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Canadian and South African Scholars' Use of Institutional Repositories, ResearchGate, and Academia.edu

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Abstract

Since their initial development in the early 2000s, institutional repositories (IRs) have proliferated around the globe. Due to low faculty participation, however, content recruitment has often posed a significant challenge for librarians and others promoting their use. Through the last decade, academic social networks (ASNs), such as ResearchGate and Academia.edu, have become popular among scholars as a means to communicate with each other and share their research. Semi-structured interviews were conducted with sixty scholars at six universities in Canada and South Africa to explore their views and practices pertaining to IRs and ASNs. Interviews were transcribed and coded to elucidate trends and themes in the data. The study found that few participants were active supporters of their local IRs. Lack of awareness, time limitations, and concerns regarding copyright remain some of the main obstacles to increased faculty participation. Conversely, more than half of the interviewees were active users of either ResearchGate or Academia.edu. These users valued ASNs both as a means of sharing their work and as tools facilitating connections with their colleagues internationally. Though IRs need not compete with these networks, proponents of open access repositories should be prepared to explain to faculty why they should consider having their research made accessible in a repository though they may already actively share their work through ResearchGate or Academia.edu. Significantly, both ASNs and IRs were more popular among South African than

Canadian researchers. It is hoped that the results of the study will be helpful in informing the understanding and decisions of librarians and others working to develop and promote IRs and green open access more broadly.

Keywords

Academia.edu; academic social networks; Canada; institutional repositories; ResearchGate; South Africa

Introduction

Institutional repositories (IRs) as we recognize them today first came into existence some fifteen to twenty years ago with the development of the EPrints and DSpace software packages in the early 2000s. Intended to serve as open access platforms making institutions' research output freely available to all with an internet connection, IRs have since proliferated; as of April 2018, the Directory of Open Access Repositories (OpenDOAR) lists over 3,000 IRs globally. Despite their growth in numbers, IRs have generally failed to meet their potential, as relatively few researchers actively support them through the submission of their work (Arlitsch & Grant, 2018). Proponents of IRs have found themselves fighting an uphill battle in their efforts to encourage faculty participation.

In the meantime, academic social networks (ASNs) have attracted millions of scholars during the last decade. ResearchGate and Academia.edu, both launched in 2008, are among the most popular. These sites help researchers to connect with each other, ask questions of their colleagues, keep abreast of others' work, and share their own research.

As a means of disseminating research, it has become clear that ASNs have quickly outpaced IRs (Borrego, 2017; COAR, 2017; Laakso, Lindman, Shen, Nyman, & Björk, 2017). This has led to questions being raised concerning whether or not IRs are in competition with ASNs—a competition that the latter would certainly be winning (see, for example, Coalition for Networked Information, 2017; Lovett, Rathemacher, Boukari, & Lang, 2017). Many librarians and other proponents of open access would be chagrined to see repositories drift into seeming obsolescence due to the impact of ASNs on the scholarly communication landscape. These networks may be viewed as a "watered-down version" of green open access, which places control "outside research institutions and into the hands, and onto the servers, of private companies" (Poynder, 2017, p. 6). While IRs are generally owned and managed by universities and other research institutions, ASNs are operated by private companies. Consequently, the commitment IRs typically have to the long-term preservation of research is not shared by ASNs, which place more emphasis on scholarly sharing and networking, and may be subject to the vagaries of corporate buyouts and closures (Laakso et al., 2017). In addition, websites such as Academia.edu and ResearchGate often require the user to create a personal account to access their content; this is not true of most repositories. The

potential for ASNs to begin charging for some services is likewise a concern that has been raised (see, for instance, Ruff, 2016).

Through interviews with 60 prolific scholars in Canada and South Africa, this study seeks to shed light on researchers' perspectives and practices concerning IRs and ASNs, particularly ResearchGate and Academia.edu. It is the authors' hope that the results of the study will be helpful in informing the understanding and decisions of librarians and others working to develop and promote IRs and green open access more broadly. Given their importance in the scholarly communication landscape, a deeper appreciation of the value of ASNs may contribute toward this end.

Literature Review

Scholarly communication as a field of study has grown significantly in recent years, attracting the attention not only of librarians, but of researchers from a wide array of disciplinary backgrounds. The volume of literature examining IRs has reflected this more general trend. A 2014 bibliometric analysis of research studying IRs identified 436 papers originating from 68 countries (Bhardwaj, 2014). Only a decade earlier, IRs were still, in many respects, in their infancy and just beginning to attract researchers' attention. Since their inception, repositories have been established at most universities and a number of research organizations in Canada and South Africa;[1] these have been the subject of several papers published over the last 15 years.

