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Canada

Research Portal

Application - Insight Development Grants

Identification

Applicant

Family Name:	Alperin	**First Name:**	Juan
Middle Names:	Pablo		
Current Position:	Assistant professor		
Primary Affiliation:	Simon Fraser University		
Department/Division:	Canadian Institute for Studies in Publishing		

Application

Application Title	Moving beyond mandates: Finding new ways of increasing open access
Research group	4 - Sociology; demography; law; criminology; social work; communication studies; journalism; media studies; gender studies; cultural studies; library and information science; and related fields
Multidisciplinary evaluation (required)	○ Yes ◉ No
Joint or special initiative	Select
Is this a research-creation project?	○ Yes ◉ No
Does your proposal involve Aboriginal Research as defined by SSHRC?	○ Yes ◉ No

Scholar Type

Are you an Emerging Scholar or Established Scholar?	Established

Confirmed Scholar Type Established

Established Scholars: Proposed Versus Ongoing Research

Established Scholars: Proposed Versus Ongoing Research

In his research to date, Dr. Alperin has investigated how knowledge is produced, disseminated, and used. He has worked on several research projects related to scholarly communications, with a special focus on Latin America. This line of work culminated in his dissertation, The Public Impact of Latin America's Approach to Open Access, where he uncovered that, in Latin America, around 20% of those who access research are non-academics who look at research for professional practice and for personal reasons. This astounding result, combined with much of his earlier work on open access, has generated many questions regarding the nature and extent of the societal impact of research that can be observed through the public's engagement with research. This driving question forms the basis of his current ongoing project titled: "Understanding the Societal Impact of Research Through Social Media."

However, the project proposed here asks fundamentally different questions. After years of doing research on research production and use, this project pivots to ask questions regarding researcher's motivations and to investigate strategies that will lead to behavioural change towards a greater opening of research. Specifically, this project asks: "what combination of evidence, visual presentation, and tools are most effectively to encourage researchers to make more of their work openly available?" This line of question is unlike anything in Dr. Alperin's previous agenda, and, as the literature review shows, it is an area that has been largely underexplored and where research is sorely needed.

This project, however, is conceptually aligned with Dr. Alperin's previous work. It is predicated, like all of his previous research, on the notion that research, especially when it is made freely available, has the potential to make meaningful and direct contributions to society. To this end, this project seeks to support the development of a new line of inquiry that will not only inform, but also lead, to an increased adoption of open access.

Administering Organization

Organization Simon Fraser University

Department/Division Canadian Institute for Studies in Publishing (CISP)

Invitations

Role	Last Name	First Name	Organization	Department
Co-applicant	Dowson	Rebecca	Simon Fraser University	Library
Collaborator	Piwowar	Heather	No Primary Affiliation	No Department/Division
Collaborator	Priem	Jason	No Primary Affiliation	No Department/Division

Activity Details

Certification Requirements

Does the proposed research involve humans as research participants?

(•) Yes ( ) No

Does the proposed research involve animals?

( ) Yes (•) No

Environmental Impact

A. Will any phase of the proposed research take place outdoors and on federal lands in Canada, as interpreted in section 2(1) of the *Canadian Environmental Assessment Act, 2012* (CEAA 2012)?

( ) Yes (•) No

B. Will any phase of the proposed research take place outdoors and outside of Canada?

( ) Yes (•) No

C. (i) Will the grant permit a designated project, as listed in the CEAA 2012 *Regulations Designating Physical Activities* (RDPA), to be carried out in whole or in part?

( ) Yes (•) No

OR

(ii) Will any phase of the proposed research depend on a designated project, as listed in the RDPA, being carried out by an organization other than the granting agency?

( ) Yes (•) No

Keywords

List up to 10 keywords that best describe the proposal.

open access, institutional repositories, science policy, research assessment, citation advantage, machine learning

Disciplines

Indicate and rank up to three disciplines relevant to your proposal, with #1 the most relevant and #3 the least relevant.

1. Library and Information Science Library and Information Science
2. Communications and Media Studies Communications and Media Studies
3. Education Higher Education

Areas of Research

Indicate and rank up to three areas of research relevant to your proposal, with #1 the most relevant and #3 the least relevant. If you select "Not Subject to Research Classification" in #1, the system will automatically remove any other areas of research when you save this page.

1. Science and technology
2. Information Technologies
3. Education

Temporal Periods

Indicate up to two historical periods covered by your proposal.

	From		To	
	Year	Period	Year	Period
1.				
2.				

Geographical Regions

Indicate and rank up to three geographical regions relevant to your proposal, with #1 the most relevant and #3 the least relevant.

1. North America
2.
3.

Countries

Indicate and rank up to five countries relevant to your proposal, with #1 the most relevant and #5 the least relevant.

1. Canada
2. United States
3.
4.
5.

Revisions since previous application

Summary of Proposal

For the first time in history, humanity has the means to openly publish the entirety of the scholarly record, making it freely accessible to students, educators, professionals, policymakers, and members of the public. In recognition of this opportunity, institutions are increasingly working to help researchers publish and self-archive their work in open access (OA) journals and repositories. This job is made easier by the fact that OA

is uniquely aligned with researchers' professional best interests, as it improves the scholarly and societal impact of their work. However, despite this rosy picture, the actual adoption of OA practices by researchers remains disappointing, presenting a gap between values and action.

