Centering Accessibility: A Review of Institutional Repository Policy and Practice

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INTRODUCTION Libraries have proposed institutional repositories as a means of providing universal access to university research. However, in recent years, it has become clear that universities and libraries have neglected web accessibility in constructing services including open access publishing programs. **METHODS** To better understand accessibility practices in relation to institutional repositories, survey responses were collected from repository managers. The survey consisted of five multiple choice and two open-ended questions regarding remediation and accessibility practices used by repository managers. **RESULTS & DISCUSSION** While the importance of accessibility has been well documented, survey responses showed that few policies and practices have been put in place to ensure accessibility in institutional repositories. Key barriers to accessibility included lack of organizational resources, lack of time, inadequate training, and product restrictions. **CONCLUSION** These results suggest that accessibility should be prioritized in future creation of policies and allocation of library resources.

IMPLICATIONS FOR PRACTICE

By understanding accessibility practices in institutional repositories, libraries can:

1. Contextualize local practice in comparison to peer institutions
2. Complete a gap analysis of institutional repository accessibility practices
3. Advocate for reallocation of resources to support accessibility of institutional repositories

INTRODUCTION

Institutional repositories (IRs) began to proliferate in the early 2000s with the goal of preserving and making accessible the intellectual outputs of institutions. IRs were founded out of a commitment to idealistic statements such as the Budapest Open Access Initiative (BOAI) of 2002, which stated that research should be "freely accessible" in order to "lay the foundation for uniting humanity in a common intellectual conversation and quest for knowledge" (2002). Raym Crow (2002) and Clifford Lynch (2003) similarly suggested that IRs had the potential of increasing access to university research with the support of libraries and librarians. In sum, IRs were seen much like the internet—as a tool for smoothing out inequities by democratizing access to knowledge.

These early formulations of the IR did not account for a variety of inequities that could not be resolved by eliminating the cost of information at the point of readership. Not least of these are barriers faced by readers with disabilities. Based on its report of 2011, the World Health Organization estimates that one billion people worldwide or 15% of the world's population experiences some form of disability (2011). For those who are blind, low-vision, Deaf, or compromised in their ability to scroll, mouse, click, and scan through webpages, information can be extremely difficult to access online. Even using assistive devices, this group requires specific infrastructural support in order to navigate online and effectively perceive the information presented on websites including IRs.

Published by the Worldwide Web Consortium (W3C), the Web Content Accessibility Guidelines (WCAG) 2.0 outline a variety of strategies for making information online perceivable, operable, understandable, and robust for both able and disabled users. These include practices like writing alternative text to describe images, placing captions on videos, allowing users to navigate websites using only the keyboard, and consistently using appropriate HTML tags for the sections of a webpage. Even setting aside specific technical requirements like these, it has become increasingly evident that IRs have hurdles to overcome should they wish to extend the BOAI's original vision by supporting the community of readers with disabilities.

For this study, a Scholarly Communication and Science Librarian at Washington State University conducted a survey of IR managers to better understand how libraries and IRs are meeting accessibility challenges for their platforms. This paper presents their perspectives on current barriers to accessibility. It also summarizes current practice and suggests future directions for research, policy development, and community conversation.

LITERATURE REVIEW

Poor web accessibility is a problem that is well-documented in the literature. In *A Web for Everyone*, Sarah Horton and Whitney Quesenbery (2014) describe how inaccessible technology can effectively create disability. As they note, "Disability is a conflict between someone's functional capability and the world we have constructed….it is the product that creates the barrier, not the person, just as design is at fault when a site has poor usability" (p. 3). Web accessibility is a burgeoning area of interest as, in the United States, 2018 saw a sharp rise in the number of lawsuits brought against institutions out of step with WCAG 2.0 (LaGrow, 2019). This increase emerged following a clarification made regarding Section 508 of the 1973 Rehabilitation Act, which pointed out the specific responsibility of public entities—including universities and libraries—to make their services and websites available to the general public.

