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This study presents the results of a survey that assessed academic reference librarians' familiarity with, attitudes toward, and use of open access sources. The electronic survey was distributed using mailing lists and completed by 460 respondents. Respondents were generally familiar with open access sources, including open access journals, institutional repositories, and self-archived materials on the web. Respondents' attitudes toward open access varied, but most agreed that open access resources are high quality and that open access would benefit authors' careers. In helping researchers find open access information, more respondents had used open access journals than institutional repositories or self-archived materials. Compared to the number of respondents who had provided information to researchers about using open access resources, fewer had provided authors with information about publishing in open access resources.

Headings:

 Scholarly communication

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EXPLORING ACADEMIC REFERENCE LIBRARIANS' FAMILIARITY WITH,
ATTITUDES TOWARD, AND USE OF OPEN ACCESS RESOURCES

by
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Diane Kelly

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Introduction

   As academic publishing mergers and subscription prices increase, much attention

has focused on the "serials crisis" in academic libraries: University libraries often cannot

afford to purchase subscriptions to journals in which the university faculty publishes, and

rising subscription prices can even force libraries to cancel existing subscriptions. The

increasing price of scholarly information, combined with new technologies that permit

widespread access to electronic information, has led to an effort to allow researchers to

access scholarly information online for free.

   In December 2002, the Open Society Institute (OSI) met in Budapest to discuss

ways "to accelerate progress in the international effort to make research articles in all

academic fields freely available on the internet" (Budapest Open Access Initiative). The

OSI developed the Budapest Open Access Initiative to promote the effort of making peer

reviewed research in all academic fields freely available on the internet. The BOAI

defines open access to scholarly literature as

> its free availability on the public internet, permitting any
> users to read, download, copy, distribute, print, search, or
> link to the full texts of these articles, crawl them for
> indexing, pass them as data to software, or use them for any
> other lawful purpose, without financial, legal, or technical
> barriers other than those inseparable from gaining access to
> the internet itself. The only constraint on reproduction and
> distribution, and the only role for copyright in this domain,
> should be to give authors control over the integrity of their
> work and the right to be properly acknowledged and cited
> (Budapest Open Access Initiative, FAQ).

This definition of open access focuses on three main characteristics of open access information: it is available on the internet, there are no financial or legal barriers to accessing it, and authors use copyright only to maintain the integrity of their work and retain the right of attribution. While not everyone agrees with every aspect of the BOAI definition, it was a landmark effort to define the goal of the open access movement, and other conceptions generally feature a variation on one or more of the three main characteristics of open access as defined by the BOAI.

In addition to offering a definition of open access, the Budapest Open Access Initiative describes two methods of achieving open access: self-archiving and open access journals. Self-archiving includes both institutional repositories (IRs) and personal web archives. Self-archived materials may also be stored in a departmental or discipline-specific online repository. Some self-archived materials (e.g. working papers) may restrict viewers to a certain group (e.g. colleagues in a department), while others are freely available on the web. Open access journals are scholarly journals that are freely available online. Many are peer reviewed, but some are not. Some are online-only publications, while others are duplicates of print journals.

The increase in the free accessibility of both self-archived materials and online journals affects everyone who is involved in the publishing and use of scholarly information. Publishers, authors, researchers, scholarly communications departments, and librarians are all affected by open access journals. Publishers are affected because the same type of information that they sell is now increasingly available for free from other sources. The open access movement impacts authors by increasing the number of ways in which they can publish their work. Authors need to understand the new market and the

benefits and drawbacks of publishing in open access sources. Academic researchers can be profoundly impacted by the increasing amount of information available through open access journals because an increase in the amount of open access literature increases the scholarly material that is available to all academic researchers. Scholarly communications departments would be interested in this research because they are often involved in setting policies and developing educational plans to inform authors about copyright issues. Open access affects librarians because of their close relationships with all of the groups listed above.

The use of open access journals depends in large part on the quality and quantity of content they find in those journals. Without useful content, open access journals cannot thrive as an effective alternative to the traditional publishing model. Because open access journals are relatively new, many authors are not familiar with them. In "The Role of Reference Librarians in Institutional Repositories," Charles Bailey examines recent open access innovations and concludes that "contemporary digital publishing, which is fueled by constant technical innovation, is slippery as a bucket full of eels" (261). Authors cannot be expected to keep track of every piece of the publishing puzzle. Author education is therefore of vital importance to the success of the open access journal publishing model. It has been suggested that academic reference librarians can be a source of such education. However, before assuming that academic reference librarians can step in and educate authors, it is necessary to assess their familiarity with, attitudes toward, and use of these newly available resources.

Several research studies and scholarly articles have examined the actual and potential effects of the open access movement. Because open access is a new concept,

however, many of those affected by it do not fully understand what it means. Many researchers have conducted studies to assess authors' attitudes about new open access publishing opportunities, but there have not been similar studies to assess librarians' attitudes about open access. A study to assess academic reference librarians' attitudes about the open access movement would be useful because several articles have focused on the role academic reference librarians can play in the open access movement. It is necessary to first have an understanding of academic reference librarians' current relationship with open access resources to get a better idea of the role they will play in the open access movement. Thus, this study seeks to address the following research question: "What are academic reference librarians' familiarity with, attitudes toward, and use of open access resources?"

Literature Review

Because the open access publishing model is so new, some research articles have attempted to define and describe it. Other studies have measured the degree to which authors are familiar with open access publishing options, often finding that many authors remain unaware or do not take advantage of open access publishing opportunities. Because so many authors have not published in open access sources, other articles address the question of how to encourage authors to take advantage of open access publishing options. Many of these articles conclude that academic reference librarians can play an important role in content recruitment for open access sources. However, the research does not address the issue of whether the librarians themselves are well-informed about open access publishing.

What is Open Access?

It is often difficult to discuss the effects of open access publishing because there is not a clear consensus on its definition. In "The Nine Flavours of Open Access Scholarly Publishing," J. Willinsky examines open access publishing practices and outlines nine variations he finds. Some types of open access publishing fit into the Budapest Open Access Initiative (BOAI) definition. E-print servers allow authors to store their published and unpublished work online. "Unqualified" open access journals provide all of their content completely free online. The "dual mode open access model" refers to journals

that immediately publish a complete open access version online at the same time that they publish a subscription-based print version. Another form Willinsky sees is "author-fee open access," which is free to users but finances its online publication by charging authors for publishing their work. Willinsky also describes open access journals that are financially supported by the principal users of the journals, which are generally institutions (265-266).

Other open access variations that Willinsky finds do not meet the BOAI criteria, but even these variations reflect a trend toward providing more scholarly information for free on the internet. The "delayed open access" model provides complete free access after an embargo period, often six months after the initial publication for subscribers. Another variation is "partial open access," which means that only a portion of the subscription-based journal is available for free online. Willinsky also sees a trend toward what he calls "open access lite," which refers to providing open access abstracts while maintaining a subscription service for full articles. Finally, some publishers provide "per-capita open access," which means that the online versions of their journals are available for free in countries where the per capita income is very low (Willinsky 265-266).

Instead of trying to pick apart specific definitions of open access in an effort to define exactly which sources are truly open access, it is helpful to notice a general shift in the traditional publishing model and a trend toward the availability of free scholarly information on the internet. Even without a consensus on the definition of open access, it is possible to examine the effects of this open access movement.

Assessing Authors' Knowledge of Open Access Publishing

In "Open Access Journal Publishing: The Views of Some of the World's Senior Authors," David Nicholas, Paul Huntington, and Ian Rowlands set out to determine (1) authors' knowledge about open access publishing, (2) authors' open access publishing activity, and (3) authors' attitudes toward open access publishing. The authors conducted an email survey based on closed questions, but they also included notes of comments the authors made at the end of the questionnaire. The survey was sent to 107,500 authors who had recently published an article in an ISI-indexed journal. The resulting sample included 3,787 completed questionnaires from 97 different countries and reflected the geographical distribution of ISI authors. In an effort to minimize overgeneralizations they used a critical incident approach, asking authors to respond to questions about their last published paper. Nicholas et al. found that very few authors describe themselves as knowing a lot about open access, a minority of authors have published in open access journals, and author attitudes toward open access publishing vary geographically depending on the volume of open access publishing in a given area (515-517).

The results of this study demonstrate the need for increased author education about open access publishing. 34% of authors reported knowing nothing about open access publishing, and half of the authors who knew about open access described themselves as knowing only a little (Nicholas 515). This study also identifies certain variables that are related to whether authors choose to publish in open access journals, such as journal price, an active interest in copyright, and depositing work in an institutional archive (Nicholas 504-505).

