what it means
- o Have some idea of what it means
- o Have a clear idea of what it means
- o Am an expert in open access

Source

If you are familiar with the term "open access," where did you first learn about it?

Definition

What does "Open Access " mean, within the research administration sphere?

Funder Mandates

Are you aware of funding bodies that mandate or encourage grantees to make their research "open access"?

Please choose *only one* of the following:

- o Yes
- o No

Mandate

In your view, which of the following are part of your office's mandate?

Please choose *all* that apply:

- o Educate researchers about Open Access in general
- o Educate researchers about the Open Access policies of the funding bodies to which they may be applying for grants
- o Help researchers with funding to pay Open Access publication fees
- o Help researchers learn how to archive copies of their work so that it is Openly Accessible
- o Make sure researchers have complied with funders' Open Access policies
- o Use Open Access to promote the research conducted at your University
- o None of these are within our mandate
- o Other:

Infrastructure

Does your research administration office or your university have any of the following elements of Open Access support or infrastructure?

Please choose the appropriate response for each item:

- o A formal statement of policy supporting Open Access: University; Research Administration Office/VP Research; Both; Neither
- o A designated individual who is responsible for Open Access efforts at your university: University; Research Administration Office/VP Research; Both; Neither
- o A committee or working group on scholarly communications or Open Access : University; Research Administration Office/VP Research; Both; Neither
- o Checks for compliance with funder Open Access requirements at the end of a grant: University; Research Administration Office/VP Research; Both; Neither

Education

Does your research administration office provide education on Open Access for the university community in any of the following ways?

Please choose *all* that apply:

- o Public lectures, information sessions or seminars
- o Lectures, information sessions, or seminars for specific departments or programs
- o Printed materials (e.g., brochures, posters, leaflets) about Open Access)
- o Webpage(s) about Open Access
- o Other:

Repository

What department(s) or unit(s) at your university are responsible for the development and maintenance of the Institutional Repository?

Please choose *all* that apply:

- o My university does not have an Institutional Repository
- o University IT/Campus computing services department
- o University library
- o Maintenance is contracted out to a commercial firm
- o Not sure
- o Other:

Activities

Does your research administration office currently carry out any activities related to Open Access?

Please choose *all* that apply:

- o Yes
- o No
- o We are planning to
- o Not sure
- o Other:

Funder Mandates

Has your research administration office carried out any activities specifically in response to funding bodies mandating or encouraging grantees to make their research Open Access?

Please choose *only one* of the following:

- o Yes
- o No

Mandate Response

If you answered YES above, please share what your office has done in response to funder open access mandates.

Plans

If your research administration office currently has plans for new Open Access related activities in the next two years, please name up to five.

Barriers

If your research administration office perceives any barriers to Open Access at your university, please name up to three.

Other Departments

Are you aware of other departments or units at your university (outside the research administration office) that have sponsored or co-sponsored any activities relating to scholarly publishing or Open Access within the last five years?

Please choose *only one* of the following:

o Yes
o No

Others' Activities

If you answered YES above, please list a maximum of five units/departments

Follow-up

If you would be willing to be contacted with any follow-up questions that arise out of this survey, please enter your preferred contact information (phone or email) here.

University Supports for Open Access: Librarian Survey

Consent

Your participation in this study is entirely voluntary and you may refuse to participate or withdraw from the study at any time without jeopardy to your employment or relationship with us.

By selecting "I have read the consent form and agree to participate in this survey," you imply that you have fully read and understood this consent form, and that you give permission to be surveyed. You imply that you understand how the information will be used, as per the terms above.

By selecting "I have read the consent form and agree to participate in this survey," you imply that you consent to voluntarily participate in this study.

Please choose *only one* of the following:

- o I DO NOT agree to participate in this survey
- o I have read the consent form and AGREE to participate in this survey

Name

Please enter your full name, for verification purposes only. Your name will not be publicly disclosed or in any way associated with your survey responses.

Institution

Please enter the name of your university here. University names will only be used for verification purpose and demographic grouping of responses.

Job title

Please enter your job title. Job titles will only be used for verification purpose and demographic grouping of responses.

Term "Open Access"

How familiar are you with the term "Open Access" as applied to research?

Please choose *only one* of the following:

- o Never heard of it
- o Heard of it but don't know what it means
- o Have some idea of what it means
- o Have a clear idea of what it means
- o Am an expert in open access

Source

If you are familiar with the term "open access," where did you first learn about it?

Definition

What does "Open Access" mean, within library sphere? Please write your answer here:

Funder Mandates

Are you aware of funding bodies that mandate or encourage grantees to make their research "open access"?

Please choose *only one* of the following:

- o Yes
- o No

Mandate

In your view, which of the following are part of your library's mandate?

Please choose *all* that apply:

- o Educate researchers about Open Access in general
- o Educate researchers about the Open Access policies of the funding bodies to which they may be applying for grants
- o Help researchers with funding to pay Open Access publication fees
- o Help researchers learn how to archive copies of their work so that it is Openly Accessible
- o Make sure researchers have complied with funders' Open Access policies
- o Use Open Access to promote the research conducted at your University
- o None of these are within our mandate
- o Other:

Infrastructure

Does your library or your university have any of the following elements of Open Access support or infrastructure?