Both before and after 2018, a number of studies have revealed significant accessibility challenges for university and library websites and electronic services. Camilla Fulton (2011) detailed the extent of the problem when taking into account lack of compliance with WCAG 1.0. Other studies pointed out widespread accessibility problems with university websites (Ringlaben, Bray, & Packard, 2014; Ahmi & Mohamad, 2015; Alahmadi & Drew, 2017) and library websites and databases (Riley, 2002; Stewart, Narendra, & Schmetzke, 2005; Byerley, Chambers, & Thohira, 2007; Tatomir & Tatomir, 2012). After indicating the cognitive overload experienced by some library users with disabilities (Ahmed, Borodin, Puzis, & Rama Krishnan, 2012; Theofanos & Redish, 2006), some researchers have remarked on the need for improvements in cataloging practices, metadata, and similar strategies for increasing access to digital library resources (Xie, Babu, Joo, & Fuller, 2015; Beyene & Godwin, 2018).

Web accessibility has proven to be a challenge even for the staple fare of library open access (OA) publishing programs. Studies on the accessibility of open access journals and open access repositories have revealed similar issues as found in other electronic materials managed by libraries. For instance, Borchard, Biondo, Kutay, Morck, & Weiss (2015) examined Open Journal Systems using an automated accessibility checker and showed that the platform did not meet WCAG 2.0 requirements at that time. This study further pushed

libraries and developers to consider how accessibility issues impact not only the readers of OA materials but the creators, curators, and managers of inaccessible systems. María Hallo, Francisco Hallo, & Sergio Luján-Mora (2017) similarly used automated accessibility checkers to reveal widespread accessibility issues in Latin American OA journals.

A handful of relatively brief studies have focused more specifically on the accessibility of institutional repositories. For instance, Alexa Ramirez-Vega (2017) examined the accessibility of 155 repositories indexed by OpenDOAR and showed that one hundred percent had accessibility issues ranging from minor to critical. Wendy Walker and Teressa Keenan (2015) performed a limited accessibility review of the Elsevier platform Digital Commons and discussed the issues a blind student had in using skip navigation links, finding files to download, and understanding context clues when metadata and alt text were missing.

In addition to these studies, recent calls have been made for specific improvements in the accessibility of institutional repositories. Carli Spina (2019) suggested that accessibility in libraries could be greatly improved by establishing accessibility policies, adapting workflows, and adhering to common standards like WCAG 2.0. As she writes, "Without a significant investment in and prioritization of web accessibility, libraries will be unable to offer an equitable experience to individuals with disabilities, both as library patrons and as library employees." In conference presentations, Caitlin Carter (2016), Colleen Lyon, Christopher Deems, Laura Waugh, & Nerissa Lindsey (2018), and Suzanna Conrad and Alyssa Loera (2019) point out resource challenges and identify steps for improving repository metadata, captioning media, and tightening standards for submissions to the IR. Finally, Raizel Liebler and Gregory Cunningham (2019) summed up these observations by noting that IRs have a legal obligation to ensure that scholarly works are available to all, including "potential users with disabilities." (328).

METHODS

Survey Design

For this study, a survey was created that asked managers of institutional repositories to reflect on the accessibility practices informing their work. The Institutional Review Board of Washington State University declared the survey exempt of review due to low risk to study participants.

- Five multiple-choice/multiple-answer questions and two open-ended questions were selected to elicit the following pieces of information about IRs:
- Current measures IRs are taking to improve accessibility

- Barriers repository managers are facing regarding accessibility
- Use of accessibility policies to guide practice in the IR
- Types of work performed by repository managers to remediation accessibility for materials submitted to the IR
- Sources of funding for remediation and accessibility work

Although most of the responses to survey questions were pre-established, answers to open ended questions were coded using thematic analysis as described by Virginia Braun and Victoria Clarke (2006). To complete thematic analysis, the authors followed the six-step process that Braun and Clarke outline in order to "identify, analyze, and report patterns (themes) within data" (6). Initially we familiarized ourselves with the range of responses provided on the survey. Then we generated codes, placing responses into categories that we grouped under particular themes related to our core research questions. We distilled our themes on the basis of their frequency in the survey responses, then defined and named final thematic categories. Anonymous quotations were selected to illustrate selected themes in the discussion that follows.

Survey Distribution

The seven-question survey was distributed via anonymous link to four listservs: the Orbis Cascade Alliance general announcements listserv, the Association of College and Research Libraries (ACRL) Scholarly Communication mailing list (scholcomm), the general discussion list for the International Federation of Library Associations and Institutions (IFLA-l), and the Digital Commons IR Managers listserv.