In "Exploring the Willingness of Scholars to Accept Open Access: A Grounded Theory Approach," Ji-Hong Park and Jian Qin also explore the factors that affect scholars' decisions to use and publish in open access journals. The authors conducted open ended interviews with eight faculty members and six doctoral students at Syracuse University. The authors selected a sample that they thought was representative of the population of scholars as a whole. Park and Qin used content analysis and a grounded theory approach to identify key concepts that emerged in the interviews. Park and Qin determined that perceived journal reputation, topical relevance, availability, career benefit, and cost affected scholars' decisions of whether to publish in open access journals.

Because this study was conducted at a single university, the specific environment at Syracuse may have affected the results. Also, there were a very low number of people interviewed. Each of these factors limits the extent to which we can generalize from the results. However, the study is still useful because it identifies variables related to some authors' decisions to publish in open access journals. These variables may not apply to all authors, but they may still be useful as a starting point for further research into what motivates authors to publish in open access journals and how to increase awareness of open access journals among authors.

While the previous two articles examined authors' opinions and behaviors regarding open access journal publishing, another article focuses on self-archiving. In "Open Access Self Archiving: An Author Study," Alma Swan and Sheridan Brown present the findings from a study about authors' attitudes toward open access self-archiving. They begin by emphasizing that self-archiving is not an alternative to

publishing in journals. Self-archived materials include drafts and copies of peer reviewed articles. Articles within an archive are tagged as either preprint drafts or peer-reviewed postprints. These documents are collectively called e-prints.

To collect their data, Swan and Brown surveyed four different populations: (1) the "interested and informed" population, who replied to a call-to-respond posted on several online discussion lists related to open access publishing (398 individuals, unknown response rate), (2) the "archived" population, who responded to an email sent to authors who had articles in open access repositories (52 individuals, 6% response rate), (3) the "Southampton" population, who responded to an invitation sent internally within the School of Electronics & Computer Science at Southampton University (35 individuals, 15% response rate), and (4) the "randomly selected" population, who responded to an invitation sent to 25,000 names randomly selected from the Institute for Scientific Information's Science Citation Index and Arts & Humanities Citation Index (811 individuals, 3% response rate). The total number of survey respondents was 1,296 (Swan 7).

Results showed that fewer than half of the responding authors had self-archived an article, even on a personal website. However, this marks a significant increase from a 2004 survey in which only 23% had self-archived. They found that authors' main reason for publishing their work was to communicate findings with their peers and influence future research, but that many authors are not very aware of their citation scores. Swan and Brown conclude that educating authors about how self-archiving can increase citations of their work would increase self archiving behavior among authors. They also conclude that a complementary strategy to increase self archiving would be a mandate

from institutions requiring their faculty to deposit articles in an institutional repository. This combination of incentive and insistence, Swan and Brown argue, would be the most successful approach.

Swan and Brown present interesting findings, but their sampling technique limits the generalizeability of their results. While some of the data Swan and Brown present is limited to one of their four identified study populations, many of the charts and graphs appear to combine the populations together. This is important to note because the "informed and interested" group and the "randomly selected" group may differ significantly with regard to their knowledge about self-archiving.

New Roles for Librarians

Given that so many authors are still uninformed about their open access publishing options, both in journals and through self-archiving, other researchers have examined the ways in which academic reference librarians can help fill this gap. In "The Role of Reference Librarians in Institutional Repositories," Charles W. Bailey Jr. describes institutional repositories (IRs), situates them within the broader context of the open access movement, and examines new roles for reference librarians in institutional repositories. Bailey begins with a "whirlwind tour of open access," describing several key features that have emerged in conferences and papers about the subject (264). He makes it clear that, to him, open access and free access are not synonymous. Open access information must have minimal use restrictions, often in the form of a Creative Commons Attribution license. These minimal restrictions allow both copying and the production of derivative works. Bailey describes the two strategies recommended by the BOAI: self-

archiving and open-access journals. Institutional repositories, the subject of his paper, are an example of self-archiving. Finally, Bailey highlights the importance of permanent archiving, and explains that institutional repositories are in an excellent position to promise permanence since they are backed by large universities. Individual websites might change or disappear as faculty move through their careers, but a university's institutional repository would allow continuous access to faculty articles.

After describing open access and situating institutional repositories within that framework, Bailey moves on to the roles reference librarians can play in the development and support of institutional repositories. Bailey asserts that reference librarians can play a role in creating IR policies, designing a user interface, and creating IR metadata. Librarians can promote the IR within their subject areas and can also keep faculty and students informed about licensing options. Because reference librarians understand user needs and are skilled in instruction, Bailey asserts that their involvement in the implementation of an IR is essential to its success.

Other research has focused on the role librarians at a particular institution have played in encouraging open access publishing among faculty members. In "Publishing Solutions for Contemporary Scholars: The Library as Innovator and Partner," Sarah E. Thomas examines new roles for libraries to play in open access scholarly publishing. Thomas uses a case study of the Cornell University Library as an example of an academic library that has taken on an open access electronic publishing role. The Cornell University Library's Center for Innovative Publishing operates several publishing initiatives: Project Euclid, the arXiv, and DPubS.

Project Euclid is an online publishing platform for scholarly journals in math and statistics. By bundling related subscription titles and serving as a host for open access journals as well, Project Euclid provides access to many types of journals, although about two thirds of its journals are open access.

The arXiv is an e-print service for scientists and mathematicians, and Thomas describes it as the most successful open access repository in the world. The arXiv is not a substitute for publishing in journals; scientists submit their current work to the arXiv while submitting publications for review in formal journals. The Cornell University Library is developing an open archival information system, which will ensure the long term preservation of documents stored in the arXiv.

DPubS is an open source content management program and is based on the content management software the library uses for Project Euclid. The library provides this program for free with the goal of encouraging more university libraries to develop formal or informal institutional repositories and publications.

Thomas describes the changes at the Cornell University Library since its shift from consumer to publisher of information and offers suggestions for the future. The library began by outsourcing some functions such as content acquisition, marketing, and managing subscription access. Increasingly, however, the library brought many of these functions in house. Thomas finds that because libraries already have experience in digital initiatives, relationships with faculty and patrons, and a strong commitment to preservation, they are very well suited to take on an active role in publishing. She argues that for libraries to make publishing a priority, librarians will need to use their

instructional skills and relationships with patrons to teach authors and researchers about new options in electronic publishing.

In "Reference Librarians and the Success of Institutional Repositories," Suzanne Bell, Nancy Fried Foster, and Susan Gibbons describe the results of a work-practice study they conducted to determine why faculty members do not participate in repository projects. In their article, the authors examine how librarians can take on new roles to support faculty members' open access publishing. Bell et al. assert that the range of materials under libraries' care is widening to include institutional content stored in repositories. Librarians can perform several roles related to institutional repositories, including content recruitment and promotion. In order to better understand how librarians could perform these new roles, Bell et al. studied faculty members to learn more about the web-based research services faculty need and what librarians can do to make IRs more attractive to faculty.

Bell et al. conducted a study at the University of Rochester to learn about the actual research practices of faculty members. Their method was based on traditional participant observation. The researchers visited the labs and offices of faculty from five science, social science, and humanities disciplines and recorded videos as the faculty gave tours of their offices and demonstrated how they use their computers to research.

Bell et al. found that faculty had not deposited content in the IR because they did not know how it would benefit them. Many of the characteristics of IRs that appeal to librarians, such as persistent URLs, do not generate interest in the faculty. In addition, many faculty members do not use the IR because they are concerned about unintentionally violating copyright.

Because many faculty members do not contribute to IRs due to a lack of knowledge, Bell et al. recommend that reference librarians take on a content recruitment role. In response to their study, the University of Rochester created the Library Liaisons, a group composed of librarians who received special training in Rochester's IR. These librarians receive training in three main areas: an understanding of what the IR is and why it was developed, common questions or concerns and how to address them, and experience with the IR deposit interface.

In "Content In, Content Out: The Dual Role of the Reference Librarian in Institutional Repositories," Barbara Jenkins and Elizabeth Breakstone examine the roles that reference librarians can play in the implementation of institutional repositories. Jenkins and Breakstone describe the University of Oregon's institutional repository, called the Scholars' Bank, focusing on the ways in which reference librarians helped in its design and development.

