TITLE: A Case Study of Librarian Outreach to Scientists: Collaborative Research and Scholarly Communication in Conservation Biology

KEYWORDS: Scholarly Communication, Altmetrics, Data Sharing, Research Collaboration, Social Networks, Open Access

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ABSTRACT

Global collaboration is increasingly important across universities and conservation biology organizations. In this example, a partnership resulted in the creation of a short-course aimed at exploring communication forms and digital tools that facilitate scholarly communication in conservation biology. Questions the authors hoped to answer in the course were: What are the benefits and limitations of these tools? How can researchers in conservation biology use these methods to share data, show impact and connect to colleagues and stakeholders? Why is open access even more important in this highly collaborative scholarly environment? How can communities of interest benefit scientists and the public?

INTRODUCTION

Global collaboration is increasingly important across universities and conservation biology organizations, and becomes more so as the scholarly communication environment evolves. While this evolution requires increased technical savvy, it allows for more creative collaboration that crosses institutional boundaries more easily and frequently than ever before. In this example, a partnership between the Distance Education Librarian at George Mason University Libraries and the Conservation Biology Librarian at the Smithsonian Libraries resulted in the creation of a short-course aimed at exploring communication forms and digital tools that facilitate scholarly communication in conservation biology. The authors collaborated with a Smithsonian Conservation Biology Institute (SCBI) training manager who teaches courses for the Smithsonian-Mason School of Conservation (SMSC) interested in developing a course on this topic. To assist the authors in learning about these emerging scholarly communication methods, the authors invited technology savvy SCBI researchers as well as two project coordinators from the Encyclopedia of Life (EOL) to serve as guest speakers and to help the librarians learn about these emerging trends from the perspective of practitioners.

Questions the authors hoped to answer in the course were: What are the benefits and limitations of these tools? How can researchers in conservation biology use these methods to share data, show impact and connect to colleagues and stakeholders? Why is open access even more important in this highly collaborative scholarly environment? How can communities of interest benefit scientists and the public? The authors highlight the course content and share results from the survey of course participants.

LITERATURE REVIEW

The focus of most of the literature thus far with regards to faculty and librarians in academic collaborations has relied predominantly on traditional relationships such as librarians collaborating with faculty to provide information literacy instruction to students (Gallegos and Wright 2000). More recently initiatives have evolved to embed librarians in online courses (Schulte, 2012) or to incorporate library resources and services into courses and collaborate on library assignments (Bhatti 2009). In fact, the literature is replete with examples of faculty and librarian partnerships to teach information literacy skills and improve student outcomes in courses (Massis 2012; Mavodza 2011; Mounce 2010; Rader 2002) with one study attributing 60% of librarian/faculty collaborations to information literacy goals (Gallegos and Wright 2000, 98).

Collaborations among librarians and scientists or researchers in non-university settings are not as well documented in the literature. Galloway, Pease and Rauh (2003) discuss the

benefits of altmetrics to scholars and how librarians can assist scholars with new ways of tracking research impact by engaging faculty entering the tenure track.

Many see librarians' roles as evolving to include educating researchers about new scholarly communication tools, and advise that future efforts should focus on the development of library services and librarian roles in relation to support of scholarly communication and social media. As librarians, we should be communicating with the researchers we support regarding new tools and methods of scholarly communication that can advance their research and scholarship including offering training and services around these new applications. (O'Dell 2010; Malenfant 2010; Gu and Widén-Wulff 2011).

While O'Dell (2010, 248) argues "The most significant obstacle encountered thus far has been the culture change that has had to happen for faculty to accept support from the library beyond information gathering." Malenfant (2010, 73) contends that there is a culture change necessary for librarians too, who must not only develop a new knowledge base-- understanding scholarly communication--but must develop new skills, namely advocacy and persuasion. He notes, "if we want people to work in new ways, they have to be comfortable hearing 'no' and feel that it's OK" (Malenfant 2010, 71).

In special libraries, where embedded librarianship is a common collaboration model, librarians serve as collaborators on research projects or as part of a research team. These project-based partnerships have a start and an end date, and at the end of the project the librarian's commitment is over (Carlson and Kneale 2011; Brandt 2007; Reynolds, Smith and D'Silva 2013). An additional collaboration mode of embedded librarianship is the programmatic-based collaboration where librarians are hired by an organization on a full-time, ongoing basis. This librarian will have defined functions and responsibilities to support the research activities of the organization. Unlike the project-based approach, this librarian supports multiple projects within the organization (Carlson and Kneale 2011).