These lists were selected in an attempt to reach IR managers both locally, nationally, and internationally. The Orbis Cascade Alliance listserv is used by librarians and staff at 36 academic institutions across the Pacific Northwest. The scholcomm listserv fosters discussion by librarians and staff primarily in North America who have an interest in scholarly communication or provide support for services such as IRs. The IFLA listserv has international reach, tapping into IFLA's base of more than 1,500 members in over 150 countries. Finally, the Digital Commons mailing list reaches users of Elsevier's institutional repository platform, numbering more than 500 based nationally and internationally.

Although an attempt was made to reach IR managers via some of the most active listservs in scholarly communication, potential gaps must be acknowledged. DSpace, Fedora, and Eprints are all common IR platform with hundreds of instances nationally and internationally, but listservs for these platforms were not reached directly. This study also relied on the

self-identification of survey respondents as IR managers or IR practitioners. Others were not prevented from taking the survey even if their knowledge of institutional practices might potentially be lacking.

Institutional Repository Sampling

In addition to insights collected in the accessibility survey, the authors also surveyed a sampling of institutional repositories to determine the frequency with which IRs make use of front-facing accessibility policies. We limited this review to institutional repositories hosted by members of the Association of Public and Land-grant Universities (APLU). This subset of all IRs was chosen largely because of the strong correlation between APLU mission and broad accessibility to the general public. APLU schools were initially established to provide agricultural and vocational training to members of the general public. The 245 members of APLU are devoted to "advancing and promoting research and discovery to improve society, foster economic growth, and address global challenges" (About APLU, 2020). As such, the stance of APLU's member institutions regarding accessibility were taken as a pertinent temperature check on accessibility work more generally in institutional repositories. Results of our search for accessibility policies are also reported in the following discussion.
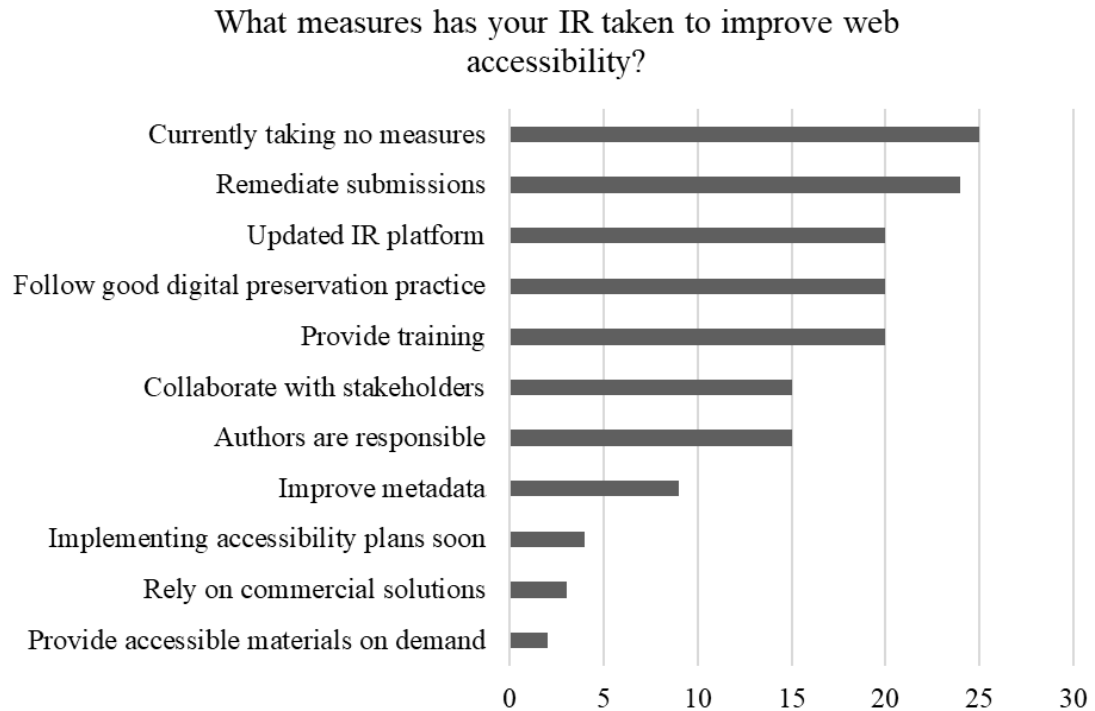
RESULTS

Following distribution, the survey was left open for approximately one month. During that time, 139 complete and partial responses were received. Ultimately, 71 respondents completed the survey while 68 clicked out before finishing.