This study will investigate two related means of closing this value-action gap: helping scholars understand the personal benefits of OA to them, and minimizing the extra effort required to select OA publication venues. Together these support the broad research question: can we improve researchers' OA behaviours by making OA easier and more appealing?

We will pursue this question by creating two software tools and testing researcher responses based on their use of the tools. Track 1 of the study will develop and test a web-based tool that presents researchers with one of several personalized information resources that show how OA publishing will boost the impact of their work as measured by citation, download counts, and social media discussion. This same tool will also provide one of several software shortcuts that ease the submission of articles to OA institutional repositories (IRs). User logs will be examined to demonstrate which combination of these interventions is most effective for boosting users' uploads to their IR. Track 2 of the study will use interviews to help understand the factors supporting researchers publication venue decisions, with the goal of using these insights to recommend useful OA journal alternatives. Using interview data, a second software tool will be tested, that will use machine-learning algorithms to help researchers select appropriate, high-impact OA alternatives to toll-access journals; a second set of interviews will then help better understand researcher reactions and determine whether automated OA recommendations can be a useful approach.

The results of this study will help further the academic investigation of scholars' OA practices, building toward a robust scholarly understanding and theoretical framework around how researchers interact with the ideas, values, and tradeoffs of OA. This in turn will be invaluable in helping shape real-world policies and practices that incentivize and facilitate open access, moving beyond mandates and toward robust, direct, concrete, and research-supported interventions at the level of individual scholars. Moreover, in addition to creating knowledge in these areas, the grant will also result in a reusable, open-source software tool that Canadian and international institutions can use to immediately begin launching their own related studies and initiatives, providing excellent value for funding dollars.

This work is timely, given the growing interest in open access and the increasing imperative to demonstrate broad social value for research spending. It will help advance the scholarly study of open access in ways that have immediate social value. By exploring means of increasing OA adoption beyond mandates, this work will give administrators, librarians, policy makers, and OA advocates an additional tool to help usher in the era of universal OA, making the forefront of human knowledge available to all.

Roles and Responsibilities

The research team is led by Juan Pablo Alperin (PI), Assistant Professor in the Publishing Program and an Associate Faculty Director of the Public Knowledge Project at Simon Fraser University. He is a multi-disciplinary scholar, with training in computer science (BMath, University of Waterloo), social science (MA Geography, University of Waterloo), and education (PhD, Stanford University). Professor Alperin's expertise

cover a wide array of topics and methods, all of which are related to the transformation of scientific activities in the digital era and its effects on knowledge diffusion and integration. His training in computer science has also equipped him with the software development expertise to support building software research tools and research instruments.

Dr. Alperin's research has marked him as an established scholar in the open access community, and, as such, has received numerous invitations to speak and publish on the topic, both in North and Latin America. His work has contributed a combination of conceptual, methodological, and empirical evidence through a combination of peer-reviewed articles and presentations, as well as two edited volumes, and several book chapters on scholarly communication topics. Dr. Alperin is member of the scientific advisory board of RedALyC and Biblioteca CTS, two major Latin American open access initiatives, as well as a board member of the Scholarly Publishing and Academic Resources Coalition (SPARC). His recognition in the scholarly communication and academic librarian communities provide a ready outlet for dissemination and uptake of the project, as well as opens the doors for future collaborations for everyone on this project's research team.

Dr. Alperin will work with and supervise the students carrying out all of the research-related tasks, and will provide the specifications and background research necessary for the website tool, so as to ensure it allows for methodologically sound research. Dr. Alperin's deep expertise in computational social science also makes him a well-suited mentor for the subsequent data analysis of the data gathered by the website tool. Finally, it is expected that Dr. Alperin will be heavily involved in the write-up of the research. As such, and in his capacity as the PI, Professor Alperin will oversee or undertake the majority of the work associated with this project. As the leader of the project, 50% of his research time will be devoted to it.

The project also counts on the deep knowledge of the library and institutional repositories of Rebecca Dowson (co-applicant), who brings extensive experience in open access publishing, scholarly communication, and integrating digital methods and tools into scholarly practice. In her role as Digital Scholarship Librarian at the Simon Fraser University Library, Ms. Dowson collaborates with researchers, librarians, and technologists to study of the ways in which new technologies are affecting the production, dissemination, and reception of scholarly products. Additionally, she leads the coordination of scholarly communication services and manages the SFU Central Open Access Fund. Her Master's in Information and Library Science has given her a strong background in information organization, curation and access, knowledge management, and information policy.

Ms. Dowson's role is central to coordinating resources and expertise from across the library in the development of research tools and services. As such, she is well positioned to oversee the student building the deposit tool for Summit, SFU's open access institutional repository, and to coordinate and oversee the research interview process with subject librarians. The SFU Library is noted for its technological innovation and participates in many national and international initiatives associated with scholarly publishing and developing open source software platforms. The library provides a diverse training environment that offers students the opportunity to combine technological skills with a strong grounding in information architecture and research dissemination. It is expected that Ms. Dowson will dedicate approximately 25% of her research time towards the project.

Finally, the project draws on the extensive technological and scholarly communication experience of Dr. Heather Piwowar and Mr. Jason Priem (collaborators), co-founders of the non-profit mission driven organization, Impactstory. Together, Heather Piwowar and Jason Priem have successfully designed, implemented, and disseminated production-level, web-scale applications including Impactstory, Depsy, and oaDOI. These

applications have supported tens of thousands of users, and handle many millions of rows of data daily.