Much of the early scholarship on IRs in Canada reports on the development of new repositories, discussing considerations such as software platforms, policies, staff training and workflows, and initial advocacy efforts. For example, Benjelloun's 2005 article recounts the process through which the Archimède repository was created at Université Laval. Similarly, Mircea (2005) describes the development of OZone, a multi-institutional repository begun as an initiative of the Ontario Council of University Libraries (OCUL). Chan (2004) considers the implementation of T-Space at the University of Toronto in 2003. Even in these early years, the issue of low faculty participation was noted and discussed. A Canadian Association of Research Libraries (CARL) study published in 2006 concludes that "content recruitment is probably the biggest challenges [sic] for the implementers of IRs in Canada" (Shearer, 2006). Chan (2004) likewise finds poor participation to be a significant hurdle for T-Space and offers some possible reasons for it, including cultural inertia and lack of awareness, as well as uncertainty concerning copyright legislation, publisher license agreements, and intellectual property rights. To be sure, this problem was not unique to Canadian repositories, as these authors point out (Shearer, 2006).

Since the establishment of Canada's first IRs in the early 2000s, further research— typically focusing on particular aspects of repositories' use or functionality—has been conducted. Mondoux and Shiri (2009) created a directory of 27 Canadian IRs and evaluated their user interfaces, exploring their searching and browsing functionality and the use of knowledge organization systems, such as subject headings, to facilitate

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[1] As of April 2018, OpenDOAR lists 33 and 83 repositories in South Africa and Canada, respectively.

discoverability. They found that, in many instances, significant improvements could be made in these areas. In a related study, Park and Richard (2011) assess the consistency of metadata elements of electronic theses and dissertations across 10 Canadian IRs, concluding that significant variation exists, which may prove a hindrance in efforts to achieve standardization and interoperability. Returning to the issue of content recruitment, Betz and Hall (2015) explore the process by which librarians at MacEwan University in Edmonton, Alberta developed a user-friendly self-archiving function in an effort to facilitate and encourage faculty use of the repository. Finally, a recent paper by Massicotte and Botter (2017) examines the incidence of reference rot in electronic dissertations found in Concordia University's institutional repository, Spectrum.

In the last several years, literature has also been produced on repositories established at South African institutions. Two articles by van Wyk and Mostert (2011; 2014) relate the development of the University of Zululand's IR, UZSpace, outlining its strengths, weaknesses, and potential future directions. Muswelanto, van der Merwe, and van Deventer (2009) report on the processes adopted by South Africa's Council for Scientific and Industrial Research (CSIR) to ensure that scholarship is made freely accessible through its IR while adhering to copyright restrictions. Echoing some of the concerns raised by Canadian scholars noted above, van Wyk and du Toit (2016), having studied 16 IRs in southern Africa, argue that shortcomings in curation practices will prove detrimental to the sustainability and interoperability of many of these repositories. Also reminiscent of experiences in the Canadian context is Fox and Hanlon's (2015) assertion that researchers in Africa have been slow to take advantage of the opportunities IRs offer. They cite many of the same reasons listed by Chan (2004) a decade earlier, adding language barriers and insufficient technological infrastructure and expertise as additional hindrances for African universities. They point to South Africa as a leader within its continent in the adoption of open access methods of research dissemination, however. The significant extent to which many South African public universities have developed their IRs is highlighted in Bangani's (2018) very recently published paper exploring the history, current status, and future directions of IRs in the country.

In a thought-provoking paper published in 2015, Raju, Adam, and Powell consider the impact of open access research and educational resources on scholarship in Africa and South Africa in particular. They conclude that open access initiatives are not only providing African scholars with increased access to research; they are also facilitating African countries' shift from being merely consumers of scholarly information to being both consumers and producers of research. They write that "the relatively rapid growth of institutional repositories radically improves the visibility and accessibility of African scholarship" (p. 156). The authors expect that this will help to stem the "brain drain" to more developed countries. The creation and maintenance of IRs is of particular importance to African researchers, universities, and nations, more generally.

Thus, the development, evaluation, and use of IRs in South Africa and Canada has received considerable attention in the scholarly literature to date, reflecting the broader

trend of increasing interest in scholarly communication issues. While the opportunities and challenges discussed in the research cited above are indeed important and warrant our attention, new areas of inquiry remain to be explored. Relatively little has been written on researchers' perspectives on IRs and their value in the Canadian and South African contexts. Fullard (2007) surveyed South African scholars as well as university and research organization administrators to determine their perceptions of open access; however, this research was limited to authors publishing in biomedical fields and focused primarily on open access journals (i.e. gold open access) rather than repositories (i.e. green open access). Similarly, while it is clear that many scholars in both countries have become active users of ASNs such as ResearchGate and Academia.edu (Onyancha, 2015; Thelwall & Kousha, 2015), research studying how and why they are using these sites is limited. It is the authors' hope that this paper will serve to contribute to our understanding in these areas.