In response to the first survey question regarding accessibility measures pursued in IRs, respondents most frequently indicated doing no accessibility work ($n = 25$). A nearly equal number reported the opposite—that some level of remediation occurs when materials are submitted to the IR ($n = 24$). Other respondents indicated that their IR platform had been updated to improve accessibility ($n = 20$), that their libraries provide educational opportunities related to accessibility ($n = 20$), or that the IR has implemented digital preservation standards ($n = 20$). These results are summarized in Figure 1.

Some survey participants wrote free-form responses indicating that their institutions were conducting audits or laying plans for future accessibility workflows ($n = 4$). Future plans, where identified, included requirements for use of Optical Character Recognition (OCR), captioning standards, and internal workflows for adding captions. Three additional respondents indicated that they use commercial vendors for their IR platforms and rely on these to ensure accessibility. One indicated that their institution had required a Voluntary Product

Accessibility Template (VPAT) from a vendor engaged with building add-on functionality for their IR. Finally, three others remarked that they provide remediation on demand or selectively add accessibility to collections depending on their use. These added responses are reflected in Figure 1.

What measures has your IR taken to improve web accessibility?

Measure	Value
Currently taking no measures	25
Remediate submissions	24
Updated IR platform	20
Follow good digital preservation practice	20
Provide training	20
Collaborate with stakeholders	15
Authors are responsible	15
Improve metadata	9
Implementing accessibility plans soon	4
Rely on commercial solutions	3
Provide accessible materials on demand	2

**Figure 1.** Measures taken to improve accessibility in institutional repositories

In response to our question about whether the respondents' IRs had accessibility policies or requirements in place, 75% indicated that they did not (n=54, see Figure 2).

A subsequent question asked respondents to report the type of remediation work their IRs perform prior to uploading submissions. Survey participants could choose as many options as were relevant, and the largest number indicated that they OCR submissions such that strings of text can be searched and read by screen readers (n = 33). Another large group of respondents indicated that their IR does not remediate submissions for accessibility (n = 23). Others indicated that the library may choose to migrate document types if needed (n = 20); that captions and transcripts are sometimes added (n = 19); and that other elements like headings, reading order, and metadata statements are edited to improve accessibility (n

= 14). Three respondents wrote free-form answers noting that their IRs remediate on an as-needed basis and complete a range of corrections and improvements. As one participant noted, "All of this work is done upon request. We do not assess and remediate upon ingest." Results of this question are summarized in Figure 3.