Dr Piwowar and Mr. Priem are both well-established scholars themselves. Dr. Piwowar has been a passionate advocate and investigator of open science since 2007, publishing what Dr Peter Suber (the de facto leader of the Open Access movement) called the "first study to document a [..] correlation between OA data and citation impact". Her Bachelor's and Master's degrees from MIT in Digital Signal Processing have given her a strong mathematics, statistics, and modeling background. In addition, Dr Piwowar has a PhD from the University of Pittsburgh in Biomedical Informatics and 15 years of software development. Dr Piwowar will take the lead supervising and mentoring the Masters student on the website tool and the journal recommendation algorithm. She will also support the project's dissemination efforts.

Mr Priem has been a passionate supporter of open science since his PhD studies began in 2009. He is credited, amongst other things, for defining the term and leading the field of "altmetrics" to help measure the impact of diverse, open scholarly products. Since then altmetrics has become an important subdiscipline of scientometrics, and has been called one of the "five schools of open science". Mr Priem's pre-academia background is in art, education, educational technology, and interface design, and he has leveraged this experience to help build acclaimed user-focused interfaces for several successful software applications including Impactstory, Depsy, oaDOI, and FeedVis. Mr Priem will guide the Masters students on the user interface and design aspects of the project, and will assist in the project's dissemination efforts.

Dr. Piwowar and Mr. Priem will offer one 2-term and one 1-term internship at Impactstory. The two Masters students will receive hands-on training on website and online services development. This opportunity will give students a unique training opportunity that couples technical skills development along with user experience design in a startup environment. It is expected that Dr Piwowar and Mr Priem will each dedicate approximately 15% of their time to the project.

Roles and Training of Students

Although this project brings together a strong and well-rounded research team, it is students who are at the heart of this research project. It is expected that two Masters students and a PhD student will be the major contributors to the project. In fact, the student's training is expected to be one of the most significant outcomes of the project, and, as such, the project timeline and structure have been designed around the student's learning goals.

The inclusion of the ImpactStory team (Dr. Piwowar and Mr. Priem) as collaborators on the project, for example, was established to give the students the opportunity to build the research instruments from within a start-up environment. As noted in the Roles and Responsibilities section, the ImpactStory team has designed, implemented, and disseminated production-level, web-scale tools aimed at creating culture change in scholarly communications. The opportunity to work alongside a successful start-up will give the students many sought-after software skills, while simultaneously giving them the opportunity to work alongside two very successful scholars who have pursued careers on the periphery of the academy.

The value of this unique opportunity cannot be overstated. It is rare that students are able to participate in a project that offers them cutting-edge academic and professional training simultaneously and in equal proportions.

One of the Masters student, who will spend two terms interning with ImpactStory, will build a website tool using software best practices and in a way that allows for a robust research methodology to be applied. Under the guidance and mentorship of Dr. Alperin (PI), the student will not only build the research instrument, but will also have an opportunity to participate in the entire research cycle: from the submission to the Ethics Review Board, through the analysis, writing, and dissemination of the work.

The second Masters student, who will spend one term interning with ImpactStory, will develop a new algorithm to recommend open access journals. This will give the student training in machine learning and other cutting-edge software techniques. At the same time, the student will have an opportunity to learn about how researchers select their venues for dissemination, and will gain an appreciation for the social and technical complexities of academic journal publishing.

Similarly, the PhD student who conducts the interviews with faculty regarding the appropriateness of the OA journal recommendation algorithm will receive a detailed account of how they think about the venues where they disseminate their work. This will offer the student an overview of faculty's publishing practices, which will serve them well as they progress in their academic career.

Finally, we must also mention that the knowledge produced by this project will greatly enrich the teaching material Dr. Alperin's classes on publishing, as well as the professional practice of Ms. Dowson. The findings of this project will, in fact, play an important role in the training of academic librarians across North America and around the world.

Knowledge Mobilization Plan

The focus of this grant is open access, so it is an excellent opportunity to practice the principles of open science: early, ongoing, and open publication of diverse research products throughout the research lifecycle. This approach mitigates funder risk, improves community participation, promotes broader lay impacts, and most importantly facilitates better research reuse.

Ongoing research updates will be published on the Impactstory blog and Twitter account which effectively reach a large audience (10k visitors, 8.5k followers) comprised of librarians, scholars, and administrators. Conversations with these stakeholders will guide research and help improve final publications.

Software will be open-source on GitHub throughout development, and registered with a DOI on Zenodo. Upon completion we will publish a "software paper" in the Journal of Open Software, facilitating citation of the software itself as a research product. The web-based service will be maintained for one year, facilitating use by institutions in Canada and worldwide.

Two significant datasets will be produced: website user behavior data in Track 1, and algorithm performance

data in Track 2. Both will be anonymized, annotated, and published on Zenodo to facilitate reuse and citation. Analysis of data will use the open-source R statistics environment. Analysis scripts will be published with a DOI, leading to a completely one-click reproducible workflow.

Preliminary conclusions will be presented at three library conferences: at the Digital Library Forum by Ms Dowson, and at PKP and OpenCon, each by a student. In addition, Dr Alperin, Dr Piwowar, Mr Priem will present this work at various scholarly communication conferences (self-funded). Complete results will be published in two journal articles: R1 in PLOS ONE (an open-access journal that reaches librarians, administrators, researchers, and OA advocates), and R2 in a library-focused journal such as JASIST (toll-access, but allows self-archiving).