Librarians at the University of Oregon are involved in several aspects of the Scholars' Bank. Originally, the University of Oregon expected many authors to deposit their own materials in the IR. In reality, members of the library staff have deposited most of the materials in the repository on behalf of authors. Reference librarians and subject specialists also serve the important role of increasing authors' and patrons' awareness of the IR and providing the necessary training to help both groups use it effectively. Librarians at the University of Oregon help patrons evaluate the information they find in the Scholars' Bank. Jenkins and Breakstone argue that because some articles in IRs may be peer-reviewed postprints and others may be drafts, patrons need to learn how to evaluate the information they find before IRs can become a trusted resource. Because of

their experience with searching a variety of databases, librarians have also played a role in the design of the search interfaces of the Scholars' Bank.

While these studies of individual institutions may reflect certain characteristics or initiatives that are particular to those universities, their conclusions are still useful to other universities. Generally, academic reference librarians have the same basic skills form one institution to another. The skills and characteristics of reference librarians identified in these articles, such as instructional experience, knowledge of search interfaces, and the ability to create and maintain relationships with faculty, would make reference librarians at any institution well suited to assist in the development of open access publishing initiatives.

Given the many recommendations for academic reference librarians to assist in educating authors and researchers about open access publishing, it is surprising that studies have not first examined what academic reference librarians know about open access. Before expecting reference librarians to take on the role of educating authors about open access, it is necessary to understand how much academic reference librarians themselves know about open access journals and self-archiving. Many librarians, especially at institutions without established open access initiatives, may share the same misconceptions and apprehensions authors have about this new publishing model. A study similar to the author studies described above could be used to assess academic reference librarians' familiarity with and attitudes toward open access publishing. Such a study is a necessary first step before expecting academic reference librarians to lead the way in author education.

Methodology

An online survey was used to evaluate academic reference librarians' familiarity with, attitudes toward, and use of open access resources. A section of this survey was similar in design and content to the surveys of authors discussed above, which allows for a similar evaluation of what librarians think about open access. Other sections of the survey evaluated librarians' use of open access resources in their interactions with researchers and authors.

The survey was distributed to four mailing lists to which academic reference librarians might subscribe: libref-l (reference services), ili-l (bibliographic instruction), collib-l (college libraries), and uls-l (university libraries). The invitation email was not distributed to mailing lists geared toward scholarly communications or open access in an attempt to reach a general sample of academic reference librarians who may or may not have a specific interest in new trends in scholarly communications.

The survey invitation email specified that the survey is for academic reference librarians. The email included a brief description of the survey and estimates that it will take approximately 15 minutes to complete. The invitation email also stated that the University of North Carolina Institutional Review Board has approved the study and that participants may enter their email to enter a drawing for one of five $20 Amazon.com gift certificates. A second survey invitation reminder email was distributed a week following the initial invitation. Its contents were similar to the contents of the initial invitation.

To distribute the survey, the Qualtrics online survey software that is available through the Odum Institute for Research in Social Science was used. The Qualtrics software is available for free to University of North Carolina students and researchers through a grant from Qualtrics.com.

The online survey used in this study began with an information sheet for study participants to read. The information sheet followed a question and answer format to provide study participants with information about research studies in general and this study in particular. Participants consented to participate in the study by clicking a button at the end of the information sheet.

The first section of the survey asked participants about their professional environment, and the second section addressed participants' attitudes toward open access publishing in general. The last section of the survey assessed participants' professional use of open access resources, including open access journals, institutional repositories, and self-archived materials on personal websites.

The second section of the survey that evaluated participants' attitudes toward open access is based on the previous surveys that have been used to evaluate authors' attitudes toward open access publishing. In "Open Access Journal Publishing: The Views of Some of the World's Senior Authors," Nicholas, Huntington, and Rowlands used several Likert-type scales to assess authors attitudes about open access publishing. Because of their study's success, some of this survey's questions were modeled after theirs. One question in the survey identified whether the respondent considers herself to be knowledgeable about open access sources. Another set of questions used a Likert-type scale to ask the respondent to what degree he or she associates each of a set of

characteristics with open access. The characteristics include Free to access, High quality, Not archived properly, and Cutting edge. Another set of questions used a Likert-type scale to ask respondents whether they agree that the open access movement will lead to certain results, such as Authors will publish more, Papers will become less concise, Libraries will have more money to spend, and Print journals will gradually disappear. Assessing academic reference librarians' attitudes on several of the same issues using similar scales allows for some comparison between the two study populations.

Other questions on the survey for this study are not from studies of authors' attitudes. Many of the studies about authors focus on whether they have published or done research using open access sources. These questions do not directly apply to reference librarians, but they are related to some questions about reference librarians' use of open access sources. The final sections of the survey assessed the extent to which academic reference librarians have used open access sources as part of answering reference questions and provided any instruction to authors and researchers about open access resources.

460 respondents completed the survey. 42% described their institution as a research university, 38% described their institution as a college, 11% described their institution as a community college, and 8% chose another description.

Results

The survey questions evaluated respondents' familiarity with, attitudes toward, and use of open access resources. Respondents provided information about their *familiarity* with open access in general, as well as their familiarity with open access journals, institutional repositories, and self-archiving on the web in particular. Respondents also provided information about their *attitudes* toward open access, including statements about the degree to which they associated certain qualities with open access publishing and what they thought open access would lead to in the future. Finally, respondents provided information about their professional *use* of open access journals, institutional repositories, and self-archived materials on the web. Professional use was divided into two subcategories: providing researchers with information about *using* open access publications and providing authors with information about *publishing* in open access resources.

Familiarity With Open Access Resources

Librarians were asked how much they know about open access publishing, including open access journals, institutional repositories, and self-archiving on personal websites. Figure 1 shows respondents' self-assessments of their knowledge of open access publishing.
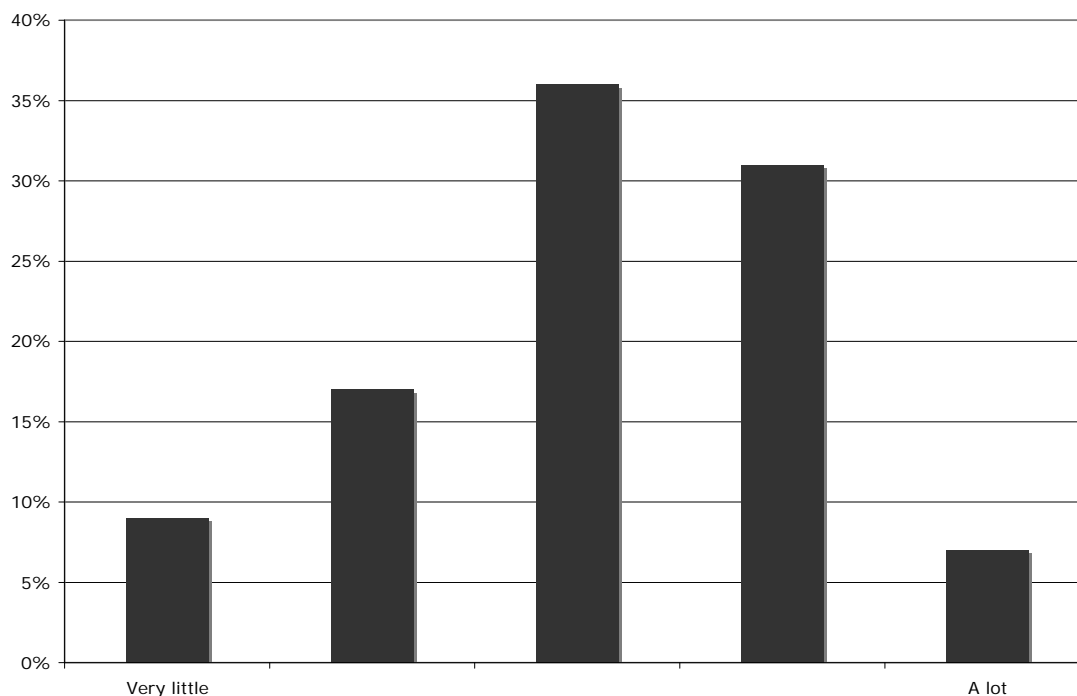
Figure 1. How much do you know about open access publishing (including open access journals, institutional repositories, and self-archiving on personal websites)?

Self-assessments were on a five-point scale, with 1 being "Very little" and 5 being "A lot." Out of 482 respondents, 42 (9%) selected 1, 84 (17%) selected 2, 172 (36%) selected 3, 148 (31%) selected 4, and 36 (7%) selected 5. The mean response was 3.11, and the standard deviation was 1.06. Most librarians rated their familiarity with open access publishing in the middle of the scale, with few respondents indicating that they knew either very much or very little.