Does your institutional repository have an accessibility policy or accessibility requirements for materials posted?
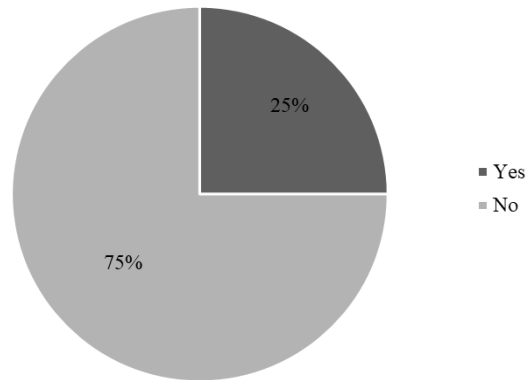
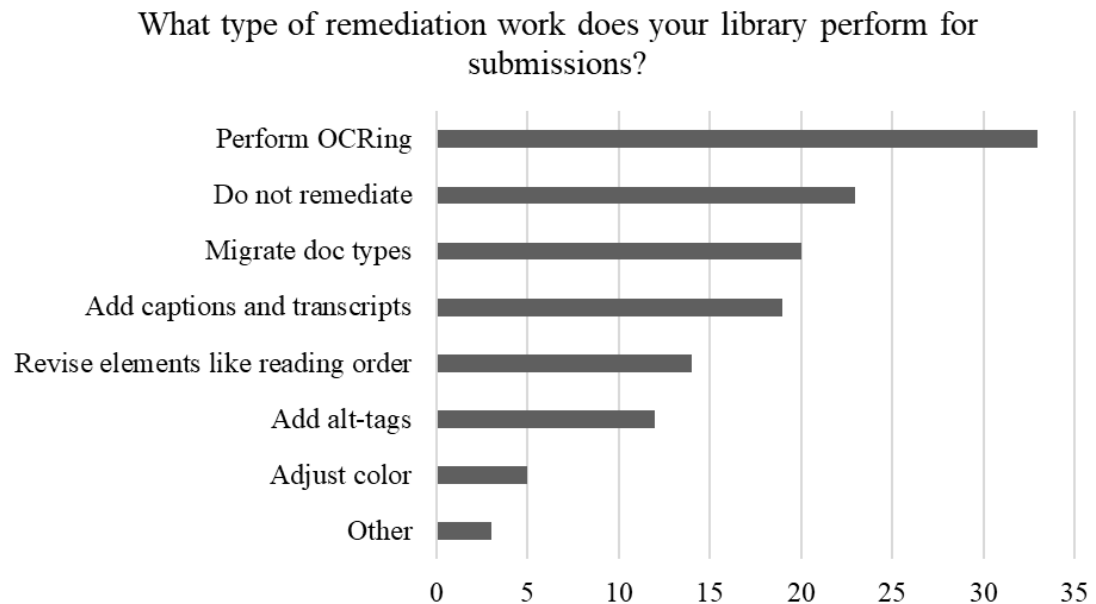**Figure 2.** Number of IRs with accessibility policies

What type of remediation work does your library perform for submissions?
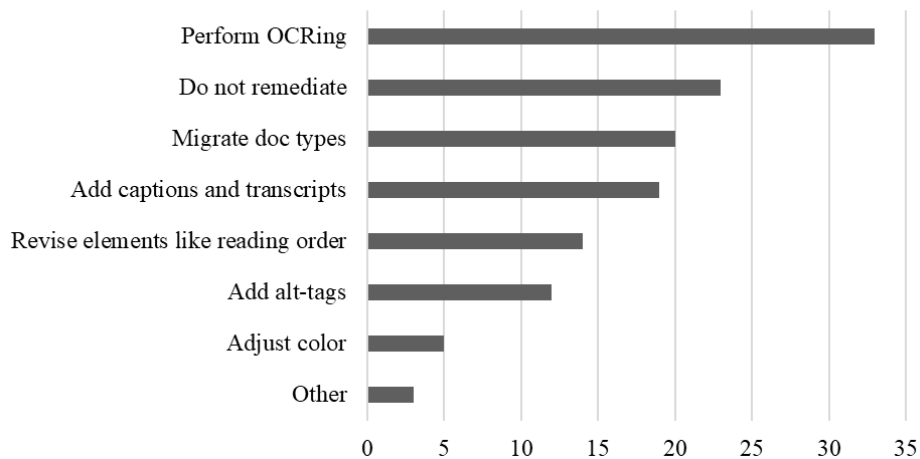
Figure 3. Types of remediation work undertaken by institutional repositories

As a last question about current state of practice, respondents were asked to indicate how their accessibility work is funded (see Figure 4). A large majority responded that library workers perform this work with support from library administration (n = 31). Another group stated that there is no funding for accessibility work (n = 13) or this work is performed on a volunteer basis (n = 3). Less common selections were that accessibility work is outsourced (n = 4) or performed with support of university administration (n = 4).

In free form answers, other respondents listed funding sources including one-time grants (n = 2) and temporary staffing (n = 1). Two other survey participants pointed to particular workflows that allow this work to happen. In one case, IR staff generates machine captions that are then reviewed by those making submissions to the IR. In another case, dedicated publishing editors perform accessibility checks. Another respondent noted that their university's accessibility policy was adopted so recently that funding streams have not yet been identified. Finally, two respondents noted that IR staff and managers perform accessibility work as they are able in the time available to them.

What type of remediation work does your library perform for submissions?