CROSS-INSTITUTIONAL COLLABORATION

Of all the collaboration models discussed, this article aligns with the project-based collaboration model and is a case study of a unique partnership that involved librarians, faculty and scientists from across a number of institutions, including; Mason Libraries, Smithsonian Libraries, the SMSC, the SCBI, and the EOL.

The original goal of this collaboration was to develop the curriculum and co-teach a SMSC course for conservation biologists about emerging scholarly communication methods. The endeavor began when the Smithsonian Libraries Conservation Biology Librarian had a research consultation with a SMSC instructor which led to an invitation to collaborate on the course. Due to the Smithsonian-Mason partnership, the Mason Libraries Distance Education

Librarian was invited to participate. The faculty member was initially surprised by how much librarians know about these topics and our willingness to collaborate.

The full course has not yet been offered by SMSC, but after several meetings we decided that there was interest in moving forward and that this would be a great topic for the upcoming International Congress for Conservation Biology (ICCB) conference which would be held locally in Baltimore, MD. A pre-conference short-course would provide an opportunity to pilot the course content with conservation biologists. Although conversant on many of the topics related to scholarly communication, the librarians knew they had more to learn. After conducting research on emerging tools and digital scholarship issues, the librarians met again with the faculty member to plan the course curriculum. The librarians, in partnership with the faculty member, developed the course description and learning outcomes and then devised a course outline that would meet the learning outcomes. Each participant took the lead on specific topics.

For many of the content areas, we decided that it would be worthwhile to partner with scientists actually using these tools and grappling with many of the issues, such as data sharing and citizen science. The Smithsonian Libraries' librarian and the SMSC instructor approached scientists in their organizations that they knew were using some of these tools and asked them to serve as guest speakers in the short course. In designing the course, we knew our participants would be coming from all over the world due to the international scope of the conference, so we purposefully highlighted resources that did not require an institutional affiliation.

Topics covered in the course included the researcher personae, professional communities, public communities, citation collaboration, data sharing, alternative metrics and open access publishing. Below is a synopsis of these tools and how they can benefit conservation biologists. There are many more tools and communities than we will discuss here. For additional tools and sites see (Roemer and Borchardt 2012; McMahon et al. 2012; MacMillan et al. 2014)

Researcher Personae

The online face of a researcher is the most visible and findable variable of new media and can have implications for collaboration, employment, and professional reputation. For this reason, we began the course by discussing the importance of creating an online researcher presence, how tools can help researchers disambiguate their work from researchers with similar names, and how these tools can help researchers track their research impact beyond traditional citation metrics. Posner (2011) suggests that when creating an effective online presence, "it's important to carry the same voice, image, and persona across multiple social networking platforms" and that you should choose a profile picture that is consistent and professional. Highlighted during the course were *ORCID*, *Impact Story*, and *Google Scholar Citations Profile*. All have benefits and help researchers track their research impact and cultivate a professional persona.

ORCID http://orcid.org/ is an open, non-profit, community-based effort to provide a registry of unique researcher identifiers and a transparent method of linking research activities and outputs to these identifiers. *ORCID* is a platform-independent identifier unique in its ability to reach across disciplines, research sectors, and national boundaries and its cooperation with other identifier systems (such as *Researcher ID, Impact Story* and *Google Scholar*).

Impact Story http://impactstory.org/ is an open-source, web-based tool that helps researchers explore and share the diverse impacts of all their research products--traditional ones like journal articles, but also alternative products like blog posts, datasets, and software. By helping researchers tell data-driven stories about their impacts, Impact Story aims to help build a reward system that values and encourages new forms of web-native scholarship.

Google Scholar Citations http://scholar.google.com/citations allows scholars to track citations to their publications, set up alerts to track who is citing their publications, graph their citations over time and compute citation metrics. *Google Scholar* profiles will show up in *Google Scholar* search results when someone searches for the researcher's name.

Professional Communities

Conservation biologists who develop connections with other professionals through shared online communities using a variety of tools, methods and practices, can develop connections with other professionals in an online environment. These communities of shared interests advance conservation biology. In the course we experimented with *ResearchGate* by setting up a project area for our short-course where we started online discussions after the course, and shared links and papers.