Respondents were also asked about their familiarity with three types of open access resources: open access journals, institutional repositories, and self-archiving on personal websites. Figure 2 shows respondents' familiarity with each category of open access resources.
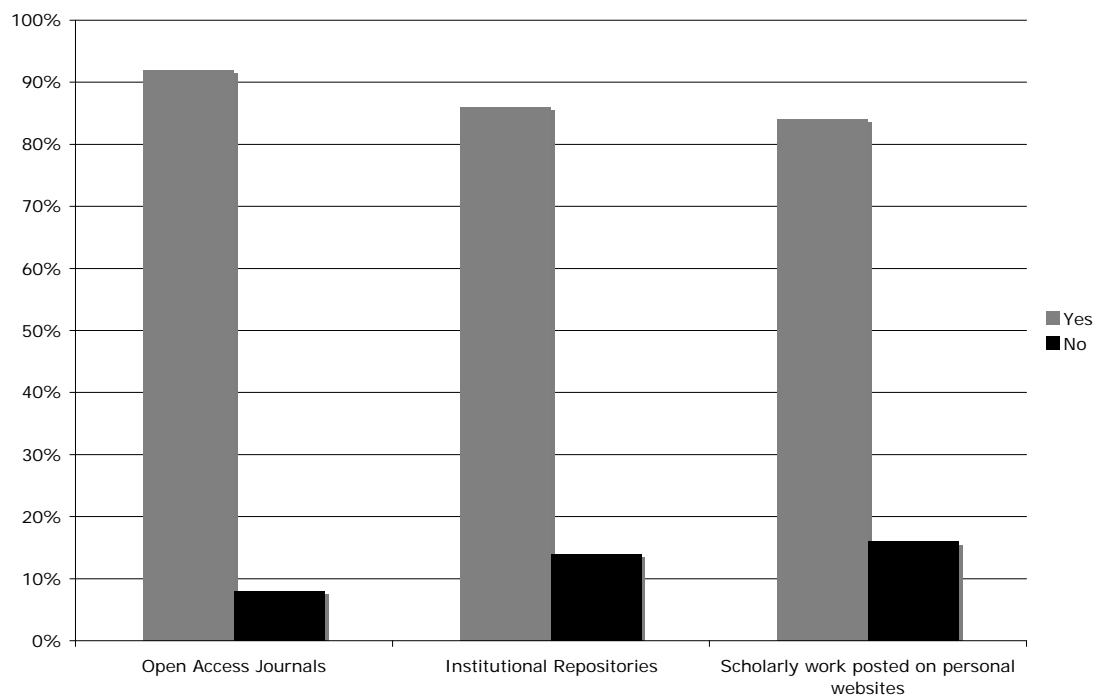
Figure 2. Are you familiar with open access journals, institutional repositories, and scholarly work posted on personal websites?

A majority of respondents were familiar with each type of open access resource. Out of 465 respondents, 428 (92%) reported that they were familiar with open access journals.

396 (86%) respondents reported that they were familiar with institutional repositories. 145 (37 %) of those who were familiar with institutional repositories reported that their institution has an institutional repository, 225 (57%) reported that their institution does not have an institutional repository, and 25 (6%) did not know whether their institution has an institutional repository.

386 (84%) respondents reported that they were familiar with self-archiving on personal websites. Of the respondents who were familiar with self-archiving, 137 (36%) reported that faculty or students at their institution self-archive scholarly materials, 26

(7%) reported that faculty or students at their institution do not self-archive, and 222

(58%) did not know whether faculty or students at their institution self-archive.

Attitudes Toward Open Access Resources

Respondents were asked about the extent to which they agreed with a number of

statements about open access. Some statements related to characteristics of open access

resources, while other statements related to what open access publishing will lead to in

the future. Table 1 provides survey respondents' answers to questions about

characteristics they might associate with open access, and Table 2 provides survey

respondents' answers to questions about what open access might lead to.

Table 1. Do you think open access is:

	Strongly disagree (1)	Disagree a little (2)	Neither agree nor disagree (3)	Agree a little (4)	Strongly agree (5)	Mean	Standard Deviation
Radical	104	100	109	127	31	2.75	1.25
High quality	3	30	187	162	92	3.65	0.88
Cutting edge	3	45	108	215	102	3.78	0.91
A fad	240	141	62	27	4	1.76	0.94
Electronic only	35	80	97	150	110	3.47	1.23
Well indexed	62	142	190	68	11	2.63	0.96
Archived properly	32	141	222	67	9	2.75	0.85
Expensive for researchers	132	156	127	50	9	2.26	1.04
Expensive for authors	92	142	132	94	14	2.57	1.1
Beneficial to authors' careers	10	46	117	186	115	3.74	1

Table 2. Do you think open access will lead to:

	Strongly disagree (1)	Disagree a little (2)	Neither agree nor disagree (3)	Agree a little (4)	Strongly agree (5)	Mean	Standard Deviation
Authors will publish more	6	56	142	191	69	3.56	0.93
Authors will have less choice over where they publish	122	194	95	49	4	2.18	0.97
The quality of papers will improve	16	103	279	55	12	2.88	0.75
Fewer papers will be rejected	22	94	156	165	24	3.16	0.97
Publishers will improve their services to authors	19	85	134	191	34	3.29	0.98
Publishers will improve their services to subscribers	23	76	119	186	58	3.39	1.06
Papers will become less concise	54	171	178	54	7	2.55	0.9
Libraries will have more money to spend	83	123	97	125	35	2.8	1.23
Print journals will gradually disappear	64	118	82	157	43	2.99	1.23
It will be easier to access papers	9	44	52	187	170	4.01	1.02
Archiving will suffer	47	120	173	102	20	2.84	1.02

67% of respondents either agreed a little or strongly agreed with the statement

that open access is cutting edge (n=317). While most respondents believed open access is

cutting edge, most did not believe that open access is a fad. 80% of respondents (n=381)

disagreed with the statement that open access is a fad, with 51% of respondents (n=240)

indicating that they strongly disagreed with that statement. Only 7% (n=31) reported

believing that open access is a fad. There was little agreement regarding whether open

access would lead to the disappearance of print journals: 64 (14%) strongly disagreed,

118 (25%) disagreed a little, 82 (18%) neither agreed nor disagreed, 157 (34%) agreed a little, and 43 (9%) strongly agreed that print journals would eventually disappear. The mean response was 2.99 (Neither agree nor disagree) and the standard deviation was 1.23.

254 respondents (54%) strongly agreed or agreed a little with the statement that open access is high quality. 279 (60%) indicated that they neither agreed nor disagreed with the statement that open access will lead to the quality of papers improving. Almost half of respondents (n=225, 48%) do not believe that open access will lead to papers' becoming less concise. These responses indicate that, in general, academic reference librarians believe that open access resources will not lead to a decrease in the quality of scholarly publishing.

301 (64%) respondents indicated that they believe open access is beneficial to authors' careers. A majority of respondents (n=260, 56%) also believe that open access will lead to authors' publishing more. 316 (68%) disagreed with the statement that open access would limit authors' choices over where they publish. 34 strongly agreed and 191 agreed a little with the statement that open access would lead to publishers' improving their services to authors. 104 disagreed with that statement, and 134 neither agreed nor disagreed.

A majority (n=288, 61%) also disagreed with the statement that open access is expensive for researchers, and almost half (n=234, 49%) disagreed with the statement that open access is expensive for authors. 186 agreed slightly and 58 agreed strongly with the statement that open access will lead to publishers' improving their services to subscribers; 23 disagreed strongly and 76 disagreed a little, with 119 neither agreeing nor

disagreeing. The responses were fairly evenly distributed regarding whether open access would lead to libraries' having more money to spend: 83 (18%) strongly disagreed, 123 (26%) disagreed a little, 97 (21%) neither agreed nor disagreed, 125 (27%) agreed a little, and 35 (8%) strongly agreed. The mean response was 2.8 (between Slightly disagree and Neither agree nor disagree), and the standard deviation was 1.23.

A little more than a third of respondents (n= 173, 37%) disagreed with the statement that open access is properly archived, and almost half (n= 204, 43%) disagreed with the statement that open access is well indexed. Despite these concerns, 187 (40%) agreed a little and 170 (37%) strongly agreed that open access will lead to easier accessibility of research papers. The mean response was 4.01 (Agree a little), and the standard deviation was 1.02.