Category	Value
Perform OCRing	33
Do not remediate	23
Migrate doc types	20
Add captions and transcripts	19
Revise elements like reading order	14
Add alt-tags	12
Adjust color	5
Other	3

Figure 4. Sources of funding for remediation work

In a second set of questions, survey participants were asked to reflect on the greatest barriers they see to accessibility in institutional repositories. They were asked first to rank their top three barriers taken from a list supplied by the authors, then to describe barriers in free-form text. In the ranking question, the top three most cited barriers were insufficient resources (n

= 21), inaccessible legacy documents already in the repository (*n* = 15), and product restrictions (*n* = 9). "Insufficient resources" was reiterated again as the second and third most significant barrier to accessibility (*n* = 14 and *n* = 9 respectively). Two other factors were ranked highly—insufficient training and insufficient time. See Table 1 for the details of rankings.

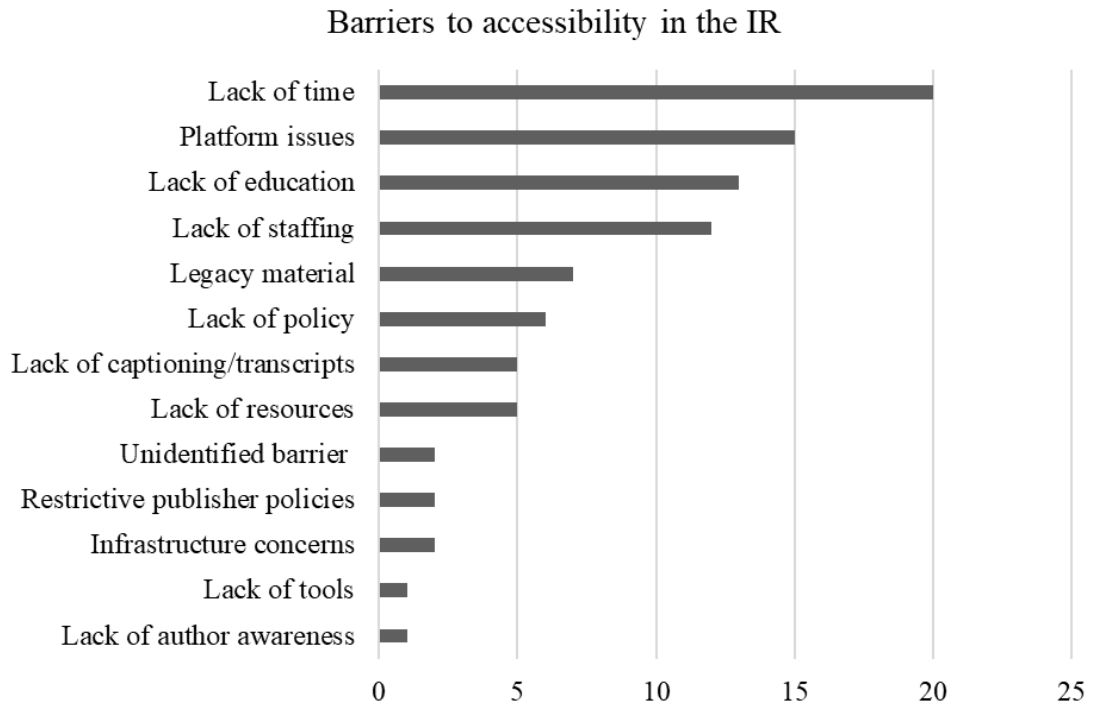| Barriers to accessibility in institutional repositories	
Most frequently identified as most important barrier (ranked by frequency)	Insufficient Resources Inaccessible legacy documents Product restrictions
Most frequently identified as second most important barrier (ranked by frequency)	Insufficient resources Inadequate training Insufficient time
Most frequently identified as third most important barrier (ranked by frequency)	Inadequate training Insufficient time Insufficient resources

Table 1. Top three factors identified by survey respondents as barriers to IR accessibility

Free-text responses about barriers were also coded and summed by category (see Figure 8). Responses citing more than one barrier were placed in multiple categories. As in the ranking exercise, respondents most frequently cited time as a barrier to improving accessibility in the IR (*n* = 20). A typical response noted, "we have one librarian working on the IR along with other responsibilities, and we haven't been able to devote time to accessibility yet." Limited staffing was also frequently cited alongside a shortage of time (*n* = 12). One person remarked that the IR has "a myriad stakeholders" and not nearly enough staff to address accessibility issues for all of them (see Figure 5).