ResearchGate http://www.researchgate.net is one of the largest online communities for researchers, with more than 4 million users. Scholars can not only find potential research partners, but can "follow" researchers, and set up groups called "projects". *ResearchGate* is aimed at scientists and can search *PubMed*, *Citeseer*, the *Institute of Electrical and Electronics Engineers* and *ArXiV*. It offers a search engine to help researchers find similar papers and gives users the opportunity to rank and comment on papers. This tool also allows users to track their research metrics if the user creates a profile.

Facebook http://www.facebook.com is the largest social network with 1.23 billion users (Kiss, 2014). The ability to join or create special interest groups has proved to be valuable for communication among scholars. Some *Facebook* groups are open (Ex: Faceplant Open Facebook Group) but for other groups, users must be invited to these groups, so there are barriers to use.

While it is generally accepted that there have been privacy issues with *Facebook*, the authors continue to advocate its use simply because the sheer scale of *Facebook* brings the power of crowd-sourcing to bear which can help with real life research needs. In one such example we highlighted in the course, a Smithsonian Institution National Museum of Natural History sponsored team of ichthyologists performed the first survey of the fish diversity in the Cuyuni River of Guyana. The researchers needed to identify over 5,000 specimens in less than a week's time in order to obtain an export permit. Faced with insufficient time and inadequate resources, they posted a catalog of specimen images to *Facebook*, hoping their colleagues would assist (Sidlauskas 2011). In less than 24 hours, the Facebook participants had identified approximately 90% of the posted specimens to at least the level of genus, and revealed the presence of two newly discovered species. The majority of commenters held a PhD. in ichthyology or a related field, and represented countries from all over the world (Sidlauskas 2011).

In another example, Brian Gratwicke, one of our guest speaker collaborators, recorded a video detailing how his small community of researchers uses *Facebook* to share and comment on each other's work related to amphibian conservation research specific to mitigating the effects of amphibian disease. Many in the *Facebook* group share preliminary results and data and elicit feedback from their colleagues as part of their research process (Brian Gratwicke, unpublished video).

In the course evaluation survey, one participant noted that "I appreciate the videos with Brian, but what I really wanted was to be able to do a Q and A interaction with a scientist who actively used these tools." Brian and Scott, the SCBI collaborators were unable to attend our short-course session, so we used technology to record interviews with those scientists, but it is obvious there was a preference to have all the guest speakers in person.

Public Communities

Public engagement, such as citizen science projects can leverage online tools and communities to raise public awareness, share news and discoveries, collect data, foster feedback, and generate funding for organizations. The most successful citizen science endeavors focus on a scientific question or environmental issue that is best addressed by analyzing large amounts of data that are collected across a wide area, or over a long period of time (Bonney et al. 2009). In the course, we looked at contributory projects, which are generally designed by scientists and for which members of the public primarily contribute data (Bonney et al. 2009). Two organizations that we spotlighted were *Encyclopedia of Life (EOL)* and *iNaturalist*. Our guest speakers Jennifer Hammock and Katja Shulz are both project coordinators for *EOL* and Brian Gratwicke is an *iNaturalist* contributor. This first-hand knowledge provides a unique perspective of these organizations and how they enable many individuals to work in concert, collecting and contributing information and data.

Encyclopedia of Life (EOL) www.eol.org is a free, online collaborative encyclopedia intended to document all of the 1.9 million living species known to science. It is compiled from existing databases and from contributions by experts and non-experts throughout the world and has a goal of building one page for each species, that will include video, sound, images, graphics, as well as text.

iNaturalist www.inaturalist.org is a site for the interested public where users can record what they see in nature, meet other nature lovers, and learn about the natural world from scientists.

One question we hoped to answer was how can communities of interest benefit scientists and the public? Scientists sometimes have reservations about the utility of citizen science projects due to the challenge of managing the data and verifying accuracy. Data verification is a real concern and researchers using citizen science approaches need to integrate a method to validate data. Wiggins et al. (2011) conducted a sampling of citizen science data verification methods and found that the primary mechanism for validating data submitted by the public is still expert review. Photo submissions were the next most used method, but can be a challenge for large-scale projects unless they provide an infrastructure for online identification and classification. Regardless of the challenges, citizen science has advantages like allowing researchers to interact and gather data in a scalable way, leverage existing networks for their work and contribute to the global conservation community, as well as, educating the public about conservation issues, so it is, for many researchers, a worthwhile partnership.