Use of Open Access Resources:

Providing Researchers with Information About Using Open Access Resources

Respondents who indicated that they were familiar with open access journals, institutional repositories, or self-archived materials were asked whether they had ever provided researchers with information about using those resources. Figure 3 shows the percentage of respondents who were familiar with each category of open access resource who had ever provided researchers with information about using open access journals, institutional repositories, and self-archived materials.
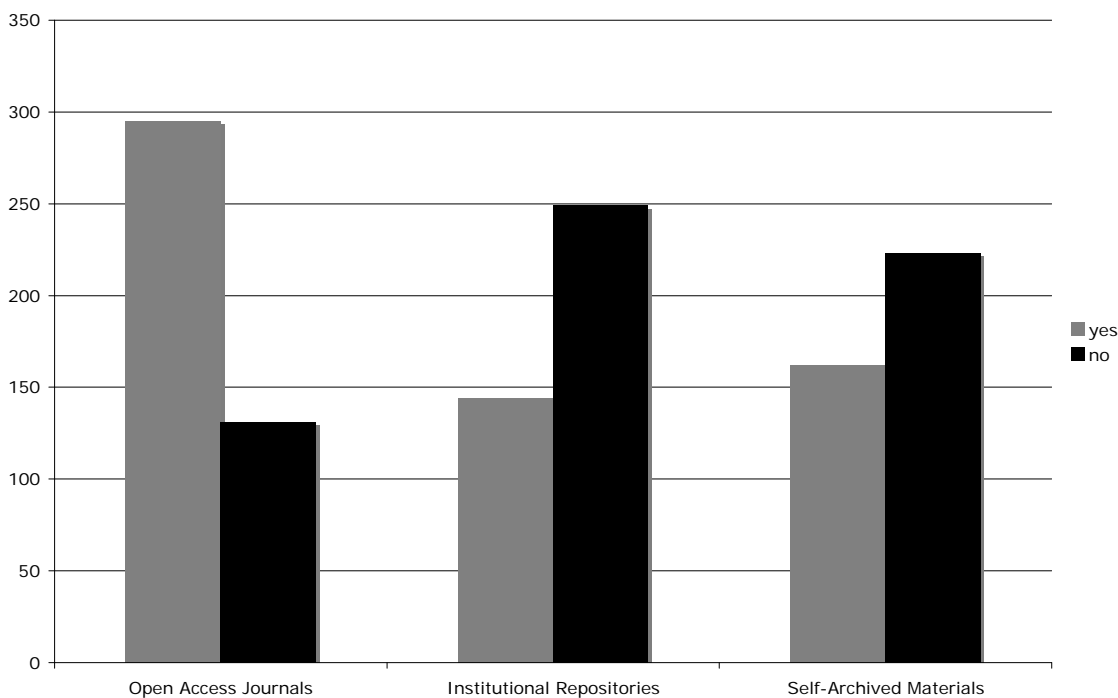
Figure 3. **Have you ever provided researchers with information about using open access journals, institutional repositories, and self-archived materials?**

Out of 428 respondents who were familiar with open access journals, 295 (69%) had provided researchers with information about using open access journals and 131 (31%) had not. Of those who had provided researchers with information about using open access journals, the majority reported that they occasionally provided researchers with information about using open access journals, while 23% reported that they frequently provided researchers with information about using open access journals, and 20% reported that they rarely provided researchers with information about using open access journals. The mean response was 2.99 (Occasionally), and the standard deviation was .73.

From 396 respondents who reported being familiar with institutional repositories, 144 (37%) had provided researchers with information about using materials in an institutional repository, and 249 (63%) had not. Of those who had provided researchers

with information about using materials in an institutional repository, 13 (9%) reported doing so almost never, 40 (28%) rarely, 74 (52%) occasionally, 14 (10%) frequently, and 1 (1%) reported providing researchers with information about using materials in an institutional repository almost every time. The mean response was 2.65 (between Rarely and Occasionally), and the standard deviation was .81.

Of the 386 respondents who were familiar with self-archived scholarly materials, 162 (42%) had provided researchers with information about using those materials, while 223 (58%) had not. Of those who had provided researchers with information about using self-archived materials, 10 (6%) reported doing so almost never, 41 (25%) reported doing so rarely, 94 (58%) reported doing so occasionally, and 16 (10%) reported frequently providing researchers with information about using self-archived materials. The mean response was 2.72 (between Rarely and Occasionally), and the standard deviation was .73.

Respondents who indicated that they had provided researchers with information about using open access journals, institutional repositories, or self-archived materials were given the opportunity to describe a time when they had done so. Many respondents noted that they considered open access resources alongside paid resources when helping researchers, while others highlighted research needs that are uniquely met by open access resources. Several respondents noted that they use discussions about open access resources to teach researchers about evaluating the reliability of free resources. Others mentioned that because some professors require that students cite only traditional paid resources, they do not lead students toward open access resources.

Several respondents who chose to describe a time when they provided researchers with information about using open access resources emphasized that they considered open access resources on par with subscription resources. One respondent wrote, "I consider open access journals to be as important a resource as for-pay journals, and I include them in instruction sessions and reference sessions." Another reported using open access journals "[w]henever these journals have studies needed to be consulted by our students. We have a robust collection of subscription databases, but when the best item is in an open access peer-reviewed journal I send the student there." To explain why his or her library promotes "open access sources equally with the other research resources that our library offers to our students," one respondent emphasized that "[s]tudents generally don't care that the article is from an open access journal, they simply want a good article for their research topic."

Several librarians reported that their libraries incorporate open access resources into their collection of paid resources. Many libraries include open access journals by using link resolvers and other resources that index open access journals, or by including selected open access journals alongside subscription journals in lists of available electronic journals. One respondent noted that materials in his or her institution's repository are "cataloged … so on my end I just searched the library's catalog."

While many respondents described incorporating open access journals into routine reference work, others described specifically instructing groups of faculty and students about how to find the material they need in open access sources. Many librarians use subject guides and online blogs to help researchers use open access resources. One respondent wrote, "I have added links to some institutional repositories on my subject

guides." Another added, "I provide links on my subject pages to digitized special collections that may be of interest to researchers in my areas of study." Other respondents use professional blogs to keep patrons informed about resources. One respondent wrote, "I have frequently directed my biology faculty to PLoS Biology website. I have also included it on one of my "Resource of the Week" posts on my faculty blog."

In addition to using subject guides and blogs to teach researchers about using open access resources, many reference librarians use formal instructional settings, including classes and workshops, to provide researchers with information about using open access resources. Several respondents reported using library instructional classes to teach students about using open access resources. Regarding open access journals, one respondent "made certain that the LTA students in the Introduction to Libraries course that I taught knew that they existed and knew that they contained quality content." Another respondent reported, "I instruct workshop sessions on using the Web for Research and I make certain to indicate that there are some very good quality personal web pages available for some areas of study."

When describing a time when they had helped researchers use open access resources, many respondents highlighted special needs that open access resources are able to meet. Many respondents reported that their college or university's theses and dissertations are stored in an institutional repository. Use of those resources seems to vary across institutions: One respondent noted that his or her "college keeps students' theses in our institutional repository. Lots of other students use these," while another reported that his or her "institution's dissertations are in a repository and rarely requested." Reference librarians also reported using institutional repositories to find materials by a specific

author. One respondent reported, "[d]epending on the search, I suggest that researchers also check authors' institutions to see if they have materials in their IR." In general, respondents reported using institutional repositories for specific research needs, such as finding a dissertation or work by a specific author or institution. One respondent represented this perspective well, reporting that he or she uses institutional repositories "[w]hen the researchers are looking for information that's easily found in the IR and that I know is there. I have to say that it's almost never been the first place I looked for information though."

Open access materials on the Web also meet special research needs. Several respondents reported using the Web in addition to paid resources to find information about specialized topics. A respondent described an annual project that requires students to research an assigned insect. "Sometimes it's difficult to locate enough material on the topic. After searching encyclopedias and databases, the next step is to do a site: .edu Google search with the scientific insect name. This usually returns personal faculty research pages." Others reported that open access materials on the Web are useful when researchers need immediate access to research. One respondent reported that "[w]hen a professor has needed an article immediately, … I have searched for the author's website and found the article," saving the time it would take to process an interlibrary loan request. Many reference librarians report that open access resources on the Web encourage collaboration and allow researchers to be aware of what others are doing. One respondent reported that he or she has "explained how working papers can be a valuable resource for current research to faculty." Another has demonstrated to researchers that "RSS is useful for following the work of a researcher who is doing similar work." Open

access resources on the Web can also increase researchers' awareness of what is going on at their own institution. One reference librarian "tell[s] students to look at the websites the various labs maintain on campus to get an idea of what types of research they're doing … (mainly to see where they want to try to get an internship). It's more a networking tool than anything else."