DISCUSSION

Survey respondents frequently pointed to lack of consistent policy regarding accessibility in the IR. While some indicated that they routinely implement particular accessibility measures for incoming publications, three-quarters of respondents had no accessibility policy for the IR. This finding bore out in a search conducted by the authors to determine whether institutions in similar standing to their own have publicly posted policies for their IRs. Seventy-nine schools were considered, all of which are members of the Association of Public and Land-grant Universities. Sixty-three of these schools had institutional repositories as of January 2020, and 24 of these had clearly posted accessibility policies attached to their IRs. However, 18 of the 24 were boilerplate statements supplied by Elsevier for its Digital Commons platform. The Elsevier policies helpfully point to WCAG 2.0 and the Digital Commons VPAT (Nemchik, Seow, & Nyikos, 2019). However, these statements do not

appear to originate from individual schools. As such, they do not address the accessibility of materials in the IR, nor do they propose local practices for ensuring accessibility. This review, while somewhat limited, bears out with the results of the survey.

Figure 5. Barriers to accessibility identified in free-text answers

In addition to problems with IR-specific policies, respondents often pointed to inconsistent, missing, or contradictory policies regarding accessibility at the institutional, regional, or national level. One survey participant remarked on a lack of coherent university strategy and concluded, "Everything we do to make the work we publish…as accessible as possible is based on our own values and initiatives. We're on our own, as are our faculty and students." The same respondent indicated that central funding for accessibility was lacking—a problem reported by others as well in free-text comments. Survey participants implicated inadequate institutional policy again when remarking on a lack of education and training made available to either library staff or authors submitting materials to the IR. Some went further still and cited widespread apathy. One person attributed accessibility issues to a "lack of interest from depositors to make their works accessible before deposit."

Confusing or inadequate policies were also implicated at the national level, with one respondent remarking that IR platforms developed internationally may not adhere to the same guidance on accessibility as recommended in the United States. Similarly, respondents complained that library and university consortia sometimes push standards at odds with institutional or even departmental choices.

Many respondents also signaled problems with the platform or software used for the IR. Issues ranged from poor keyboard accessibility to general "clunkiness" and limited options for automating accessibility checks. Several explained that their institutions rely on platform solutions such as Digital Commons to implement appropriate accessibility features. When corporate product creators pursue practices at odds with accessibility, respondents reported feeling helpless to make changes. For instance, more than one remarked specifically that Digital Commons strips alt text and added accessibility features from pdfs when the system automatically produces cover sheets for uploads. To date, Elsevier/Digital Commons has been resistant to addressing this complaint, which results in thousands of inaccessible pdfs circulated by a system that tickets itself as relatively progressive on the accessibility front. Similarly, another respondent cited accessibility issues with Islandors, whose development team works outside of the United States. The upshot is that the developers have little incentive to meet the accessibility standards of customers working in other contexts. Overall, survey respondents who signaled problems in their IR platforms also indicated frustration over the "unwillingness" of vendors to implement accessibility features in their products.

In keeping with the above, survey respondents often expressed feelings of frustration about lack of control with regard to accessibility. They noted that their IRs are dependent on corporate, institutional, departmental, or library policy and practice. One person explained in final comments that remediation work is waiting on the formation of a library-wide digital accessibility policy, while another person lamented that university administration were perhaps not fully understanding the extent of the issue. As this respondent said, "I worry that…true action won't occur until a lawsuit is brought against the institution." Along similar lines, another person remarked that only a quarter of the IR's contents begins its life in the library and, as such, the library has little ability to manage accessibility of materials coming in from the outside.

Along with the frequently cited time and resource limitations, another concern often repeated by survey respondents was the need to handle accessibility for a diverse set of materials already archived in the institutional repository. Some remarked generally on the quantity of material in need of remediation and others on the range of issues at play. Media materials were of particular concern, with several respondents noting that their media lacks captions and/or transcripts (n=5). Another person commented on accessibility challenges presented

by specialized collections such as handwritten letters that cannot be automatically OCRed. One person commented on the difficulty of keeping up with rapidly changing standards and technologies, noting that remediating files after the fact is always a challenge for this reason.