While little has been written on the use of ASNs in South Africa and Canada, this topic has received some attention internationally, especially during the last three years. In a 2015 paper, Ortega considers the disciplinary backgrounds of Spanish National Research Council scholars with profiles on ResearchGate, Academia.edu, Google Scholar Citations, and Mendeley. He found that Academia.edu was particularly popular among scholars in the humanities and social sciences, while ResearchGate was well used by biologists. In an article published two years later, Ortega (2017) finds that while disciplinary biases persist, they are weakening as more scholars studying poorly represented fields create profiles. Williams and Woodacre (2016) offer a brief review of the literature on ASNs, highlighting their potential benefits and drawbacks. Through a survey of 728 faculty members at the University of Rhode Island, Lovett et al. (2017) examine scholars' practices and attitudes concerning ResearchGate and the University's open access policy, concluding that the majority of participants did not participate in either. In a similar study, Muscanell and Utz (2017) surveyed primarily American and European scientists to learn about their usage of ResearchGate. They found that most respondents who had created a ResearchGate profile did not use the site extensively and did not find it very beneficial. Finally, having analyzed a random sample of 500 full-text articles made available on ResearchGate, Jamali (2017) argues that a significant proportion of ResearchGate users are infringing copyright, though he could only hypothesize why this is so. Thus, this paper joins a small but rapidly growing body of literature studying academics' use of ASNs around the globe.

Methodology

This paper reports some of the results of a broad study of Canadian and South African scholars' behaviours and perspectives pertaining to various aspects of scholarly communication. Sixty scholars across a wide range of disciplines (see Table 1), including the humanities, social sciences, natural sciences, engineering, medicine, and business (the latter three areas are grouped in the table as "professions"), participated in semi-structured interviews covering an array of topics, such as altmetrics, institutional and subject repositories, academic and popular social networks, gold open access publishing, and the traditional scholarly publishing model (see Appendix A for a list of

interview questions). This article focuses on the interviewed researchers' use of IRs and ASNs, specifically ResearchGate and Academia.edu. South Africa and Canada were chosen primarily for the sake of convenience; the authors have lived and worked in Canada and South Africa and thus had personal connections that facilitated research in these countries.

Table 1

Interview participants by broad disciplinary area

Discipline	Canadian Scholars	South African Scholars
Natural Sciences	9	9
Social Sciences	7	8
Humanities	5	6
Professions	9	7
Total	30	30

Six institutions were included in the study: North-West University (South Africa), Stellenbosch University (South Africa), the University of Calgary (Canada), the University of Lethbridge (Canada), the University of Pretoria (South Africa), and the University of Victoria (Canada). These institutions were selected primarily to optimize the feasibility of the study. Ethics approval was received from each university. Ten researchers at each institution, and thus 30 researchers from each country, were interviewed. As the authors were especially interested in practices concerning publishing and other means of disseminating research, prolific scholars were targeted. Scopus, Web of Science, and Google Scholar were used to identify prolific researchers based on the number of publications they had authored or co-authored in each database.[2] To avoid having interviewees disproportionally represent disciplines in which research output tends to be numerically greater, scholars from a variety of subject backgrounds were sought at each of the six universities. Potential study participants identified through this process were contacted by email until interviews had been scheduled with ten researchers at each institution. When a request was declined, the next most prolific author in the broad disciplinary area was contacted. A total of 49 individuals declined the invitation to participate; this is not surprising given faculty members' typically busy schedules. No incentive was offered to participants; however, the interviewer found that including a link to each individual's Scopus profile in the email invitations often roused the recipient's interest. In-person interviews were conducted between November 2015 and April 2016 and averaged approximately 30 minutes. They

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[2] There are no doubt limitations in using these resources to identify potential study participants. Not all research outputs are captured by Scopus, Web of Science, and Google Scholar. In addition, some subject areas are disproportionately represented in these tools. In certain instances, poor author disambiguation can also result in misleading figures. Still, as they are among the largest and most comprehensive databases of scholarly work, the authors found them a useful means of identifying prolific researchers. See also the section pertaining to study limitations below.

were audio recorded and subsequently transcribed by the authors and two research assistants. Descriptive coding was undertaken to facilitate analysis of the interviews. Using NVivo 11, the authors independently coded a few interviews and then met to agree on a code list. One of the authors then used this list to code all 60 interviews. Because coding was completed by one individual, cross-checks were not done after the code list was agreed upon; this is a methodological limitation of the study. When coding was finished, the authors proceeded to analyze the data. Using the NVivo software, excerpts from the transcripts were collated based on coding and grouped by country, university, and broad disciplinary background. This process proved helpful in identifying trends and themes in the data.

Results

Use of Institutional Repositories

During the interview stage of the research project, it became clear that relatively few participants were active contributors to an IR. This observation was supported quantitatively by several figures that were gathered in preparation for the interviews. Collectively, the 30 Canadian scholars included in the study had authored 5,561 items indexed in Scopus; conversely, these same researchers had only 254 items listed in their IRs. The figures for South African participants show significantly greater use of repositories, though, as will be seen, this is due in part to institutional policies and the efforts of library staff rather than the initiative of the researchers themselves. The 30 South African interviewees had authored 3,314 items indexed in Scopus; approximately half as many—1,713—could be found in their IRs.[3] For more information on the IRs hosted by the six universities included in the study, see Table 2. Note that the South African IRs are well populated.