Like institutional repositories and open access materials on the Web, open access journals meet needs that paid journals do not meet. Several respondents reported providing information to researchers about using open access journals when those researchers do not have access to many subscription journals. High school teachers, distance learners, and recent graduates were specifically mentioned as groups that benefit from using open access journals. One respondent "tell[s] high school physics teachers about open access because they do not have the same resources that we have here." Another notes that "open access journals are extremely valuable to distance learners, especially in the health sciences [because] there are often connection and access issues" with the library's paid subscription resources. Other librarians encourage recent graduates to use open access journals as a way to stay aware of scholarly publishing when they leave their college or university. One respondent "included DOAJ on a list of resources available to our Social Work alumni after graduation," and another "generally explain[s] open access journals to students who are close to graduation, in the hopes that they will continue to read professional information even when they don't have access to the university's collection."

Open access resources are also often used as an alternative to interlibrary loan. Several respondents reported that open access journals are especially useful in subject

areas in which their library's collection is weak. One respondent reported using open

access resources "[w]hen ILL requests have been made for printed articles that are also

freely available online, either from the publisher or on the author's personal website."

Institutional repositories are also useful as an alternative to borrowing material

from other libraries. Several respondents mentioned that they routinely check institutional

repositories (IR) before completing interlibrary loan requests. According to one

respondent, "when ILL requests are found to be available in an IR, I refer our patrons to

the IR rather than providing the paper directly to the patron, just as we do if an article is

available in our own databases." Other respondents look to self-archived resources on the

Web instead of or in addition to interlibrary loan requests. One respondent described

"help[ing] researchers find the pre-print … version [of an interlibrary loan request]

posted to the scholar's website for immediate use while waiting for the "official"

version."

Many respondents reported that whether a resource is open access is a secondary

concern to whether it will be useful to the researcher, but that they are as likely to use

helpful open access resources as they are to use helpful subscription resources. Among

those respondents who expressed reservations about embracing open access resources,

three themes emerged: Many reference librarians do not actively seek out open access

resources but will use them if they are retrieved by a traditional search, other librarians

expressed concerns about the authority of some open access resources, and other

librarians do not promote open access resources to students because of some professors'

reluctance to accept them as cited sources.

Several respondents emphasized that while they are comfortable using peer reviewed or other high quality open access resources, they do not actively seek out those resources. As one respondent explained, "I don't ever specifically use or not use OA journals. If they are indexed in a database and are returned as relevant results, then I will use them." This approach highlights the importance of integrating high quality open access resources with traditional paid resources. Another respondent elaborated on this perspective, explaining that because

> there are hundreds of other subscription-based resources to introduce to researchers … I usually don't focus on the "open access" silos. Who has time to do this? It's more important to show users the highest-quality, most relevant research for their topics, and in most cases, unfortunately, this excludes repositories of open access content. … The best we can do as research librarians is package open access content along with other resources, but I'm not convinced it deserves the prime real estate that other expensive and high-use e-resources tend to occupy.

Many respondents expressed some concern about the quality of open access resources. While there are many respected open access resources, reference librarians still encounter resources of questionable authority. Many respondents reported using open access content in an instructional setting to teach researchers that they must evaluate the quality of online sources. One librarian has "utilized an open access journal, that published Holocaust revisionist research, as an example of questionable scholarship disguised as a legitimate source." Regarding the reliability of information on the Web, one respondent noted, "I always deal with the issue in library instruction, because I want them to realize it is out there, but they need to be careful." Other respondents also encourage student researchers to use materials on the Web as long as the resources are high quality. One reference librarian commented that when "[w]orking with

undergraduates in history and literature, this type of resource is useful as long as they look for some sort of editorial control and compare the content with other literature they find." Another respondent explained that students may use an article self-archived on a personal website "if it has been published in a peer-reviewed journal, and the journal allowed the professor to link/post the article on their own personal website."

Some librarians find that professors are not as accepting of open access sources as they are of traditional sources. Because some professors do not accept free resources as acceptable cited sources, some librarians do not lead student researchers to those resources. One respondent noted that because "instructors often will limit the students to articles available only through our databases, … showing them the free sources is not useful anymore." Regarding the use of open access journals, one reference librarian wrote, "I hesitate to provide open access journals all the time … because they are not always as accepted by our faculty at this point in time, and I do not want an undergraduate to be marked down because of choosing to use such a resource." The same respondent noted that while faculty acceptance is a current limitation, he or she "believe[s] that this situation will change in time."

Use of Open Access Resources:
Providing Authors with Information About Publishing in Open Access Resources

Respondents who indicated that they were familiar with open access journals, institutional repositories, or self-archived materials were asked whether they had ever provided authors with information about publishing in those resources. Figure 4 shows the percentage of respondents who were familiar with each category of open access

resource who had ever provided authors with information about publishing in open access

journals, depositing materials in institutional repositories, and self-archiving.
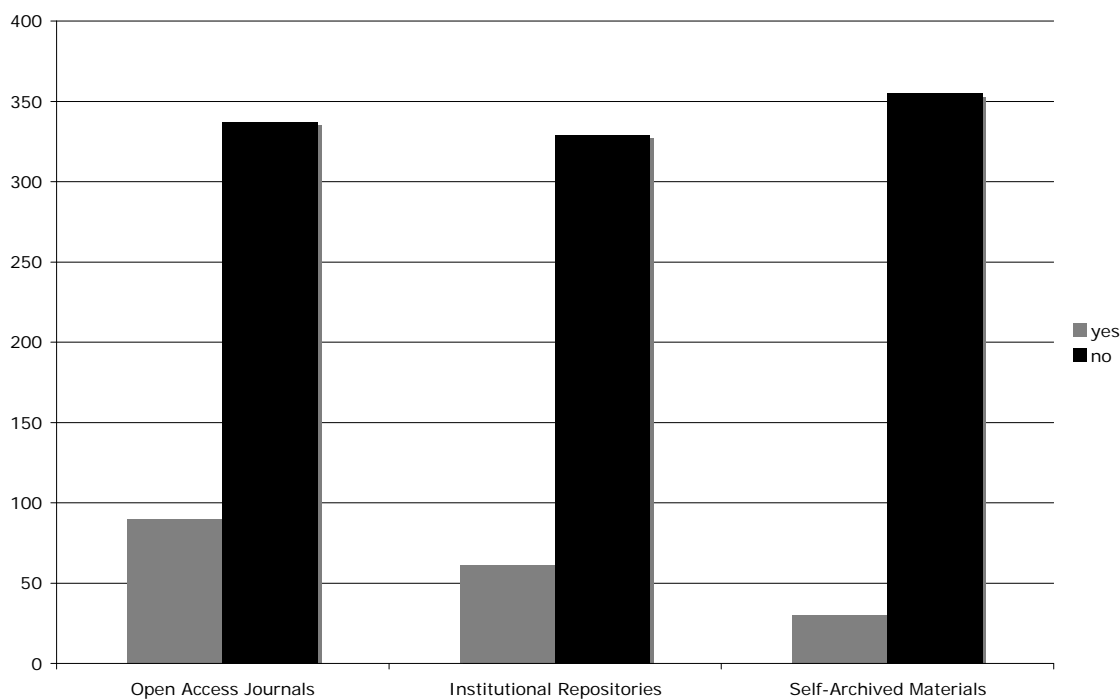
Figure 4. Have you ever provided authors with information about publishing in open access journals, depositing work in institutional repositories, and self-archiving materials?

Of the 428 respondents who reported being familiar with open access journals,

427 answered a question about whether they had ever provided authors with information

about publishing in open access journals. 90 (21%) had provided authors with

information about publishing in open access journals, while 337 (79%) had not. Of those

who had provided authors with information about publishing in open access journals, 6

(7%) did so almost never, 34 (38%) did so rarely, 44 (49%) did so occasionally, and 6

(7%) did so frequently. No respondents reported providing authors with information

about publishing in open access journals almost every time. The mean response was 2.56 (between Rarely and Occasionally), and the standard deviation was .72.

396 respondents reported being familiar with institutional repositories. 390 of those respondents answered a question about whether they have provided authors with information about publishing materials in an institutional repository. 61 (16%) had provided authors with information about publishing materials in an institutional repository, while 329 (84%) had not. Of those who had provided authors with information about publishing materials in an institutional repository, 8 (13%) reported doing so almost never, 20 (33%) reported doing so rarely, 28 (46%) reported doing so occasionally, 4 (7%) reported doing so frequently, and 1 (2%) reported doing so almost every time. The mean response was 2.51 (between Rarely and Occasionally), and the standard deviation was .87.