One undercurrent in comments about remediation was that attending to the accessibility of diverse materials is a highly labor-intensive issue requiring significant allocation of resources. As one person noted, accessibility is not an issue that one can merely address in "lip service." This survey participant continued, noting that libraries do a disservice to accessibility as well as existing labor inequities when they heap accessibility work on developers and staff members who "may be greatly underpaid, overworked, or just swimming in a sea of priorities." Comments like these indicate how poorly funded accessibility programs can produce inequities even for individuals without disabilities.

Another frequent point in comments was the need to triage accessibility or apply standards on a case-by-case basis within the context of resource scarcity. One survey participant noted that accessibility work at their institution is currently focused on new deposits because "we do not have resources to address legacy documents." Similarly, another indicated, "We do all of our remediation work upon patron request." These negotiations were individual to the institution and the institution's capacity to handle particular collections. Larger scale discussions about triaging accessibility may be useful to help institutions set priorities in keeping with wider recommendations by advocacy groups and patrons with disabilities.

Another subset of respondents named infrastructural issues such as electricity blackouts and erratic internet connectivity as key barriers to accessibility. These responses rarely appear on accessibility checklists circulated by libraries in the United States. However, they clearly constitute concerns for those with and without disabilities needing to download and access files. In a similar vein was a response that indicated complete lack of awareness about the institutional repository in the local area. Overall, these responses framed "access" as a still more basic need underlying "accessibility."

A final observation that bears noting is the number of survey participants who implicitly or explicitly acknowledged their complete lack of engagement with accessibility. A sizeable group dropped out of the survey before completing it, while others indicated that their IR is taking no measures to remediate documents and has not implemented an accessibility policy. While these actions can be variously interpreted, some respondents explicitly stated, for instance, "I have never really thought about [this issue]." Responses like these point to the need to reconceive accessibility as a natural extension of open access. One survey respondent explained this problem by noting that a "significant portion of scholarly commu-

nication librarians" merely cite the need for accessibility without taking measures to achieve it in reality. Another noted that their IR had not prioritized accessibility because their focus was on "getting publications in there as soon as possible with the highest quality metadata available." This survey participant continued by indicating that, "mistaken or not," their IR simply had not prioritized accessibility above the need for speed and volume of output. These responses show that at the individual or programmatic level, scholarly communication has not yet embraced accessibility as a default position.

CONCLUSION

Survey responses drew attention to a number of barriers for libraries when it comes to implementing accessibility in IRs. As the previously cited literature suggests, these barriers include limited resources and staffing necessary to complete the labor-intensive work of remediating inaccessible documents and media materials. It would seem, based on these results, that organizations need to consider reallocating resources to the challenging—but important—work of making repositories truly inclusive spaces. While we must acknowledge that the library may not be able to control all factors regarding accessibility, we make the following recommendations based on survey results:

1. IR managers can conduct accessibility reviews of local institutional repositories.
2. Library administrators can reallocate work duties to allow time for the remediation of inaccessible documents/media and creation of accessible born-digital documents.
3. Library administrators can facilitate training for staff and librarians regarding accessibility of digital platforms and remediation of documents/media materials.
4. Libraries can implement accessibility policies for IRs.
5. Administrators can identify other resources needed to make IRs accessible and prioritize this work.

Additionally, the authors would reiterate the need for scholarly communication as a field to reassess its assumptions about "access." Philosophically, the institutional repository has often fallen in line with ideas propagated by Mark Greene and Dennis Meissner in their 2005 article, "More Product, Less Process," which views "access" as a function of reach, volume, and visibility. Greene and Meissner contended that archives should minimally process collections before putting them into the world, and scholarly communication similarly has defined the success of the IR around measures such as volume of submissions and extent of reach. In this framing of "access," little value is accorded to labor-intensive work that specifically serves marginalized communities. Survey responses suggest, in part, that scholarly communication as a discipline may need to fundamentally reframe its priorities before it

can productively determine how to address accessibility in the future. For real change to occur, organizations may have to make substantial changes in the way they allocate staffing and resources and, ultimately, how they assess success when it comes to the institutional repository.

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