Please choose the appropriate response for each item:

- o A formal statement of policy supporting Open Access : University; Library; Both; Neither
- o A designated individual who is responsible for Open Access efforts at your university: University; Library; Both; Neither
- o A committee or working group on scholarly communications or Open Access: University; Library; Both; Neither
- o Open Access resources in the library catalogue or other library finding aid (e.g., e-journal database): University; Library; Both; Neither
- o Open Access resources in your library's link resolver knowledgebase: University; Library; Both; Neither

Education

Does your library provide education on Open Access for the university community in any of the following ways?

Please choose *all* that apply:

- o Public lectures, information sessions or seminars
- o Lectures, information sessions, or seminars for specific departments or programs
- o Printed materials (e.g., brochures, posters, leaflets) about Open Access)
- o Webpage(s) about Open Access
- o Other:

Repository

What department(s) or unit(s) at your university are responsible for the development and maintenance of the Institutional Repository?

Please choose *all* that apply:

- o My university does not have an Institutional Repository
- o University IT/Campus computing services department
- o University library
- o Maintenance is contracted out to a commercial firm
- o Not sure
- o Other:

Publishing support

Does your library do any of the following activities in support of Open Access publishing?

Please choose *all* that apply:

- o Utilize the Directory of Open Access Resources (DOAJ), BioMedCentral, or PubMedCentral to identify Open Access resources to put in the catalogue or similar finding aid?
- o Visibly identify resources in the catalogue or other discovery tools as Open Access resources?
- o Hold a membership to one or more Open Access organizations (e.g., Public Library of Sciences, Hindawi, BioMed Central, SPARC)
- o Feature information about Open Access on the library's homepage or from one level below the homepage?
- o Host Open Access journals?
- o Other:

Funder Mandates

Has your library carried out any activities specifically in response to funding bodies mandating or encouraging grantees to make their research Open Access?

Please choose *only one* of the following:
o Yes
o No

Mandate Response

If you answered YES above, please share what your office has done in response to funder open access mandates.

Plans

If your research administration office currently has plans for new Open Access related activities in the next two years, please name up to five.

Barriers

If your research administration office perceives any barriers to Open Access at your university, please name up to three.

Other Departments

Are you aware of other departments or units at your university (outside the research administration office) that have sponsored or co-sponsored any activities relating to scholarly publishing or Open Access within the last five years?
Please choose *only one* of the following:
o Yes
o No

Others' Activities

If you answered YES above, please list a maximum of five units/departments at your university that are doing activities related to Open Access.

Follow-up

If you would be willing to be contacted with any follow-up questions that arise out of this survey, please enter your preferred contact information (phone or email) here.

CONTACT INFORMATION

Devon Greyson
Information Specialist
Centre for Health Services and Policy Research
University of British Columbia
Vancouver, BC
V6T 1Z3
devon@chspr.ubc.ca

Charlyn Black is the associate director of Knowledge Translation at the Centre for Health Services and Policy Research (CHSPR) and a professor in the School of Population and Public Health in the Faculty of Medicine at the University of British Columbia. She served on the Advisory Committee on Access to the Products of Research Outputs, convened by the Canadian Institutes for Health Research (CIHR). This committee developed a policy mandating grant recipients to make their peer-reviewed publications freely accessible through open-access mechanisms. Contact cblack@chspr.ubc.ca

Devon Greyson is the information specialist at the Centre for Health Services and Policy Research at the University of British Columbia and a faculty member in the Women's Studies program at Capilano University. Devon is actively involved with information-policy issues through work with the BC Library Association and the Canadian Health Libraries Association.
Contact devon@chspr.ubc.ca

Heather Morrison is a professional librarian at BC Electronic Library Network, an adjunct faculty member at the University of British Columbia's School of Library and Information Studies, a well-known advocate of open access and transformative change in scholarly communication, and the author of the scholarly blog *The Imaginary Journal of Poetic Economics*. Contact hgmorris@sfu.ca

Donald Taylor is assistant head of Access Services at Simon Fraser University Library, which includes management of the SFU institutional repository and interlibrary loans. His research in usage statistics and work in collections management led him to an interest in open access and how it will impact traditional library collections' metrics. Contact dstaylor@sfu.ca

Kumiko Vézina, a tenured associate librarian, is currently the Electronic Resources coordinator at Concordia University Libraries. She served on the Canadian Library Association Open Access Task Force, is the Canadian chief-editor for E-LIS (http://eprints.rclis.org/; an international open-access archive for Library and Information Science), and coordinates the Open Access Initiative within Concordia University Libraries. Contact Kumiko.Vezina@concordia.ca

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NOTE

1. The librarian response rate would be reduced to 67% if we restricted library respondents to a single respondent per institution. We elected to keep all responses in the analytic data file but did sensitivity testing to determine if removing the responses from one of the two respondents would change our findings; it did not.