386 respondents reported being familiar with self-archived scholarly materials published on personal websites, and 385 responded to a question about whether they ever provided authors with information about publishing scholarly materials on a personal website. 30 (8%) had provided authors with information about publishing scholarly materials on a personal website, while 355 (92%) had not. Of the 30 respondents who answered yes, 29 provided information about how often they provided authors with information about publishing scholarly materials on a personal website: 2 (7%) did so almost never, 10 (34%) did so rarely, 14 (48%) did so occasionally, 2 (7%) did so frequently, and 1 (3%) did so almost every time. The mean response was 2.66 (between Rarely and Occasionally), and the standard deviation was .86.

Respondents reported providing authors with information about publishing in open access resources less often than providing researchers with information about using open access resources. This discrepancy is understandable, given that the traditional role of reference librarians has been to help researchers get materials out of resources rather than to help authors put material into resources. However, those reference librarians who have taken on the task of helping authors publish their materials in open access resources have taken on an active role in the process. Reference librarians describe instructing groups of faculty and individual authors about how to publish their work in open access journals, institutional repositories, or the Web. Librarians also describe providing information about open access publishing to authors in casual conversation. Those who described the factors that limit authors' publishing in open access sources focused on two issues: authors' concerns about tenure, and a lack of institutional support.

Many respondents described teaching groups of faculty authors about how to publish their materials in open access resources. Several described presenting information about open access journals to faculty groups. One respondent "[p]repared a library display directing authors to resources to help them publish through open access." Several reference librarians have sent informational mailings to faculty, including one who provided information about open access publishing "in the mailing I sent to all science faculty," and another who "sent brochures to faculty and sponsored a demonstration of our system's repository to interested parties on campus." Several respondents specifically mentioned the new NIH open access requirement, including one respondent who "sent out information about the new requirement for anyone whose research is funded by NIH that they must submit their article to PubMed Central upon acceptance for publication."

Other reference librarians use online resources to teach authors about open access publishing. One respondent "co-created an online tutorial for authors that has a section about open access journals." Another reports the he or she uses a professional blog and "encourage[s] others to do so to move forward scholarly work within the library community."

Other reference librarians described one-on-one interactions with authors in which they discussed publishing in open access resources. One respondent described discussing open access journals "[d]uring consultations with faculty and students seeking to publish their material." Several librarians mentioned discussions with faculty about copyright issues, and many included the subject of open access publishing in that context. One respondent noted that "[i]n discussions over the cost of copyright fees for some journals, I have mentioned to graduate students and to other professors … the option of open access publishing." Another reported, "[a]ny time that I am discussing publishing and copyright issues with a faculty member, I mention our institutional depository." Some reference librarians take on a very active role in helping authors publish their work in open access resources. As one respondent described, a "professor wanted to post a few of his published articles on his Web site. I helped him scan the articles, then gave him basic copyright information, and contacted one of the publishers to get permission for him to put it on his Web site."

Many reference librarians reported discussing open access publishing possibilities with authors as a part of everyday conversations. One described addressing the issue "[w]hen talking about the future of academic publishing and higher education" and another addresses it "[w]hen it comes up in conversation."

When describing the subject of their conversations with authors, most respondents emphasized either increasing exposure of open access publishing opportunities or educating authors about copyright issues. One respondent noted that his or her conversations with authors have "largely been attempts to expose them to the journals, alert them to some of the high impact factor OA journals and let them know grant money could be used for author fees." Several reference librarians noted that they discuss copyright concerns with authors. One respondent described his or her conversations with authors about open access publishing as "mostly related to copyright issues." Another "told a researcher that he could choose to self-archive a publication on his website based on the policy of the journal he submitted his article to," and another reports that he or she "often tell[s] faculty to check their agreements and urge[s] them to self-archive."

Respondents who addressed obstacles to authors' willingness to publish in open access resources often cited faculty concerns about whether open access publications would decrease their chances of earning tenure. One respondent reported that early on in Public Library of Science (PLoS) development, he or she "[e]ncouraged a biology faculty member to submit her manuscript to PLoS Biology rather than Nature, but her co-author felt strongly that publication in Nature would be more effective for tenure review and for communicating the research results very broadly." Because some faculty seeking tenure are more likely to want to publish in traditional routes, one respondent suggests publishing in open access journals "to authors, mainly those with tenure, as possibilities when they are asking of journals that are available to publish in."

Some reference librarians indicated that the environment at their institution influences their interactions with authors about publishing in open access resources. One

respondent explained that his or her institution is not currently focused on open access publishing, and "the level of involvement really is dependent upon the participation of one's institution." Another respondent reported that he or she had been involved in discussions with authors about depositing their work in an institutional repository "when the library was interested in having an institutional repository (around 4 years ago), and we had little to no faculty and administrative support." In contrast, librarians whose institutions were actively involved in promoting open access seem more likely to be involved in talking about open access publishing options with authors. One respondent is "part of a pilot group of librarians at my university who a) train other librarians to use, discuss, and promote our IR and b) encourage faculty outside the library to contribute."

Discussion

Because this study explores academic reference librarians' familiarity with, attitudes toward, and use of open access sources, it is possible to compare these results with the results of previous studies that have focused on authors' familiarity with, attitudes toward, and use of open access resources. The results may not be directly comparable, since this study and the author studies were conducted at different times and used different study populations, methods, and questions. However, it is interesting to note the similarities and differences between librarians and authors in their responses.

According to their self-assessments, the academic reference librarians who responded to this survey are generally familiar with open access resources. On a five point scale where 1 was "Very little" and 5 was "A lot," the mean response was 3.11 and the standard deviation was 1.06. Only 9% of respondents indicated that they knew very little about open access publishing. These results contrast sharply with the results from the author study conducted by Nicholas et al. More than a third of the authors that were surveyed indicated that they knew nothing about open access, and even among authors who knew about open access, half described themselves as knowing only a little.

The contrast between authors' and academic reference librarians' familiarity with open access resources seems to indicate that academic reference librarians are more familiar with the open access movement. If that is the case, reference librarians may be well suited to take on the open access content recruitment and promotional roles

suggested by Bell et al. The contrast between authors' and librarians' familiarity with

open access may also be due to the time that has passed since the author study, which was

conducted in 2003 and 2004. Because of the recent growth of the open access movement,

studies conducted at different times may not be reliably compared.

The academic reference librarians surveyed in this study and the authors surveyed

in the Nicholas et al. shared many attitudes about open access publishing. The academic

reference librarians surveyed in this study and the authors surveyed by Nicholas et al.

were similarly undecided about whether open access would lead to the disappearance of

print journals. 39% of librarians and 31% of authors surveyed disagreed, 18% of

librarians and 15% of authors neither agreed nor disagreed, and 43% of librarians and

53% of authors agreed with the statement that open access publishing would lead to the

end of print journals.

The librarians surveyed in this study and the authors surveyed in the Nicholas et

al. study also shared similar views about whether open access would lead to the easier

accessibility of research papers. 77% of librarians surveyed either agreed a little or

strongly agreed that open access would lead to easier accessibility of research papers, and

78% of authors surveyed also indicated that open access would lead to easier accessibility

of papers.

The librarians surveyed in this study and the authors surveyed by Nicholas et al.

differed in some of their attitudes toward open access. A higher percentage of librarians

than authors surveyed believed that open access would lead to authors' publishing more.

While 56% of academic reference librarians surveyed either agreed a little or strongly

agreed with the statement that open access will lead to authors' publishing more, 37% of

authors either agreed a little or strongly agreed with the same statement. This discrepancy

may be due to the time that passed between the Nicholas et al. survey and this survey.

Librarians and authors surveyed also disagreed about whether open access will

lead to libraries' having more money to spend. While only 35% of librarians surveyed

either agreed a little or strongly agreed with the statement that open access would lead to

libraries' having more money to spend, 59% of authors surveyed indicated that they

either strongly agreed or agreed a little with the same statement. This difference can

likely be attributed to the fact that librarians are more in touch with library budget issues

than authors are.

More than the librarians surveyed in this study, the authors surveyed by Nicholas

et al. associated open access with high quality. 79% of authors surveyed associated high

quality with open access journals very strongly, quite strongly, or a little, while only 54%

of librarians surveyed agreed a little or strongly agreed with the statement that open

access is high quality. (It is important to note that many librarians surveyed (40%) neither

agreed nor disagreed with the statement that open access is high quality, and only about

6% disagreed strongly or a little with the statement that open access is high quality.) This

difference between librarians and authors may be attributable to reference librarians'

higher familiarity with open access resources. Nicholas et al. note that, in their study,

most authors who were familiar with open access "did not rate the quality of [open

access] articles highly" (Nicholas 507).