Citation Collaboration

The ability to share and discuss the research literature is vital in the world of digital scholarly communication. Often both project-based and cross-institutional, this type of collaboration can include sharing and annotation of articles for literature reviews.

Mendeley http://www.mendeley.com/ is a free reference manager and academic social network that can help you organize your research, generate bibliographies, collaborate with others online, and discover and share the latest research as well as manage and annotate your PDF documents. *Mendeley* has a web browser plugin to extract and save complete bibliographic references from web resources and employ the word processor add-on to incorporate citations into documents as in-text citations and reference lists (Zaugg et al. 2011).

Zotero www.zotero.org is a free research tool that helps you collect, organize, and annotate your references and share them with other *Zotero* users. Additional functionality includes the *Zotero* web browser plugin to extract and save complete bibliographic references from web resources. (CHNM 2014).

Of the two, *Mendeley* has the advantage of incorporating research statistics. As *Mendeley's* version of altmetics reports how often articles are saved by different users and how articles are being tagged, enabling researchers to see how often different articles are being read, or at least accessed (Zaugg et al. 2011). In fact *Mendeley* downloads and reads are being reported in most altmetric tracking tools now. Both tools have significant advantages to researchers who would like to collaborate by sharing references and annotations as well as serving as discovery tools for finding related research.

Data Sharing

Data sharing and reuse has become increasingly important, especially in the sciences. Funding agencies have begun requiring data release. In 2003, the National Institutes of Health (NIH) added a data management plan requirement for grants over $500,000 (NIH 2003). The National Science Foundation (NSF) has a statement requiring data sharing in its grant contracts, but has not enforced the requirement consistently; however in 2010 the NSF made the announcement that all future grant proposals would require a data management plan and will be subject to peer review (NSF 2010). Increasingly, journals like *Science* and *Nature* have begun to expect researchers to submit data as part of the article submission process. For example, *Nature* will be launching *Scientific Data* in May 2014, a new open-access, online-only publication for descriptions of scientifically valuable datasets. *Scientific Data* exists to help researchers publish, discover and reuse research data (NPG 2014). Beyond being a requirement, data sharing is the ideal as it accelerates the process of discovery and advancement in conservation research**.**

In some content areas like data sharing, the librarians relied heavily on the expertise and experience of our invited guests to take the lead for the course. We approached two project coordinators from the *EOL* who did an excellent job of explaining current issues and practices in data sharing and showing some of the many data sharing repositories as well as explaining the difference among primary data repositories, data aggregators and citizen science projects (Hammock and Schulz Figure 1). Two primary data repositories highlighted in the course were Dryad and PANGAEA.

> **Dryad Digital Repository** datadryad.org is a curated general-purpose primary data repository that makes the data underlying scientific publications discoverable, freely reusable, and citable. Dryad has integrated data submission for a growing list of journals. *Ecology and Evolution* is the latest journal to integrate submission of manuscripts with data to *Dryad*. (Schaeffer 2014)

> **PANGAEA** http://www.pangaea.de is a primary data repository operated as an Open Access library aimed at archiving, publishing and distributing earth and environmental science data. The system guarantees long-term availability of its content through a commitment of the operating institutions. Authors submitting data to the *PANGAEA* data library for archiving agree that all data are provided under a creative commons license.

The rationale for sharing data is firstly to reproduce or to verify research as well as to make results of publicly funded research available to the public. Sharing data also enables others to ask new questions of existing data, and to advance the state of research and innovation. Even though data sharing is the ideal, there are challenges with sharing data. The reasons why researchers may not share data include incompatible or non-transferable data formats, missing or insufficient descriptive metadata, ethical issues, issue of incentives, and concern over re-use and ownership.