Expected Outcomes

Scholarly Benefits

Indicate up to three scholarly benefits of the proposed project. (required)

1. Student training/skill development
2. Knowledge creation/intellectual outcomes
3. Enhanced research methods

Summary of Expected Scholarly Outcomes

This study will make several empirical and methodological contributions to benefit researchers, primarily in the fields of scholarly communication, library science, and the science of science policy. First, it will fill important gaps in the emerging study of research behaviours and motivations around open access, moving beyond surveys and descriptions of policy, and helping to inform new theoretical models of researcher behavior in the area of open access. Second, the project will advance the practice of integrating development of best-practice, reusable software with careful and rigorous research, resulting in diversely useful research products that multiply the project's potential impact. In addition, the study will offer extensive training to two Master's and one PhD students in open-source software development, qualitative and quantitative methods, and machine-learning -- valuable skills both academically and professionally.

Societal Benefits

Indicate up to three societal benefits of the proposed project.

1. Enhanced policy
2. Behavioural outcomes
3. Enriched public discourse

Summary of Expected Societal Outcomes

The growing interest in open-access mandates demonstrates an increasing recognition from policy-makers that open access multiplies the societal benefits of research. However, it is also increasingly clear that these mandate-based approaches are insufficient to change researcher behavior alone. By addressing researcher motivations, this study will help build knowledge to support new, creative, and decisive policies and tools at the

institution level, particularly by empowering academic librarians with research-based strategies to improve open access adoption. It will also produce a free, open-source, working software tool that librarians can begin using and researching immediately. These outputs will support not just better access to publicly funded work, but access to all scholarship--not only for lay readers, but also for public and private work pursuing text-mining, knowledge extraction, and other cutting-edge machine-learning techniques for extracting value from open scholarship.

Audiences

Indicate up to five potential target audiences for the proposed project.

1. Academic sector/peers
2. Postsecondary institutions
3. Postsecondary students
4. Scholarly associations
5.

Summary of Benefits to Potential Target Audiences

This study will benefit a wide variety of audiences and stakeholders, including academic librarians, scholarly communication researchers, open access (OA) advocates, and institutional policy makers. Academic librarians will gain immediate use of a working, free, open-source tool to help them improve OA adoption at their universities. Scholarly communications researchers will better understand researcher motivations around OA, as well as benefit from prototypes, data, and methods to help them easily extend and expand this research. This better understanding of researcher motivations will be especially useful to OA advocates in positions within government, funding, and the public as they seek to support public access to research. Finally, the entire academic community, including faculty and researchers, will be interested in the results, as the outputs of this project will be useful in motivating them towards a greater opening of their research.

Funds Requested from SSHRC

Year 1

Personnel costs

Student salaries and benefits/Stipends	Number	Amount	Justification
Undergraduate			
Masters	3	$34,000.00	Two Masters students are at the heart of this project. Both will complete the work as part of an internship experience w/ the non-profit org. ImpactStory, jointly supervised by project PI. The first student will

Personnel costs

Student salaries and benefits/Stipends	Number	Amount	Justification
			build impact score card tool (35 hrs/wk x 6 mo.=840 hrs) and then analyze collected data (20 hrs/wk x 2 mo.= 240 hrs). The second student will begin journal recommendation tool (finished in yr 2) (35 hrs/wk x 2 mo.=280 hrs). In total, 1280 hrs x $25/hr=$34,000 (incl. 12% benefits).
Doctoral	1	$2,100.00	In year 1, a PhD student will be in charge of conducting 12 interviews with subject liasion librarians to inform the journal recommendation tool. The student will work with the MA student and Dr. Alperin to synthesize and relay findings and provide input for recommendation algorithm. These tasks are expected to take a total of 60 hours. In total, 60 hours x $35/hr = $2,100 (incl. 12% benefits).
Subtotal		**$36,100.00**	

Non student salaries	Number	Amount	Justification
Postdoctoral			
Professional/Technical Services	2	$6,000.00	The ImpactStory team, Dr. Piwowar and Mr. Priem (collaborators) will play an instrumental role in training both the MA students. They offer a unique opportunity that couples technical skills development, user experience design, and rigorous research training, from a startup

Personnel costs			
Student salaries and benefits/Stipends	**Number**	**Amount**	**Justification**
			environment. They anticipate spending 5 hrs/wk solely dedicated to the students interning (5 hrs/wk x 8mo.=160 hrs.) In total, 160 hrs x $50/hr = $8,000 (incl. 12% benefits)
Other			
Subtotal		**$6,000.00**	

Travel and Subsistence Costs for Research	Number	Amount	Justification
Applicant/Team Member(s)			
Student(s)			
Subtotal		**$0.00**	

Travel and Subsistence Costs for Dissemination	Number	Amount	Justification
Applicant/Team Member(s)			
Student(s)			
Subtotal		**$0.00**	

Other Expenses	Amount	Justification
Supplies	$200.00	A total of $200 is requested for the purchase of office and research supplies, such as ink cartridges, paper, books, etc.
Non-disposable equipment		
Subtotal	**$200.00**	

Personnel costs			
Student salaries and benefits/Stipends	**Number**	**Amount**	**Justification**
Grand total year 1	**$42,300.00**		

Year 2

Personnel costs			
Student salaries and benefits/Stipends	**Number**	**Amount**	**Justification**
Undergraduate			
Masters	1	$3,500.00	As stated above, two Masters students are at the heart of this project. Both will complete the work as part of an internship experience w/ the non-profit org. ImpactStory, jointly supervised by project PI. The second student's internship will spill over into the second year of the grant. They will finish building the journal recommendation tool started in year 1 (35 hrs/wk x 1 mo.=140 hrs). In total, 140 hrs x $25/hr=$3,500 (incl. 12% benefits).
Doctoral	1	$3,500.00	In year 2, a PhD student will be in charge of conducting 24 interviews with faculty members to assess the appropriateness of the journal recommendation algorithm. The student will work with Dr. Alperin and Ms. Dowson to synthesize and relay findings to the MA student, and to write the results. These tasks are expected to take a total of 100 hours. In total, 100 hours x $35/hr = $3,500 (incl. 12% benefits).