Academic reference librarians seem to use open access journals more than authors

publish in them. 63% of librarians who responded to this survey had provided

information to researchers about those journals, while Nicholas et al. found that 11% of

the responding authors had published an article in an open access journal. Even taking into account the increasing popularity of open access since 2003 and 2004, when Nicholas et al. conducted their study, there may be a difference between librarians' use of and authors' publishing in open access journals. This is not surprising, since reference librarians have several opportunities each day to use scholarly resources, while authors publish scholarly materials less frequently. Librarians have more opportunities to use open access journals than authors have to publish in them.

In contrast, the percent of responding librarians who have helped researchers use materials in institutional repositories and on the web is less than the percent of authors who have published in those resources. In a study of authors' self-archiving in institutional repositories and on the web, Swan and Brown found that fewer than half of the responding authors had self-archived an article. Among librarians who responded to this survey, 31% had provided researchers with information about using materials in institutional repositories and 35% had provided researchers with information about using materials that were self-archived on the web. These percentages are notably lower than the 63% who had provided researchers with information about using open access journals.

Several of the considerations that affect authors' decisions to publish in open access resources also affect reference librarians' decisions to use those resources. In their study of authors' decisions to publish in open access sources, Park and Qin determined that perceived journal reputation, topical relevance, availability, career benefit, and cost affected scholars' decisions of whether to publish in open access journals. Academic reference librarians who described their use of open access sources with researchers and

authors also raised all of these considerations. Perceived journal reputation and topical relevance were frequently cited by librarians who emphasized that their first priority was to help patrons find reliable sources that suit their needs. Availability and cost were often brought up in the context of using open access sources as alternatives to interlibrary loan and filling gaps in the library's collection without purchasing materials. Some reference librarians cited career benefit as one of the issues they must consider when helping authors choose where to publish. It seems that academic reference librarians and authors take many of the same considerations into account when they decide whether and how to use open access resources.

The results of this study are useful in evaluating the recommendation that academic reference librarians take on the role of teaching authors about open access. Many of the librarians who responded to this survey indicated that they already teach authors about publishing in open access journals, depositing their work in an institutional repository, and self-archiving on the web. Their descriptions of their instructional interactions with authors indicate that academic reference librarians can and do play an important role in teaching authors about open access publishing opportunities.

Librarians' responses also indicate the conditions under which they might play a more active role in teaching authors about open access publishing. Librarians who indicated that they teach authors about open access publishing opportunities often had the formal support of their institution. Many librarians described instructing authors about open access through workshops and other formal instructional settings that could be facilitated by the larger institution.

While this study offers a useful comparison with previous studies about authors' familiarity with, attitudes toward, and use of open access resources and allows for further exploration of the possibility that reference librarians could take on the role of teaching authors about open access, its results are limited by several factors. The results of this survey are limited by the sampling method that was used. Because survey participants were recruited using mailing lists, it is not possible to determine the response rate or to determine whether subjects in certain groups were more or less likely to complete the survey. Because the survey was identified as being about open access resources, it is likely that reference librarians who knew about or were interested in open access were more likely to decide to participate in the study. This may have led to a population of respondents that is more aware of and interested in open access than the general population of academic reference librarians.

The issue of social desirability limits this study's validity. In general, people are reluctant to seem ignorant in their responses to survey questions. Librarians in particular may feel like they should be familiar with open access sources and use them as part of their work, and they might answer the survey questions based on what they think they should say. Because librarians in general want to appear knowledgeable about resources, their answers might not reflect their actual familiarity with open access resources, especially if it is low. This study's results therefore may not accurately reflect what it was designed to measure: librarians' familiarity with, attitudes toward, and use of open access resources.

Summary and Conclusion

The open access movement has created a new body of scholarly literature that is available to users for free. Open access journals are available on the open web, and institutional repositories allow authors to self archive their work in a stable online environment. While the future of this model and the exact ways it will affect the existing publishing model are uncertain, it is clear that new resources are now available to authors who want to publish their work.

Many researchers have examined authors' attitudes toward these new open access sources. Studies have examined whether authors choose to publish in open access sources and what attitudes they have about those sources. These studies have led researchers to the conclusion that many authors are unaware of their open access publishing options. Many authors do not publish in open access journals and institutional repositories because they do not know about those options. Many authors have misconceptions about the characteristics of open access sources, and those misconceptions prevent them from venturing outside the traditional model.

Other researchers move on from those findings to propose that author education will raise awareness of and eliminate many of the common misconceptions about open access sources. To the extent that authors do not publish in open access journals or deposit work in institutional repositories because they do not know those options exist, education would increase the amount of work submitted to open access publishing

sources. To the extent that authors do not publish in open access journals or deposit work in institutional repositories because they have misconceptions about those publishing options, author education will also increase the amount of work submitted to those sources.

Who will educate authors about open access publishing? Several researchers have suggested that academic reference librarians are in an ideal position to take on the task. They have experience in education and a familiarity with scholarly resources that could be directed toward increasing awareness of open access publishing and research options. Many reference librarians have existing relationships with faculty authors, which also put them in an excellent position to provide this necessary education about open access sources.

While studies have been conducted to determine what authors know about open access, similar studies have not been conducted to determine what academic reference librarians know. Before advocating that librarians should take on the role of educating authors about open access publishing, it is first necessary to determine what academic reference librarians themselves know about open access publishing.

The purpose of this study was to assess academic reference librarians' familiarity with, attitudes toward, and use of open access resources. A survey was designed with a combination of closed ended and open ended questions. The first section of the survey asked participants about their professional environment, the second section addressed participants' attitudes toward open access publishing in general, and the last section of the survey assessed participants' professional use of open access resources, including open access journals, institutional repositories, and self-archived materials on personal

websites. The survey was distributed through an email that was sent to four mailing lists to which academic reference librarians might subscribe. 460 respondents completed the survey.

Respondents provided information about their familiarity with open access in general, as well as their familiarity with open access journals, institutional repositories, and self-archiving on the web. Most respondents' self-assessments of their familiarity with open access in general placed them in the middle of a five point scale ranging from "Very little" (1) to "A lot" (5). The mean response was 3.11, and the standard deviation was 1.06. Respondents were also asked about their familiarity with three specific types of open access resources: open access journals, institutional repositories, and self-archiving on personal websites. 92% of respondents reported that they were familiar with open access journals, 86% reported that they were familiar with institutional repositories, and 84% reported that they were familiar with self-archiving on personal websites.

Respondents also provided information about their attitudes toward open access, including statements about the degree to which they associated certain qualities with open access publishing and what they thought open access would lead to in the future. In general, respondents' answers indicated that they believed open access would not lead to a decrease in the quality of scholarly materials available. Most respondents strongly agreed or agreed a little with the statement that open access is high quality, and only 13% believed that open access would lead to papers' becoming less concise. Most respondents indicated that they believe open access is beneficial to authors' careers, and most also expected that open access would lead to authors' publishing more. While a little more than a third of respondents disagreed with the statement that open access is properly

archived, and almost half disagreed with the statement that open access is well indexed, a majority agreed that open access would lead to easier accessibility of research papers.

Finally, respondents provided information about their professional use of open access journals, institutional repositories, and self-archived materials on the web. Professional use was divided into two categories: providing researchers with information about using open access resources and providing authors with information about publishing in open access resources. Across the board, more librarians provided researchers with information about using open access resources than provided authors with information about publishing in those resources. Among respondents who were familiar with open access journals, 69% had provided researchers with information about using open access journals and 21% had provided authors with information about publishing in them. Among respondents who were familiar with institutional repositories, 37% had provided researchers with information about using materials in an institutional repository, and 16% had provided authors with information about publishing materials in an institutional repository. Among respondents who were familiar with self-archived scholarly materials, 42% had provided researchers with information about using those materials, while only 8% had provided authors with information about publishing scholarly materials on a personal website.

The results of this study indicate that academic reference librarians are generally familiar with open access resources but have not yet taken on the role of teaching authors about publishing in those resources. Even among those respondents who were familiar with open access sources, relatively few academic reference librarians had provided authors with information about publishing in those resources. However, most survey

respondents' familiarity with open access journals, institutional repositories, and self-archived materials on the web indicate that academic reference librarians may be well suited to take on the instructional role. Respondents' generally positive attitudes toward open access indicate that many academic reference librarians support open access materials and might therefore be more likely to encourage authors' publication in them.

Many survey respondents cited the support or lack of support from their institution as a contributing factor in their professional use of open access resources, especially regarding teaching authors about publishing in such resources. Research about institutional support of open access publishing might shed more light on the question of what factors influence reference librarians' professional use of open access resources. Further research in this area could explore the ways in which institutions can encourage academic reference librarians to take on the role of teaching authors about open access publishing opportunities.

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