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[3] A few limitations of these figures should be noted. First, as Scopus does not comprehensively index all forms of scholarly output in all disciplines, the items indexed in Scopus should not be viewed as an exhaustive list. Second, though efforts were made to include items listed under all variations of each author's name, some items may have been missed due to the lack of authority control in some IRs. Finally, in many IRs, theses and dissertations are included within supervisors' lists of research output, thereby inflating the figures. Despite these limitations, the data demonstrate that only a fraction of participants' research has been uploaded to their IRs, especially in the Canadian context.

Table 2

Institutional repositories at the six universities included in the study

University	Number of Items	Item Types	URL
Lethbridge	3,253	Articles, theses, reports	https://www.uleth.ca/dspace/
Calgary	18,664	Articles, theses	http://dspace.ucalgary.ca/
Victoria	4,867	Articles, theses, video, audio, books, technical reports	https://dspace.library.uvic.ca:8443
Pretoria	31,943	Articles, theses	http://repository.up.ac.za/
North-West	9,990	Articles, theses, inaugural lectures, Africana	http://dspace.nwu.ac.za/
Stellenbosch	53,063	Articles, theses, inaugural lectures, presentations	http://scholar.sun.ac.za/

Factors Contributing to IR Use

The handful of study participants who actively support their local IRs generally do so due to an appreciation of the merits of open access research. As one Canadian biology professor commented, "The library makes it publically accessible, so that's useful." Similarly, a South African researcher in the natural sciences lauded library staff for the development of an open access repository: "I think they are doing an invaluable job … I am perfectly happy for my published stuff to be out there for everybody to see." A Canadian scholar who studies marketing observed that having journal articles made available through an IR is especially important for researchers in countries in which universities cannot afford many subscription resources. Multiple participants noted the value of IRs in providing access to grey literature in particular. Those materials that are not typically made available through traditional publishing channels, including theses, dissertations, reports, and conference proceedings, may be uploaded to an IR to ensure their accessibility. A Canadian researcher in the health sciences appreciated the extent to which his peer reviewed summative reports, having been uploaded to an IR, were being used:

> The free availability through the institutional repository is what's caused these things to be cited so many times. People know that I put all my major works on the institutional repository…. I'm very, very pleased with the repository here, because I know these things have been downloaded thousands of times.

Beyond bolstering usage metrics, he went on to explain that providing open access to research is important because "we're paid from the public purse. I think our products need to be publicly available and as free as possible."

Other interviewees were taking advantage of their IRs to satisfy the requirements of funding bodies or institutional policies. One researcher in chemistry, for example, noted that he would soon have to use an IR because of the Canadian Tri-Agency Open Access Policy on Publications, which mandates that all funding recipients ensure that their research is made available through open access channels within 12 months of publication (Government of Canada, 2016). In 2009, the University of Pretoria adopted a policy requiring its faculty and students to "submit peer-reviewed postprints of their articles and published conference papers to UPSpace, the University's institutional repository" (University of Pretoria, 2009). Interestingly, the policy was almost invariably well regarded by study participants at the University of Pretoria. A faculty member studying medicine said that he was happy to send manuscripts when they are requested. A professor in the social sciences likewise remarked, "if the UP library asks me for one of my articles, I immediately send it…. I appreciate the effort they put into that, to remind me." Another researcher in the natural sciences stated that "they [library staff] have been very good in approaching me, and getting me to submit material to go along to the repository. So, I have been working quite readily and steadily with them."

To be sure, the success of UPSpace appears to rest heavily on the library staff who track faculty publications and request postprints from authors. Interviewees generally regarded the ongoing population of the IR as chiefly the Library's responsibility rather than their own. Indeed, many participants from other institutions, especially Canadian universities, were surprised to learn that some of their research had been uploaded to an IR. These items had not been indexed in the repository due to their own initiative, but that of library staff members, students, or coauthors. A few interviewees regarded this with a degree of distrust and suspicion. Upon learning that several of his articles were accessible through an IR, one Canadian professor of engineering questioned, "those papers of mine that are there—I should look at what is there. Where did they get that from? Did they get that from my website?" Authors who are unaware of their IR, its purpose, or the processes by which items are made accessible through it may be wary upon finding their research openly accessible without their knowledge or permission. The concerns of study participants who were initially wary of their university's IR were largely allayed when the interviewer explained the purpose of IRs and their value in the scholarly communication landscape.

Barriers to IR Use

While some interview participants are active supporters of their IRs, most are not. Among the most important reasons for this is a lack of awareness. At least seven Canadian interviewees across the natural sciences, social sciences, and humanities readily conceded that they did not know about their IRs. An economics professor, having been asked about his use of his university's IR, exclaimed, "You're aware of this, and I'm not!" A historian similarly commented, "I don't really know what they [IRs] are. It's the first time I've heard about them, quite honestly." Notably, only one South African scholar indicated that he had no prior knowledge of his IR.

Though a significant number of participants knew little or nothing about IRs before being interviewed, many showed keen interest after receiving a brief explanation of their

purpose and the opportunities they afford. "I'd be delighted to get more into that," a Canadian researcher in geography noted. "That is beautiful—I am all in," a business professor echoed. "I promise you I will look into that," one philosopher assured. While lack of awareness is certainly not the only factor hindering faculty use of IRs, overcoming this obstacle would go a long way in garnering support from researchers.