Personnel costs

Student salaries and benefits/Stipends	Number	Amount	Justification
Subtotal		**$7,000.00**	

Non student salaries	Number	Amount	Justification
Postdoctoral			
Professional/Technical Services	2	$3,000.00	One of the student internships with the ImpactStory team will spill over into Year 2 of grant. The ImpactStory team expects to spend 5 hrs/wk solely dedicated to the student (5 hrs/wk x 1mo.=20 hrs.). In total, 20 hrs x $50/hr=$1,000 (incl. 12% benefits). Total, 60 hrs x $50/hr = $3,000 (incl. 12% benefi
Other			
Subtotal		**$3,000.00**	

Travel and Subsistence Costs for Research	Number	Amount	Justification
Applicant/Team Member(s)			
Student(s)			
Subtotal		**$0.00**	

Travel and Subsistence Costs for Dissemination	Number	Amount	Justification
Applicant/Team Member(s)	1	$2,472.00	Ms. Dowson will travel to the Digital Library Forum (DLF) to disseminate the findings of Track 1. This conference bridges the library, digital, and open access themes of the work and are the perfect venue for dissemination. DLF is

Personnel costs

Student salaries and benefits/Stipends	Number	Amount	Justification
			typically held in the US in the fall, around when results will be written up by team. $2,472 are requested ($800 airfare, $700 registrations, $100 taxis, $200 hotel x 3 nights, 3 per diems at SFU rate of $68/day)
Student(s)	2	$3,850.00	The MA student working on the website tool will attend OpenCon: the student and early career researcher conference on open access. OpenCon is typically held in the US ($800 airfare, $400 registration) The student working on the recommendation algorithm will be invited to participate in the Public Knowledge Project conference, typically held in Canada each year ($800 airfare, $100 registration). For both: $200 hotel x 3 nights + $100 taxis + 3 per diem (SFU rate for US $68, for Canada $57)
Subtotal		**$6,322.00**	

Other Expenses	Amount	Justification
Supplies	$2,200.00	A total of $200 is requested for the purchase of office and research supplies, such as ink cartridges, paper, books, etc. An additional $2,000 is requested for the publication fees associated with the journal PLOS One, where the team expects to submit one of the project publications.

Personnel costs			
Student salaries and benefits/Stipends	**Number**	**Amount**	**Justification**
Non-disposable equipment			
Subtotal		**$2,200.00**	
Grand total year 2	**$18,522.00**		
Grand total		**$60,822.00**	

Funds from Other Sources

You must include all contributors (e.g., individuals, not-for-profit organizations, philanthropic foundations, private sector organizations) that are providing contributions for the project. Indicate whether or not these contributions have been confirmed.

If a funding source is not listed, you must:

(a) type the source name in Funding Source
(b) identify the contribution type
(c) enter an amount.

If you have received, from a single funding source, more than one contribution of the same type (e.g., cash) and confirmation status, you must combine these into one entry (e.g., two $20,000 confirmed cash contributions from a university become one $40,000 confirmed cash contribution).

For examples of Canadian and international sources of eligible cash and/or in-kind support, see SSHRC's Guidelines for Cash and In-Kind Contributions.

Note: All contributions must be indicated in Canadian currency.

Funding Source	Contribution Type	Confirmed	Year 1	Year 2	Total
					$0.00
Details					
					$0.00
Details					
					$0.00
Details					
					Add Row
Grand total			$0.00		

Objectives

It is commonly understood that scholarly research is "created as a public good to facilitate inquiry and knowledge" (ACRL, 2003). Traditionally, this mission has been fulfilled through scholarly publishing efforts focused on making research available and discoverable among scholars, scientists, and related professionals. However, with the onset of the digital era and the electronic circulation of research, a new model of "open access" to this body of work has taken hold, one which is committed to making this freely and universally available online (Alperin, 2014; Willinsky, 2006; Laakso et al., 2011; Morrison, 2006; Pinfield, Salter, & Bath, 2014). The open access model has won support from various sectors, including government and private research funders around the world, which are adopting public access policies, such as Canada's Tri-agency's Open Access policy (CIHR, NSERC, & SSHRC, 2015). Yet, despite this growing institutional support and pressures for open access, individual researchers continue to shy away from making copies of their research freely available in their institutional repositories (Davis & Connelly, 2007; Thomas & McDonald, 2007; Kim 2011). As a result, the amount of research and scholarship that remains closed (i.e., not freely available to the public) is, depending on the study, somewhere between half and three quarters of everything published (Archambault, Amyot, & Deschamps, 2014; Butler, 2016; Laakso & Björk, 2012; Morrison & Villamizar, 2013).

So while, as is the case at our own institution, "the University … is committed to making accessible and preserving the products of research with the broadest possible community, including other scholars, practitioners, policymakers, and the public at large." (Alperin et al., 2017), it would seem that new strategies are needed if individual faculty members are going to demonstrate the same level of commitment through their actions. To that end, this study is designed to explore and measure the effectiveness of new strategies, beyond policies and mandates, that incentivize faculty members to increase the number of publications they make openly available. More specifically, the study has two objectives (O1 and O2), each supported by an underlying research question (RQ1 and RQ2). Each Question/Objective pair is organized into a Track:

Track 1: Identifying effective incentives

O1. Develop an online tool that shows researchers how much more impact they could have made if they had made more of their work open access.

RQ1. What combination of evidence, visual presentation, and tools are most effectively to encourage researchers to make more of their work openly available?

Track 2: Identifying relevant open access journals

O2. Develop a new method of identifying OA-friendly journals that are related to the researcher's previous publications.

RQ2. What qualities of an OA-friendly journal do researchers value when considering substitutes for a closed-access journal?

Background

As of today, the Registry of Open Access Repository Mandates and Policies has a record of 618 institutional OA policies, and 71 departmental policies throughout the world. At the national level, the funding agencies of Canada, Argentina, Mexico, and Peru all have policies or laws mandating open access to federally funded research (CIHR et al., 2015; UNESCO, n.d.-b). In the US, the National Institute of Health has had a public access policy since 2008, and in 2013 the Obama administration issued a directive requiring all other government agencies to explore their own public access policies (UNESCO, n.d.-a). Some funding agencies have also begun to require open access to any research they fund (Bill and Melinda Gates Foundation, 2017). In Europe, the European Commission and the European Research Council both have OA policies in effect, and open and public access policies have

been discussed or are currently under consideration in several other countries (UNESCO, n.d.-a). These laws, mandates, and policies are often justified with claims about public benefits. In Canada, for example, the Tri-agency's Open Access (OA) policy states that: "Societal advancement is made possible through widespread and barrier-free access to cutting-edge research and knowledge, enabling researchers, scholars, clinicians, policymakers, private sector and not-for-profit organizations and the public to use and build on this knowledge" (CIHR et al., 2015, para. 1). However, uptake of these policies is low, as measured by deposits of OA-versions of research in institutional repositories (as most of the laws, policies, and mandates dictate) (Borrego, 2016; Creaser, 2010; Dubinsky, 2014; Gargouri et al., 2012; Swan, Gargouri, Hunt, & Harnad, 2015; Xia et al., 2012; Zhang, Boock, & Wirth, 2015). As a result, we are still far from the universal adoption of OA models.

This, we hypothesize, is because while the expected benefits of open access are broadly conceived in the policies, they fail to speak to researcher's intrinsic motivations. The study proposed here will assess, inform, and ultimately lead to the success of such policies by contributing to our understanding of what information researchers need in order to be driven to post their works openly. This research is sorely needed, as despite countless policies and mandates promoting open access, as well as the development of tools and resources that facilitate it, and despite years of advocacy work, the majority of researchers are still not compelled to make their research outputs publicly available because current efforts have not succeeded at appealing directly to researcher's own motivations. As a result, open access remains an afterthought for most researchers, and the societal benefits of open access remain unrealized.

Literature review

Open access has been largely argued and justified in a number of ways, including (but not limited to): a citation advantage (i.e., OA will lead to increased citations) (for a full bibliographic on the topic, see Hitchcock, 2013); an ethical imperative (i.e., it is the right thing to do) (Willinsky & Alperin, 2011; Willinsky, 2006); an economic necessity (i.e., to ease the financial burden on university budgets from subscriptions) (Johnson, 2005; Noorden, 2013); a responsibility to the tax-payer (i.e., the tax-payer is entitled to access tax-funded research) (SPARC, n.d.); an acceleration discovery imperative (i.e., easy access and few re-use restrictions leads to faster science) (Swan, 2007); a contribution to development (i.e., to bridge an access to knowledge divide) (Guédon, 2008; Packer & Meneghini, 2007; Vessuri, Guedon, & Cetto, 2013). In spite of all this attention by researchers on OA, there has been almost no research that explicitly seeks to assess which evidence researchers find most compelling, or what tools would make them take the extra step to share their work more openly.

What is clear from the evidence gathered so far is that compliance with institutional OA policies is very low (Swan et al., 2015; Willinsky, 2006). One study suggests that, across all institutions, more than three-quarters of published articles are not deposited at all (Swan et al., 2015). Even of those that are deposited, almost half are metadata only. These rates go up (only slightly, but with a statistically significant difference) when that deposit is mandated by the policy (Swan et al., 2015; Vincent-Lamarre, Boivin, Gargouri, Larivière, & Harnad, 2016). So while the presence of the policies is an indication of interest from the academic, funding, and government communities, the lack of the deposits, even when mandated, is a strong indication that researchers are not yet seeing a personal benefit from depositing their work.

This may seem surprising, since, as is mentioned above, there is evidence that shows that there are direct and demonstrable benefits of open access to researchers. In particular, dozens of studies have demonstrated that open access publications are more more highly-cited than their toll-access counterparts; several annotated bibliographies have been created to track this literature (Wagner, 2010; SPARC Europe, 2015). Although some of these studies have been criticized on methodological grounds

(Davis, Lewenstein, Simon, Booth, & Connolly, 2008), more sophisticated analysis in recent years have continued to confirm the so-called open access citation advantage (OACA). For instance McCabe and Snyder (2014) use a complex statistical model to remove confounding effects of author selection (authors may selectively publish their higher-impact work as OA), reporting a small but meaningful 8% OACA. Archambault, Amyot, and Deschamps (2014) describe a 40% OACA in a massive sample of over one million articles. Ottaviani (2016) used a natural experiment as articles (not selected by authors) emerged from embargoes to become OA. This is particularly interesting since not only is any author selection bias is removed, but the study examines older articles outside their prime citation years, still finding for for these articles a 19% OACA.

Not only has research demonstrated a citation advantage for OA, it has also shown advantages to open access in reaching broader audiences. One way to quantify this advantage has been with so-called "altmetrics," (Priem, Taraborelli, Groth, & Neylon, 2010; Priem, 2014) which look beyond citations to mine online tools and environments for evidence of impact. For instance, several studies demonstrate that open access articles are downloaded twice as frequently as their toll-access peers (Davis et al., 2008) and this advantage increases over time (Wang, Liu, Mao, & Fang, 2015). Others have shown that OA articles are more heavily discussed on social media platforms (Adie, 2014) and more referenced in Wikipedia (Teplitskiy, Lu, & Duede, 2016).

Together, this evidence of greater impact across multiple dimensions would seem to offer clear benefits to researcher's career goals, yet, the information being available in research papers has not been sufficient to transform practices, even when they are clearly designed to do so (McKiernan et al., 2016).

Theoretical and Conceptual Framework

There is a surprising disparity between the normative value scholars place on openness and transparency (Merton, 1968), and their own actions in making research open access. However, although interest in these researcher behaviors is growing (Davis & Connelly, 2007; Kim, 2011) there remains no comprehensive theoretical framework in this area. Therefore we propose applying a novel framework from the field of environmental studies, "value-action gap" theory (Blake, 1999). In the environmental literature, the value-action gap framework has been used to explore reasons for the lack of direct correlation between values and actions, particularly explaining how citizens' pro-environmental opinions fail to translate into pro-environmental actions (like recycling or conserving energy) (Kollmuss & Agyeman, 2002). The theory suggests that this disconnect is often caused by lack of information, as well as individual constraints (Blake, 1999; Retallack & Lockwood, 2007), and therefore predicts that increased information and decreased personal time constraints will narrow the gap between environmental values and actions.

This framework is well suited to describing the similar gap between scholarly values of openness, and researchers' actual actions to make their work open. Moreover, it suggests a solution: increased information and decreased personal time constraints may narrow this gap, increasing researcher adoption of OA. In this study we test this hypotheses. In Track, 1 we present users with an estimate of personal benefits from making their research OA, as well as time-saving instructions. In Track 2, we supply OA journal suggestions and comparison information, informing users about available OA options they may otherwise have otherwise missed or discounted. The value-action gap framework predicts the higher levels of these interventions will result in greater openness behaviour.

Methodology

The proposed work will follow two tracks, each corresponding to the first and second objectives and research questions. The first track (9 months) will see the development of an online tool that will serve

as a research instrument to test and measure what strategies are successful to trigger researchers to deposit an open access version of their article. The second track (6 months) will develop an algorithm to effectively propose open access journals that researchers would consider for future publications. Both tracks are composed of multiple activities, both research and software development, and will see the creation of traditional and non-traditional research outputs (i.e., peer-reviewed articles, experimental software, and a "software paper").

Track 1: Determining what strategies work to encourage researchers to make work openly available

a. Develop a research instrument (website tool)

As shown above, there is ample evidence that making work openly available can have a positive impact on a researcher's career. However, as seen by the lack of action on researcher's part, more is needed. This first activity will see a Masters student develop a website, under the guidance and mentorship of Dr. Heather Piwowar and Jason Priem, that shows researchers how much more impact they could have made if they had published more of their past papers in open access. Specifically, a researcher would arrive on the website, type in their name, and (after confirming their publication list drawn from an API offered by Microsoft Academic Graph[1]) be shown their "impact report card." Users would be shown statistics about the impact of their publications in the form of citations, altmetrics, and the percentage of publications that are already openly available. All users would also see, after clicking a button, a projection of how their impact would have changed if 100% of their publications had been made openly available. These projections will be based on the extensive research data quantifying OA advantage for citations, downloads, and altmetrics in various fields (cited above). The system would randomly show users one of the following three variants: a) show projected citations, b) show projected altmetrics, and c) show both projected citations and altmetrics.

In addition, the tool will also optionally offer assistance with depositing articles into SFU's institutional repository. The way the help is offered will come in one of three variants: i) only a link to the institutional repository, ii) an instructional video explaining how to deposit an article, and iii) a link that pre-populates the data entry form for the repository. (This aspect of the tool will be developed with the collaboration of the SFU Library.) As a result, users will be randomly selected into one of 9 variants (3 impact variants x 3 help variants).

Outcomes for 1a: Complete Objective 1 (website and deposit tool)

Timeline for 1a: Building website tool, 6 months; building deposit tool, 2 months.

Personnel in 1a: One Masters student to build website as part of internship with ImpactStory team (Collaborators), with joint supervision from Dr. Alperin (PI); Same student to build tool to ease deposits into institutional repository, with joint supervision of Ms. Dowson (Co-Applicant).

b. Study what motivates researchers

The tool built described above will keep track of all of its users, which impacts they were shown, and the number and percentage of their publications that are available in open access. This will allow for the ongoing study of which of the nine variants leads to the greatest number of deposits of articles. Given the different variants of two factors (potential impact and deposit help), the study design will be considered a 3x3 factorial design, requiring a sample size of approximately 35 for each of the 9 variants, assuming a small effect size and a desired statistical power of 80%, at a 0.05 significant level.[2] This will require recruiting 315 participants to use the tool.

[1] https://www.microsoft.com/en-us/research/project/microsoft-academic-graph/

[2] http://www.math.yorku.ca/SCS/Online/power/

Participants will be recruited by sending invitations to research faculty with an invitation to "see their impact report card." In order to avoid participants feeling compelled to deposit because of their involvement with the study, they will be informed that they are part of a study, and that their behaviour will be recorded, but the purpose of the study will not be disclosed until after participation. Through the participation of Ms. Dowson (Co-Applicant), the SFU Library will facilitate a list of faculty and a list of their publications.

Outcomes 1b: Answer RQ1; Write and submit an article for peer-review.
Timeline for 1b: Recruit participants, 2 months; Analyze data and write-up results, 3 months.
Personnel for 1b: One Masters student to analyze website data under the supervision of Dr. Alperin; Ms. Dowson to facilitate recruitment; All three to write-up results.

Track 2: Determine the most effective strategies for identifying relevant open access journals

a. Hold one-on-one interviews with faculty to test validity of journal recommendation tool

A PhD student will conduct one-on-one interview with 12 subject liaison librarians. The interviews will be used to gather information about the journals used in different subjects, as well as which journals tend to be used by the same faculty members. This information will directly inform the recommendation system (described in b. below). After the recommender is built, the same PhD student will conduct 24 one-on-one sessions with faculty to evaluate if the tool yields journals that they would consider, and to understand what are the qualities in those recommended journals that they value (or, if they are not considered appropriate, which qualities they lack).

Outcomes for 2a: Answer RQ2; Write and submit an article for peer-review.
Timeline for 2a: Interviews with librarians and synthetize findings, 2 months; interviews with faculty, 2 months; analyze and write-up results 2 months;
Personnel 2a: A PhD student to conduct the interviews; Ms. Dowson (Co-Applicant) to co-ordinate and oversee interactions with librarians; Dr. Alperin (PI) to oversee research protocol; All three to write-up results.

b. Develop tool to identify open access journals researchers would consider

Using the knowledge gathered from A list of suggested OA journals is generated based on toll-access journals where the researcher published in the past, matching subject area and selectivity. Several efforts from both commercial publishers (Kang, Doornenbal & Schijvenaars, 2015) and academic research groups (Schuemie & Kors, 2008) have explored the problem of recommending appropriate journals for submission given a particular article. However, few have explored this from the perspective of locating specifically open-access journals. We will apply the same machine-learning approaches from previous efforts to this specific domain, also incorporating OA-specific resources like the Directory of Open Access Journals (DOAJ), thinkchecksubmit.org, and SHERPA/RoMEO.

We will restrict our journals to those that issue DOIs. We'll use subject areas and publishing times from Crossref metadata, get impact factors from Scopus, and open access journal statistics from the Directory of Open Access Journals. The site will include a feedback button to capture suggestions that users feel are erroneous so we can continue refining the algorithm over time.

Outcomes for 2b: Complete Objective 2 (OA journal recommendation tool)
Timeline for 2b: Develop recommendation algorithm, 3 months
Personnel for 2b: One Masters student to develop the algorithm under joint supervision of ImpactStory (collaborators) team and Dr. Alperin (PI)

The project will be carried out in Two tracks, spanning 17 months. After an initial planning and team-building period of two months (summer 2017), Track 1 begins immediately and concludes after 14 months. Track 2 begins in April 2018 (summer semester) and concludes after 8 months (December 2018).

Track 1 is largely composed of a 2-term MA student internship with the ImpactStory team (Dr. Piwowar and Mr. Priem, who are collaborators), which will see the completion of the website tool (research instrument), and is concluded with the experimental phase, data analysis, write-up and presentation.

Track 2 is a combination of research (interviews), algorithm experimentation, and further interviews to assess the algorithm. The track activities are concluded with a write-up and presentation phase.

Chronogram:

			2017						2018											
			Year 1 of grant												Year 2 of grant					
		Activity	July	A	S	O	N	D	Jan.	F	M	A	M	J	July	A	S	O	N	D
Track	0	Project coordination (hiring, planning)	X	X																
		MA Student 1 internship at ImpactStory																		
		Build website tool			X	X	X	X	X	X										
		Build deposit tool									X	X								
		Recruit participants (send out link to use tool)											X	X						
		Analyze data													X	X				
		Write results															X	X		
		Present at PKP Conf (student)														X				
		Present at DLF (Ms. Dowson)																	X	
	2	MA Student 2 internship at ImpactStory										X	X							
		Explore recommendation algorithms											X	X	X					
		PhD student to work with liason subject librarians to inform algorithm											X	X						
		PhD student to Interview faculty to assess new algorithm													X	X				
		Write results															X	X		
		Present at OpenCon (student)																	X	

*gray bands indicate the academic terms at SFU. Note that the student activities and internships are organized around these terms, and in such a way that there is only one student at a time working with the ImpactStory team.

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