> "If the rewards of the data deluge are to be reaped, then researchers who produce those data must share them, and do so in such a way that the data are interpretable and reusable by others. Underlying this simple statement are thick layers of complexity about the nature of data, research, innovation, and scholarship, incentives and rewards, economics and intellectual property, and public policy. Sharing research data is thus an intricate and difficult problem—in other words, a conundrum." (Borgman 2012, 1059)

At this point, there are no easy answers, but some have suggested ways that data can be shared, and both *Dryad* and *PANGAEA* have incorporated elements of these models. Essentially, built into all data banks there would be an attribution system that would make sure the original researcher retains credit or ownership of their data. An issue facing journals and data banks is how to ensure proper citations for data sets. Attribution is very important, especially in science and without a way of assigning credit for original data, scientists will be reluctant to share as they will not get the recognition for the work or their data could be "poached" or "scooped" in the parlance of researchers.

William Michener, director of e-science initiatives for University Libraries at the University of New Mexico, Albuquerque, and a leader of *DataONE,* sees an additional challenge, "Changing the culture of science from one where publications [are] viewed as the primary product of the scientific enterprise to one that also equally values data" (quoted in Nelson 2009). The discussions that arose in the course surrounding both the positive and negative aspects of data sharing revealed the complexity of this new scholarly environment.

Alternative Metrics

The traditional citation-based metrics of a researcher's published work has been the basis of decisions like promotions and budgets for decades. Increasingly, scholars are becoming aware of the limitations of traditional scholarly metrics, such as the lag time between publication and seeing any impact from publications being cited. These limitations can provide librarians with opportunities to initiate discussions with researchers by showing how alternative metrics or altmetrics can capture a more immediate and accurate picture of scholarly influence. Altmetrics are an attempt to measure web-driven scholarly interactions. Galloway, Pease and Rauh (2003) point out the limitations of new altmetrics tools including the challenge to disambiguate authors and how tools like *ORCID* are endeavoring to solve this issue by providing unique identifiers for authors and point up the need for faculty to establish a unified digital profile. Applying metrics

to contributions to scientific and public communities using altmetrics has been difficult to capture, yet it is beginning to make progress.

> **Altmetric Explorer** http://www.altmetric.com/ is a fee-based service that captures hundreds of thousands of tweets, blog posts, news stories and other pieces of content each week that mention scholarly articles and allows users to browse, search and filter this data.
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> **Altmetric It!** http://www.altmetric.com/bookmarklet.php is a bookmarklet available for Chrome, Firefox and Safari browsers (not Internet Explorer) that tracks altmetrics at the article level. Once in a journal article page, click "Altmetric it!" to see altmetrics at the article level.
>
> **Plum-X (Plum Analytics)** http://www.plumanalytics.com/about.html is a fee-based product that tracks more than 20 different types of artifacts, including journal articles, books, videos, presentations, conference proceedings, datasets, source code, cases, and more. Its suite of tools helps answer questions about research impact.

There have been attempts to create a statistical methodology that defines different types of altmetrics. Priem et al. reported finding five patterns of usage: 1.) Highly rated by experts and highly cited; 2.) Highly cited; Highly shared; 3.) Highly bookmarked, but rarely cited; 4.) Uncited. (Priem et al.,"Altmetrics in the Wild," 2012). Plum Analytics categorizes altmetrics into five separate types: 1.) Usage; 2.) Captures; 3.) Mentions; 4.) Social Media; and 5.) Citations (Plum Analytics 2013). For a brief chart showing the different types of altmetrics that can be tracked, see Figure 2 "Examples of Altmetrics."

In the example we used in the course, our guest speaker, Scott Loss from the Smithsonian Conservation Biology Institute, co-published a paper looking at the effects of the impact of free-ranging domestic cats on wildlife of the United States, which was one of the first data-driven systematic reviews on the issue. As Scott notes, "We expected there to be a decent response to the paper given the contentious nature of the topic." Within a day of publication, the article was picked up by most press agencies including the *New York Times* and was tweeted by readers at these news outlets as well as organizations like the Nature Conservancy. "The article took on a life of its own," said Scott. A recent review of the altmetrics of this article, which was only published in 2013, paints an interesting picture. The article was shared in tweets 437 times, posted 69 times on *Facebook* pages, mentioned in 1 *Google+* post, picked up by 26 news outlets, posted to 20 scientific blogs, and recommended in 5 *Reddit* libraries (Nature Communications 2014).