Perhaps as important as the lack of awareness among scholars is their lack of time. As a South African genetics researcher observed, "I think the reality for many of us is, we are incredibly overloaded." In a similar vein, a Canadian humanities scholar asserted, "This is definitely something I should do something about; I just haven't had the time." One South African researcher in engineering had hired a research assistant to find the postprints of articles he had authored and have them uploaded to the IR and other venues. "It's a full-time job," he remarked. For those who have to take time out of their own busy schedules to have their research made available in an IR, the task is seldom completed. "We have to upload these things ourselves … I don't have the time for it," a South African geography professor stated frankly. It is largely due to time constraints that researchers leave much of the work in populating IRs to library staff. "To me, I say a librarian can do it," concluded one South African researcher in the natural sciences.

A handful of scholars were apathetic toward IRs. Having been asked how some of his papers had been uploaded to his university's IR, a South African economist dismissed the question: "I have no idea and I don't care…. These things that the university is posting, I couldn't really care about it." Other researchers were hesitant to use repositories because of copyright concerns. When asked whether she would consider having her research made available through an IR, one Canadian English professor supposed, "most of the journals I publish in would not necessarily be down with that, I think." Another humanities researcher from South Africa explained that he is similarly cautious due to copyright considerations:

> I am oversensitive about copyright. They have this nice idea—save the post-adjudicated, pre-published version…. I have a problem with that. For me, that is not copyright safe. Because my post-adjudicated, pre-published journal [article] looks the same as my published version.

Apart from lack of awareness, time limitations, apathy, and copyright concerns, a few participants raised other issues leading them to avoid using an IR. Usability was one such issue. "I never figured out how to do it," a Canadian women's studies professor admitted in response to being asked whether she had ever had any of her research uploaded to an IR. Another Canadian researcher in economics expressed reservations concerning the impact of open access repositories on the traditional publishing model: "Is this a road to killing off the academic journals?… I am a little concerned that this is going to kill the model." Finally, a Canadian physicist suggested that IRs are not ideal venues for sharing his research due to their local nature: "It is such an international field, that any forum that was not fully international would not make sense." Indeed, no single IR can compete with popular international subject repositories and ASNs in terms of size and number of users; they are not intended to do so. However, this highlights the importance of developing IRs that are discoverable through search interfaces likely to

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be used by scholars internationally (COAR, 2017). Improvements to the interoperability of IRs may also allow repositories collectively to offer networking options that are more appealing to faculty.

Use of ResearchGate and Academia.edu

During discussions concerning IRs, several study participants explained that while they were not active users of IRs, they did make their work available through ASNs. A Canadian social sciences researcher, for example, pointed out that though he had not had any of his research archived in an IR, in the last year he had begun uploading postprints of his articles to Academia.edu. One paper, he noted, had already been downloaded 53 times. "I guess I am doing that form of self-archiving," he surmised. Another Canadian scholar in the humanities, upon learning about his university's IR, replied, "Oh, it's like Academia. Because everybody does Academia … in part because it is accessible to people in other countries…. Oh I see, so this is competition for Academia." There was a clear perception among at least a handful of interviewees that ASNs were effective means of achieving open access and were comparable alternatives to institutional and subject repositories. A South African researcher in the natural sciences explained that he had never seriously considered publishing in an open access journal because there were two workarounds: a personal request or ResearchGate. An understanding of these perceptions will be important in efforts to have scholars recognize the merits of IRs.

All interview participants were asked whether they use Academia.edu and ResearchGate. See Table 3 for figures representing the use of these ASNs among participants. Nine Canadian and 15 South African researchers had profiles on Academia.edu, though approximately half in each group indicated that they seldom use the website. Conversely, 14 Canadian and 22 South African interviewees had profiles on ResearchGate. While half of the Canadian scholars noted that they were not active users of the site, only two of the South African scholars explained that their accounts were inactive. Slightly more than half of the study participants were active users of at least one of the two websites with ResearchGate being the most popular. ResearchGate was more commonly used in the sciences and social sciences, while Academia.edu had proportionally more users among researchers in the humanities; this observation generally aligns with broader trends noted in the literature (Thelwall & Kousha, 2014; Ortega, 2015; Thelwall & Kousha, 2017). Both ASNs received greater use among South African study participants than those in Canada. They were also more heavily used than IRs in both countries.

Table 3

Use of ResearchGate and Academia.edu among participants by country

Country	ResearchGate Accounts	Academia.edu Accounts	Active Users of Both	Active Users of Neither
Canada	14 (7 inactive)	9 (4 inactive)	1	19
South Africa	22 (2 inactive)	15 (7 inactive)	4	8

Factors Contributing to ASN Use

Participants offered several reasons why they use ResearchGate and Academia.edu. One, as seen above, is the access they afford to research. "I do see the value in that people are quickly able to read an article, and to share it and to cite it," a Canadian scientist related in reference to ResearchGate. A second Canadian science professor echoed this assertion, having found that ResearchGate was very helpful in procuring obscure articles. The access provided by ASNs can also facilitate the promotion of one's research; a South African scientist concluded, "I find that it probably does assist substantially with the exposure of my work to the community." The provision of usage metrics on ResearchGate and Academia.edu help to demonstrate the extent to which users' research is making an impact through the sites. As one Canadian researcher argued, "ResearchGate gives you a lot of information…. They say who is reading your article, how many people have cited your article, here is who has cited, and so they are giving me a lot of useful information." Many scholars appreciate this data, and some track it closely; one interviewee knew his ResearchGate score to the hundredth decimal place.[4] A South African engineering professor jokingly confessed, "I must say sometimes we are in a bit of a competition between guys saying 'I passed you on the [ResearchGate] score.'" The value placed by some scholars on such metrics provides incentive for them to participate more actively on ASNs.

A number of interview participants used ResearchGate and Academia.edu primarily to network with other researchers, rather than to make their work more widely accessible. In reference to Academia.edu, a South African scholar in the health sciences commented that "it is just for people to find me." Similarly, a Canadian medical researcher explained, "ResearchGate—that is something I signed into because it gives me connections to other investigators." Some users appreciate the ability to send and receive questions from others in their field. A South African scientist noted that he had received inquiries "from all around the world, all sorts of questions, some of which are unbelievably stupid and naïve, and some of which are extremely good." Another South African scholar in the health sciences remarked, "It is also nice to put faces with names, you know, people you have been citing, so that social aspect I think is quite nice." She

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[4] The ResearchGate (RG) score is a measure calculated by an algorithm that takes into account one's contributions, interactions, and reputation on ResearchGate.

went on to explain that a bad experience had led her to be wary of using ASNs as vehicles for collaboration, however.

Finally, a few study participants cited usability as a key reason for their use of ResearchGate and Academia.edu. In reference to the latter, one Canadian researcher stated, "It does not take you forever to learn it. It is very intuitive, and then you can post things." A Canadian engineering professor echoed this assertion about ResearchGate, adding that he appreciated that the website identifies one's publications and asks if they should be added to their list of works. Other scholars pointed out that having publisher license terms displayed was helpful.

Barriers to ASN Use

Interviewees also identified many reasons why they do not use ASNs, or do not do so extensively. Chief among them was limited time. As one Canadian social sciences professor exclaimed, "I just can't keep up with this stuff! I mean, just keeping up with classes and the research I like to do is hard enough." A significant number of study participants found themselves in a similar predicament. Though they might appreciate the value of ASNs, they could commit little or no time to them; a South African researcher in medicine explained, "It is not that I don't approve of any of these things; I am concerned about how time-consuming or perhaps all-consuming they can become and divert my attention from more important activities." "I realize these things have value, but I don't have time to play with self-promotion," a Canadian social sciences professor echoed. A few study participants expressed frustration with the volume of notifications they receive from ResearchGate and Academia.edu. "They [ResearchGate] flood me with information and I just get actually quite angry sometimes, and then I distance myself from the whole thing," one South African scholar in the health sciences criticized. Another South African scholar in the humanities shared a similar experience: "They are annoying me with too many automatically generated things."

Several interview participants were concerned that the dissemination of publications through ASNs violates copyright legislation. A South African humanities professor shared, "I am a bit wary to put my publications on social media because of copyright issues…. I don't know whether journals would allow it. My knowledge on copyright issues is probably a bit limited." A Canadian natural sciences scholar similarly noted, "People are now sharing their publications through it [ResearchGate], which is kind of below the board, because they really belong to the publisher…. I just don't feel good about that." To be sure, other researchers uploaded their work to Academia.edu and ResearchGate despite their knowledge of publisher copyrights. "I do load my papers there, which is probably illegal," a South African scholar in the natural sciences readily admitted. A colleague at the same institution elaborated further:

> I have no qualms about circumventing it, because the publishing houses are making money out of our IP [intellectual property] anyway. So I have no qualms putting it on ResearchGate. I wouldn't even look at the [publisher-licensing] status if it is red or green. I just load it up.

Clearly, copyright considerations are not a deterrent for all scholars, including those who have a better understanding of publishers' copyrights.

Interviewees offered a handful of other reasons why they don't use ASNs. A lack of awareness was one, though it was significantly less common than with respect to IRs. In addition, though some researchers were not familiar with ResearchGate or Academia.edu, they had typically at least heard of one of them. A few participants found the user interfaces wanting, with some preferring ResearchGate and others Academia.edu. A South African professor in the natural sciences explained, "I struggle to use it [Academia.edu] for some reason. I find ResearchGate a lot easier." Conversely, a Canadian marketing researcher argued that ResearchGate "is not nearly as user-friendly as Academia.edu." Several scholars, most conducting research in physics, mathematics, and computer science, preferred subject repositories, particularly arXiv.org, to ASNs as a means of sharing their work broadly. As a Canadian physicist bluntly stated, "One might even say, if it hasn't been submitted to the arXiv, it does not exist. It really is the repository that is used throughout my field." Finally, a small handful of interviewees expressed concern regarding the organizations behind ASNs, and thus their sustainability. "Is there a company behind it?" a Canadian engineering professor asked warily. A South African scholar in the natural sciences offered related concerns: "People put a lot of time into establishing a significant presence, and if it proves not to be sustainable and it crashes, it is a waste of time." These participants were hesitant to invest in websites they did not know they could trust for the longer term.

Discussion

It is clear that most study participants did not actively use IRs to share their research. Several interviewees had had their work uploaded to IRs either due to a recognition of the value of the open access to research they afford or efforts to satisfy the requirements of funding bodies and institutional policies. These scholars were in the minority, however. The results of this study strongly suggest that faculty participation remains a significant hurdle for advocates of IRs to overcome. In many respects, the challenges identified by Chan (2004) and Shearer (2006) more than a decade ago persist. Lack of awareness among researchers remains fairly common, particularly in Canada. Busy schedules keep many scholars from taking time to understand and use IRs. Apathy, concerns related to copyright, and poor usability are among the other reasons why faculty are not more actively taking advantage of IRs.

Regarding copyright concerns, in most instances, publisher policies allow authors to self-archive a postprint of their article in a repository, though an embargo period may be required. Ensuring that researchers are aware of the legitimate, legal options available to them as authors may encourage many to more readily take advantage of their IRs. SHERPA/RoMEO may be a useful tool for this purpose; very few interviewees were aware of this online database of publisher copyright policies.

The University of Pretoria provided an interesting case in that it had adopted a policy several years prior to the study requiring that researchers submit their manuscripts to be uploaded to the University's repository. This policy was generally supported by the U of

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P scholars interviewed; however, the onus was placed on library staff to identify new publications and request postprints from authors. While the policy appeared to have proven effective, its success rested heavily on dedicated library support. A similar finding was reported by Zhang, Boock, & Wirth (2015), who asserted that "direct solicitation of author manuscripts is more successful in facilitating OA than an OA policy" (p. 1). They go on to argue that until "institutional policies are in place that require article deposit for promotion and tenure review, institutional OA policies will only be as effective as the library mediated processes that are put in place to identify and solicit articles from faculty" (p. 15). Any university considering the development of a policy similar to that adopted by the U of P, then, should be prepared to provide considerable library support to ensure its effectiveness.

Generally, ASNs were significantly more popular than repositories among interview participants. Some researchers viewed ResearchGate and Academia.edu as viable alternatives to institutional or subject repositories as means to archiving and sharing their research. It is important for proponents of IRs to understand this perception as they advocate the use of repositories instead of or in addition to ASNs. It should be noted that a recently published article by Lovett et al. (2017), studying faculty at the University of Rhode Island, found that users of ResearchGate were in fact more likely to have manuscripts uploaded to the University's repository; those who made efforts to disseminate their work often did so through multiple venues. Thus, they argue, we "should not see academic social networking as a threat to open access" (p. 27). Indeed, IRs and websites such as ResearchGate and Academia.edu need not compete with each other; however, faculty should be educated as to why they should consider having their research made accessible in a repository though they may already actively share their work through an ASN.

Many of the reasons why interviewed scholars chose or chose not to use IRs were similar to those factors influencing their participation in ASNs. These considerations may inform library efforts to develop, improve, and promote IRs. As time is clearly an important concern for faculty, having manuscript submission processes that require little of their time is essential. In addition, interviewees indicated that they value user-friendly interfaces and the provision of impact metrics; these would also encourage faculty participation in repositories. Improving integration and interoperability of repositories may afford networking functionality attractive to scholars that is not otherwise possible (COAR, 2017; Laakso et al., 2017; see also COAR, 2015). Finally, researchers' awareness and understanding of IRs, publisher copyright policies, and the value of open access in light of the current scholarly publishing model remains limited. Efforts to educate faculty in these areas have much left to accomplish.

Overall, South African and Canadian scholars shared more commonalities than differences. Interview participants in both countries participated in ASNs more often than IRs, and repositories were not widely used at any of the institutions included in this study, save the University of Pretoria, which was an exception for reasons discussed above. Researchers in both Canada and South Africa expressed concerns about limited time, copyright restrictions, and usability of repositories and ASNs. The minority of

interviewees who actively supported an IR generally did so for similar reasons; they valued the provision of open access to research and made efforts to satisfy the requirements of institutional policies and funding bodies.

These likenesses aside, it is important to point out that there was greater use of both IRs and ASNs among South African scholars. This trend was suggested by the quantitative data gathered early in the study and confirmed through the interviews. While several Canadian researchers were unaware that their universities had a repository, only one participant in South Africa had not known about their IR prior to the interview. Why these differences exist was unfortunately not elucidated through the interviews. It may be that South African scholars, researching at institutions that tend to have fewer resources than those in Canada, more readily understand the value of open access for less developed countries (see Raju, Adam, and Powell, 2015). This is merely a hypothesis, however.