While one may argue that altmetrics are not necessarily an indication of the quality of an article, in this case, in addition to altmetrics, the article has 11 *Web of Science* citations, 12 *Cross-Ref* citations and 11 *Scopus* citations, for a total of 34 "traditional" citations in less than a

year's time. The article is in the 99 percentile (ranked 41st) of the 51,567 tracked articles of a similar age in all journals and is in the 99 percentile (ranked 1st) of the 263 tracked articles of a similar age in *Nature Communications* (Nature Communications 2014).

Unfortunately, the news agencies sensationalized the topic by providing the conclusions of the study without providing the qualifications along with the conclusions and ran with a "killer cats" theme. The Smithsonian Press office estimated that there were about 500 million unique viewers of the press coverage of the article (Scott Loss, unpublished video.) This is a great example of how internet coverage can lead to greater visibility for science research and can inform the public, but can also lead to sensationalized coverage.

In the future, altmetrics may be consulted in promotion and tenure decisions. This will be especially important as studies are beginning to find that some articles may be heavily read and saved by scholars but seldom cited (Priem et al.,"Altmetrics in the Wild," 2012). For the time being, altmetrics can serve as a "reader's advisory" for scholars to stay abreast of research in a given field of study and to gauge the impact of their research (Galloway, Pease and Rauh 2003). For a more complete overview of a wide range of specific altmetrics tools see Roemer and Borchadt (2012).

Open Access Publishing

Closely related to the issues raised in research collaboration and altmetrics is the issue of Open Access (OA) publishing. OA publishing is literature that is online, free of charge, and free of most copyright and licensing restrictions. OA removes price barriers (subscriptions, licensing fees, pay-per-view fees) and permission barriers (most copyright and licensing restrictions) (Suber 2013).

The course discussion of OA publishing included how it can intersect with research collaboration and altmetrics. A distinct challenge to researchers not affiliated with large well-funded research libraries is that electronic access to the literature is not assured. This is due to unprecedented increases in the price of journal subscriptions, as well as practices like "bundling" that do not allow cancellations of individual titles in the bundle, leading to libraries subscribing to some titles they might not have otherwise and often requiring cuts in non-bundled journals to maintain bundled subscriptions (Willinsky 2006).

Laasko notes, ("Background" 2012) "Open Access (OA) has expanded the possibilities for disseminating one's own research and accessing that of others." The benefits to scholars are more research impact. So how should scholars who would like to publish their research in OA platforms proceed? It is important to understand that OA can be accomplished by either publishing in a OA journal (called "Gold OA") or self-archiving in an online digital or institutional repository (called "Green OA") (Suber 2013)

Many of our course participants were surprised to learn that just because they are the author of a work, did not mean they retain the right to deposit a copy of their work in either a digital or institutional repository (Green OA). One thing librarians can begin doing is educating faculty on their rights as authors and encouraging them to assert those rights when signing publishing contracts. Here is a synopsis of three tools helpful with navigating the landscape of Open Access journals.

> **Directory of Open Access Journals (DOAJ)** http://www.doaj.org/ aims to increase the visibility and ease of use of open access scientific and scholarly journals, thereby promoting their increased usage and impact. The DOAJ aims to be comprehensive and cover all open access scientific and scholarly journals that use a quality control system to guarantee the content. In short, the DOAJ aims to be a clearinghouse for users of open access journals.
>
> **Beall's List** http://scholarlyoa.com/publishers/ is a list of potential, possible, or probable predatory scholarly open-access publishers based on evaluation criteria such as credentials of the journal's editorial staff; the journal's publisher and publishing model; integrity issues related to impact factors, journal mission, indexing claims and peer review; author experiences and adherence to codes of conduct, specifically to the Open Access Scholarly Publishers Association (OASPA) Code of Conduct; the Committee on Publication Ethics (COPE) Code of Conduct for Journal Publishers; and the International Association of Scientific, Technical & Medical Publishers (STM) Code of Conduct.
>
> **Sherpa/Romeo** http://www.sherpa.ac.uk/romeo/ is a great resource to check for copyright/self-archiving policies by journal. Use this site to find a summary of permissions that are normally given as part of each publisher's copyright transfer agreement.

Though these resources are a step in the right direction, *Science's* recent investigation where the author targeted dozens of OA journals in an elaborate sting where these journals accepted a spoof cancer research article, raises questions about peer-review practices in OA journals. Bohannon notes, "Some say that the open-access model itself is not to blame for the poor quality control revealed by *Science's* investigation. But open access has multiplied that underclass of journals, and the number of papers they publish" (2013). This study points out the need to educate scholars about predatory journals and the need for more rigor regarding what makes the DOAJ list, especially since the study uncovered that some Beall labelled predatory journals made it into DOAJ.

For a more complete treatment of Open Access including history and statistics see Willinsky (2006), Hitchcock (2013) and Suber (2013).

COURSE OUTCOMES

Overall the course was very successful. We had 22 attendees from many countries including Australia, Canada, Cameroon, England, Guyana, New Zealand, Thailand and the United States. The attendees represented many kinds of institutions including Universities, government agencies, and NGO's such as the International Union for Conservation of Nature (ICUN) and the National Land Resource Center (NLRC). Ten attendees responded to the survey. Of the 10 responses, all "strongly agreed" (6) or "agreed" (4) that the short-course was valuable. All "strongly agreed" that the instructors were prepared and knowledgeable, most "strongly agreed" (7) or "agreed" (3) that the instructors were approachable/accessible. And the majority "agreed" (7) or "strongly agreed" (3) that the hands-on portion of the course helped them better understand the concepts presented. All participants would recommend the short-course to a friend or colleague.

Though the response to the course was positive and one of our presenters, Brian Gratwicke reported being approached during the conference by course attendees with great things to say about it, the comments revealed some confusion over what the participants thought the course was going to be about. The mention in the course description of social media seemed to confuse some participants who expected a different focus. A couple of participants noted,

> "I expected to focus on social media (Facebook and twitter) and how to grow followers and get out a conservation message to different audiences" [but] "this was really about how to make yourself known as a researcher and how to use online tools to advertise yourself and work with collaborators. That said, it was still super helpful and something that I think is unique among the usual social media classes. You have so many topics; this could certainly be a one week or longer course."

> "While I did find this short course to be valuable, I admit I signed up because I was most interested in what was discussed in the latter part of the course: new media communication skills for public discourse/sharing about science. I had thought that was what the course would be focused on due to the description."

Another suggestion was to have everyone in the room introduce themselves at the beginning of the session. We had discussed doing this before, yet decided against it because of time constraints, but some participants would have valued the networking opportunity and the opportunity as one participant put it [to meet the] … "interesting people in the room."

If this content is further developed into a course for the SMSC, it will be important to continue to include librarians and scientists as guest speakers. In addition, incorporating more organizational marketing and outreach for NGO's and research institutes should probably be included into the curriculum plan.

CONCLUSION

Collaboration outside of traditional library roles is an important new arena for librarians and can result in a rewarding experience, professional growth and beneficial outcomes. To be successful in these partnerships librarians must embrace change, and be willing to learn and take risks. It is also important for librarians to get buy-in from their organization and/or direct supervisors since this is a new role requiring time to learn new content areas and time to build trust and relationships with potential conservation biology research project teams.

In any collaboration, patience is important, and this example is no exception. Staying on track as a group could be challenging. In addition to occasional travel to each other's sites, the authors used the internet video phone service *Vidyo* to meet virtually from our different institutions and locations, and the document sharing tool *Dropbox* to share outlines, PowerPoints and videos and the research tool *Zotero* to save, annotate, share and format references. We also created a project space in *ResearchGate* for the short-course, which attendees were encouraged to join and is where we shared articles and posted discussion threads after the short-course to continue conversations. These tools kept us on track and served as a "practice what you preach" approach.

The discussions that arose in the course surrounding both the positive and negative aspects of these tools revealed the complexity of this new scholarly environment. The authors benefited greatly by collaborating with others, as this enabled us to learn from one another and gain new expertise. The librarians agreed that having the scientists involved not only lent a sense of legitimacy to the course, it helped the librarians relinquish parts of the course content (like data sharing and citizen science) for which we have no first-hand experience. At the same time, the scientists graciously ceded the floor when it came to "library stuff" like altmetrics, OA publishing and citation management tools. Respecting each other's expertise is the key to a successful collaboration.