Limitations of Study and Further Research

A few limitations of this study must be noted. First, the two years that have elapsed between the time at which the interviews were conducted and the time of publication must be acknowledged. Second, there are drawbacks in using Scopus, Web of Science, and Google Scholar to identify prolific researchers, as detailed in a note above. Third, as this study targeted prolific scholars, interview participants were likely not representative of faculty at their universities. The process through which potential interviewees were identified resulted in a large number of mature scholars having been included in the study, as older researchers have had more time to amass a lengthy list of publications. Many of these participants established themselves as scholars before the advent of IRs, ResearchGate, and Academia.edu, and thus first developed values and habits in scholarly communication when these tools were not available. Moreover, mature researchers are typically not striving to attain full-time positions or achieve tenure, which may influence how they approach their research and its dissemination. The means of identifying study participants also resulted in relatively few women having been included in the study, as men typically comprised the majority of academics listed as having the greatest numbers of publications by institution and broad disciplinary background. This was especially true in the sciences.

Because scholars at only three institutions in each country were interviewed, it should likewise not be assumed that participants' views and practices represent those of researchers across their respective countries. The three Canadian universities, for example, are all situated in Canada's two westernmost provinces, Alberta and British Columbia. The perspectives of faculty at institutions in central and eastern Canada, including francophone universities, are not captured in this paper.

Further research may attempt to fill some of these gaps. Does the usage of repositories and ASNs vary between English- and French-speaking researchers? Does it vary between mature faculty and their colleagues who are at earlier stages in their careers? This study found that South African participants tended to use both IRs and ASNs more often than their Canadian counterparts. Additional research could determine whether

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statistically significant differences between use in Canada and South Africa—among other countries—exist and go on to investigate the reasons behind these differences.

As the global scholarly communication landscape is in a continual state of flux, significant developments have occurred since the interviews were conducted. The creation of ScholarlyHub as an alternative to other ASNs and ResearchGate's decision to restrict access to millions of articles in response to increasing pressure from academic publishers are examples of only two such developments (Matthews, 2017; Offord, 2017). How these and other changes are impacting the means by which scholars communicate with each other will continue to provide new areas of inquiry for researchers interested in this growing field.

Conclusion

Since their initial development some 15 to 20 years ago, thousands of institutional repositories have been established around the world. While IRs have attracted the attention of many researchers, little literature exists considering their value and use from the perspective of Canadian and South African scholars. Similarly, little has been written on the use of ASNs, such as ResearchGate and Academia.edu, in the Canadian and South African contexts. Through interviews with 30 prolific scholars in each country, this study aims to shed some light on this area of inquiry.

Faculty participation clearly continues to pose a significant challenge for those involved in the development and promotion of IRs; relatively few interview participants had had any of their work uploaded to an IR. Lack of awareness, limited time, and concerns regarding copyright violation remain obstacles to increased faculty participation. Many interviewees did appreciate the open access to research that IRs afford, however. ASNs were consistently more popular than IRs, though they are often used for reasons beyond the dissemination of research, and a significant number of study participants were active users of neither ResearchGate nor Academia.edu. While IRs need not compete with these networks, many researchers would benefit from a better understanding of the role IRs can play in the provision of open access to scholarly literature, such that they recognize the value of having their research made accessible in a repository though they may already actively share their work through ResearchGate or Academia.edu. Significantly, both ASNs and IRs were more popular among South African than Canadian researchers.

It is the authors' hope that librarians and others working to promote open access through the use of repositories find the results of this study helpful in their efforts to foster increased faculty participation. As the scholarly communication landscape continues to evolve, those seeking to influence the direction it takes should strive to better understand the values, perspectives, and practices of the scholars themselves. After all, they are, in many respects, at the wheel.

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Appendix A: Semi-structured Interview Questions

The following questions were asked of study participants. In some instances, explanation of terms used in the questions was required. Questions were designed to elicit conversation with interviewees, including further questions posed by the interviewer in response to topics raised by the participants. Note that this paper reports only those study results pertaining to institutional repositories and academic social networks.

What form does your scholarly output typically take?

Inquire about specific formats: journal articles, books, book chapters, conference proceedings, reports, images, audio and audiovisual formats, datasets, patents, computer software, etc. If they produce datasets, ask about their data management practices.

When choosing a journal in which to publish, what considerations guide your decision?

If the participant does not mention the following considerations, ask about them specifically: journal scope, audience, impact factor and other metrics, speed of publication, and open access options.

Have you had any of your research uploaded to a repository?

Inquire specifically about their university's institutional repository and noteworthy subject repositories in their field, as applicable. Depending on the participant's response, ask why they have or have not used a repository.

Do you use academic social networking websites?

Inquire specifically about ResearchGate and Academia.edu. Depending on the participant's response, ask why they have or have not used these websites.

Do you use popular social networking websites to advance or disseminate your research?

Inquire specifically about Facebook and Twitter.

Are you familiar with altmetrics, and if so, how well do you think they represent the value and impact of one's research?

Ask the participant if they would value the provision of altmetrics, either by a library or publisher.