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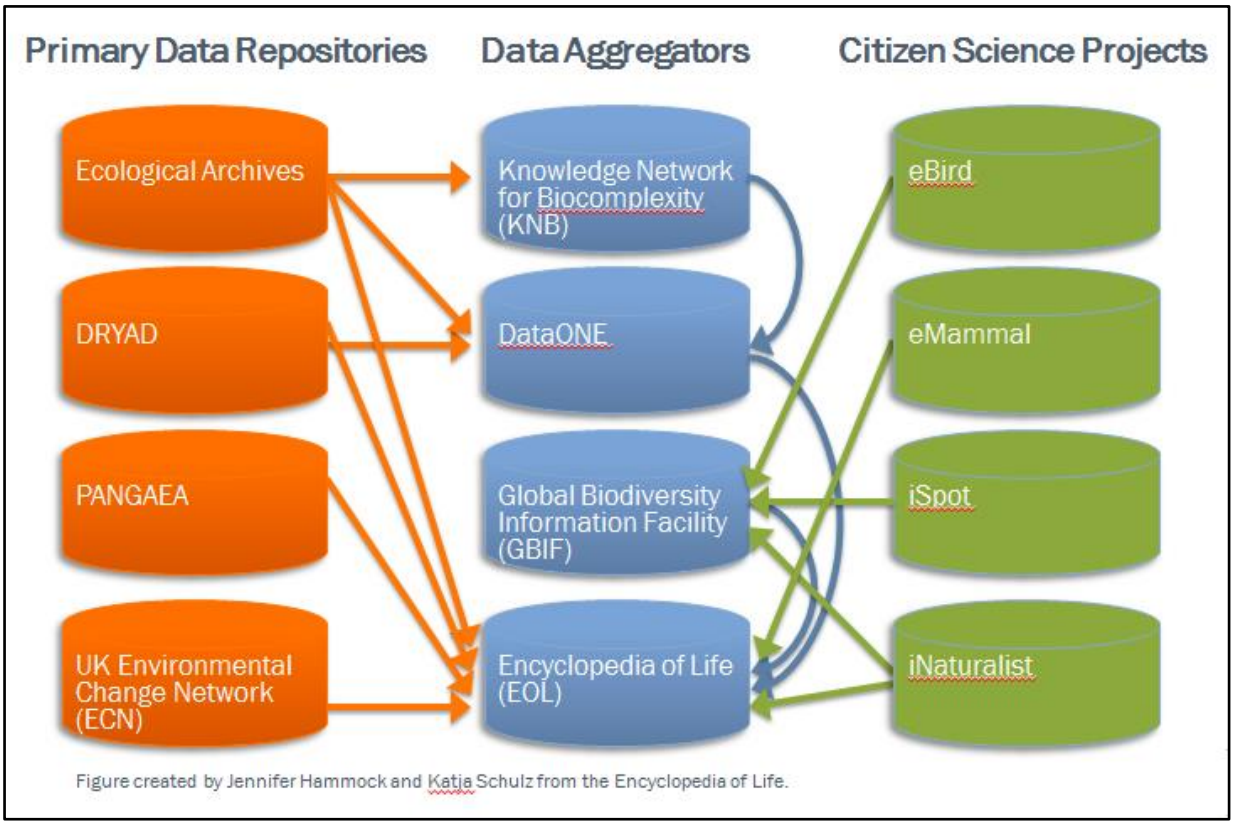

Figure 1 Data Sharing Repositories

	Scholarly	*Public*
Recommended	Faculty of 1000	Popular Press, Reddit
Cited	Google Scholar, Web of Science	Wikipedia
Discussed	Scholarly blogs (ScienceSeeker.org)	Blogs, Twitter
Saved	Mendeley, Citeulike,	Delicious

Adapted from http://www.plumanalytics.com/metrics.html

FIGURE 2 Examples of Altmetrics

Appendix A Short Course Evaluation

Short Course: New Media Matters: Communicating Conservation Research & Ideas

Please respond to the following questions using the rating scale below. Feel free to add comments in the Comments field.

1. I found the information in this short course to be valuable

Strongly Agree Agree Disagree Strongly Disagree No Opinion

2. The instructors were prepared and knowledgeable

Strongly Agree Agree Disagree Strongly Disagree No Opinion

3. The instructors answered questions appropriately and were accessible.

Strongly Agree Agree Disagree Strongly Disagree No Opinion

4. Utilizing hands-on exercises in class helped me to understand the concepts.

Strongly Agree Agree Disagree Strongly Disagree No Opinion

5. Would you recommend this workshop to others?

Yes No

Comments: