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Guest Editorial

Developing ALA's Journal Publication Ethics Policy

Heather Campbell, Emily Knox, Richard Saunders, and Kristen Totleben

This editorial shares how and why the American Library Association developed a Publication Ethics Policy for all its journals.

Background

The School Library Media Special Interest Group (SIG) presentations at the 2022 Association for Library and Information Science Education (ALISE) Annual Conference focused on two different areas of school librarianship—diversity and ethics. Little did attendees know that the presentation on ethics would lead to policy changes at the American Library Association. Lucy Santos Green's conference presentation detailed the findings in an article she recently published with Melissa P. Johnston in the *Journal of the Association for Information Science and Technology* (JASIST). Although Santos Green's presentation, "Upending Systems of Injustice: Educating Future School Library Researchers on Ethical Publishing for Scholarly Research" emphasized how to teach ethics, she also highlighted ethical misconduct in library and information science publishing.

Santos Green and Johnston's data set included all of the major LIS scholarly publishers including Taylor & Francis, Emerald, Elsevier, SAGE, and ALA. They identified 12 categories of editorial misconduct in the present literature:

(1) citation coercion,
(2) conflict of interest,
(3) deliberate and avoidable delay in manuscript review,
(4) editorial bias/confirmatory bias,
(5) editorial policies not provided or spelled out,
(6) encroachment on authorial integrity,
(7) excessive secrecy of editorial office,
(8) inappropriate review procedures/failure to observe due process,

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(9) incorrect post-publication modification of articles,
(10) lack of transparency in dealing with authors,
(11) rejection without reason given, and
(12) rewriting of article presented as copyediting.[1]

The authors conducted a two-phase research analysis. The first phase consisted of a content analysis of public-facing ethics policies for 33 journals. None of the 6 ALA publications included a publishing ethics policy. The second phase of the research consisted of 31 informant interviews with 31 LIS authors. Analysis of the interviews found that ALA accounted for 55% of the documented editorial misconduct events.

Overall, the findings were damning for ALA publishing:

> Perhaps the most surprising finding was the complete lack of any publishing ethics documentation, other than author guidelines and one general statement, for journals housed by the American Library Association divisions. The amount of editorial misconduct incidents collected during this study that occurred during interactions with professional organization journals (six journals responsible for over 55% of incidents) indicate their lack of publishing ethics documentation has had a disproportionate and adverse impact on LIS research. Because of experiences with editorial misconduct, multiple participants applied passive avoidance as a coping mechanism—choosing to no longer publish in these journals.[2]

A member of the ALA Publishing Committee was at the ALISE presentation and sent an email to the chair of the committee and the head of ALA Publishing soon after the conference concluded. It was clear that publishing policies needed to be implemented for all of ALA's journals. An agenda item was added to the committee's meeting two weeks later.

Process

The ALA Publishing Committee moved to form a subcommittee to draft the guidelines. In July 2023 the committee chair sent an invitation to editors and editorial board members of ALA publishing units, including *C&RL News; Children and Libraries; College & Research Libraries; ITAL: Information Technology and Libraries; Journal of Intellectual Freedom & Privacy; Knowledge Quest; LRTS: Library Resources & Technical Services, RBM: A Journal of Rare Books, Manuscripts, and Cultural Heritage; School Library Research; and YALS: Young Adult Library Services.* The invitation stated the subcommittee's charge as the creation of a draft publishing ethics policy, which ALA editors ultimately would implement for their publications. Representatives of each publication agreed to join, and the Publishing Committee members and staff liaisons agreed to support the subcommittee.

The Publishing Ethics Subcommittee first met virtually in September 2023, and members continued to communicate through the spring of 2024 as they formulated a draft. Subcommittee members agreed early on that it would benefit ALA to join the Committee on Publication Ethics (COPE), an international organization established to provide guidance on ethical issues that arise in journal publishing. To become a COPE member, publishers must adhere to COPE's Principles of Transparency and Best Practice in Scholarly Publishing, among which is the requirement to have a publication ethics policy visible on the publisher's website.[3] Adopting such an ethics policy not only would enable ALA's membership in COPE; it would represent

a crucial step toward assuring those who engaged with the association's publications that its standards for scholarly communications were ethical and transparent.

Using COPE's resources as a model, the subcommittee decided to limit the scope of the policy to ALA's peer-reviewed journals. Members drafted guidelines for the authors, peer reviewers, and editors of those journals. The draft also defined processes to help identify and handle ethical concerns, such as authorial or editorial misconduct, conflicts of interest, and post publication discussions and corrections.

In June 2024 the ALA Publishing Committee approved the subcommittee's policy draft in time for its inclusion in the committee's required biannual report to ALA Council. In the report, the committee also proposed the following action to be voted on by Council at the ALA Annual Conference later that month in San Diego:

Per the Publishing Committee charge, by which the committee "recommends policies on publishing for the approval of Council if revision or new policies are needed," the Publishing Committee requests that ALA Council approve the creation of an ALA journal publication ethics policy as association policy, permitting this new policy to be added to the ALA Policy Manual and ALA Publishing web page, and enabling the association to pursue membership in COPE.[4]

The chair of the Publishing Committee presented the action at the Council II meeting on June 30, 2024. Several councilors rose to speak in favor of the action before the Council overwhelmingly approved it. With this vote, responsibility for implementing the journal publication ethics policy shifted to the ALA Policy Monitoring Committee, which oversees additions and changes to the ALA Policy Manual.[5]

The Policy Monitoring Committee chair has informed the Publishing Committee that the new ethics policy will be inserted into the Policy Manual following a general revision and renumbering of the manual that is currently underway. At that time, ALA journal publishers will be able to point to the publication ethics guidance as official association policy and adopt it for their own websites. As part of its charge, the Publishing Committee also will continue to support the policy by mediating any "conflicting practices, inconsistencies, or irregularities it observes among the units its members represent."[6]

Purpose and Rationale

Please note that Santos Green and Johnston's findings *are not* that ALA's journal publishing practice is unethical. Their work implies that the organization, despite clear process for appointments and support for journal production and distribution, has allowed individual editors to handle the editorial and review functions of its journals rather informally. That informality has left a potential space for unintentional infractions. The article points out that an ethical standard requires intentional structure and action.

The Publication Ethics subcommittee is confident a publication ethics policy is a positive step toward reducing and eventually eliminating the problems documented by Santos Green and Johnston. Policies themselves are not merely abstractions or goals, but a basis for acceptable activity. Having an ethic and adopting a policy by itself does not guarantee the integrity of any single discrete decision, but it formalizes ALA's commitment to recognized standards for its journals and gives ALA's editors and editorial boards a basis for the work of publishing ALA's scholarly literature. It also provides for review, notice, and action, should ethical questions arise at any step of the publishing process.

The committee intends the policy to directly and indirectly benefit the organization as drafted. Though all benefits will not be realized immediately, like laying footings for a foundation, the policy provides a solid basis for ALA's scholarly and professional serials from several perspectives.

Standardizes Practice

The policy's chief purpose is as boundaries for acceptable practice. The document reinforces editorial review with a transparent, shared standard. It is a measure of trust in ourselves and our profession that for decades the organization has trusted its members to act ethically. That trust is not misplaced, but we are people, too, with liability to error and bias, even if imposed unconsciously. Since it is clear that ALA journal publication has ethical holes, for the first time organizational policy provides an expectational standard of editorial behavior applying across the constellation of ALA journals. Without sacrificing editorial independence or intruding into routine content decisions, the policy is a lodestar or guide rails to both author representation of their work and of editorial practice. No matter which division publishes a journal or in what field an article may be submitted, ALA and its journal editors now have a basis for judging acceptable and unacceptable practice through the complexities of journal publication.

Commitment to Inclusivity and Fairness

The policy provides ALA with a visibly public basis for expressing a fundamental doctrine of librarianship, a core standard guaranteeing disparate voices are formally heard in our discipline. The ALA Freedom to Read and drive for inclusivity are now formally reflected in publication policy. In short, the policy reinforces that publishing decisions are not made arbitrarily nor based on an editor's personal views. The policy should reassure authors and readers that the institution *has* a standard behind the myriad decisions involved in disseminating professional communications.

Interpretive Structure

As a document guiding individual action, the policy has two facets. On one hand it provides prospective authors with general guidance about writing practices expected in key journals of our field. On the other hand, it also provides ALA's editors and editorial boards with an ethical grounding for making editorial decisions with direction, for handling suspected ethical breaches in submissions, and provides policy grounds for taking action to correct ethical infractions.

Institutional Memory

Policies act as a formalized version of institutional memory. In this role the policy provides for two functions. First, it should ease the transition between succeeding journal editors, essentially serving as a training document. Its second role is a basis for self-development, a resource as new professionals begin exploring opportunities for involvement in the organization beyond readership.

Moving Forward—From the Editor

As a number of colleagues worked on this project, and as the *C&RL* Editor, it helped me see how all ALA editors would benefit from having this Publication Ethics Policy in place. I value having to ensure consistency and equity of treatment in working with authors, peer reviewers

and editorial board members. Although the ALA Publication Ethics Policy is not in the ALA Manual yet (but will be soon), I have already experienced situations in which this policy is useful for decision making and procedures to work through. When the ALA Publication Ethics Policy is published, it will be referred to in the *C&RL* web pages to assist all who interact with this journal. As with any policy, its power is in its implementation. As ALA journal editors engage with and practice the Policy, I believe it would also be helpful for the ALA editors to regroup after a year or so of its publication to assess how the ALA Publication Ethics Policy is supporting all parties involved and what might need to be revised. In spring 2025, a subcommittee of the Editorial Board will host a *C&RL* Peer Review workshop, and we will share the Publication Ethics Policy with regards to peer reviewers and expectations.

Notes

1. Lucy Santos Green and Melissa P. Johnston, "A Contextualization of Editorial Misconduct in the Library and Information Science Academic Information Ecosystem," *Journal of the Association for Information Science and Technology* 73, no. 7 (2022): 914, https://doi.org/10.1002/asi.24593.
2. Santos Green and Johnston, 924.
3. Committee on Publication Ethics, "Principles of Transparency and Best Practice in Scholarly Publishing," COPE, November 2022, https://doi.org/10.24318/cope.2019.1.12.
4. American Library Association, "ALA CD#32," Virtual, LLX, and Annual Conference Council Meetings, accessed November 26, 2024, https://www.ala.org/aboutala/virtual-llx-and-annual-conference-council-meetings-0.
5. American Library Association. "ALA Policy Manual." Accessed December 4, 2024. https://www.ala.org/aboutala/governance/policymanual
6. American Library Association. "ALA Publishing Committee." Accessed November 26, 2024. https://www.ala.org/aboutala/committees/ala/ala-pb.

"I'll Wait Zero Seconds": Faculty Perspectives on Serials Access, Sharing, and Immediacy

Rachel Elizabeth Scott, Anne Shelley, Chad E. Buckley, Cassie Thayer-Styes, and Julie A. Murphy

This study explores how faculty across disciplines access and share scholarly serial content and what expectations they have for immediacy. The authors conducted twenty-five in-depth, semi-structured interviews with faculty of various ranks representing all Illinois State University (ISU) colleges. The findings, presented in the words of participants and triangulated with data from local sources, suggest that faculty use a variety of context-specific mechanisms to access and share serial literature. Participants discuss how they use library services such as databases, subscriptions, interlibrary loan, and document delivery, coupled with academic social networks, disciplinary repositories, author websites, and other publicly available sources to obtain the full text of articles, in addition to their manifold considerations for sharing and requesting content. The urgency with which faculty need to gain access to scholarly literature is dependent on intersecting elements of discipline, current projects, how the resource will be used, the perceived competitiveness of the field, career stage, and personal practices. The findings reiterate that scholarly literature remains integral to the research and teaching of faculty even as needs and practices for accessing and sharing it grow more individualized and distributed.

Introduction

The staggering increase in the cost of scholarly serials has contributed to a variety of mechanisms—sanctioned and not—to gain access to journal content. Whereas personal, library, or colleagues' subscriptions to print serials provided the only means to access these resources in a pre-digital era, scholars now have a multitude of options at their disposal to browse, discover, download, and interact with this content. The proliferation of options, as well as the rapid increase in the price of serials, raises many questions in a time of widespread budget cuts. Perhaps the most provocative question is: if libraries are priced out of serials subscriptions and

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academic communities have alternate means of accessing content, should librarians invest these funds elsewhere? Some argue that librarians "breach the principle of fairness and damage public interest" and are complicit in paywalling a public good by continuing relationships with commercial publishers.[1] Others proclaim the inevitability of pirate sites like Sci-Hub, given the inequities and costs of traditional and Open Access (OA) scholarly communication models, not to mention all of the coordinated change required to embrace a new model.[2] The role of the library in providing formal access to scholarly content—long assumed—is losing importance as informal access mechanisms proliferate.[3]

To further complicate matters, disciplinary differences have a profound influence on how and where scholars expect to access scholarly literature, the immediacy with which they expect to get it, and the culture around sharing it. The question remains as to how librarians with limited resources can best serve communities with such strongly differentiated needs. Faculty access to serials is of great interest to academic librarians; U.S. libraries typically spend a large portion of their budgets on journal subscriptions.[4] By learning more about the processes faculty members use to interact with and gain access to scholarly serial content, librarians work to keep the library central to these processes.

The authors conducted interviews with twenty-five faculty members across academic disciplines to understand how they interact with serial content. This article reports their needs and practices related to serials; it also provides context from the literature and local usage data sources. In this study, the authors sought to learn:

1. What processes do faculty across disciplines use to access scholarly serial content?
2. How, when, and with whom do faculty across disciplines share serial content?
3. What expectations do faculty across disciplines have with respect to immediacy of access?

By conducting this research and presenting the findings, the authors aim to amplify the voices of faculty members using their own words—not to ascribe value judgements about their current practices or any perceived deficits in the services academic libraries currently provide.

Literature Review

The question of how faculty access scholarly content has been studied at scale.[5] The Ithaka S+R US Faculty Survey was an important springboard for the study at hand. The authors reviewed recent iterations of that survey instrument to identify questions that could be probed more deeply in interviews.[6] That survey and the interview instrument, for example, both ask participants "what do you do when you can't access the full text?" Survey research establishes which standard methods faculty use to access literature (e.g., "Search for a freely available version online, Use interlibrary loan or document delivery services provided by my library, Give up and look for different resources that I can access […]").[7] Although the same questions are posed, interviewers can follow up to ask for clarification or expansion and may allow subjects to shift the direction of inquiry; surveys do not allow for this.

The authors are all librarians and were accordingly interested in learning to what extent faculty needs are met via library collections and services. However, by asking participants to describe how they access and share scholarly content, as well as how important immediate access is, the authors understood that library access would only be part of the conversation and that other methods would also be discussed. Ideally, the library would fund comprehensive licenses that provide immediate and legitimate access to all published content. This

is not possible due to the proliferation of scholarly outputs in most formats, rapid increases in the cost of published research, and stagnant library budgets.[8]

So-called Big Deals—which provide subscribers more content by including access-only journals alongside subscribed journals from a single publisher—have been decried for being unsustainably priced, deprecating librarians' collection building expertise, promoting inequity in the library community, demonstrating price discrimination compared to title by title pricing, and delivering less value based on cost per cited journal, among other reasons.[9] Many academic libraries have since unbundled these big deals and shared their evaluative considerations for doing so, including usage, citations, local authorship, cost per use, cost per citation, impact factor, impact per paper, local surveys, or subjective factors.[10] Tools such as Unsub have facilitated unbundling by factoring in previously unavailable or unsatisfactory data on the availability of Open Access content, perpetual access entitlements, and paid fulfillment options in order to model the "Net Cost per Paid Use."[11] Kohn studied use of ScienceDirect after unbundling a Big Deal with Elsevier and found that "the broad picture painted here is that patrons still turn to the library and may meet their requirements via substitution or reliance on open access."[12]

The Open Access movement has the potential to disrupt scholarly communications and traditional subscription models.[13] Subscription models persist for a variety of reasons, however, most notably the "protected competitive position and high profitability" of some commercial publishers.[14] Studies into the costs of publishing have identified an average cost range per article from $200 to $1,000.[15] Meanwhile, Open Access article publishing charges have far outpaced inflation, with some publishers charging over $10,000 per article for their most selective journals.[16] Providing publishing support is newer to libraries who have long provided "Read" access via subscriptions. Transformative agreements, also known as Read and Publish, provide many potential benefits, including publishing more articles OA, increasing the impact of local scholarship and making it free to read, centralizing payments and reducing double-dipping, and expanding read access to include the publisher's full portfolio. There are nonetheless considerable concerns about the equity and sustainability of most OA publishing models.[17]

Interlibrary loan (ILL) has long delivered materials to which a local library does not provide access, and the literature demonstrates that faculty use and appreciate this service.[18] Research has demonstrated how ILL services fall short in providing the immediacy and seamlessness of subscribed and publicly available content. Knowlton, Kristanciuk, and Jabaily, for example, found that patrons submit ILL requests for only about a third of all desired articles.[19] To address this disconnect between discovery and access, librarians have explored ways to make ILL more efficient for users and library personnel.[20] Perhaps in response to the perceived limitations of ILL, a variety of services have proliferated to support "just-in-time" access to materials to which a library does not subscribe.

Librarians have documented their experiences with document delivery and tokens or pre-paid articles to provide on-demand access.[21] Murphy and Buckley have written about the utility of replacing subscriptions with paid document delivery to provide access to articles in the wake of journal cancellations.[22] Often, solutions to the perceived need of real-time access to specific materials is approached by multiple, complementary initiatives. Daugherty and Lowry recently described how the University of Alabama Libraries optimized and expanded access to library resources by implementing Lean Library, a browser extension that identi-

fies full text; Article Galaxy Scholar, a paid document delivery service; and EBSCO custom linking, an embedded "request item" that populates data in request forms.[23] Interlibrary loan costs are on average lower than those of paid document delivery or article tokens and are invested primarily in the employees engaged in that work.[24] Unfortunately, ILL services may have negative associations based on the previous experiences of faculty, as will be discussed in the results.

How, when, and with whom faculty share serial content has been explored, though primarily via surveys and quantitative data analysis.[25] The primary options for sharing are one-to-one;[26] academic social networks, such as ResearchGate or Academia.edu;[27] crowdsourcing via social media, such as #ICanHazPDF;[28] and Sci-Hub and other platforms for filesharing.[29] The Ithaka S+R Faculty Surveys typically ask about engagement in related activities, but do not explore motivations.[30] Tenopir et al. looked at these motivations in a large survey (N=1,000) and found that "Sharing is done for both altruistic and personal interest reasons such as building reputations and careers. It is an important means of content discovery and dissemination."[31] Segado-Boj, Martín-Quevedo, and Prieto-Gutiérrez recently published findings from a large survey (N=3,304) that explored academics' willingness to use piracy sites and other strategies for circumventing paywalls.[32] These informal sharing mechanisms, as well as the highly nuanced distinctions in deciding when to share what are discussed in the results section.

Faculty expectations with respect to immediacy of access to scholarly serials have not been deeply explored in library and information science literature. In 2004, Meadows asked "How will the immediacy factor be affected by the electronic transition – will it increase the reliance on recent research?"[33] Although it may seem that immediate access to huge amounts of publicly available information online has only increased expectations with respect to immediacy and currency, several participants—especially those in the humanities—have articulated practices that do not necessarily prioritize it. Disciplinary expectations for deep, methodical, and sustained approaches to research may supersede current expectations for the quick and now.[34] The question of immediacy sets apart the study at hand from other library-led investigations of faculty needs for scholarly literature. By presenting participants' responses in the context of their practices and triangulating these with usage data, the authors provide insight for supporting timely access to desired content.

Methods

The authors conducted twenty-five in-depth, semi-structured interviews with faculty of various ranks representing all Illinois State University (ISU) colleges and schools. ISU is a public, Midwestern university with a Carnegie classification of R2 (Doctoral Universities – High research activity) and an enrollment around 20,000. Participants were recruited via the University faculty email list and fifty-six faculty members indicated their interest by emailing the PI. The team reviewed all prospective participants and selected the twenty-five whose college, school/department, and rank promoted the most diverse perspectives. This approach aligns with Maxwell's articulation of purposeful selection as a method that increases the relevance of information and richness of the pool by selecting based on specified criteria.[35] The ISU Institutional Review Board approved the protocol and interview instrument as exempt. Two members of the team conducted interviews via Zoom in September and October 2022, receiving permission to record the interviews and enabling transcription. During the interviews, both took notes, which they afterward reconciled to ensure their interpretations matched and nothing was omitted.

In naturalistic inquiry, "data processing is a continuously ongoing activity, making possible the meaningful emergence or unfolding of the design and the successive focusing of the study."[36] The participants' responses shaped the direction of their respective interviews and informed the analysis and future interviews. The authors relied on their notes, transcripts, and recordings to analyze the data for the frequency, intensity, connections, and conclusions drawn in participants' statements. The authors used inductive coding to organize the data into themes and subthemes. Due to the semi-structured nature of the interviews and the participants' highly varying responses, however, the authors did not conduct quantitative analysis of interview data.[37]

In order to promote the validity of the data, the authors embraced several best practices for qualitative studies.[38] Creswell and Miller outline validity procedures within three different paradigms: constructivist, critical, and postpositivist. The postpositivist—or systematic—paradigm involves triangulation, in which researchers search for convergence among multiple and different sources; member checking, in which researchers take the data and interpretations to participants for their input on the credibility of the information and account; and the audit trail, in which professionals external to the project examine the account and consider its credibility. The constructivist paradigm offers, among other procedures, thick, rich description which "creates verisimilitude, statements that produce for the readers the feeling that they have experienced, or could experience, the events being described in a study."[39] Amplifying the voices of participants and conveying in their own words the richness of their preferences and experiences is especially important given both the strong personal and disciplinary differences and the processes for obtaining content that might not be in compliance with vendor agreements.

Demographics

Participants represented all academic colleges and twenty-two distinct departments / schools at ISU (see Appendix A) and all faculty ranks, with ten Assistant Professors, seven Associate Professors, six Professors, and two Instructional Assistant Professors. Among the participants, one is currently serving in an administrative capacity, one is currently in a doctoral program, and one completed additional coursework beyond their master's degree. Participants completed their terminal degrees between 1987 and 2022 (see Appendix B) and conduct research in diverse areas within applied sciences (criminal justice, family studies, geography, human development, information technology, and kinesiology); arts and humanities (film studies, history, literary studies, music education, and musicology); business (finance and management); formal (mathematics) and natural sciences (biology, chemistry, math, and physics); health sciences (communication sciences and disorders and nursing); and social sciences (anthropology, communication, economics, psychology, sociology, social work, special education, and teaching).

Limitations

The standard answer to the number of interviews needed in a study is "it depends."[40] The twenty-five interviews analyzed herein provide thick, rich description, but the authors make no claim that the results are generalizable to all contexts. Rather, their intention has been to collect data representative of the divergent perspectives within their Carnegie R2 context to consider how aspects of disciplinarity intersect with access to serial literature. Although the

data may not be generalizable, they nonetheless provide useful insights to librarians working in a variety of academic library contexts. The interviews extended up to one and a half hours and, in the coding process, it became clear that there were more diverse themes than could be treated in a single manuscript. The authors have accordingly split up the findings into discrete manuscripts;[41] the questions treated in this article are provided in Appendix C. Dividing the findings allows for topics to be treated in great detail but could also be considered a limitation. Additionally, the interviews were conducted by librarians at ISU's Milner Library and participants may have been reluctant to disparage library services or fully disclose practices that may be incriminating.

Results

RQ1. What processes do faculty across disciplines use to access scholarly serial content?

Participants described how they typically access scholarly literature and some of the considerations and exceptions in their process. All typically begin by using Milner Library's search interfaces or resources, Google Scholar, or other databases external to the library. Two scholars typically start their search with PubMed. The database recognizes their University affiliation, but one scholar also has credentials from collaborators at two R1 institutions. Two other scholars both begin their process via arXiv. A formal scientist does this because it is "faster because it is a preprint. [Going] through publisher paywalls (JSTOR) takes too much time." They regret that JSTOR is not more comprehensive and takes so many clicks to navigate ("The interface was designed by someone who is not a researcher in my field"). A natural scientist is unsure if they are getting access to anything from Milner Library: "Because arXiv and NASA ADS [Astrophysics Data System] are so useful, I don't even check to see what we have through ISU."

Google Scholar

Scholars in business and applied and social sciences all noted using Google Scholar as a frequent or exclusive starting point. A few scholars, including one in health sciences, indicated they only use Google Scholar when they have trouble finding articles through Milner Library. An applied sciences scholar indicated that access through Google Scholar is easier and access through the library "is more complicated—sometimes it takes me to the journal, and I have to find the article and I usually give up." A social scientist similarly noted that they start with Google Scholar because it is familiar and easier: "If I cannot access it there, I will search Milner but often rely on the library's chat reference service." Although another social sciences scholar typically starts with the library, they sometimes search Google because "sometimes articles are Open Access and if I don't feel like going through the ordeal of a library search, I will do a Google search. Milner requires SSO login." They also use Unpaywall, which allows them to access freely available content when they discover content outside of Milner Library's search platforms.[42]

In one health sciences discipline made up of practitioners, there is a considerable emphasis on free and publicly available information. A scholar reiterated that they are often reminded that clinicians need examples, materials, and resources they can access. This expectation has informed where they start their research for practitioner-facing work. They search Google to help frame their expectations. As one scholar explained, "I go to Google and [ask], What are the clinicians going to see? Are they seeing Pinterest? Are they seeing an Etsy site? What do

they really see? Because it's going to help inform how I talk about it." This attempt to make their work accessible to audiences in order to show the evidence behind it has had a big impact on their research; they still use Milner Library resources, but with more understanding of content available to clinicians.

Several participants noted that, although they start with Google Scholar, they are often routed to Milner Library or its resources. One applied sciences scholar uses the link resolver through Google Scholar and another starts with Google Scholar and then "I'm pointed different directions for a PDF." A scholar in the social sciences noted some of the pain points in gaining access to full text via Google Scholar as follows: "It works well in my campus office because I'm already logged in. At home sometimes I've logged into the VPN–I find titles on Scholar and cut and paste them in Milner. [Library] databases don't have the reliable functionality that [Google] Scholar does." They admitted some frustration, stating, "I'm a pretty productive scholar; I steer students away [from library search] because I get confused and I can't expect them to figure it out." Another participant reiterated this by saying they could find things via the library's search, "but I have a hard time figuring out how to *get* something. Maybe this is a reason why I don't choose to start with the library website."

Milner Library

Participants in chemistry, geography, history, musicology, sociology, and special education shared that they typically begin their search using Milner Library's search interfaces or resources. A humanities scholar searches the library catalog, then the catalog of the state-wide consortium, then submits an ILL request, but notes that their students "start in Google Scholar and they give up really easily." A social sciences scholar starts at the Milner Library homepage, then searches specific databases: Academic Search, PsycINFO, or ERIC, with a limit to the past five or ten years. They search where full text is available, because "if the full text is not available there is no use."

For several participants, where they start depends on whether they are looking for a known item or exploring a topic by keyword. An applied sciences scholar, for example, shared that the process of access depends on topic and venue:

> There are journals Milner doesn't have and I know those off the top of my head—I will ILL those articles or I will email the author. […] I have a Google Scholar profile, and if someone has cited me, I get a notification and then I go to see who has cited me. I'm only moved to conduct research there if I'm prompted, I don't start with Google Scholar for searching.

An education scholar said they may start with Sage or JSTOR if looking for something specific. If Milner Library does not provide access, they often Google the desired article and find a PDF someone has posted, or one on ResearchGate or similar sites. An arts scholar will begin at the Milner Library website once they have a list of desired resources in hand. They will search Google for ephemera such as event programs, which they may buy from eBay or AbeBooks.

Meanwhile, a natural sciences scholar is usually looking for a specific topic and begins by searching SciFinder, which has linked full text. They have recently adopted Milner Library's DOI search, which they prefer to searching other citation information, which can be

incorrect.[43] The link resolver is connected to Get It Now, a service of the Copyright Clearance Center that provides fee-based document delivery, and ILL. Although they occasionally find content on Academia.edu and ResearchGate, "I haven't needed to use them because SciFinder is such a fabulous resource. It's hard to not find stuff on SciFinder." Like one of the humanities scholars, this participant notes that their own means of access are not necessarily those of their students; however, they are working to impart the importance of these resources in the production and dissemination of scholarship, as well as the access. They explained, "In one of my courses we do a library database exercise. They go through SciFinder, Chemical Structure Database, talk about DOIs, and create ORCIDs."

A social sciences scholar was the only one to mention Milner Library's subscription to ThirdIron's BrowZine, a table of contents browsing service. This scholar said, "I go to BrowZine first, I was so happy when Milner added it. It's what I always wanted. Before that, I was using [the link resolver] and it's annoying, it's easy because it's integrated with the databases but it's not reliable, sometimes it doesn't work right." They enjoy browsing the issue's articles in an intuitive way, sharing that, "when I use [the link resolver] I would have no idea about related content. I do use [the link resolver] still when content is not on BrowZine." They appreciate that this connects them to the PDF of publisher's versions.

A scholar in the health sciences indicated that they typically access materials through either Milner Library or the library at the hospital at which they are also employed, and "I reach out to the librarian at my full-time job–she can give me tips." Some participants shared hesitations about asking for Milner Library to provide research materials. A humanities scholar said, "I censor myself in some ways because I'm afraid that I ask for too much. I'd rather privilege what I know I need for class and find an alternate route for what I would like to work on. Because then that's just me fending for myself to find it, and not fifteen students having to deal with finding [resources]."

Interlibrary Loan and Document Delivery

Several participants spoke to ILL or document delivery, their typical workflows, and the myriad strategies they have in place when full text is not immediately available. A variety of participants indicated that if they were not able to find a source via the library or Google Scholar, which may have the same limitations as the library, they Google it. Their Google searches have yielded PDFs on Semantic Scholar, ResearchGate, Academia.edu, National Center for Biotechnology Information, author websites, or other publicly available sites. Less frequently, participants reported using the "Request full-text" function within ResearchGate to get content from authors. A social scientist reported, "I think I'm on both [ResearchGate and Academia.edu] but I haven't used them a lot. The few times I've used those sites to contact an author for an article, I haven't gotten a reply." An applied sciences scholar has had more success requesting and sharing content via ResearchGate. Direct emails to authors are a more widely used strategy, and this will be discussed more extensively in the following section, as will direct requests to friends and collaborators.

Several participants shared their satisfaction with ILL and document delivery services, including scholars in business management, chemistry, communication sciences and disorders, finance, geography, human development and family science, literary studies, musicology, nursing, psychology, social work, and special education. One scholar said, "I find ILL fantastic, it's great to have scanning chapters and ILL as an option. There's only been one

time the library couldn't find a particular article, which was old, unique." Another said "It's been rare that ILL can't get an article for me. Then I move on because if they can't get it, then other places probably don't have it either." A few participants spoke to balancing ILL with direct requests to authors or colleagues at other institutions. A social sciences scholar places ILL requests when time allows but asks friends at an R1 if the need is more urgent.

A few participants expressed hesitations or concerns about ILL. An education scholar is reluctant to use ILL because they "want to look at it and know if it's going to be useful or not right away." They shared that the library is responsive, "but I feel badly when an ILL request comes through, and I realize I don't need it." A business scholar noted that although they have used ILL for books, "I wasn't aware that ILL is an option for articles–I don't recall it being obvious during a search that I could request an article." A social scientist shared that before the internet they used ILL a great deal, but no longer do so, and an applied sciences scholar indicated they have never used ILL or Get It Now. They suggested: "If it automatically popped up as a link, then I would use that option, but publisher websites don't facilitate ILL."

An applied sciences scholar similarly noted that ILL and Get It Now options are not obviously or easily linked. Scholars also shared problems they have experienced along the order process. A health sciences professor said, "Sometimes I've tried to order it and I'm told I can't order it. But I can find it in other libraries, so I ask [a librarian] and we talk about why, often it's user error or a system glitch." A formal sciences scholar raised concerns about ILL taking too long and the processes being inefficient or unclear, stating, "they [ILL office] would write back to me and say, 'Oh, you can't get it through this channel, you should now write to this channel,' and I was thinking, 'This is your internal business, right?'" This participant rightly asked why they could not depend on the ILL office to figure out the request without several emails back and forth. Unfortunately, this has led the scholar to get content outside of library channels if unavailable via JSTOR.

Participants expressed a spectrum of perspectives on both the frequency of this issue and the extent to which it is a problem. A business scholar indicated they have not "had any trouble finding resources regularly at my previous institutions and here," while someone in the natural sciences indicated that of all their sources for articles, they are "least likely to get full text through ISU." This scholar typically texts colleagues at larger institutions "that have subscriptions to everything, and they get me the PDF within minutes." A clinician who also has access to resources via the hospital where they work indicates that access is not typically a problem, explaining, "if I don't have access through Milner I probably do through [hospital], and vice versa." An applied scientist spends considerable time trying to find resources and was among the very few participants who draw on personal subscriptions to their professional society's journals to access journal content.

An education scholar uses ILL and will also ask friends at larger universities. From their perspective, these options typically meet their needs, though sometimes they find similar articles and read those if they have given up on a specific article. Identifying alternatives was a solution mentioned by a few other participants. An applied sciences scholar shared that in their field, knowledge is cumulative: "It's not like this article is so unique that we can't find something similar." A scholar in business will look for other sources that discuss the same idea or topic, or they read the abstract and extract as much as possible from that. Similarly, an applied sciences scholar indicated that sometimes looking at the abstract "helps" or is enough. A social scientist indicated that if something is hard to get, they use an alternative source; ILL works for them almost all the time.

External Access Venues

The days of traveling to nearby institutions to gain access to their licensed content seem to have passed. One natural scientist mentioned that when they first started at ISU, a local liberal arts college had a database that ISU did not, so they would go there to use it. Some participants identified circumstances under which they would pay for content. Three scholars in the arts and humanities all mentioned buying books. No one, however, indicated experience or willingness to buy articles. One shared that "I've bought books—I don't mind if it's something I will keep and use. I'm not apt to pay for a journal article, especially if I'm not sure if it's that useful. I'll do about anything before I pay for a journal article." Several participants noted that they will not buy articles and advise their students to never pay for articles as well ("I have counseled my peers to not pay for articles when they encounter paywalls").

Although a few participants noted that they gain access to scholarly journals in exchange for their service as peer-reviewers, this is not a primary means for doing so. For example, one social sciences scholar said, "it's a hassle for me to go in there and register myself, so I am not using it." Another shared concerns about the implications of online availability for usage: "I think as everything has become more accessible online, people rely a lot more on the online resources and they tend to get cited more. They tend to get used more, you know, [than] if someone has to physically haul their American butt down to the library."

No participants indicated that they use Sci-Hub or similar means of accessing materials that have been illegally posted. One person mentioned casual networks for sharing scholarly content: "There is a poor man's file sharing, which is not through file sharing websites, but is through Slacks and informal communication channels where people at different universities may have different access, and we can share papers individually with each other by just requesting." They further note that this can be especially helpful for obscure and older journals: "For example, there are very strange things in [my field] where a lot of work was done in [another country], and those organizations are extinct, and scans have been made, and they are not even owned by the major publishers." The next section continues the theme of sharing serials content via more casual networks.

RQ2. How, when, and with whom do faculty across disciplines share serial content?

Sharing scholarly content—whether among friends, colleagues, collaborators, and even family—came up in most interviews. Participants note a variety of practices and several important boundaries around what they will and will not do with respect to sharing or requesting articles. The most common refrain is that scholars are happy to share the published version of materials they have authored and to directly request materials either from authors, collaborators, or friends; however, there are several caveats.

Direct Requests

Private or direct contact was the primary method articulated. Although phenomena like #ICanHazPDF have normalized public requests for content on social media, only three participants indicated that they have put out a call for content in a potentially publicly identifying way. For example, one scholar has requested content from colleagues via a professional organization's Facebook group. A natural scientist is happy to request and share by direct contact, similar to a humanist who noted, "I'm not a public Twitter asker." Instead, they email friends from

graduate school who work at institutions with larger library collections, doing so when they need an article more quickly than ILL can deliver it. A business scholar indicated that they have both shared and received requests for content, stating, "I probably wouldn't hesitate to reach out to one of my colleagues and say, 'Hey, do you think you could get this at your institution and share it with me?' I've gotten those emails before in the past. […] I'll share it with them, so I wouldn't mind asking someone for something."

When reaching out to colleagues, some participants have restrictions in place to prioritize active collaborators or to save face. A business scholar reaches out to co-authors at R1 institutions, as "they tend to have subscriptions to journals we don't." An applied sciences scholar is only willing to share with project collaborators, "but not outside that circle." A social scientist revealed that requesting content is an admission that one's own institution does not have it—which may create negative impressions. This scholar said, "I don't tend to ask R1 friends that I'm actively working on stuff with for resources because 'face management,' like when you're trying to manage everybody else's expectations and impressions of you. Admitting you can't get something impacts that." An applied sciences scholar emails people at the institution where they did a postdoc. Saving face is not a consideration when reaching out to family. Two participants indicate that they regularly ask their adult children to send them content. One said: "My son is at another university and has better access, so I ask him for articles, and he emails them to me."

Another concern was the agreements entered into by the supplier or requestor. One participant who willingly supplies resources to colleagues at other institutions and receives resources from them indicated, "it's part of being a good colleague." Their primary concern was adhering to agreements they had signed with archives that required them not to share images from the collections. In those cases, they "would only share with a colleague who I know has also signed that agreement." A few participants actively use login credentials from R1 universities to access more library resources, likely in violation of institutional agreements. A more complex situation was highlighted by a participant who indicated that there is a culture of sharing resources with others whose work might be impacted by the research. If the collaborative group includes individuals not employed by the organization that is providing access to licensed content, the letter of the law may not be obeyed.

Some participants noted the desire to make an exchange reciprocal. A humanities scholar described a case in which they needed something from another country that was unavailable via ILL: "Then I did reach out to a colleague and let him know how delighted I would be to read [x]. I try to make it reciprocal, you know, maybe because we have something in common. And so, maybe it's an exchange of pieces, but it's hard to burden overworked colleagues with requests. I have done it once or twice, and people were usually gracious, and likewise I've received some requests for me to send things, and I have done so." A social scientist echoed that asking colleagues for someone else's article is too much of an imposition.

Contacting authors to request the full text is quite common. Most often, such requests are well received and can even spark conversation and relationships. An applied sciences scholar noted: "I don't mind reaching out to a scholar for their article, because you may then make a connection, right? And maybe you'll follow up down the road after you've read the article, or something like that. People are usually happy to share their PDFs, and I'm certainly very happy to share mine." One social sciences scholar shared, "Personally, I love it when somebody asks me for one of my articles, because I know they're using it. I'm sure not everyone is

like that." This scholar will only email authors, which is fast and effective, if they know the person well enough to greet them at a conference. Similarly, another scholar will only contact authors if they have met them and enjoys receiving requests for their work, stating: "when I get requests, I send them quickly because it's kind of flattering." For an education scholar, emailing the author makes most sense for papers that have not yet been published or in cases where they saw the conference presentation. An applied scientist did note, however, that perhaps the confidence required to email an author takes time or experience to cultivate: "[I'm] less inhibited to reach out to someone in the field [than] when I was fresh out of graduate school. Maybe I would be a little shy about reaching out to an established professor."

ResearchGate Requests

Several participants mentioned making and receiving requests via ResearchGate. A social scientist indicated they gladly share the published version privately via this platform; an applied sciences scholar receives and shares content via ResearchGate sometimes, but they do not use the platform to discover content. Most of the participants who engage with ResearchGate and Academia.edu expressed issues with these platforms generally, or for sharing content specifically. An education scholar who does download content from ResearchGate said, "a problem with using sites like this is that you have to join and […] the email notifications may not be worth being able to get the papers for free." A social scientist concurs that the notifications from such commercialized platforms are annoying. A health sciences scholar shared their process for sharing content via ResearchGate: "when I publish the article, and it gets added into ResearchGate. But I found, as my sort of trick to remember, so I don't have to keep going through the copyright forms is to upload whichever version as a private file for myself, whether that has to be the preprint or whether that can be the actual published version. I put that on there, so that I have it, and I don't have to keep remembering which one I can share. If the request comes in the next time. I can just send that to them, whatever that is."

Reluctance to Share

For others, reaching out to the authors is "a last resort" or problematic in various ways. One of the scholars, who had recently completed their PhD, reported a rather awkward exchange in which the author of the article was reluctant to share: "I really wanted to read that specific article. I emailed the author, and it was this whole back and forth. He finally sent it to me, but he wanted to know who I was first. I was like, 'Come on, give me a break, I just want to read your article.'" A social sciences scholar finds it a bit embarrassing to ask the author for a paywalled article to which the library does not provide access, saying, "it sends two signals simultaneously—one that I'm working at a university that can't afford this journal, so it looks bad on me, and then it looks bad on them because they published this thing, and people don't have access to it, you know, so it's almost like it's like 'Oh, your journal is not accessible, you should have published higher.'" They acknowledge, however, that asking the author is largely positive "because you're helping them by reading their work and citing it."

A participant in the natural sciences indicated they do not get requests from others to share licensed content, noting, "SciFinder is very picky about who you share data with that you get from them." They have, however, been asked to share NSF grant proposals. A business scholar shared that they have reached out to authors to request interview instruments and usually do not hear back. An applied sciences scholar shared that people send them literature

and ask them to cite it: "usually I have seen the article anyway, but they tend to download it on their end and send me a PDF." One social scientist has encountered some authors who are annoyed by direct requests, which they attribute to the lack of opportunity to increase usage and Altmetric data.[44]

RQ3. What expectations do faculty across disciplines have with respect to immediacy of access?

Most participants indicated that "the faster I can get resources, the better." The relative time they would be willing to wait, however, varied from an hour to a month—or longer for an essential resource. The most common explanation for needing materials immediately is that "research time is precious" and, when time is allocated for research, faculty need their resources at hand. The most frequently articulated considerations were time or schedule, application, timing, importance to project, and format. Several participants noted how expectations for instant gratification and immediate access in other areas of their life influence their needs for scholarly literature (e.g., "there's a pervasive mentality of wanting something right now.")

Time and Schedule

One participant in the natural sciences rated immediacy as "extremely important," saying "if I need it, I usually have it within the hour. My time to peruse literature is really demarcated. And so, if this is the time I need to read it, then I need it now. I can't wait." An education scholar said, "I'll wait zero seconds. If I want it, I want to go online and have it. I don't want to go through the process of requesting it or waiting," and a natural sciences scholar said, "this may be the most important thing. If it's not immediately available, I probably won't wait and won't cite it." Participants in chemistry, communication sciences and disorders, HDFS, and nursing shared that they tend to be planners and work ahead of known deadlines to request materials. For example, one of these scholars shared: "when I'm preparing for my main conference in March, I usually have it ready to go by December. I try not wait until the last minute and do that to myself."

How Will it Be Used?

The application for the desired text also plays into the perceived urgency of the need. One social scientist indicated, "when it's a revision for a journal, I'm forced to be impatient. Then I would say [I can wait] less than a week." Another social sciences scholar reiterated that the urgency "depends on how I'll be using the resource and when the deadline is. If ILL will be too slow, I'll post on Twitter that I need a PDF or ask a friend at another institution." A third social scientist concurs, noting that it depends on what they are working. If a grant deadline is coming up, more immediate access is preferred. Writing a meta-analysis was an example of a situation in which a business scholar needed all of the content to get started. Similarly, an applied scientist emphasized that, when writing a literature review, scholars must clearly articulate their procedure and note the number of articles that were unavailable and therefore excluded from the analysis.

Several scholars indicated that urgency tends to be more of an issue if they are working with a student. One person shared: "Students' perceptions of the library and research are different than [those of] faculty, but this is part of my role as a faculty member. I build this into students' timelines–they have to do a systematic search and realize it takes time and

planning." A participant who is also a Ph.D. student indicated that they are more willing to wait for materials related to their dissertation; however, they also encounter hard deadlines as a student and their needs for scholarly literature accordingly feel more urgent.

Timing

Several scholars indicated that, although they can be somewhat patient if the application is not urgent, there is a risk that "if I get too patient, then the project might fall off my radar." A few other participants shared the concern about forgetting having placed an ILL request or remembering what piqued their curiosity (e.g., "Sometimes I put in a request and by the time it arrives, I forget, and it gets lost in my email. Timing is really important"). A social science scholar shared: "My general preference is immediate access so I can make the notes and citation then and don't have to go back and do it later." An applied sciences scholar reiterated:

> Immediate access is awesome, especially because of the particular balance of teaching and research, where sometimes I only have one day a week that I'm doing research, and I'm in the moment, you know. [If I] request it from ILL, it may hit at a moment when it's going to be another six days before I can sit down and do research. For that reason, I really do like to have access.

A scholar in the formal sciences also emphasized being "in the moment," saying,

> oh, God! It's like I want it yesterday. Because I need to check something from several sources at the same time, and I have only so much time for research, which means several hours all at the same time. It's like art, I have to put it down or it goes away. I can't do some of it now and check something later; two days later I'll have forgotten what I'm thinking about. I need to see several articles [at the same time], look at them and see which one is more relevant, which one tells me something better. There's no point in writing down something from one article only to find out several days later, or this guy has better and newer research, and I should have used that."

Importance of the Source

A business scholar tied immediacy to the importance of the source for their current project: "If it's something tangential I can drop it. If it's important I have to wait, right?" An applied sciences scholar shared, "I can be impatient if I'm excited about something!" They typically get materials in a few days from ILL and that meets their needs. Four weeks was the hard limit cited by one health sciences scholar, but they indicated there have been times in the past when they have waited longer for important sources. Another person in the health sciences shared that it is hard to determine the potential importance of a source without the full text, saying, "if the whole article isn't available, I question: 'Is there something in the article that I wanted to write about? It's hard to tell without full text.'" One of the more novel perspectives came from a social scientist, who suggested that individual sources are not necessarily important. They shared: "I am not fishing for ideas generally. You know, I have enough ideas. My work is not extending other people's work. I'm just trying to see where they are."

Format of the Source

The format of the desired content also has implications for how quickly it can be obtained. An applied sciences scholar wants access to articles right away, for example, but will wait for a book. They softened this by saying: "research takes a long time, and if I don't have the article today it's okay; I'm not going to read the twenty-five articles I found today, it will take me time." A humanist shared: "I'm used to waiting for books, a couple days feels pretty standard for me. [… With respect to] primary sources, access is so important for research and teaching and that's done on a much larger timeline. We plan those trips a year or two out, [though the] digitization of collections has changed this." An arts scholar reaches out to friends and colleagues near archives they work with and finds that they are willing scan physical materials and send a PDF. An applied sciences scholar can wait a day or two but finds that authors respond quickly on ResearchGate, explaining, "If I don't hear back in a day, I usually don't hear back at all." They noted that they wait more for journal articles than conference proceedings because the latter are usually available Open Access.

The Limits of Immediacy

Some scholars pushed back against the expectation of immediacy with statements such as, "I can't read everything all at once, anyway, so if I have to wait a few weeks to get something, it's not the end of the world." A humanities scholar said, "it's lovely to have immediate access, but my research doesn't hinge on one source. There's always something else I can work on while I'm waiting." A social scientist provided some levity, saying: "It's not like if I don't get this research paper paragraph written by the end of the day, people die. It's not that important, you know. I think generally a couple of days is fine." An arts scholar spoke to generational differences in expectations—for example current students having instant access to music recordings—to highlight that, although students gain immediacy, they may lose elements, such as anticipation, which contribute to a deep and transformative learning experience. They shared concerns about what immediacy means for research processes, saying,

> I also recognize that some individuals may get hyper-focused on the speed with which they can access something, and they stop actually paying attention to the quality of a thing that they're able to be able to access, or there's the concern and the risk that they might just jettison that thing entirely, because they simply don't have the patience to wait to receive it.

Participants' willingness to wait for scholarly literature has implications for how they obtain access, of course, and so does their tenacity. An arts scholar reported: "It's rare that I'll give up—if I do, I probably just forgot that I was looking for it." Some participants were less invested in specific sources, perhaps especially those that are not widely available. A health sciences scholar shared that, "if it were going to be that game-changing to what I'm doing, […] it's not something that would be a huge paper, you know, in some well-respected journal, because I would be able to find it somewhere." The same person reiterated that much of the important work in their areas is government-funded and available for free, which "helps with access." A social sciences scholar shared that their first response is frustration—they need these materials to do their research. An applied sciences scholar said: "Often I don't need to cite every article I am seeking, but sometimes there is 'the' article – often super new

or super old and I need to get a hold of it." A natural scientist begins to "dig" and an arts scholar is "a dog with a bone."

Discussion

RQ1. What processes do faculty across disciplines use to access scholarly serial content?

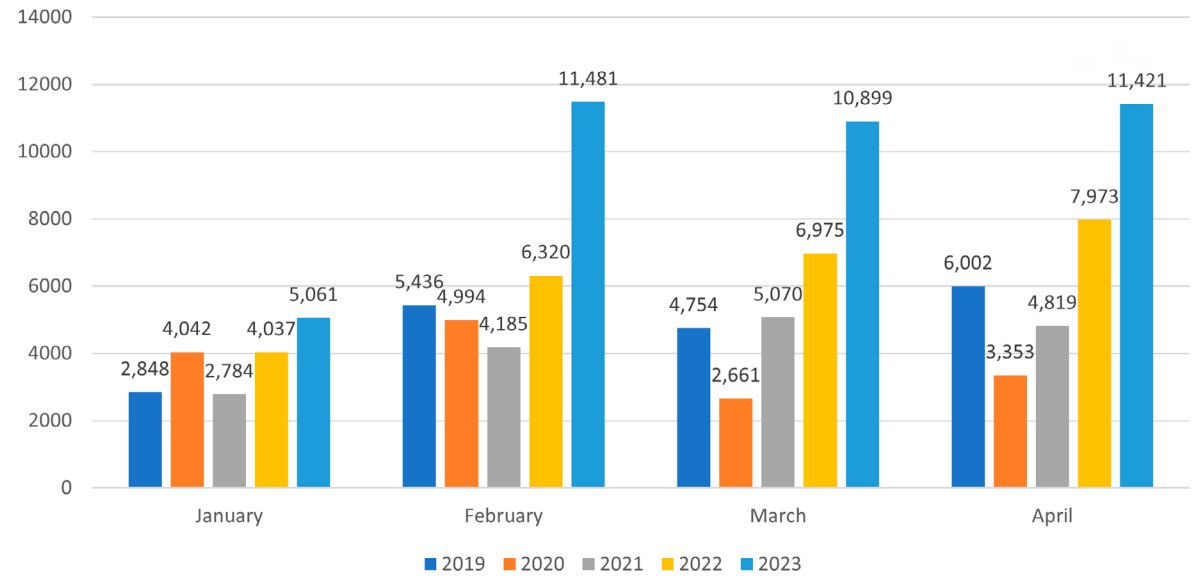
One alternative to placing requests or sharing content is to offer more comprehensive collections and immediate access. Milner Library has historically preferred a la carte agreements and therefore has limited data with which to evaluate the impact of transformative agreements, access-only content, and big deals. Studies have shown that institution size and classification have an impact on the cost of journal bundle pricing and the savings afforded by cancelling Big Deals—in other words, a Carnegie R2 such as ISU does not benefit from unbundling to the extent an R1 does.[45] Local data suggest that agreements promoting expanded "Read" access have been well used and provide a better value based on cost-per-use. A transformative agreement with a university press beginning in January 2021, for example, has more than doubled total item requests and decreased cost-per-use from $15.37 in 2019 and $22.81 in 2020 to $8.30 in 2022.

TABLE 1
Total Item Requests and Decreased Cost-Per-Use

	2019	2020	2021	2022
Total_Item_Requests	2,419	1,837	4,976	5,201
Cost-per-Use	$15.37	$22.81	$8.67	$8.30

Similarly, an access-only agreement with a commercial publisher beginning January 2023 has increased usage and decreased the total cost-per-use. The total_item_requests in spring semester 2023 almost doubled the average usage in the same months from 2019 to 2022 and, although quite preliminary, the cost-per-use has decreased considerably.

FIGURE 1
Spring Semester Usage of Commercial Publisher Platform, 2019-2022



These agreements to expand access to serials and make them immediately available are in direct response to frequent faculty requests to "buy everything from [specific science publisher]" or complaints that the library does not provide comprehensive access to a particular publisher's journal portfolio. Milner Library cannot reasonably provide access to everything given its flat budget. In an interview, one applied sciences scholar said, "I don't feel like the collection of accessible electronic journals is bad or inadequate. I recognize that every scholar can probably identify journals that they would like to have electronic access to but don't." Librarians regularly solicit the input of departments on potential cancellations or acquisitions, and the understanding that the library cannot provide everyone with everything they need is reassuring.

RQ2. How, when, and with whom do faculty across disciplines share serial content?

Many participants view sharing scholarly literature as part of being a good colleague. There are many limitations to this practice, however, and ways in which sharing and requesting content are moderated by reputational, relationship, status, timing, and disciplinary considerations. Some share materials to promote their work or that of their colleagues, some share materials to help students or practitioners without other means of access. The legal considerations of sharing copyrighted materials seemed to be of less importance to participants than did professional ethics of ensuring the availability of scholarship created by a community of which they are part. Scholars have noted the "conspicuous gap between discovery and publication," but no participants in this study mentioned sharing the publisher-provided free copies of their work to help bridge this gap.[46]

Although no participants in this study indicated that they take advantage of illegal file-sharing platforms to obtain serials content, the large collection of articles available via Sci-Hub, for example, suggests that it is a useful service to many scholars. Recent surveys and site statistics confirm it is well-used; in 2022, the United States had the second most downloads worldwide.[47] More common means of sharing content—via email requests and ResearchGate, or wherever Google (Scholar) leads—are frequently used and not perceived as inappropriate by participants. Locally, ISU has 3,776 accounts on Academia.edu and 3,970 members on ResearchGate. The authors requested information on campus use of Sci-Hub, ResearchGate, Academia.edu, and Google Scholar. Although traffic to these sites is not retained, referrals are. Google Scholar was the only platform to have more than a few referrals—150 in the past ten years. A review of total referrals shows that library platforms far outpaced these, including Milner Library's Springshare account (85,426), the former consortial discovery layer (48,367), the former proxy server (47,477), and the current unified library service (41,548). These referrals do not prove that library platforms are preferred, however, and quantifying the extent to which scholarly literature is informally shared across email, file sharing services, social platforms and other mechanisms is beyond the scope of this study.

RQ3. What expectations do faculty across disciplines have with respect to immediacy of access?

Participants divided neatly into two camps when asked about their needs for immediacy: those who are willing to wait and those who are not. Those who are not willing to wait can only be served by a library with comprehensive collections, otherwise, they will seek and find access via their informal networks. These individuals cannot be served by ILL and may

not even by be satisfied with paid document delivery services such as Get it Now, which can deliver articles in a matter of minutes. Studies have shown that simply placing a request is a deterrent to access.[48] The interviews confirm that faculty have a variety of valid reasons for not placing ILL requests, even though Milner Library has three full-time employees dedicated to operating the service and averages twenty-seven hours for article fulfilment. Although total local statistics for ILL requests continue to trend downward, a few departments show stability or growth (see table 2).

TABLE 2
ILL Article Requests From ISU Departments with a Graduate Program, 2019–2022

	2019	2020	2021	2022	Average	% Increase
Accountancy	38	53	54	15	40	5.26316
Agriculture	11	29	139	39	54.5	395.455
Anthropology	115	62	77	61	78.75	-31.522
Art	29	27	20	32	27	-6.8966
Biological Sciences	482	186	332	265	316.25	-34.388
Business	15	11	50	41	29.25	95
Chemistry	508	306	274	245	333.25	-34.4
Communication	658	227	216	346	361.75	-45.023
Communication Sciences & Disorders	333	113	166	285	224.25	-32.658
Criminal Justice	142	121	122	142	131.75	-7.2183
Economics	86	33	36	24	44.75	-47.965
Education Administration and Foundations	277	160	224	202	215.75	-22.112
English	249	94	112	102	139.25	-44.076
Family and Consumer Sciences	237	97	194	184	178	-24.895
Geography, Geology, and the Environment	361	154	231	264	252.5	-30.055
Health Sciences	119	37	34	126	79	-33.613
History	152	24	85	125	96.5	-36.513
Information Technology	36	0	42	0	19.5	-45.833
Kinesiology and Recreation	314	152	251	363	270	-14.013
Languages, Literatures and Cultures	415	80	129	171	198.75	-52.108
Management and Quantitative Methods	69	47	78	65	64.75	-6.1594
Marketing	59	13	35	23	32.5	-44.915
Mathematics	133	54	78	159	106	-20.301
Music	128	42	49	46	66.25	-48.242
Nursing	903	439	828	848	754.5	-16.445
Politics and Government	130	54	85	61	82.5	-36.538
Psychology	701	267	297	479	436	-37.803
Social Work	176	76	157	110	129.75	-26.278
Sociology	307	47	140	129	155.75	-49.267
Special Education	252	120	184	214	192.5	-23.611
Teaching & Learning	427	201	253	289	292.5	-31.499
Technology	117	67	85	93	90.5	-22.65
Theatre and Dance	60	8	12	16	24	-60

A natural sciences scholar has an ongoing joke with colleagues about a departmental ILL service in which they would hire a student to sit in the library of a nearby R1 university to scan and send them research. They conceded that Milner Library's services meet their needs in a reasonable timeframe, saying, "Get It Now is amazingly fast. Sometimes I need older articles and come to the library to get those in bound volumes." Get It Now is indeed fast and convenient. Unfortunately, Milner Library has almost doubled the amount of money spent on self-serve Get It Now in the past few years: $24,467 (FY19), $28,648.85 (FY20), $48,167.90 (FY21), and $49,692.29 (FY22). These increases are due to two primary use cases: activating Get It Now in response to the cancellation of a subscription, or to "trial" a specific journal to assess its usage. Some publishers have increased their per-article costs in recent years, and Milner Library will also factor this into considerations of the value of access-only and transformative agreements.

Some participants indicated that they did not use ILL because it was not immediately apparent how to do so. The perceived inconvenience and invisibility of ILL may be contributing to its lack of use. Meanwhile, reliance on Get It Now has increased in terms of total requests and cost. Those patrons who are willing to place requests are increasingly doing so via Get It Now rather than ILL. This suggests that there may be an opportunity to reduce the amount of content available via Get It Now and direct those users instead to ILL. Both require that users submit a request; although ILL may take one day longer to fulfill, the costs of ILL are committed in the personnel budget and ILL employees can purchase content via Get It Now when unable to source it by other means.

Milner Library implemented Ex Libris' Alma unified library services platform and Primo VE discovery platform in the summer of 2020 and continues to strive to improve their usability. In the summer of 2021, Milner Library implemented OpenAthens and has leveraged that product's Wayfinder application to ensure that users can login directly on publisher's webpages instead of requiring they begin their process at the library homepage.[49] Like other libraries, Milner uses third party tools in the hopes of making subscribed content more easily findable and accessible to users. One participant called out BrowZine as particularly useful in their access of materials; Milner Library is currently expanding the integration of Third Iron's LibKey products to promote ease of access alongside the discovery of materials.

Conclusion

This study contributes to the literature by investigating not only how faculty across disciplines access and share scholarly serial content, but also their expectations for immediate access to it. By presenting the findings in the words of participants and triangulating interviews with data from local sources, the authors offer a more comprehensive analysis of the context- and individual-specific mechanisms in place to access and share serial literature. Library-provided access via databases, subscriptions, ILL, and paid document delivery remain central to the processes of many participants; however, most participants couple these with less formal mechanisms, drawing on contacts in their professional networks, using academic social networks, and finding publicly available content.

Faculty hold very different perspectives with respect to the immediacy of need for scholarly literature. Participants articulated a variety of considerations for immediacy including their teaching load and schedule, time available to focus on research, how the material will be used, project timing, the relative importance of the source, and the format of the source.

Their responses also suggest that their discipline, the perceived competitiveness within their particular specialty, their career stage, and personal expectations also factor into their understanding of urgency. There was consensus that life in a digitally mediated culture sets high expectations for immediacy, but some participants pushed back against allowing such expectations to influence their research practices.

The scholarly literature to which all participants contribute is integral to their research and teaching. Where the library was previously more consistently central to scholars' access of serials, modes of access and sharing have grown individualized and distributed. The authors have been intentional in seeking out a variety of perspectives to inform initiatives to support faculty members' legal and timely access to desired content. Learning that immediate access to scholarly literature is not a universally held expectation allows the authors to focus their efforts on balancing immediate access for those who demand it and request-based access for those who are willing to wait.

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Appendix A. College and School / Department

College of Applied Science and Technology - Criminal Justice Sciences; Family and Consumer Sciences; Information Technology; Kinesiology and Recreation

College of Arts and Sciences - Chemistry; Communication; Communication Sciences and Disorders; Economics; Geography, Geology, and the Environment; History; Languages, Literatures, and Cultures; Mathematics; Physics; Psychology; Social Work; Sociology and Anthropology

College of Business - Finance, Insurance & Law; Management & Quantitative Methods

College of Education - Special Education; Teaching & Learning

Mennonite College of Nursing - Nursing (2)

Wonsook Kim College of Fine Arts - Music (2)

Appendix B. Year of Terminal Degree

1987
1993
1994
1999
2005 (2)
2006
2008
2009 (2)
2011 (2)
2013
2016
2017 (5)
2018
2020
2021
2022 (3)

Appendix C. Interview Instrument

Demographic

- In which department(s) do you teach?
- Which subject area(s) do you research?
- In what year did you complete your terminal degree?

Access

- Please describe how you access scholarly journal articles and conference proceedings.
- How important is immediate access?
- What do you do when you can't access the full text?

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First-Year and First-Gen: Assessing the Information Literacy Skills of First-Year, First-Generation College Students

Sarah LeMire, Zhihong Xu, and Doug Hahn

As higher education continues to focus its attention on first-generation college students, academic libraries are increasingly interested in designing outreach and instruction programs to support these students, especially during their first year of college. This study informs these efforts by implementing a standardized test to assess the information literacy skills of first-year, first-generation college students. Study results reveal that first-year, first-generation college students demonstrate substantial information literacy skills. However, gaps remain in comparison with first-year, continuing-generation students, particularly in understanding the research process and scholarly communication.

Introduction

Professors and employers agree that students need information literacy skills in order to be successful.[1] However, at some academic libraries, it can be challenging for librarians to target information literacy instruction to the students who most need it. At Texas A&M University, librarians commonly note that some upper division students will have received half a dozen library sessions, while others will ask why they're just now learning this for the first time. One way that librarians try to improve allocation of information literacy instructional resources is by focusing on underserved students.

At many colleges and universities, first-generation college students are an underserved population. Many of these colleges have developed programs to better support first-generation students and improve their likelihood of retention and completion.[†] Librarians can be an active partner in these efforts, creating outreach programs aimed at increasing first-generation student awareness of library resources. However, it is unclear if there are specific ways library

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[†] *At Texas A&M, the 2022 Quality Enhancement Plan (QEP) focuses specifically on first-generation students' sense of belonging, academic and professional development, and social engagement from their freshmen to their senior years.*

information literacy programs could better support first-generation students. At Texas A&M, librarians partnered with other campus stakeholders to apply for a grant to explore this question, and ultimately found that first-generation students demonstrated gaps in a number of information literacy skill areas.[2]

Although this information was helpful as a first start toward revamping Texas A&M's libraries' information literacy collaboration with first-generation programs, additional questions remained. Specifically, this initial research did not uncover whether first-generation students exhibited different information literacy knowledge and skills at the first-year level. This question is significant at the Texas A&M University campus, as the majority of the campus' first-generation programming occurs at the first-year level. This study explores the specific information literacy skills of first-year, first-generation college students.

The research questions for this study focus on the performance of first-year, first-generation students on three measures of a standardized information literacy test, which will be detailed more thoroughly in the methodology. The research questions are as follows:

1. Are there differences in information literacy outcomes between first-year, first-generation students and first-year, continuing-generation students?
2. Are there differences in information literacy dispositions between first-year, first-generation students and first-year, continuing-generation students?
3. Are there differences in information literacy performance indicators between first-year, first-generation students and first-year, continuing-generation students?

This study contributes to filling a gap in the literature about the information literacy skills of first-generation students by providing a quantitative comparison between first-generation and continuing-generation students during their first year of college.

Literature Review

Research on the information literacy skills of first-year students is common in the library literature. This makes sense, because librarians devote considerable effort to first-year library instruction. Research by *Library Journal* and *Credo Reference* suggests that as many as 97 percent of academic libraries provide some sort of information literacy support for first-year students.[3] Research suggests that this support is needed; scholars report that librarians and faculty commonly perceive that first-year students are not adequately prepared for college-level research.[4]

Although first-year students in general are likely to benefit from information literacy support, libraries are also striving to provide targeted support for underserved students. For example, librarians at Purdue University embedded information literacy instruction into a summer bridge program aimed at underserved students.[5] Research by librarians at the University of West Georgia indicated that library instruction for summer bridge programs is common.[6] Other librarians have provided targeted support for adult learners,[7] international students,[8] and transfer students.[9] One specific underserved population that is increasingly of interest in higher education, and in libraries, is first-generation students.

Research suggests that first-generation students may not be fully aware of the breadth of resources available at the library.[10] Other scholars have found that first-generation students may be reluctant to seek help accessing library resources.[11] For this reason, researchers advocate for libraries to implement strategies to reduce access barriers for first-generation students and increase resource awareness. Arch and Gilman advise using teaching strategies like peer learning and metacognitive activities such as "asking students to engage in self-reflection about

the ways they use information and the ways in which conducting research can be useful and relevant in their own lives."[12] Folk advocates for individual consultations for first-generation students focused on facilitating information transfer and understanding course expectations.[13] Hands recommends transparency in assignment design, communicating clear expectations and requirements.[14] Though the specific strategies recommended by researchers vary, each advocates for increased support to improve outcomes for first-generation students.

In addition to resource awareness, librarians have explored the information literacy skills of first-generation students. Studies suggest that, while first-generation students bring with them both real-world and academic experience, they may be disadvantaged compared to their continuing-generation peers. Ilett explored the real-world information literacy skills of first-generation students and found that students had considerable experience finding and using information that could transfer to a higher education context.[15] Logan and Pickard found that, while first-generation students varied in their understanding of the research process, they "clearly knew how to look for quality information."[16] However, some researchers have found that first-generation students exhibit gaps in their information literacy skills. LeMire et al. found that first-generation students received lower scores on information literacy tests.[17] Similarly, Graves et al. found that first-generation students received lower scores when tested on their ability to select appropriate sources.[18] It is important to note that many scholars have critiqued the framing of differences as gaps, arguing against a deficit-based approach that shifts responsibility from society and systems to the individual.[19] Within the library literature, many researchers have used a deficit-based approach to describe first-generation students, which critics have argued positions those students "as a problem that needs to be solved."[20] Instead, researchers have advocated for replacing deficit-based models with strengths-based approaches.[21]

The body of library literature on first-generation students is growing rapidly, with an increased focus on those strengths-based approaches. However, there is little research focused on first-year, first-generation students. Hodge highlights the significance of this gap in her examination of literature on first-year, first-generation students, arguing that "first-generation students' first year of college is critical to their persistence and long-term academic success, yet little is known about these students' research behaviors and library use."[22] In their study comparing first-generation students in their first and senior years, Pickard and Logan found that first-year students exhibited less sophisticated information literacy skills, including a less advanced understanding of the research process.[23] This finding suggests that the information literacy skills of first-generation students improve over the course of their undergraduate program.[24] However, the extent to which first-year, first-generation students may experience challenges in library research compared to their continuing-generation peers remains unclear.

Hodge noted that "Additional research is needed on the first-year and first-generation student populations, especially where these populations overlap."[25] This study contributes toward filling that gap in the literature.

Methodology

This analysis is part of a larger study intended to establish a baseline of undergraduate student information literacy knowledge and skills. The study employed the Threshold Achievement Test for Information Literacy (TATIL). TATIL is a standardized information literacy test developed by Carrick Enterprises following the creation of the ACRL *Framework for Information Literacy for Higher Education*. The test was developed and tested over a period of four years

before its official launch in 2018.[26] In 2023, the TATIL assessment was acquired by ACRL.[27]

The researchers chose to implement a standardized test in order to collect a large set of quantitative data that could be analyzed in multiple ways. The TATIL assessment was selected due to its alignment with the ACRL *Framework*, its robust scope, and its ease of implementation.

The TATIL assessment evaluates students' information literacy skills in four separate modules. Table 1 lists the four TATIL modules along with Carrick Enterprises' description of each module.[28]

TABLE 1
TATIL Modules and Descriptions

Module Number	Module Name	TATIL Module Description
Module 1	Evaluating Process & Authority (EP&A)	This module combines concepts from two of the ACRL information literacy frames, Authority is Constructed, and Contextual and Information Creation as a Process. It focuses on the process of information creation, and on the constructed and contextual nature of source authority.
Module 2	Strategic Searching (SS)	This module relates to the Searching as Strategic Exploration frame. It focuses on the process of planning, evaluating, and revising searches during strategic exploration.
Module 3	Research & Scholarship (R&S)	This module combines elements from the Research as Inquiry, and Scholarship as a Conversation frames. It focuses on the knowledge-building process and how scholars build knowledge.
Module 4	Value of Information (VoI)	This module is inspired by the Information Has Value frame. It focuses on the norms of academic information creation and the factors that affect access to information.

In order to assess the full breadth of skills assessed by TATIL, the researchers chose to administer all four modules of the test. However, each module of the test can take between thirty to fifty minutes to complete. For this reason, the researchers opted to have students complete only one module of the test. When students logged in to complete the assessment, they were randomly assigned one of the four test modules to complete.

The assessment was administered to students enrolled in core curriculum courses at Texas A&M University from fall 2018 and fall 2019. After receiving institutional review board approval for the study, the researchers asked instructors of core curriculum courses to share the study with their students. Instructors could, but were not required to, offer extra credit for completing the assessment, which would be done out of class. As an additional incentive, students who participated were entered into a drawing for gift cards at the end of the semester. Students who opted to participate logged into the assessment's demographic questionnaire with their Single Sign On (SSO) credentials and then assigned a module of the test to complete.

TATIL Assessment

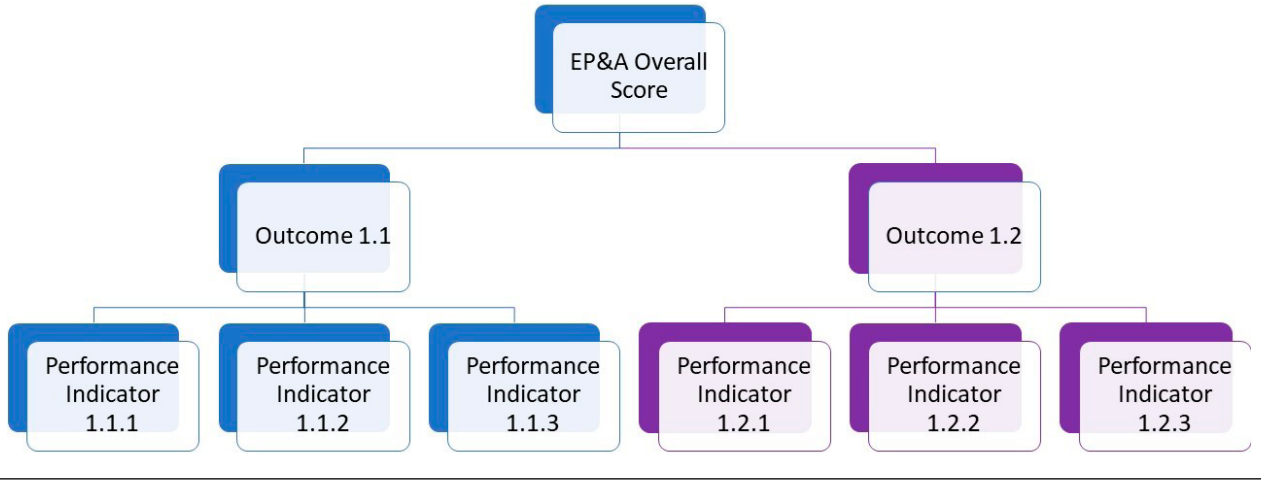
Each module of TATIL assesses information literacy skills in four ways:

1. Outcomes
2. Performance Indicators

3. Overall scores
4. Dispositions

The first metric, outcomes, measures students' information literacy skills in a particular category. For example, Outcome 1.2 is: "Apply knowledge of authority to analyze others' claims and to support one's own claims."[29] The second metric, performance indicators, consists of the individual questions that determine each outcome. Scores on each performance indicator are tallied to make up the score for that particular outcome. The overall scores reflect the outcome scores for that module. A sketch of the hierarchy of these first three metrics is available in Figure 1.

FIGURE 1
Representation of the TATIL Overall/Outcome/Performance Indicator hierarchy



TATIL's fourth metric is the disposition score. This score is separate from the other three metrics, and it measures attitudes or behaviors rather than skills or knowledge. This means that a student can score highly on their demonstrated knowledge of a concept (e.g., recognizing types of authority) but receive a lower score based on how they apply this knowledge in the disposition section.

Demographics

A total of 680 first-year students at Texas A&M completed the TATIL assessment. To ensure that students spent enough time to finish the survey questions, we dropped all the observations whose total time of finishing the survey was less than ten minutes. One hundred and sixty-three first-year students completed the first module of the information literacy test—Evaluating Process and Authority. We dropped four students' information because their total participation time was less than ten minutes, with 126 continuing-generation students and thirty-three first-generation students completing the module. One hundred and seventy-two students completed the second module of the information literacy test—Strategic Searching. Among them, nine students' participation time was less than ten minutes. Therefore, 129 first-year, continuing-generation students and thirty-four first-year, first-generation students' information were included in the data analysis, with 163 in total.

In the third module of the information literacy test—Research and Scholarship, ten students' information was dropped because of the participation time (<ten minutes). One hun-

dred and twenty-one first-year, continuing-generation students and thirty-three first-year, first-generation students' information was included in the data analysis. In the fourth module of the information literacy test—Value of Information, we dropped six students' information since they completed the survey in less than ten minutes. Therefore, 131 first-year, continuing-generation students and forty-four first-year, first-generation students were included in the fourth module, with 175 in total. Initially, we included library experience as the control variable in the data analysis. Since we did not detect any statistical significance in the covariate, we excluded the control variable in the final model.

TABLE 2
Number of Participants

Module	First-Generation	Continuing- Generation	Total
EP&A	33	126	159
SS	34	129	163
R&S	33	121	154
Vol	44	131	175
Total	144	507	651

Data Analysis

We employed four multivariate multiple regressions to investigate the difference in information literacy outcomes across four modules—Evaluating Process & Authority; Strategic Searching; Research & Scholarship; Value of Information—between first-year, first-generation students and first-year, continuing-generation students (the first research question). In the analysis, outcome scores were treated as the dependent variables and the group condition (first-year, first generation or first-year continuing-generation students) as the independent variable, with library experience as covariates. We chose multivariate multiple regression because the outcome scores are correlated. The least-squares estimation was utilized as the parameter estimation method.

To answer the second research question, four multivariate multiple regressions were analyzed to examine the difference in information literacy dispositions between first-year, first-generation students and first-year, continuing-generation students. The group condition and the library experience were used as independent variables while the disposition scores were used as the dependent variables. The least-squares estimation was utilized as the parameter estimation method.

Four multivariate multiple regressions were conducted to investigate the differences in information literacy performance indicators between first-year, first-generation students and first-year, continuing-generation students (third research question). The group condition and the library experience were used as independent variables while the performance indicator scores were used as the dependent variables. The least-squares estimation was utilized as the parameter estimation method.

Results

Overall Scores

First, we analyzed first-year, first-generation students' overall scores in comparison to those of first-year, continuing-generation students. We did this by calculating students' percent-

age rate of knowledge performance levels for first-year students. According to TATIL, three performance levels—Conditionally Ready, College Ready, and Research Ready—are used to describe student achievement on the knowledge section of the test, with a cutoff score for each. Conditionally Ready is the lowest of the three scores, College Ready is the intermediate score, and Research Ready is the highest score. Table 3 and Table 4 provided detailed information about first-year students' percentage rate of knowledge performance levels for each outcome score across modules and overall score for each module.

The majority of first-generation and continuing-generation students scored at the College Ready level or higher for each of the four modules. Both groups scored fairly high on the Strategic Searching (SS) module, with two (5.88 percent) first-generation students and eleven (8.53 percent) continuing-generation students performing at the Conditionally Ready level. Similarly, few students (four, or 12.12 percent of first generation students and ten, or 7.84 percent of continuing-generation students) scored at the Conditionally Ready level for the Evaluating Process & Authority (EP&A) module. For both EP&A and SS, few students scored at the highest level; only one (2.94 percent) first-generation student and six (4.65 percent) continuing-generation students scored at the Research Ready level for SS. Notably, no student, regardless of first-generation status, scored at the Research Ready level for EP&A.

Students performed more highly for the Research & Scholarship (R&S) and Value of Information (VoI) module. Both first-generation and continuing-generation students scored highly in the Value of Information (VoI) category, with only two (4.55 percent) first-generation students and one (0.76 percent) continuing-generation students performing at the Conditionally Ready level. For R&S, very few students (three, or 9.09 percent of first-generation students and zero continuing-generation students) tested at the Conditionally Ready level. Additionally, quite a few students tested at the Research Ready level for the R&S module, which is the highest of the three performance levels. For R&S, three (9.09 percent) first-generation students and thirty-five (28.93 percent) continuing-generation students tested at the Research Ready level.

TABLE 3
First-Year Students' Percentage Rate of Knowledge Performance Levels for Overall Scores (CdR= Conditionally Ready; CR = College Ready; RR= Research Ready)

	Module 1 (EP&A)		Module 2 (SS)		Module 3 (R&S)		Module 4 (VoI)	
Group	**n**	**Overall Score (%)**	**n**	**Overall Score (%)**	**n**	**Overall Score (%)**	**n**	**Overall Score (%)**
Firstgen CdR	4	12.12	2	5.88	3	9.09	2	4.55
Firstgen CR	29	87.88	31	91.18	27	81.82	40	90.90
Firstgen RR	0	0	1	2.94	3	9.09	2	4.55
Continuing CdR	10	7.94	11	8.53	0	0	1	0.76
Continuing CR	116	92.06	112	86.82	86	71.07	115	87.79
Continuing RR	0	0	6	4.65	35	28.93	15	11.45

To understand if there were significant differences between the outcome scores of first-generation and continuing-generation students, we employed four *t*-tests. We found that there were no significant differences between the two groups in module 1 (p=0.21), and module 2 (p=0.06). In module 3 (R&S), first-year, first-generation students' overall scores (*M=430.33*,

SD=139.17) were statistically lower than first-year, continuing-generation students' (*M=529.34*, *SD=135.87*) ($p<0.001$). In module 4 (VoI), first-year, first-generation students' overall score (*M=442.16*, *SD=123.91*) was statistically lower than first-year, continuing-generation students' (*M=490.66*, *SD=129.24*) ($p<0.05$).

Outcomes

In addition to examining overall knowledge performance levels, we examined the knowledge performance levels on each of the eight outcomes across the four different test modules. The outcome scores are incorporated into the overall scores but provide greater granularity to expose whether student performance is consistent or varies within a module. Results revealed that there was some variation, particularly within EP&A, R&S, and VoI. In EP&A, first-generation and continuing-generation students alike were more likely to struggle with O12, "Apply knowledge of authority to analyze others' claims and to support one's own claims."[30] Within R&S, both groups of students were more likely to struggle with O31, "Understand the processes of scholarly communication and knowledge building."[31] And within VoI, both groups of students were more likely to struggle with O42: "Recognize social, legal, and economic factors affecting access to information."[32]

TABLE 4
First-Year Students' Percentage Rate of Knowledge Performance Levels (CdR= Conditionally Ready; CR = College Ready; RR= Research Ready)

	Module 1 (EP&A)				Module 2 (SS)				Module 3 (R&S)				Module 4 (VoI)			
Group	**n**	**O11 (%)**	**n**	**O12 (%)**	**n**	**O21 (%)**	**n**	**O22 (%)**	**n**	**O31 (%)**	**n**	**O32 (%)**	**n**	**O41 (%)**	**n**	**O42 (%)**
Firstgen CdR	3	9.09	9	27.27	5	14.71	6	17.65	8	24.24	2	6.06	3	6.82	5	11.36
Firstgen CR	29	87.88	24	72.73	28	82.35	26	76.47	25	75.76	18	54.55	27	61.36	37	84.09
Firstgen RR	1	3.03	0	0	1	2.94	2	5.88	0	0	13	39.39	14	31.82	2	4.55
Continuing CdR	11	8.73	22	17.46	23	17.83	15	11.63	7	5.79	0	0	2	1.53	6	4.58
Continuing CR	114	90.48	104	82.54	97	75.19	104	80.62	100	82.64	54	44.63	92	70.23	113	86.26
Continuing RR	1	0.79	0	0	9	6.98	10	7.75	14	11.57	67	55.37	37	28.24	12	9.16

Multivariate multiple regression results showed statistical significance in information literacy outcome scores O31 [t (153) = -3.77, $p < 0.001$], O32 [t (153) = -2.76, $p < 0.01$], and O42 [t (174) = -2.83, $p < 0.01$] between first-year, first-generation students and first-year, continuing-generation students across the four modules. Outcome score O12 [t (158) = -1.98, p =0.05] was also found to be marginally statistically different between the groups. First-year, first-generation students scored statistically lower than first-year, continuing-generation students across all scores. Descriptive statistics and the detailed information from the multivariate multiple regression results about the information literacy outcomes are included in Table 5 and Table 6.

TABLE 5
First-Year Students' Outcome Scores

	Module 1 (EP&A)			Module 2 (SS)			Module 3 (R&S)			Module 4 (Vol)		
Group	**n**	**O11 (M/SD)**	**O12 (M/SD)**	**n**	**O21 (M/SD)**	**O22 (M/SD)**	**n**	**O31 (M/SD)**	**O32 (M/SD)**	**n**	**O41 (M/SD)**	**O42 (M/SD)**
Firstgen	33	453.85/ 159.59	461.73/ 141.50	34	473.62/ 114.25	462.50/ 167.74	33	409.19/ 157.08	447.94/ 155.39	44	400.41/ 171.64	469.36/ 159.01
Continuing	126	466.00/ 143.62	517.13/ 143.81	129	512.00/ 152.10	523.88/ 188.16	121	532.11/ 168.22	527.15/ 143.62	131	408.39/ 182.37	543.83/ 148.03

TABLE 6
Multivariate Regression Analysis Results for First-Year Students' Information Literacy Outcome Scores (Note: * *p*<0.05; ** *p*<0.01; ***p<0.001).

	Estimate	Standard Error	*t*-value	*p*-value
O11				
Intercept	466.00	13.10	35.58	0.000
First-year Firstgen/Continuing	-12.15	28.75	-0.42	0.673
O12				
Intercept	517.13	12.77	40.50	0.000
Firstgen/Continuing	-55.41	28.03	-1.98	0.050*
O21				
Intercept	512.00	12.78	40.06	0.000
Firstgen/Continuing	-38.38	27.98	-1.37	0.172
O22				
Intercept	523.88	16.21	32.31	0.000
Firstgen/Continuing	-61.38	35.50	-1.73	0.086
O31				
Intercept	532.11	15.09	35.27	0.000
Firstgen/Continuing	-122.93	32.59	-3.77	0.000***
O32				
Intercept	527.15	13.29	39.67	0.000
Firstgen/Continuing	-79.21	28.71	-2.76	0.007**
O41				
Intercept	408.39	15.71	26.00	0.000
Firstgen/Continuing	-7.98	31.32	-0.25	0.799
O42				
Intercept	543.83	13.18	41.27	0.000
Firstgen/Continuing	-74.47	26.28	-2.83	0.005**

Dispositions

Next, we examined the disposition scores. Disposition scores in TATIL are separate from the Overall and Outcome scores, as they are intended to measure student "judgments regarding strategies. Students earn high scores on these items if they judge behaviors associated

with the disposition to be useful and behaviors not associated with the disposition to be not useful."[33] Because disposition scores measure attitudes rather than knowledge, students can perform highly on an outcome and lower on a related disposition, or vice versa. From the multivariate multiple regression analysis, we detected that there was statistical significance between first-year, first-generation students and first-year, continuing-generation students in D32 [t (153) = -2.28, $p < 0.05$]. TATIL describes Disposition 3.2 as, "Learners who are disposed to demonstrate self-reflection in the context of research and scholarship consistently question their own assumptions as they are challenged by new knowledge."[34] Specifically, first-year first-generation students scored 5.72 units lower on the D32 score (*M = 70.36*, *SD = 14.51*) than the first-year continuing-generation students (*M = 76.08*, *SD = 12.29*). Detailed descriptive statistics for information literacy dispositions were reported in Table 7. The detailed information from the multivariate multiple regression analysis for information literacy dispositions were reported in Table 8.

TABLE 7
First-Year Students' Disposition Scores

	Module 1 (EP&A)				Module 2 (SS)		Module 3 (R&S)				Module 4 (Vol)		
Group	**n**	**D11 (M/SD)**	**D12 (M/SD)**	**D13 (M/SD)**	**n**	**D21 (M/SD)**	**n**	**D31 (M/SD)**	**D32 (M/SD)**	**D33 (M/SD)**	**n**	**D41 (M/SD)**	**D42 (M/SD)**
First gen	33	52.45/ 10.01	58.85/ 11.82	63.61/ 11.48	34	62.98/ 10.54	33	53.73/ 11.36	70.36/ 14.51	49.97/ 8.84	44	64.48/ 11.72	70.93/ 6.92
Continuing	126	54.61/ 10.66	56.79/ 12.65	67.63/ 13.61	129	65.93/ 8.63	121	57.02/ 11.26	76.08/ 12.29	51.93/ 9.40	131	66.24/ 11.97	71.52/ 8.60

TABLE 8
Multivariate Regression Analysis Results for First-Year Students' Information Literacy Dispositions (Note: * p<0.05; ** p<0.01; ***p<0.001)

	Estimate	Standard Error	*t*-value	*p*-value
D11				
Intercept	54.61	0.94	58.22	0.000
First-year Firstgen/Continuing	-2.16	2.06	-1.05	0.297
D12				
Intercept	56.79	1.11	51.05	0.000
Firstgen/Continuing	2.06	2.44	0.84	0.400
D13				
Intercept	67.63	1.18	57.49	0.000
Firstgen/Continuing	-4.02	2.58	-1.56	0.121
D21				
Intercept	65.93	0.80	82.68	0.000
Firstgen/Continuing	-2.96	1.75	-1.70	0.092
D31				
Intercept	57.02	1.03	55.59	0.000
Firstgen/Continuing	-3.29	2.22	-1.48	0.140

TABLE 8
Multivariate Regression Analysis Results for First-Year Students' Information Literacy Dispositions (Note: * p<0.05; ** p<0.01; ***p<0.001)

	Estimate	Standard Error	*t*-value	*p*-value
D32				
Intercept	76.08	1.16	65.45	0.000
Firstgen/Continuing	-5.72	2.51	-2.28	0.024*
D33				
Intercept	51.93	0.84	61.50	0.000
Firstgen/Continuing	-1.96	1.82	-1.07	0.285
D41				
Intercept	66.24	1.04	63.68	0.000
Firstgen/Continuing	-1.76	2.07	-0.85	0.398
D42				
Intercept	71.52	0.72	99.67	0.000
Firstgen/Continuing	-0.59	1.43	-0.41	0.682

Performance Indicators

Finally, we analyzed the most granular aspect of the four TATIL modules, the performance indicators and individual disposition questions. We employed four multivariate multiple regressions to examine the difference in information literacy performance indicators between first-year, first-generation students and first-year, continuing-generation students across four modules.

In module 1, we found that first-year, first-generation students' outcome score D12a (*M = 14.09*, *SD = 4.59*) was statistically higher than first-year, continuing-generation students' D12a (*M = 12.02*, *SD = 4.81*) (D12a [t (158) = 2.23, $p < 0.05$]). This disposition, titled Toleration of Ambiguity, is described by TATIL as follows: "Learners who are disposed to demonstrate toleration for ambiguity when they are evaluating sources of information treat authority as subjective because it is based on the context of the information need."[35]

Performance indicators p2111 [t (154) = -1.98, $p < 0.05$] and D21c [t (154) = -2.88, $p < 0.01$] in module 2 were also found to be statistically significant different between first-year, first-generation students and first-year, continuing-generation students. Many performance indicators in module 3 showed statistical difference between the first-year, first-generation students and first-year, continuing-generation students. They were performance indicators p312 [t (153) = -2.15, $p < 0.05$], p314 [t (153) = -2.22, $p < 0.05$], p325 [t (153) = -2.52, $p < 0.05$], p3112 [t (153) = -2.38, $p < 0.05$], p326 [t (153) = -3.25, $p < 0.001$], p3212 [t (153) = -4.04, $p < 0.001$], p319 [t (153) = -2.37, $p < 0.05$], p3114 [t (153) = -3.31, $p < 0.001$], and D32b[t (153) = -2.72, $p < 0.01$]. Results also showed that there was statistical difference in performance indicators p416 [t (174) = -2.99, $p < 0.01$] in module 4. In all these performance indicators, first-year, first-generation students scored statistically lower than the first-year, continuing-generation students except in D12a. Detailed information about information literacy performance indicator scores and multivariate multiple regression analysis for performance indicators were provided in Table 9 and Table 10.

TABLE 9
First-Year Students' Performance Indicator Scores

	Module 1 (EP&A)	Module 2 (SS)		Module 3 (R&S)									Module 4 (Vol)
Group	**D12a (M/SD)**	**p2111 (M/SD)**	**D21c (M/SD)**	**p312 (M/SD)**	**p314 (M/SD)**	**p325 (M/SD)**	**p3112 (M/SD)**	**p326 (M/SD)**	**p3212 (M/SD)**	**p319 (M/SD)**	**p3114 (M/SD)**	**D32b (M/SD)**	**p416 (M/SD)**
Firstgen	14.09/ 4.59	166.59/ 228.95	14.12/ 2.73	164.55/ 253.41	138.42/ 248.50	307.67/ 213.44	310.18/ 242.64	122.27/ 136.02	332.55/ 253.88	257.15/ 206.55	235.45/ 176.58	11.70/ 3.07	358.09/ 304.78
Continuing	12.02/ 4.81	256.12/ 236.06	15.60/ 2.67	278.23/ 272.55	259.55/ 285.50	397.72/ 172.37	445.88/ 301.86	200.08/ 117.92	525.14/ 240.98	345.59/ 185.44	345.40/ 167.17	13.13/ 2.57	510.77/ 289.21

TABLE 10
Multivariate Regression Analysis Results for First-Year Students' Performance Indicators in Information Literacy Skills (Note: * p<0.05; ** p<0.01;*p<0.001)**

	Estimate	Standard Error	*t*-value	*p*-value
Module 1 (EP&A)				
D12a				
Intercept	12.02	0.42	28.31	0.000
Firstgen/Continuing	2.08	0.93	2.23	0.027*
Module 2 (SS)				
p2111				
Intercept	256.12	20.66	12.40	0.000
Firstgen/Continuing	-89.54	45.23	-1.98	0.049*
D21c				
Intercept	15.60	0.24	66.13	0.000
Firstgen/Continuing	-1.49	0.52	-2.88	0.005**
Module 3 (R&S)				
p312				
Intercept	278.23	24.42	11.39	0.000
Firstgen/Continuing	-113.69	52.76	-2.15	0.033*
p314				
Intercept	259.55	25.28	10.27	0.000
Firstgen/Continuing	-121.12	54.62	-2.22	0.028*
p325				
Intercept	397.72	16.53	24.07	0.000
Firstgen/Continuing	-90.05	35.70	-2.52	0.013*
p3112				
Intercept	445.88	26.40	16.89	0.000
Firstgen/Continuing	-135.70	57.03	-2.38	0.019*
p326				
Intercept	200.08	11.09	18.05	0.000
Firstgen/Continuing	-77.81	23.95	-3.25	0.001***

TABLE 10
Multivariate Regression Analysis Results for First-Year Students' Performance Indicators in Information Literacy Skills (Note: * p<0.05; ** p<0.01;*p<0.001)**

	Estimate	Standard Error	*t*-value	*p*-value
p3212				
Intercept	525.14	22.16	23.70	0.000
Firstgen/Continuing	-193.60	47.87	-4.04	0.000***
p319				
Intercept	345.59	17.28	20.00	0.000
Firstgen/Continuing	-88.44	37.33	-2.37	0.019*
p3114				
Intercept	345.40	15.38	22.46	0.000
Firstgen/Continuing	-109.94	33.23	-3.31	0.001***
D32b				
Intercept	13.13	0.24	53.82	0.000
Firstgen/Continuing	-1.44	0.53	-2.72	0.007**
Module 4 (VoI)				
p416				
Intercept	510.77	25.61	19.94	0.000
Firstgen/Continuing	-152.68	51.08	-2.99	0.003**

Discussion

Study results reveal that, while some disparities exist between first-year, first-generation students and their continuing-generation counterparts, there are also several commonalities between the two groups. These commonalities will be discussed below, followed by the disparities.

Common Strengths and Weaknesses

As a whole, first-year students demonstrated substantial information literacy knowledge and skills. The majority of students in both the first-generation and continuing-generation groups scored at the College Ready level or higher in the overall scores for each module of the TATIL assessment. Only thirty-three students (5 percent) received a score in the lowest level, Conditionally Ready, on the overall score for any module. This finding suggests that librarians should not assume that first-year students, regardless of their first-generation status, are entering college with low-level information literacy skills.

Students from both groups shared strengths in the R&S and VoI categories, areas which focus on scholarly communication, ethical use of information, and the research process. Only five students (3 percent) received Conditionally Ready scores in this category, indicating that few students struggle significantly in this area. Indeed, a considerable number of students excelled: thirty-eight (25 percent) students scored at the highest level, Research Ready, in R&S, while seventeen (10 percent) students attained Research Ready status in VoI.

In contrast, students were more likely to struggle in the EP&A module, which is focused on the ACRL Framework's *Authority is Constructed and Contextual* and *Information Creation as a Process* frames.[36] This module received the largest number of students who scored as Con-

ditionally Ready, with fourteen (9 percent) scoring in this lowest category. Additionally, no student from either group attained Research Ready status in EP&A. Students from both groups particularly struggled with O12, "Apply knowledge of authority to analyze others' claims and to support one's own claims."[37] This finding suggests that, while librarians should not assume that first-year students lack information literacy skills, they should consider implementing pre-assessments to determine whether their first-year students would benefit from additional instruction in understanding the context and complexity of authority when evaluating sources.

Disparities

Although there are similarities between the overall scores of first-generation and continuing-generation students, there are also differences that may support calls for additional information literacy support for first-year, first-generation students.

The most significant differences between first-generation and continuing-generation students appeared in the R&S and VoI modules. As was noted previously, students in both groups scored most highly in these two categories, with a substantial number of students even attaining Research Ready status in this category. Despite these positive results, first-generation students received significantly lower scores in these two modules, which are focused on the ACRL Framework *Research as Inquiry, Scholarship as a Conversation, and Information has Value* frames.[38]

The largest cluster of significant differences appeared in module 3, R&S. Although most first-generation students received College Ready scores, their outcome and performance level scores revealed that first-year, first-generation students experience knowledge gaps in this area in comparison to their continuing-generation peers. Disposition scores also revealed that first-generation students scored lower in Disposition 3.3, Mindful self-reflection. Table 11 depicts the significant R&S outcomes and performance indicators. Based on this finding,

TABLE 11
R&A Outcomes and Performance Indicators with First-Generation Gaps

Outcome 3.1	**Understand the processes of scholarly communication and knowledge building.**
Performance Indicator 3.1.2	Given a literature review, identify the gap that the authors have identified in the existing research.
Performance Indicator 3.1.4	Recognize that scholars bring their own perspectives to the study of a research topic.
Performance Indicator 3.1.9	Identify venues for scholarly communication, such as books, journals, conventions, blogs.
Performance indicator 3.1.12	Evaluate an emerging scholar's likelihood of being accepted into the scholarly conversation.
Performance Indicator 3.1.14	Given a set of research needs, match them to appropriate research methods.
Outcome 3.2	**Understand stages of the research process.**
Performance Indicator 3.2.5	Order the stages of the research process when writing a research paper.
Performance Indicator 3.2.6	Explain why research inquiry can be appropriate for personal information needs in addition to academic needs.
Performance Indicator 3.2.12	Classify descriptions of specific actions taken during the research process by the stage in the research process when they are most likely to happen.

first-generation students appear to have a less sophisticated understanding of the scholarly conversation and research process.

A second set of disparities is apparent in module 4, VoI. This module, which is based on the *Information has Value* frame,[39] reveals a more specific knowledge gap, as depicted in Table 12 below. Based upon this finding, first-year, first-generation students may benefit from additional instruction on the conceptual reasons for citing sources.

TABLE 12
VoI Outcomes and Performance Indicators with First-Generation Gaps

Outcome 4.2	Recognize social, legal, and economic factors affecting access to information.
Performance Indicator 4.1.6	Given a list, select the purposes of citation.

In addition to the areas where the scores of first-generation students suggested knowledge gaps, there was also an area where first-generation students demonstrated more sophisticated information behavior compared to their continuing-generation peers. First-generation students received significantly higher scores on one disposition question, D12a, which is part of the "Toleration of Ambiguity" disposition. This disposition assesses students' research behavior and choice of authoritative sources. First-generation students' high scores in this area support Ilett's assertion that first-gen students "recognize various types of authority and seek help from appropriate sources accordingly.[40]

Limitations

There are several limitations to this study. First, the study was implemented at a single institution. Results may not be generalizable to other institutions. Next, it is important to note that standardized tests have limited utility. Students' ability to select a correct answer from multiple choices may not correlate with their ability to implement that knowledge in actual practice. There are also limitations to the way this study was implemented. The assessment was administered over multiple semesters to students enrolled in several different courses, with results aggregated into a single data set. It is possible that there were factors that differentiated results from different semesters or courses that are not accounted for in the results. The assessment was completed by students on their own time outside of the classroom environment. Because students opted into completing the assessment, there is potential for selection bias in the sample. Further, the lack of a controlled testing environment could have impacted the results. Finally, the assessment was conducted prior to the COVID-19 pandemic, which substantially impacted the academic experience.

Next Steps and Future Directions

The results of this study suggest several potential changes to librarian practice. First, librarians should consider the pre-existing knowledge and skills of both first-generation and continuing-generation students. Both groups of students demonstrated substantial information literacy knowledge at the first-year level, indicating that librarians should not assume that students are entering college without information literacy skills. Additionally, both groups experienced the most challenges with the EP&A module, which focused on evaluating sources and considering issues of authority. Librarians may wish to consider increasing information literacy support in this area for all first-year students.

Librarians may also adjust how they work with first-generation students. Librarians who have the opportunity to engage directly with first-generation students should consider focusing information literacy support in the areas where first-generation students exhibited gaps. Additional support in understanding scholarly communication and the research process could help first-generation students gain better understanding of the larger information literacy landscape.

This study also reveals several opportunities for additional research. One potential area is the application of first-generation research skills. Although standardized testing revealed gaps, it is unclear if those gaps appear in actual practice. Additional research is needed to better understand how first- and continuing-generation students apply information literacy knowledge and skills. Research is also needed into effective information literacy support. Identifying effective library interventions in supporting first-generation student information literacy skill development would provide practitioners with insights that could guide practice.

Conclusion

As libraries strive to better support first-generation students, information literacy instruction will be an important part of that support. Understanding the specific information literacy strengths and needs of first-generation students is an important step toward advocating for, designing, and implementing appropriate information literacy support. At many libraries, information literacy instruction is heavily concentrated at the first-year level. This study reveals that first-year, first-generation college students demonstrate substantial information literacy skills, especially in the areas of *Research as Inquiry, Scholarship as a Conversation, and Information has Value.* Despite these strengths, first-generation students appear to lag behind their continuing-generation peers in these same knowledge areas.

Closing the gap between first-generation and continuing-generation college students is key to ensuring an equitable academic experience for first-generation students. Librarians should consider whether first-generation students experience information literacy gaps and access barriers on their campuses. Although removing barriers and highlighting strengths is a best practice for supporting first-generation students,[41] librarians should also consider whether they can implement additional information literacy support to help first-generation students excel.

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Appendices

Appendix A: TATIL Outcomes

Code	Module	TATIL Outcome	TATIL Outcome Description[42]
O11	1 (EP&A)	Outcome 1.1	Apply knowledge of source creation processes and context to evaluate the authority of a source.
O12	1 (EP&A)	Outcome 1.2	Apply knowledge of authority to analyze others' claims and to support one's own claims
O21	2 (SS)	Outcome 2.1	Plan, conduct, evaluate, and revise searches to achieve relevant results.
O22	2 (SS)	Outcome 2.2	Compare and contrast a range of search tools.
O31	3 (R&S)	Outcome 3.1	Understand the processes of scholarly communication and knowledge building.
O32	3 (R&S)	Outcome 3.2	Understand stages of the research process.
O41	4 (Vol)	Outcome 4.1	Recognize the rights and responsibilities of information creation.
O42	4 (Vol)	Outcome 4.2	Recognize social, legal, and economic factors affecting access to information.

Appendix B: TATIL Dispositions

Code	Module	TATIL Disposition	TATIL Disposition Description[43]
D11	1 (EP&A)	Disposition 1.1	Mindful self-reflection
D12	1 (EP&A)	Disposition 1.2	Toleration of ambiguity
D13	1 (EP&A)	Disposition 1.3	Responsibility to community
D21	2 (SS)	Disposition 2.1	Productive persistence
D31	3 (R&S)	Disposition 3.1	Productive persistence
D32	3 (R&S)	Disposition 3.2	Mindful self-reflection
D33	3 (R&S)	Disposition 3.3	Responsibility to community
D41	4 (Vol)	Disposition 4.1	Mindful self-reflection
D42	4 (Vol)	Disposition 4.2	Responsibility to community

Appendix C: TATIL Performance Indicators and Individual Disposition Descriptions

Code	Module	TATIL Performance Indicator/Individual Disposition	TATIL Performance Indicator/Individual Disposition Description[44]
D12a	1(EP&A)	Disposition 1.2	Toleration of ambiguity
p2111	2 (SS)	Performance Indicator 2.1.11	Apply nested logic structures, Boolean operators, and truncation to successfully construct an advanced search.
D21c	2 (SS)	Disposition 2.1	Productive persistence
p312	3 (R&S)	Performance Indicator 3.1.2	Given a literature review, identify the gap that the authors have identified in the existing research.

p314	3 (R&S)	Performance Indicator 3.1.3	Recognize that scholars bring their own perspectives to the study of a research topic.
p319	3 (R&S)	Performance Indicator 3.1.9	Identify venues for scholarly communication, such as books, journals, conventions, blogs.
p3112	3 (R&S)	Performance Indicator 3.1.12	Evaluate an emerging scholar's likelihood of being accepted into the scholarly conversation.
p3114	3 (R&S)	Performance Indicator 3.1.14	Given a set of research needs, match them to appropriate research methods.
D32b	3 (R&S)	Disposition 3.2	Mindful self-reflection
p325	3 (R&S)	Performance Indicator 3.2.5	Order the stages of the research process when writing a research paper.
p326	3 (R&S)	Performance Indicator 3.2.6	Explain why research inquiry can be appropriate for personal information needs in addition to academic needs.
p3212	3 (R&S)	Performance Indicator 3.2.12	Classify descriptions of specific actions taken during the research process by the stage in the research process when they are most likely to happen.
p416	4 (Vol)	Performance Indicator 4.1.6	Given a list, select the purposes of citation.

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Job Control, Library Instruction, and Burnout: A Quantitative Analysis of Academic Instruction Librarians' Experiences of Job Control While Teaching

Matthew Weirick Johnson

Providing library instruction, often via one-shots in someone else's classroom, may reduce feelings of agency or job control for academic instruction librarians. This study addresses potential differences in job control across core responsibilities, specifically looking at the difference between job duties overall and instruction responsibilities.

As we consider the characteristics of library instruction, we should examine how those characteristics impact librarian agency in teaching spaces and acts. For job control regarding instruction, training and experience may have specific impacts and should be pursued as a way to empower academic library instructors.

Introduction

In the 2022 closing keynote for the Critical Librarianship and Pedagogy Symposium, Baharak Yousefi said that "no physicist, historian, or geographer on our campus teaches this way: going around begging for the right to teach in a one-off manner." Yousefi's statement underscores the inherent lack of control within the one-shot model. However, empirical research on job control among academic instruction librarians is lacking. Given that the one-shot model is the predominate approach for instruction in academic libraries, control among academic instruction librarians requires further consideration and research.

By giving up this control, academic instruction librarians may be put in a precarious position that lends itself to higher levels of burnout. Johnson (2023) found that job control is inversely correlated with burnout, such that academic librarians with low job control might experience higher levels of burnout. In that study, the data also demonstrated that the effects of status (e.g., faculty, academic staff, or staff) and teaching workload (e.g., far too light to far too excessive) are statistically significant and small. Participants identified as staff and participants with "far too excessive" workloads experienced less job control.

To further understand job control as a phenomenon among academic librarians, this study addresses potential differences in job control across core responsibilities, specifically looking

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at the difference between job duties overall and instruction responsibilities. It is hypothesized that perception of job control when completing instructional responsibilities and tasks will be lower than it is when completing other general librarian duties.

Literature Review

For academic librarians, providing instruction can be fraught. Developing a teacher identity, working with faculty, and engaging with students could all impact feelings of agency and control. Furthermore, library instruction can encompass a variety of teaching practices, including one-shots, credit-bearing courses, and standalone workshops, and can occur in various modalities, including synchronous, asynchronous, or hybrid teaching. This nebulous landscape may be difficult to fully understand or capture and may require considerable nuance and knowledge of the field in order to explain how librarians experience control and agency during instruction.

Job Control and Burnout

According to Ganster (1989), job control is "the ability to exert some influence over one's environment so that the environment becomes more rewarding or less threatening." Job control is an expansive concept covering a wide range of dimensions, such as work tasks, work pacing, work scheduling, physical environment, decision making, interaction, and mobility. Burnout, as defined by the World Health Organization (WHO) in their International Classification of Diseases, 11th Edition (ICD-11), is "a syndrome conceptualized as resulting from chronic workplace stress that has not been successfully managed. It is characterised by three dimensions: 1) feelings of energy depletion or exhaustion; 2) increased mental distance from one's job, or feelings of negativism or cynicism related to one's job; and 3) a sense of ineffectiveness and lack of accomplishment" (2020). Johnson (2023) and Wood et al. (2020) both found that academic librarians are experiencing a high rate of burnout. These findings empirically prove what we've already known in the field: librarians are burning out.

Existing research suggests that low job control may predict higher levels of burnout (Park et al., 2014; Portoghese et al., 2014; Taris et al., 2005). Johnson (2023) corroborates this finding among a sample of academic instruction librarians. The study, sample, and data discussed in that article are the same as in this article; however, here the focus is on job control while performing instructional responsibilities whereas the previous article looked at job control and burnout more generally. Throughout this article, the terms job control and agency are occasionally conflated, which is aligned with Leiter & Maslach's (2003) use of agency in the Areas of Worklife Survey, a companion to the Maslach Burnout Inventory, which relies on the Job Demand-Control (JDC) model (Karasek, 1979). Job control may also be conceived similarly to the concept of autonomy.

Job control and burnout are related psychological phenomena as demonstrated by their inverse correlation in Johnson (2023), among librarians, as well as in studies of other professions (Taris et al., 2005). As such, they have many similar impacts on worker health and satisfaction. Inadequate job control may result in increased anxiety (Jensen et al., 2013; Sanne et al., 2005; Too et al., 2021), depression (Sanne et al., 2005; Too et al., 2021), stress (Chiang et al., 2010; Thompson & Prottas, 2006), work-family conflict (Thompson & Prottas, 2006), role overload (Jensen et al., 2013), and turnover intentions (Jensen et al., 2013; Thompson & Prottas, 2006). In contrast, workers with higher job control are more likely to be satisfied with their jobs and

have better attitudes toward the job itself (Thompson & Prottas, 2006). As mentioned above, low job control also predicts higher levels of burnout. In a systematic review examining physical, psychological, and occupational consequences of burnout, the authors found that

> [b]urnout was a significant predictor of the following physical consequences: hypercholesterolemia, type 2 diabetes, coronary heart disease, hospitalization due to cardiovascular disorder, musculoskeletal pain, changes in pain experiences, prolonged fatigue, headaches, gastrointestinal issues, respiratory problems, severe injuries and mortality below the age of 45 years. The psychological effects were insomnia, depressive symptoms, use of psychotropic and antidepressant medications, hospitalization for mental disorders and psychological ill-health symptoms. Job dissatisfaction, absenteeism, new disability pension, job demands, job resources and presenteeism were identified as professional outcomes (Salvagioni et al., 2017, p. 1).

Library Instruction: One-shots and Training

In both her guest editorial and her introduction to the *College & Research Libraries* special issue on one-shots, Nicole Pagowsky considers the concept of agency regarding library instruction (2021, 2022). In the guest editorial, she defines a one-shot as "a standalone session, superficially (or not at all) connected to course content, that is tacked onto a class. Within a curriculum, the one-shot has no memory of where information literacy has been and no vision of where it is going. It is ephemeral within cycles of ineffectiveness" (Pagowsky, 2021, p. 300). In the subsequent introduction to the special issue on one-shots, she argues that "One-shots are not in a binary of good versus bad, but rather in a spectrum with varied experiences resulting from differing levels of agency and marginalization" (Pagowsky, 2022, p. 721). As we consider library instruction, and one-shots in particular, agency or control may be a predictor of negative experiences of the one-shot.

While the one-shot model may be one structure impacting job control among academic instruction librarians, a possible lack of training may also result in librarians who are unprepared to perform instruction and possibly unsure of how to exercise their agency during instructional situations. In 2015, Laura Saunders noted that "despite the fact that LIS programs are offering courses on instruction, studies of practicing librarians indicate that most did not learn instruction or teaching skills in their master's program, and many feel underprepared to take on a teaching role." She found that the majority of ALA-accredited programs do provide some course options for information literacy and library instruction; however, she also points to related limitations, such as the fact that offerings of these courses have not increased in recent years despite instruction growing as a role for librarians, and that librarians likely need more than one course in order to become effective teachers. It's possible that lacking training and being unprepared for instructional responsibilities contributes to feelings of lacking control or agency.

Building on questions about the one-shot model and teacher training, this study presents an empirical examination of job control among academic instruction librarians to expand our understanding of this phenomenon and to consider job control as one avenue for mitigating burnout among librarians. Given the implications for individual and organizational health, libraries and librarians need to build further understanding of these psychological concepts

and to develop practical solutions. This research catalyses this conversation by looking at issues with job control when librarians perform their teaching responsibilities.

Methods

A web survey was administered to measure job control and burnout among academic librarians with instruction responsibilities. The survey used a psychometric measurement of job control; it asked respondents to complete the inventory considering job control when completing their general job duties and then specifically when completing instructional responsibilities. The goal was to compare the job control scores for general duties to those for instructional responsibilities.

Sample and Recruitment

The study targeted academic librarians with some instruction responsibilities and recruited participants primarily via email distribution lists. A recruitment email was sent three times (August 29, 2022; September 13, 2022; and September 28, 2022) via ALA Connect, a forum and email distribution system maintained by the American Library Association (ALA), to three lists: ACRL Members, which includes approximately 7,200 members; ACRL Instruction Section, which includes 4,800 members; and Information Literacy Instruction in Academic Libraries, which includes 292 members. Concurrent messages were sent via the social media platform Twitter. In the end, 307 survey responses were collected, of which, 245 included complete results, which were used for data analysis.

Measures

The web survey was created using SpringShare's LibWizard and included demographic questions, questions about the characteristics of the participant's work, and two validated psychometric inventories: Ganster's (1989) 22-item job control inventory and Kristensen et al.'s (2005) 19-item Copenhagen Burnout Inventory.

Ganster's (1989) job control inventory includes 22 questions to measure job control across various dimensions. Scoring for the job control inventory uses a Likert scale with values one through five attributed (Very little = 1; Little = 2; A moderate amount = 3; Much = 4; and Very much =5). A participant's job control score is their average across the first 21 items. The twenty-second item is used as a control. Participants were asked to complete the same job control inventory twice: first, as it applies to their general job duties and then specifically considering their instructional responsibilities.

Cronbach's alpha was used to measure internal consistency as a measurement of the reliability of the scale. The Cronbach's alpha for the 21-item job control scale was 0.89 (n=245) when used for job control in general and 0.894 (n=245) when used for job control specifically related to instruction. This is similar to Ganster's (1989) report on the scale, which had an alpha of 0.87 (n = 191), and Dywer & Ganster's (1991) study, which also had an alpha of 0.87 (n = 90). Ganster (1989) presents factor analysis to demonstrate construct validity.

The Copenhagen Burnout Inventory (CBI) includes three subscales: personal burnout (six items), work-related burnout (seven items), and client-related burnout (six items). For the purposes of this study, the word client in the client-related burnout subscale was changed to "patrons," to better suit the sample population. This is aligned with recommendations for the use of CBI in practice: "'Clients' is a broad concept covering terms such as patients, inmates,

children, students, residents, etc. When the CBI is used in practice, the term appropriate for the specific group of respondents is used" (Kristensen et al., 2005).

The CBI uses two different Likert scales that are given values ranging from zero to 100. The total work-related burnout score (TWRBS), total personal burnout score (TPBS), and total client-related burnout score (TCRBS) are the average within the given subscale for the participant.

The Cronbach's alpha for the personal burnout subscale, work-related burnout subscale, and client-related burnout subscale from the Copenhagen Burnout Inventory were 0.875, 0.889, and 0.887, respectively, which is similar to the findings of both Kristensen et al. (2005)—which reported a range from 0.85 to 0.87 (n = 1,910) —and Wood et al. (2020) with a Cronbach's alpha of 0.798 (n = 1,808) for the work-related burnout subscale. Previous studies have reported on the psychometric properties of the CBI, including conducting factor analysis using factorial validity to measure construct validity (Johnson, 2024, Walters et al., 2020; Creedy et al., 2017, Milfont et al. 2008).

Statistical Analyses

Analyses were conducted using the R Statistical language [version 4.2.1; R Core Team (2022)] on macOS Monterey 12.5.1, using the packages easystats [version 0.5.2; Lüdecke et al. (2022)], ltm [version 1.2.0; Rizopoulos (2007)], MASS [version 7.3.58.1; Venables & Ripley (2002)], plyr [version 1.8.8; Wickham (2011)], ggplot2 [version 3.4.0; Wickham (2022a)], stringr [version 1.4.1; Wickham (2022b)], dplyr [version 1.0.10; Wickham et al. (2022)], and tidyr [version 1.2.1; Wickham & Girlich (2022)].

Ethical Considerations

Human research ethics approval was obtained from the Institutional Review Board at the University of California, Los Angeles (IRB#22-001337), which certified the study as exempt. No survey responses were required though a response of "prefer not to disclose" was available for many questions. Participants clicked a button labeled "I agree to participate" to signal consent prior to beginning the survey.

Results

Within the sample of academic librarians who have some degree of instructional responsibility, the mean job control perceived when completing general duties was 3.33 and the mean job control when completing instructional responsibilities was 3.13. A comparison of the characteristics of these data are included in Table 1. A box plot showing the distribution of these data with the median as the center is included in Figure 1.

The paired t-test testing the difference suggests that the effect is positive, statistically significant, and medium (difference = 0.20, 95% CI [0.16, 0.25], $t(244) = 8.29$, $p < .001$; Cohen's $d = 0.53$, 95% CI [0.40, 0.66]). The effect size is labeled following Cohen's (1988) recommendations. Figure 2 and Table 2 break down the difference between job control in general and job control for instruction based on severity of burnout (moderate, high, and severe).

The Pearson's product-moment correlation between Job Control (General) and Job Control (Instruction) is positive, statistically significant, and very large ($r = 0.77$, 95% CI [0.71, 0.82], $t(243) = 18.87$, $p < .001$). Effect sizes were labeled following Funder & Ozer's (2019) recommendations. The psychometric test for Job Control (General) and Job Control (Instruction) is the same test measuring the same concept but within different contexts for the same participants.

FIGURE 1
Distribution of Job Control Data (Note: The median is used for the center.)

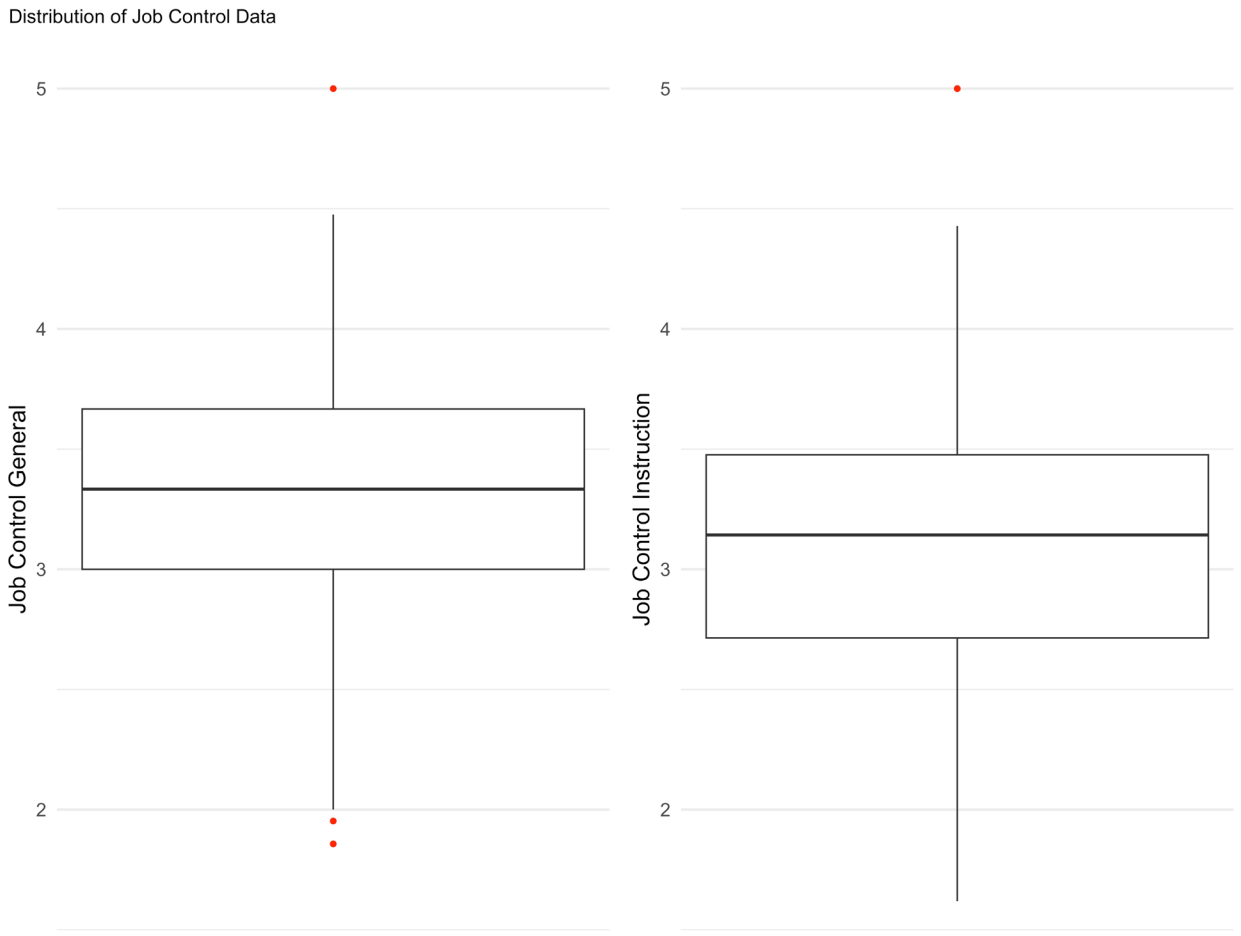
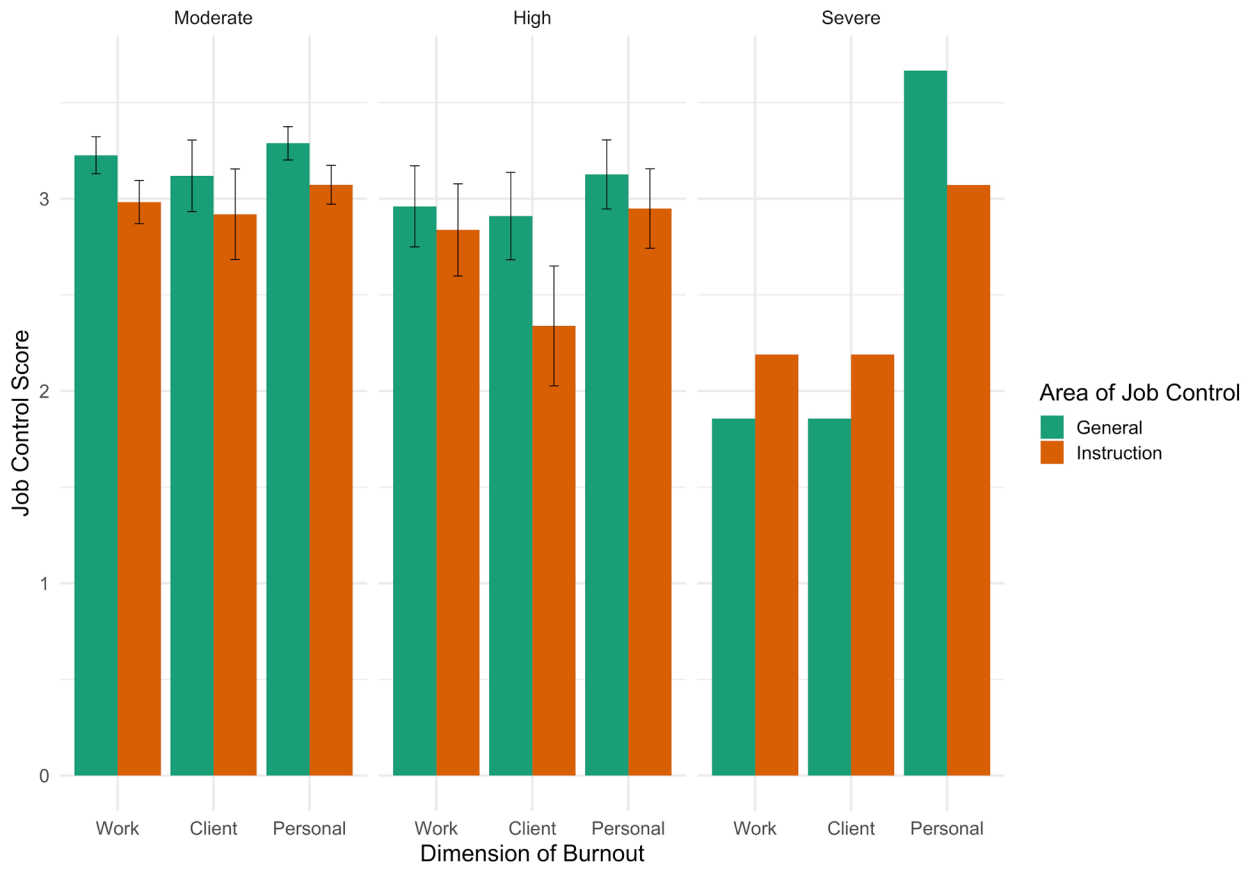


TABLE 1
A Summary of Job Control Data

Attribute	Job Control (General)	Job Control (Instruction)
Std. Dev.	0.52	0.60
Median	3.33	3.14
MAD	0.49	0.64
Min	1.86	1.62
Max	5.00	5.00
N	245	245
Skewness	-0.09	0.26
Kurtosis	0.13	0.30

FIGURE 2
Job Control by Dimension and Severity of Burnout



*Error bars indicate a 95% confidence interval for the corresponding mean. Error bars are excluded where severity of burnout is severe. For TCRBS and TWRBS n=1, so confidence intervals cannot be calculated. For TPBS n=2, so the confidence interval is large.

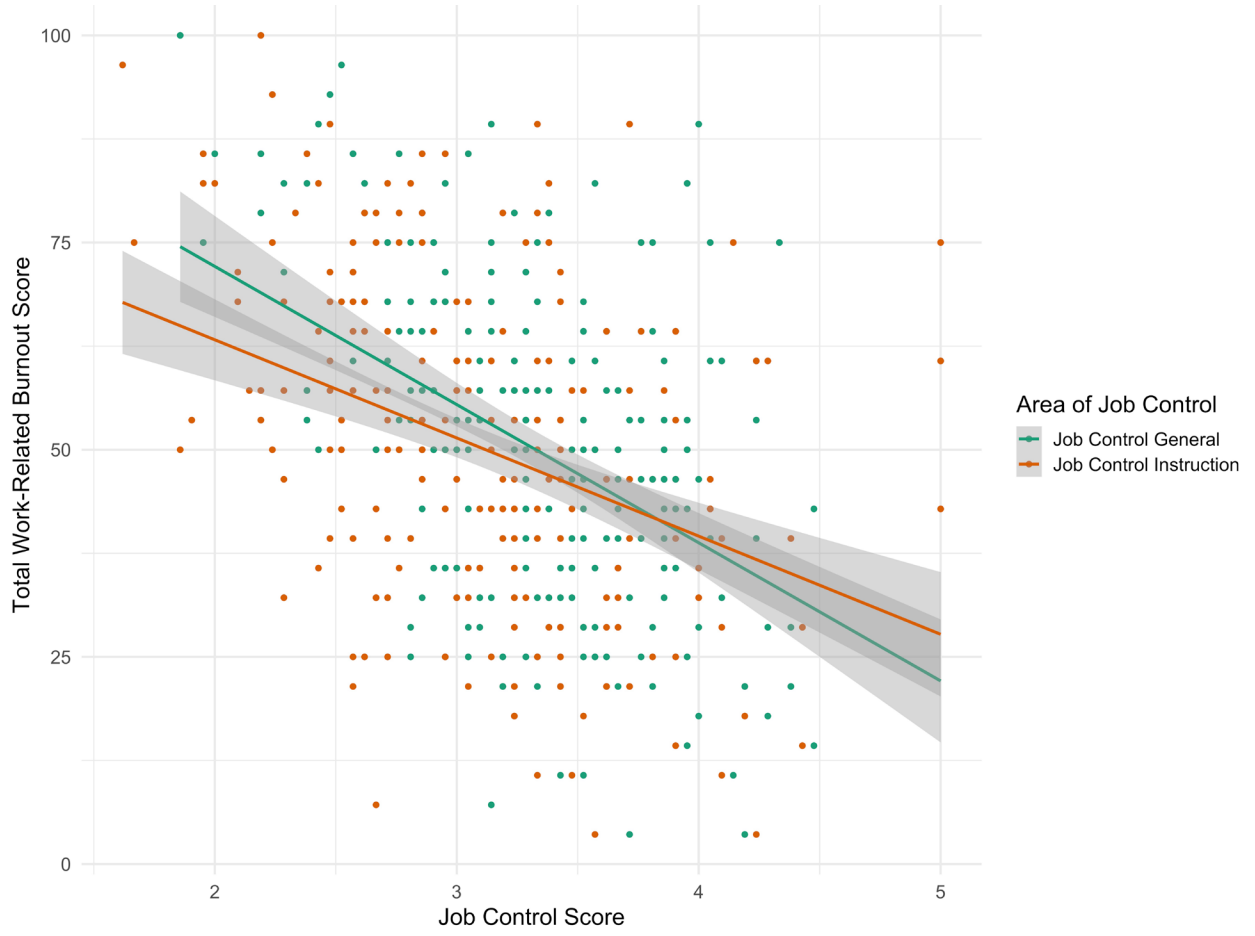
TABLE 2
Means for Job Control (General) and Job Control (Instruction) by Severity of Burnout

Burnout Severity	N	Job Control (General)	Job Control (Instruction)
Work-Related			
No Burnout	114	3.55	3.35
Moderate	95	3.23	2.98
High	35	2.96	2.84
Severe	1	1.86	2.19
Client-Related			
No Burnout	209	3.39	3.2
Moderate	26	3.12	2.92
High	9	2.91	2.34
Severe	1	1.86	2.19
Personal			
No Burnout	75	3.53	3.34
Moderate	122	3.29	3.07
High	46	3.13	2.95
Severe	2	3.67	3.07

Linear models (estimated using OLS) were fitted to predict TWRBS (Figure 3), TPBS (Figure 4), and TCRBS (Figure 5) with job control when completing instructional responsibilities:

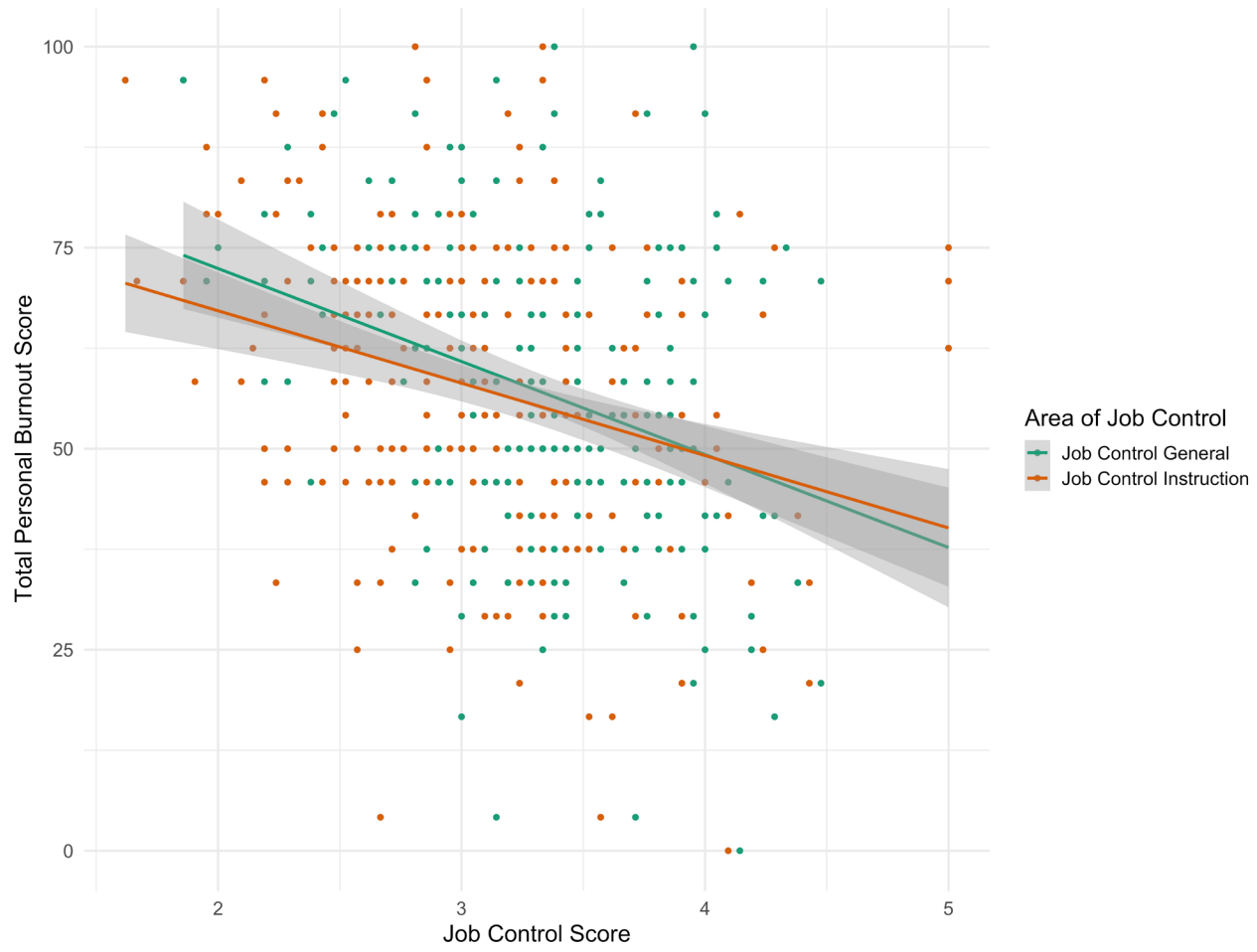
- TWRBS ~ Job Control (Instruction): The model explains a statistically significant and moderate proportion of variance (R2 = 0.13, F(1, 243) = 37.22, p < .001, adj. R2 = 0.13). The model's intercept, corresponding to Job Control (Instruction) = 0, is at 86.96 (95% CI [74.77, 99.15], t(243) = 14.05, p < .001). Within this model, the effect of Job Control (Instruction) is statistically significant and negative (beta = -11.85, 95% CI [-15.67, -8.02], t(243) = -6.10, p < .001; Std. beta = -0.36, 95% CI [-0.48, -0.25]). The model is shown in Figure 3 along with the linear model to predict TWRBS with Job Control (General).

FIGURE 3
Scatterplot and Linear Regression between Work-related Burnout and Job Control



- TPBS ~ Job Control (Instruction): The model explains a statistically significant and weak proportion of variance (R2 = 0.09, F(1, 243) = 22.61, p < .001, adj. R2 = 0.08). The model's intercept, corresponding to Job Control (Instruction) = 0, is at 85.16 (95% CI [73.27, 97.04], t(243) = 14.11, p < .001). Within this model, the effect of Job Control (Instruction) is statistically significant and negative (beta = -9.00, 95% CI [-12.73, -5.27], t(243) = -4.76, p < .001; Std. beta = -0.29, 95% CI [-0.41, -0.17]). The model is shown in Figure 4 along with the linear model to predict TPBS with Job Control (General).

FIGURE 4
Scatterplot and Linear Regression between Personal Burnout and Job Control



- TCRBS ~ Job Control (Instruction): The model explains a statistically significant and weak proportion of variance (R2 = 0.11, F(1, 243) = 29.23, p < .001, adj. R2 = 0.10). The model's intercept, corresponding to Job Control (Instruction) = 0, is at 63.41 (95% CI [50.52, 76.30], t(243) = 9.69, p < .001). Within this model, the effect of Job Control (Instruction) is statistically significant and negative (beta = -11.10, 95% CI [-15.15, -7.06], t(243) = -5.41, p < .001; Std. beta = -0.33, 95% CI [-0.45, -0.21]). The model is shown in Figure 5 along with the linear model to predict TCRBS with Job Control (General).

Standardized parameters were obtained by fitting the models on a standardized version of the dataset. 95% Confidence Intervals (CIs) and p-values were computed using a Wald t-distribution approximation.

While the R2 for all the above models using job control for instruction are lower than found in Johnson (2023), using job control in general—which suggests that job control for instruction explains a weaker proportion of variance—the data still suggest some impact of job control on burnout. Since burnout is a multi-faceted phenomenon, it makes sense that job control wouldn't be a sole predictor of burnout.

FIGURE 5
Scatterplot and Linear Regression between Client-related Burnout and Job Control

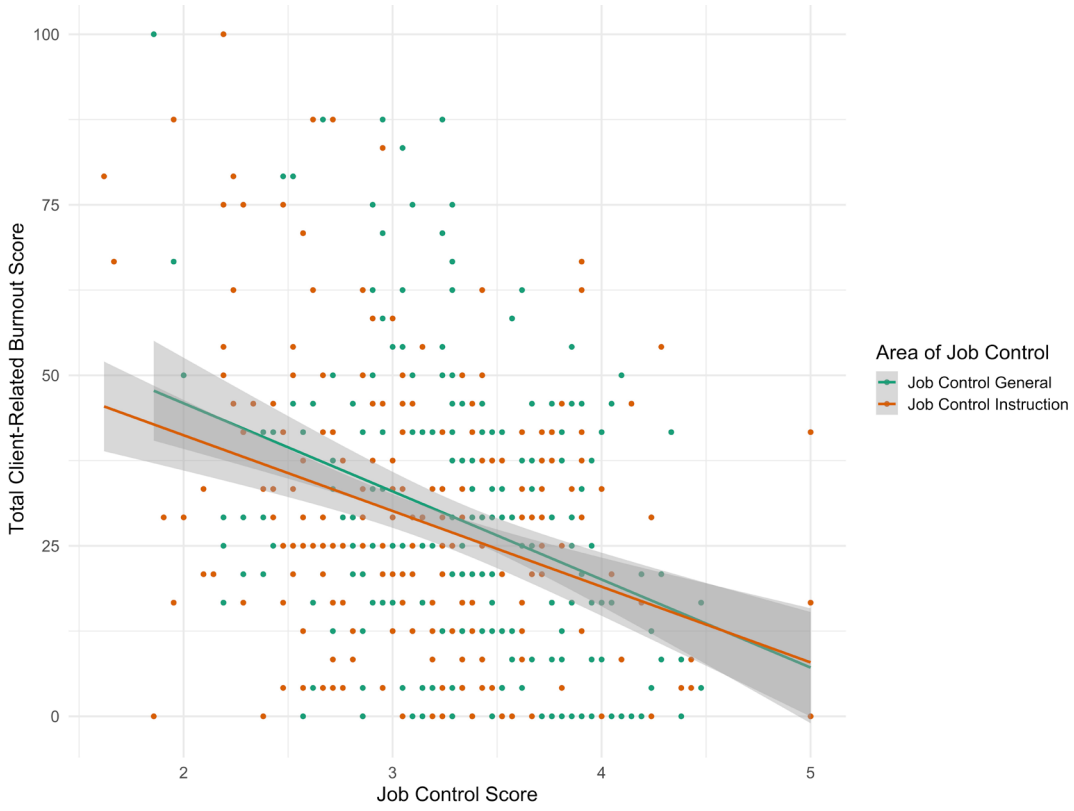
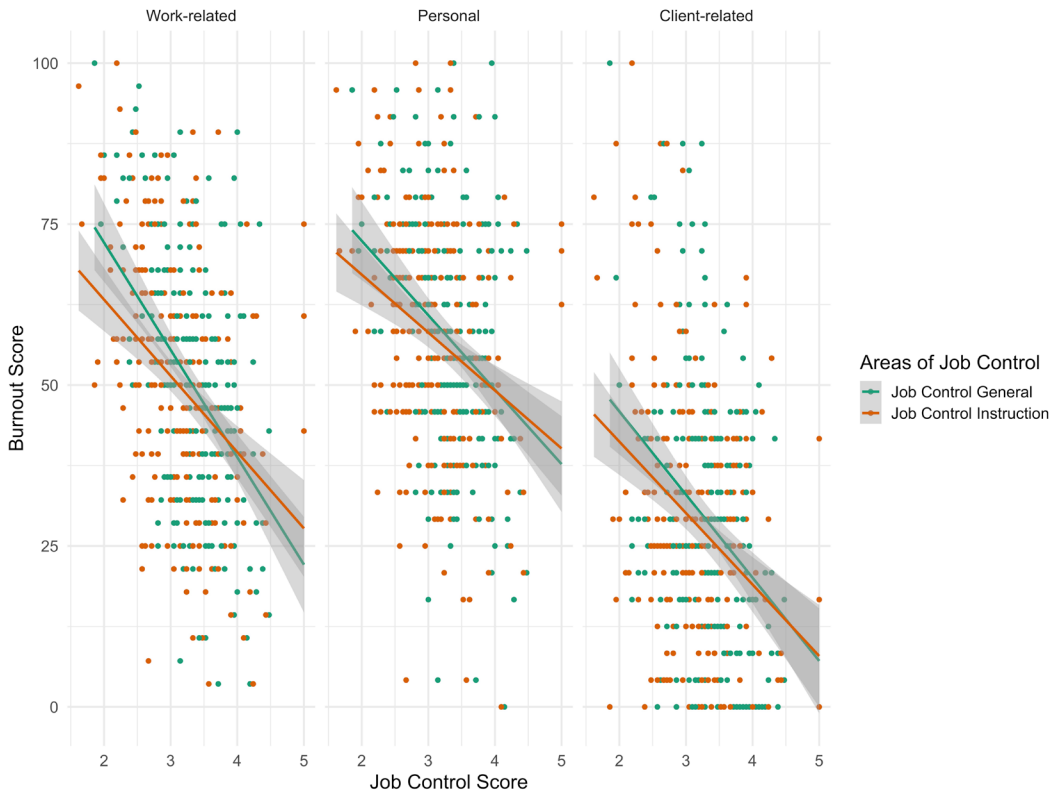


FIGURE 6
Scatterplot and Linear Regression between Dimensions of Burnout and Areas of Job Control



Analysis of Variance

Johnson (2023) found that extent of job control is tied to status (e.g., faculty, academic staff, or staff) and teaching workload when measuring job control generally. This study looks specifically at perception of job control when completing instructional tasks and found that both time since degree (in years), and whether or not training for instruction was received have statistically significant ($p < 0.05$) effects on job control. Time at institution, full-time or part-time status, and tenure status for individuals had weaker evidence that the observed extremeness of differences in means was not random ($p < 0.1$). For income, the p value was slightly higher ($p = 1.04$), so the data are presented in the results for readers who may still be interested. Finally, because status and teaching workload were significant in the study of job control in general, details about those results are included below as well. Table 3 shows the results for statistical significance computed using ANOVA tests for each demographic and job characteristic studied. In the sections that follow, the effect sizes are labeled following Field's (2013) recommendations.

TABLE 3
P-Values from ANOVA Tests of Attributes Studied

Attribute	*p*-value
Gender	0.572
Gender Modality	0.192
Disability	0.822
Income	0.104
Time at Institution	0.0583 *
Time Since Degree	0.0263 **
Time in Libraries	0.195
Public or Private	0.406
Non-profit or For-profit	0.858
Permanent or Temporary	0.187
Full-time or Part-time	0.0934 *
Staff or Faculty	0.238
Tenure (individual)	0.0845 *
Tenure (institution)	0.215
Union	0.972
Training Received	0.0357 **
Training Quality	0.814
Teaching Workload	0.11

* denotes $p < 0.1$ and ** denotes $p < 0.05$

Time Since Degree

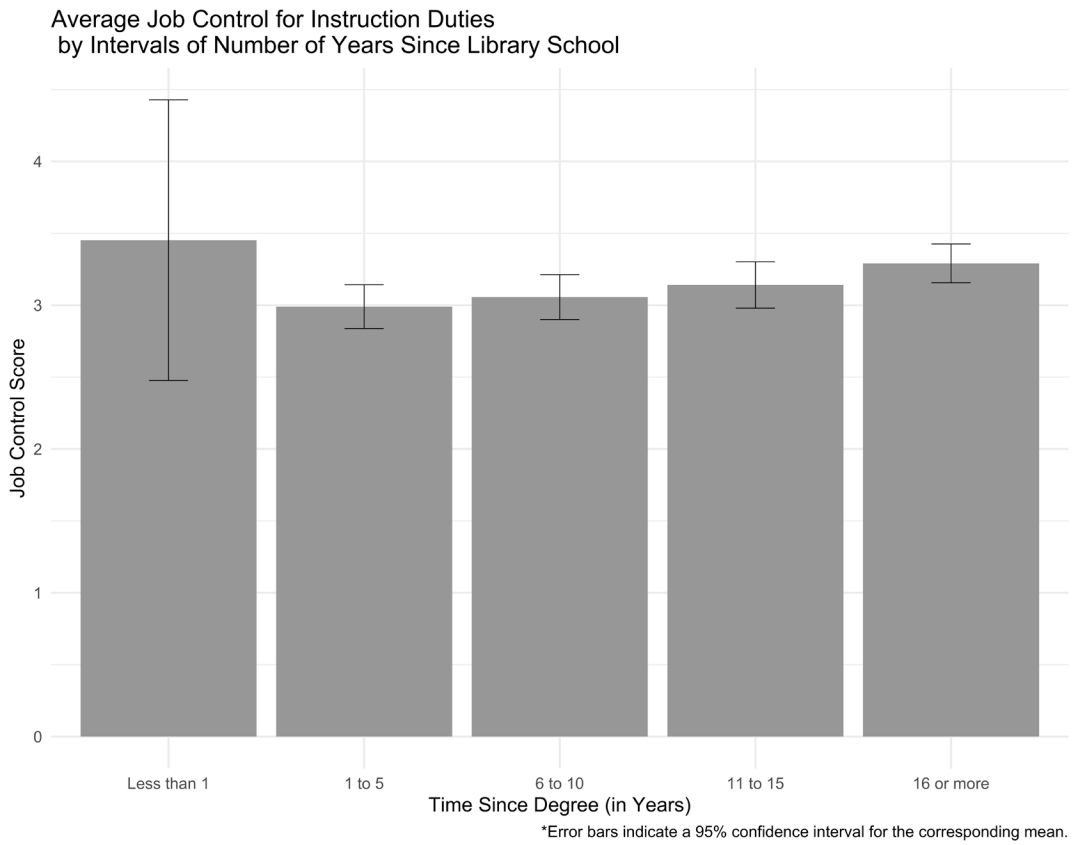
The ANOVA testing the effect of time since degree on job control for instruction suggests that the main effect is statistically significant and small ($F(4, 238) = 2.81$, $p = 0.026$; Eta2 = 0.05, 95% CI [2.91e-03, 1.00]). Post-hoc analysis using Tukey's HSD test revealed a significant difference between participants with 16 or more years since receiving their degree and participants with one to five years since receiving their degree ($p < 0.05$).

As demonstrated in Figure 7 and Table 4, job control for instruction generally increases over time, though the mean job control is highest for individuals who received their degrees less than a year ago, though the number of participants in that category is particularly low.

TABLE 4
Job Control for Instruction by Time Since Degree in Years

Time Since Degree (years)	N	Mean	Median	Std. Dev.	Min.	Max.
Less than 1	6	3.45	3.29	0.930	2.52	5
1 to 5	62	2.99	2.93	0.599	1.86	5
6 to 10	63	3.06	3.10	0.620	1.62	5
11 to 15	45	3.14	3.14	0.536	1.90	4.38
16 or more	67	3.29	3.29	0.553	2.19	4.43

FIGURE 7
Average Job Control for Instruction Duties by Intervals of Numbers of Years Since Library School



Training Received

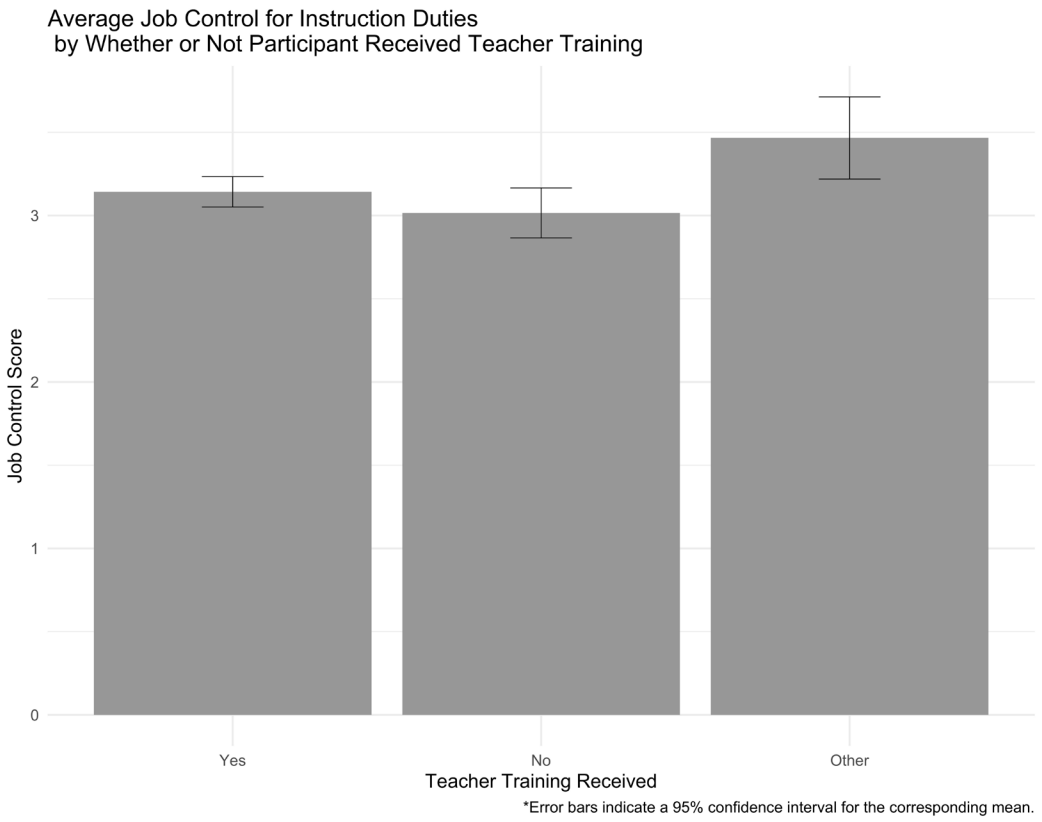
The ANOVA testing the effect of whether or not teacher training was received on job control for instruction suggests that the main effect is statistically significant and small ($F(2, 242) = 3.38$, $p = 0.036$; Eta2 = 0.03, 95% CI [9.70e-04, 1.00]). For this test, teacher training received was flattened to yes or no. Respondents had three yes options: "Yes, in library school and on the job," "Yes, only in library school," and "Yes, only on the job." The difference between these was not statistically significant, but the difference was statistically significant when comparing yes to no. Post-hoc analysis using Tukey's HSD test revealed a significant difference between respondents who received no teacher training and respondents who provided free text responses coded as "Other."

As demonstrated in Table 5 and Figure 8, mean job control for instruction is higher for those who have received training for library instruction than those who haven't; however, job

TABLE 5
Job Control for Instruction by Whether or Not Training Was Received

Training Received	N	Mean	Median	Std. Dev.	Min.	Max.
Yes	173	3.14	3.14	0.609	1.86	5
No	58	3.02	3	0.571	1.62	4.29
Other	14	3.47	3.40	0.427	2.71	4.10

FIGURE 8
Average Job Control for Instruction Duties by Whether or Not Participant Received Teacher Training



control for instruction is particularly high for those who responded "Other." Responses for other generally referenced teacher training that was not specific to libraries or not provided through a library program.

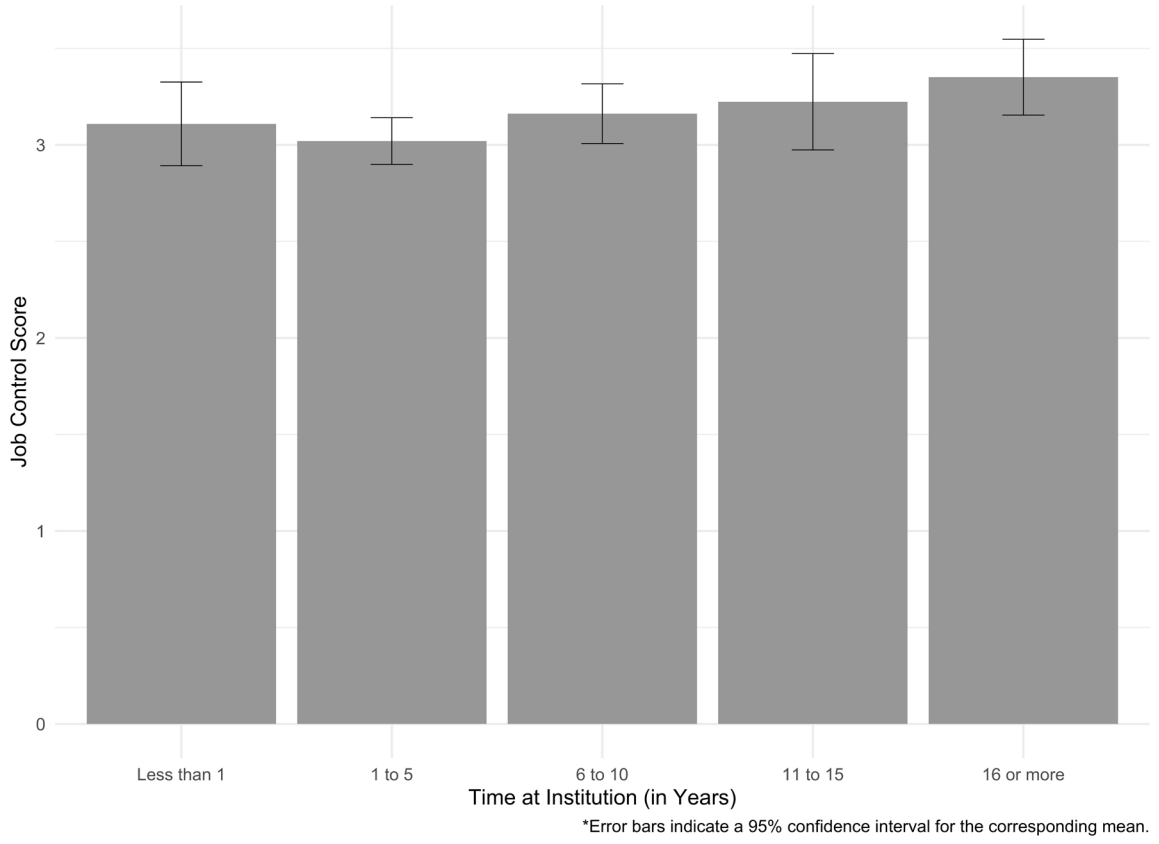
Time at Institution

The ANOVA testing the effect of time at institution on job control for instruction suggests that the main effect is statistically not significant and small ($F(4, 240) = 2.31$, $p = 0.058$; Eta2 = 0.04, 95% CI [0.00, 1.00]). The p value is less than 0.1, suggesting weak evidence that the difference in means is not due to random chance. Post-hoc analysis using Tukey's HSD test revealed that the difference between participants with 16 or more years since receiving their degree and participants with one to five years since receiving their degree is statistically significant ($p < 0.05$).

TABLE 6
Job Control for Instruction by Time at Institution in Years

Time at Institution (years)	N	Mean	Median	Std. Dev.	Min.	Max.
Less than 1	31	3.11	3.05	0.590	1.86	5
1 to 5	100	3.02	3.02	0.608	1.62	5
6 to 10	55	3.16	3.24	0.572	1.90	5
11 to 15	23	3.22	3.19	0.578	2.24	4.38
16 or more	36	3.35	3.40	0.580	2.19	4.29

FIGURE 9
Average Job Control for Instruction Duties by Intervals of Number of Years at Current Institution



As demonstrated in Figure 9 and Table 6, mean job control for instruction increases over time at an institution similarly to time since degree with the mean for those with less than one year at their institution slightly disrupting the trend.

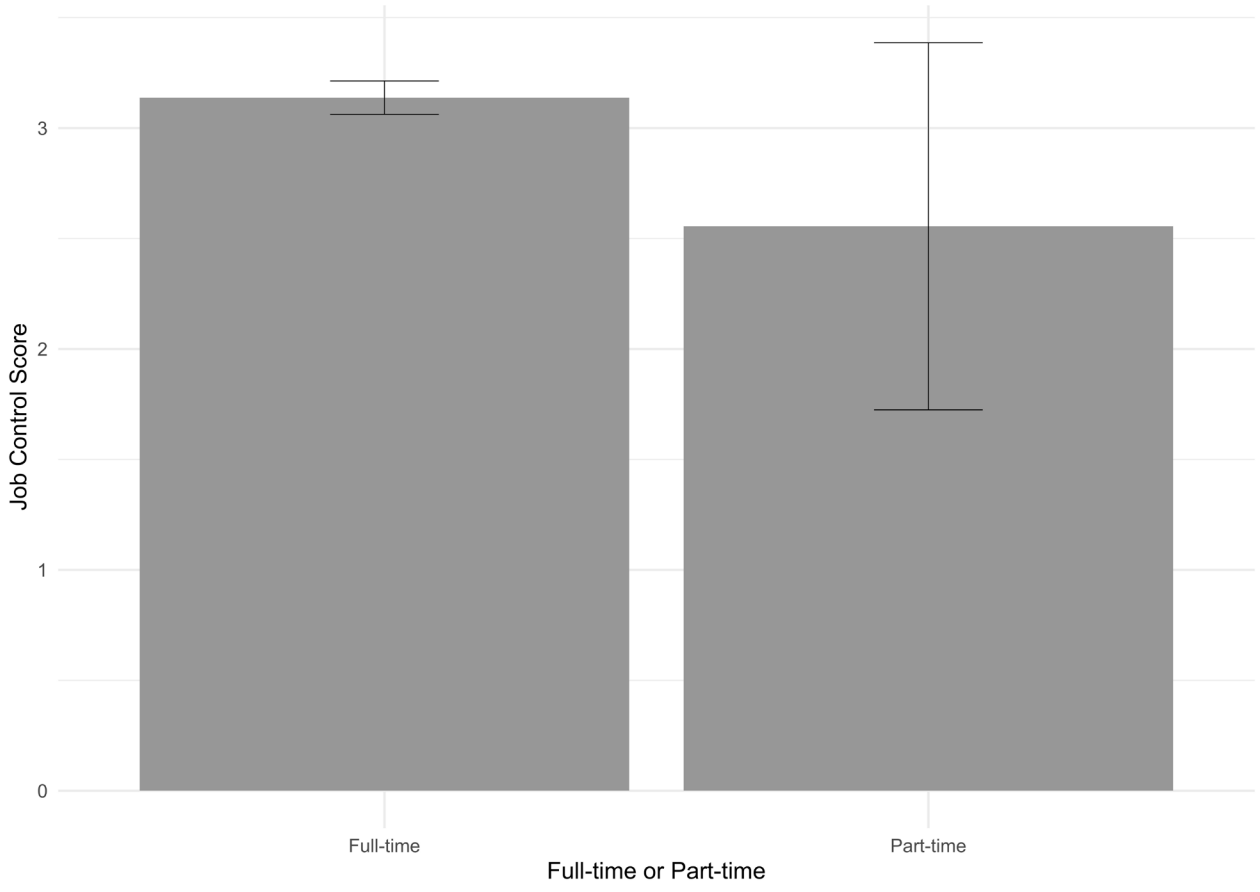
Full-time or Part-time

The ANOVA testing the effect of full-time or part-time status on job control for instruction suggests that the main effect is statistically not significant and small ($F(1, 243) = 2.84$, $p = 0.093$; Eta2 = 0.01, 95% CI [0.00, 1.00]). The p value is less than 0.1, suggesting weak evidence that the difference in means is not due to random chance. As demonstrated in Figure 10 and Table 7, the mean and median job control scores for librarians in full-time positions are greater than those in part-time positions. Additionally, the maximum job control among librarians in part-time positions is lower than the mean and median scores among librarians in full-time positions. However, the number of participants in part-time roles (n=3) is quite low, making it difficult to support solid conclusions.

TABLE 7
Job Control for Instruction by Full-time or Part-time Position

Full-time or Part-time	N	Mean	Median	Std. Dev.	Min.	Max.
Full-time	242	3.14	3.14	0.597	1.62	5
Part-time	3	2.56	2.52	0.334	2.24	2.90

FIGURE 10
Average Job Control for Instruction Duties by Full-time or Part-time Positions



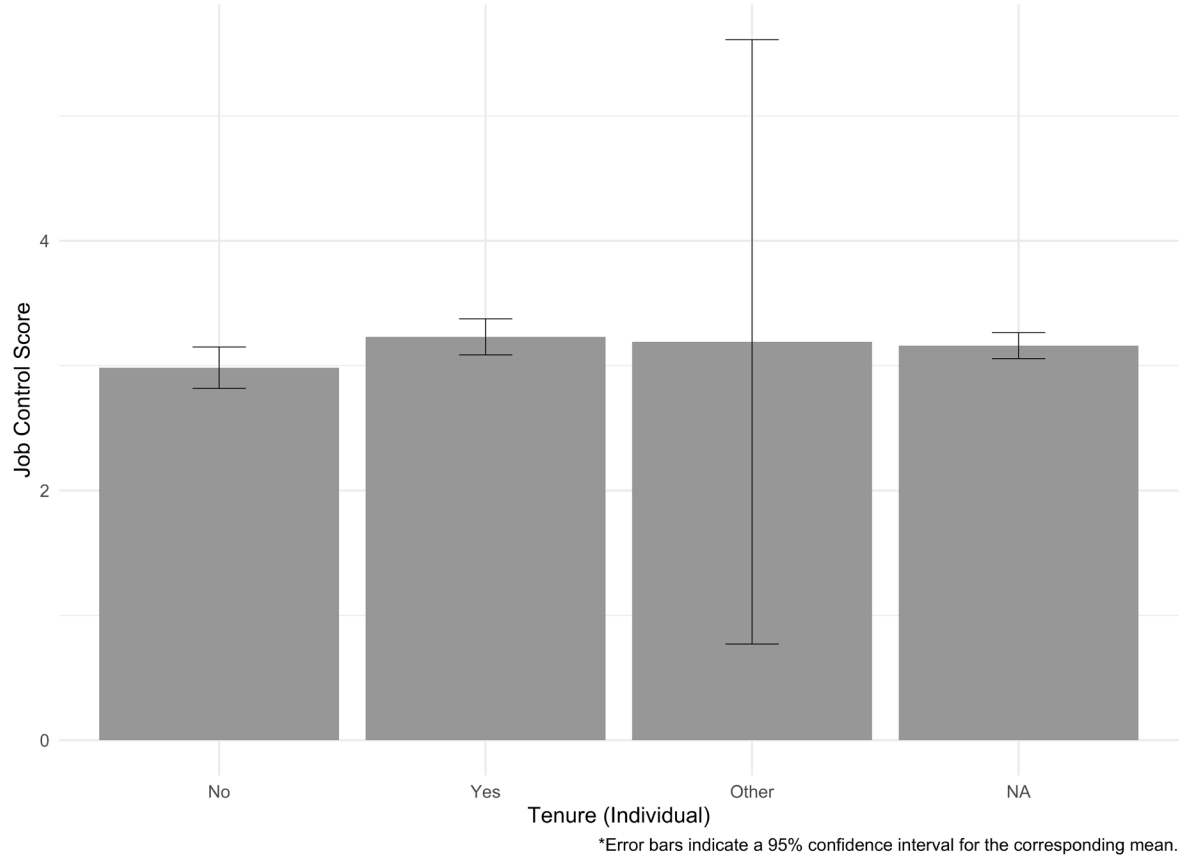
Tenure (Individual)

The ANOVA testing the effect of whether or not an individual has attained tenure at their institution suggests that the main effect is statistically not significant and small ($F(2, 117) = 2.52$, $p = 0.085$; Eta2 = 0.04, 95% CI [0.00, 1.00]). The p value is less than 0.1, suggesting weak evidence that the difference in means is not due to random chance. Post-hoc analysis using Tukey's HSD test revealed that the difference between participants with tenure and those without was statistically not significant ($p = 0.069$) but also suggests weak evidence. Tukey's HSD is also a conservative test, which might lend to a lack of probabilistic significance; however, as can be seen in Figure 11 and Table 8, average job control is lower for individuals without tenure than individuals with tenure. Additionally, "not applicable" here refers to individuals at institutions where it isn't possible to attain tenure. The question about an individual's tenure status was only presented if they responded that tenure was available to librarians at their institution. Among those without access to tenure, average job control is still higher than those with access to tenure but who have not yet attained the status.

TABLE 8
Job Control for Instruction by an Individual's Tenure Status

Tenure (Individual)	N	Mean	Median	Std. Dev.	Min.	Max.
No	63	2.98	2.86	0.657	1.86	5
Yes	55	3.23	3.24	0.534	2.24	4.38
Other	2	3.19	3.19	0.269	3	3.38
Not Applicable	125	3.16	3.19	0.588	1.62	5

FIGURE 11
Average Job Control for Instruction Duties by Participant's Individual Tenure Status



Income

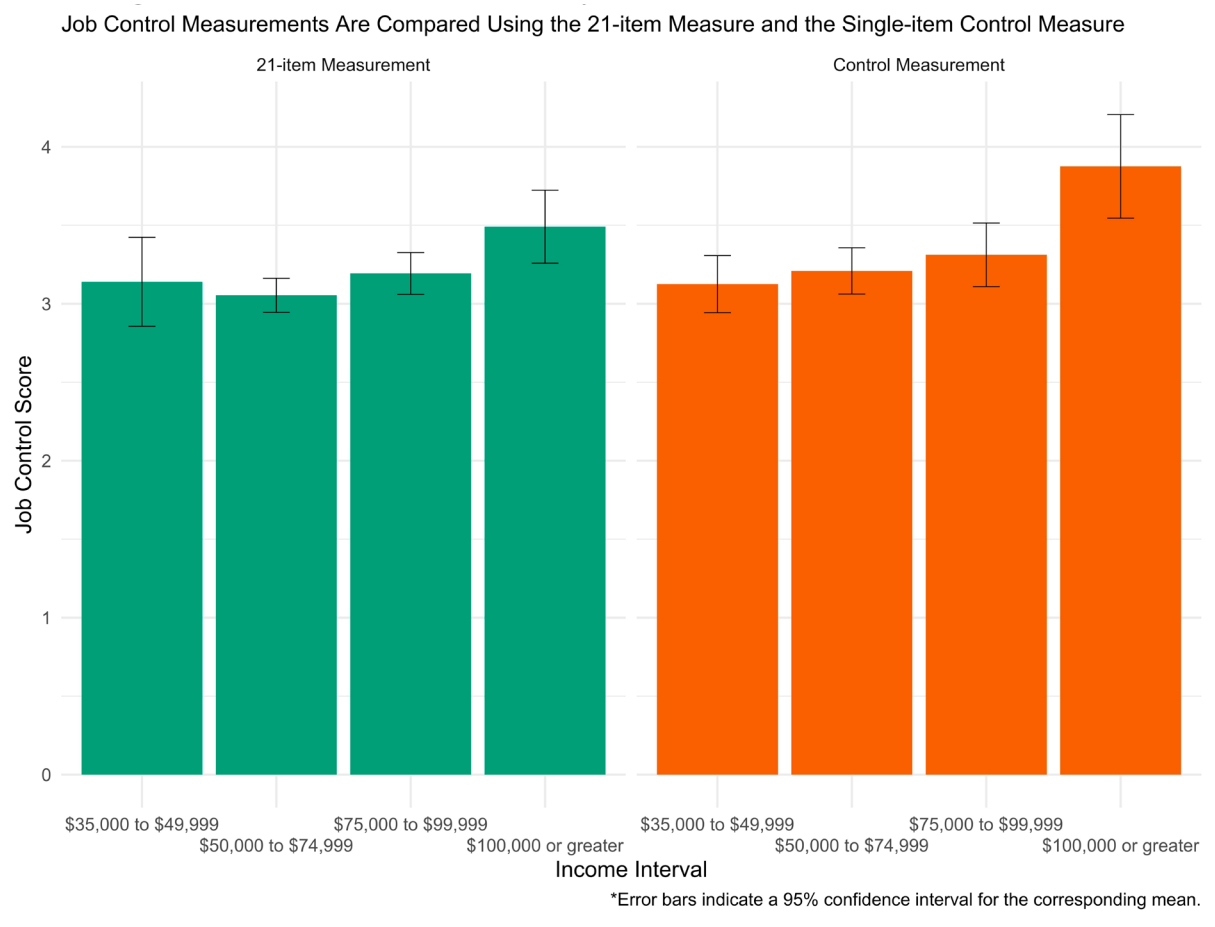
The ANOVA testing the effect of income suggests that the main effect is statistically not significant and small ($F(5, 239) = 1.85$, $p = 0.104$; Eta2 = 0.04, 95% CI [0.00, 1.00]). Since the p value was close to 0.1, which would suggest weak significance that the difference in means is not due to random chance, post-hoc analysis was conducted using Tukey's HSD. The post-hoc analysis revealed weak evidence of statistical significance ($p = 0.063$) when comparing participants with incomes from $50,000 to $74,999 to those with incomes of $100,000 or greater.

Additionally, income was the only value that becomes statistically significant when using the control test item on the job control scale rather than the averaged score. As mentioned above, the job control score is the average of the values for the first twenty-one items on the scale. The twenty-second item is a control for perception. The question is also measured us-

TABLE 9
Job Control for Instruction by Income with Comparison Between Methods of Measuring Job Control

Income	Measurement	N	Mean	Median	Std. Dev.	Min.	Max.
$20,000 to $34,999	Job Control Score	1	2.90	2.90	NA	2.90	2.90
$20,000 to $34,999	Perception Control Item	1	3	3	NA	3	3
$35,000 to $49,999	Job Control Score	16	3.14	3.14	0.532	2.29	4.14
$35,000 to $49,999	Perception Control Item	16	3.12	3	0.342	3	4
$50,000 to $74,999	Job Control Score	129	3.05	3.05	0.623	1.62	5
$50,000 to $74,999	Perception Control Item	129	3.21	3	0.845	1	5
$75,000 to $99,999	Job Control Score	77	3.19	3.14	0.586	1.95	5
$75,000 to $99,999	Perception Control Item	77	3.31	3	0.892	1	5
$100,000 or greater	Job Control Score	16	3.49	3.45	0.437	2.52	4.24
$100,000 or greater	Perception Control Item	16	3.88	4	0.619	3	5
Prefer not to disclose	Job Control Score	6	3.04	2.88	0.448	2.57	3.67
Prefer not to disclose	Perception Control Item	6	2.67	3	0.816	1	3

FIGURE 12
Average Job Control for Instruction Duties by Income Intervals



ing a likert scale (1 = very little; 2 = little; 3 = a moderate amount; 4 = much; 5 = very much) and asks: "In general, how much overall control do you have over work and work-related matters?"

The ANOVA testing the effect of income on the control item from the job control scale suggests that the main effect of Income is statistically significant and small (F(5, 239) = 2.66, p = 0.023; Eta2 = 0.05, 95% CI [3.97e-03, 1.00]). Post-hoc analysis revealed statistically significant differences between individuals with incomes in the range $50,000 to $74,999 and those with incomes of $100,000 or greater (p = 0.031) and between individuals who preferred not to disclose their incomes and those with incomes of $100,000 or greater (p = 0.029).

While some of the data are quite limited due to low numbers of participants in some of the income intervals, job control has a general upwards trajectory as income increases within the sample.

Teaching Workload

The ANOVA testing the effect of teaching workload suggests that the main effect is statistically not significant and small (F(4, 240) = 1.90, p = 0.110; Eta2 = 0.03, 95% CI [0.00, 1.00]). Data related to teaching workload are included because it's interesting that teaching workload was statistically significant when considering job control generally in Johnson (2023); however, it is not statistically significant when considering job control for instruction which is presumably more directly related. Similarly, post-hoc analysis was conducted using Tukey's HSD. In Johnson (2023), the post-hoc analysis didn't reveal any statistically significant findings; however, the difference between participants with slightly light and slightly excessive workloads was near statistical significance (p = 0.056). For job control regarding instruction, the p value is even greater (p = 0.114). Regardless, the data are illustrated in Table 10 and Figure 13.

Status

The ANOVA testing the effect of status (faculty, academic staff, or staff) suggests that the main effect of status is statistically not significant and small (F(2, 242) = 1.45, p = 0.238; Eta2 = 0.01, 95% CI [0.00, 1.00]). Post-hoc analysis using Tukey's HSD revealed that the differences between staff and academic staff (p = 0.253) and between staff and faculty (p = 0.263) were not statistically significant. In Johnson (2023) these were significant for job control in general, so they're included here for comparison. Also, while the difference might not be statistically significant, average job control for instruction is still greater for academic staff and faculty than staff. Both academic staff and faculty also had a maximum score of 5 while the maximum score for staff was 4.10.

TABLE 10
Job Control for Instruction by Perception of Teaching Workload

Perception of Teaching Workload	N	Mean	Median	Std. Dev.	Min.	Max.
Far too light	17	3.18	3.24	0.797	1.95	5
Slightly light	60	3.23	3.19	0.670	1.62	5
Just right	90	3.15	3.17	0.537	1.86	4.43
Slightly excessive	68	2.98	3	0.521	1.67	4.43
Far too excessive	10	3.32	3.52	0.655	2.33	4.29

FIGURE 13
Average Job Control for Instruction Duties by Participant's Perception of Their Teaching Workload

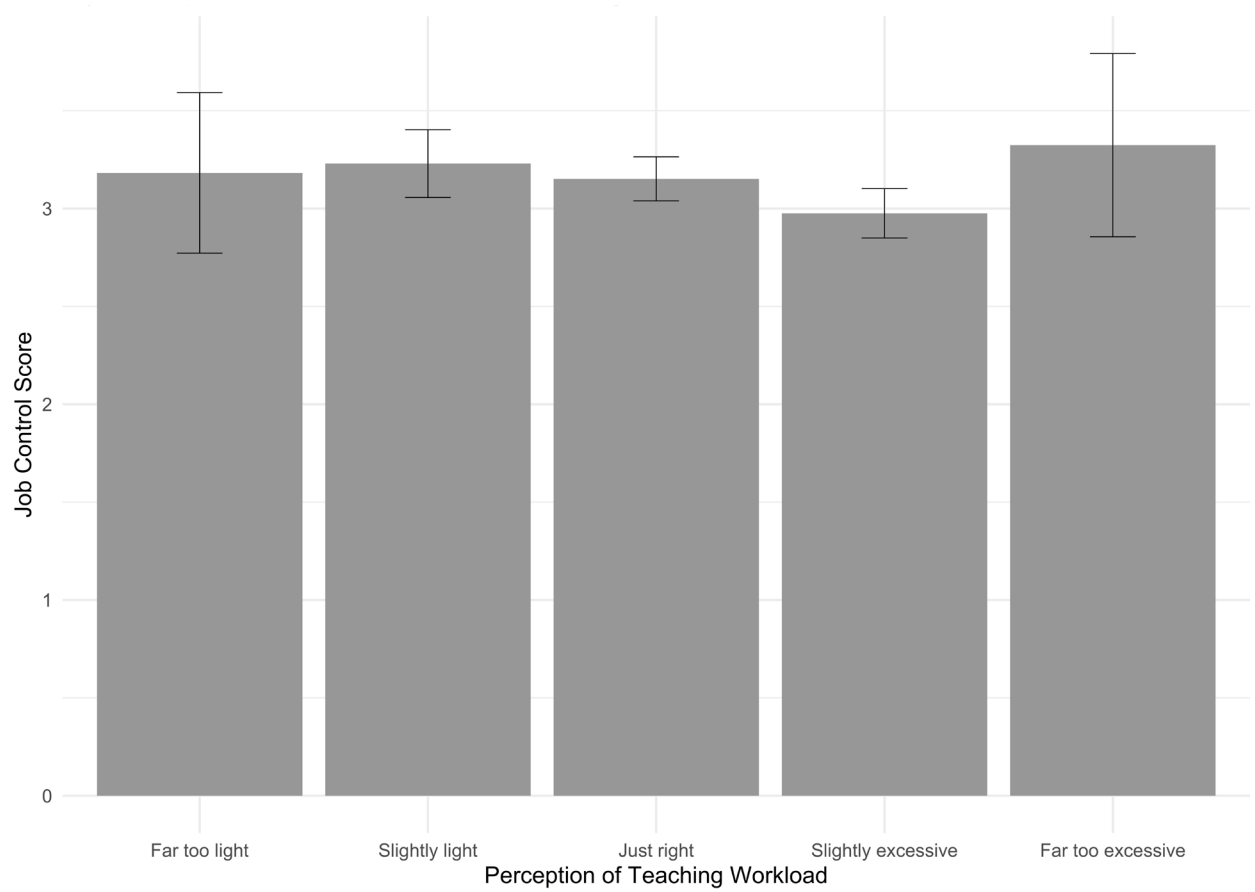


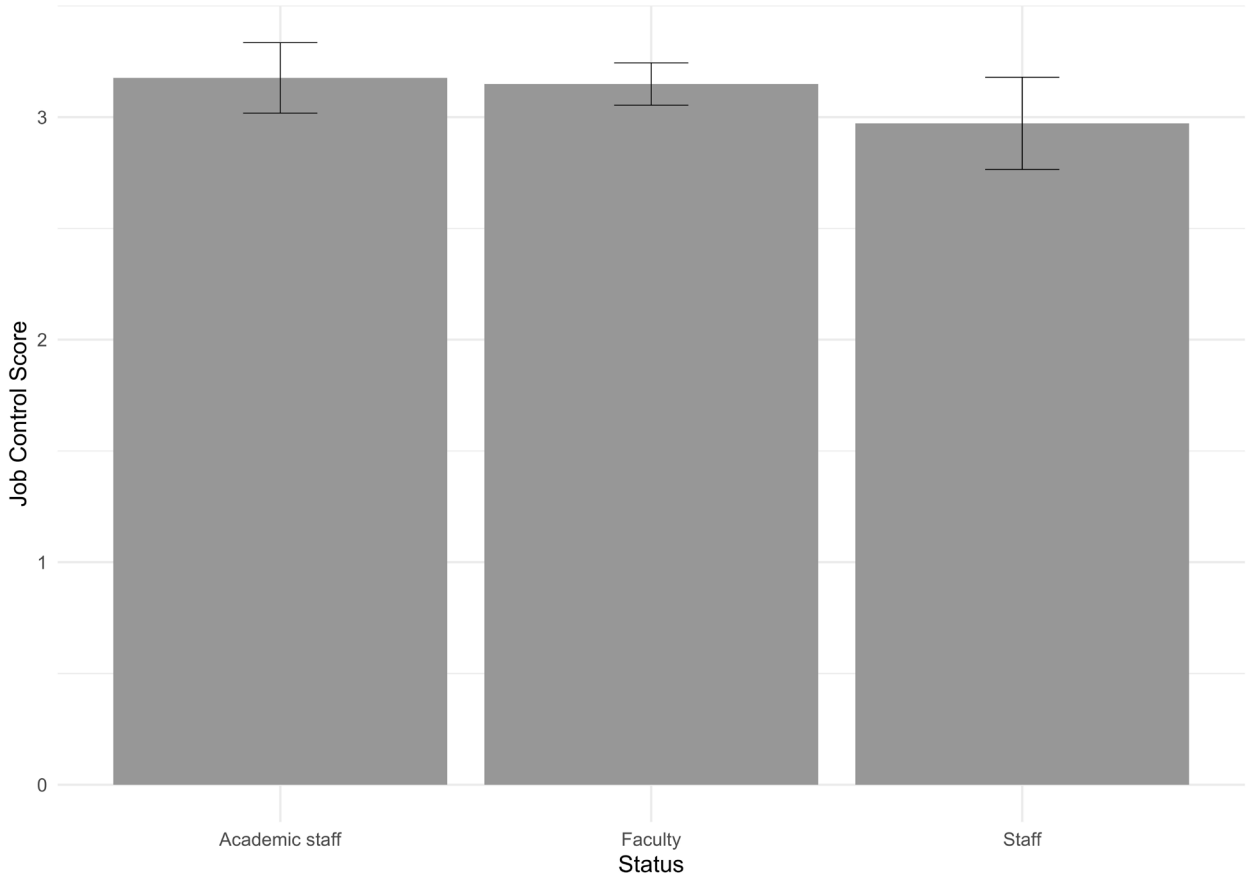
TABLE 11
Job Control for Instruction by Status

Status	N	Mean	Median	Std. Dev.	Min.	Max.
Staff	34	2.97	3	0.594	1.62	4.10
Academic Staff	58	3.18	3.07	0.602	1.95	5
Faculty	153	3.15	3.19	0.594	1.67	5

Discussion

This research continues the development of a body of knowledge related to job control among academic librarians, which began with Johnson (2023). That article demonstrates the inverse correlation between job control in general and burnout across three domains: personal, work-related, and client-related. The results presented here corroborate those findings regarding job control when doing instruction. Additionally, these results demonstrate that academic instruction librarians perceive their job control to be lower while completing their instructional tasks as compared to overall job control. This finding points to key issues with instructional work for librarians. The data also demonstrate existing statistically significant differences in average job control for academic instruction librarians based on their time since receiving

FIGURE 14
Average Job Control for Instruction Duties by Participant's Status



their degree and whether or not they received training for library instruction. While previous literature and the data presented here together provide a means for conjecture regarding this discrepancy in job control in general and when doing instruction, further research is needed to pinpoint key issues and identify productive remedies or solutions. Additionally, the linear regressions presented represent a predictive rather than causal relationship. Further experimental research would be required to demonstrate a causal relationship.

Implications for the Profession

Since job control may be a predictor of burnout, it's worthwhile to consider the factors that impact job control as a potential means for reducing burnout. Regardless of the relation to burnout, supporting librarian agency at work is important for empowering workers. While job control for librarians appears to be generally higher than in some other professions, the decrease in job control for academic instruction librarians when performing instructional duties warrants further consideration. Even among librarians who are not experiencing burnout, job control is still lower when completing instructional duties.

The issue of one-shot library instruction continues to be discussed at length within the field and could be one reason for reduced control when completing instructional responsibilities. However, further research is needed to identify exactly what aspects of library instruction contribute to reduced job control.

A participants' time since receiving their graduate degree and whether or not they received training to do library instruction were statistically significant ($p < 0.05$). Based on the data collected, perception of job control generally increases from those with less time since degree to those with more time. Participants with less than one year since receiving their degrees defy this trend by having higher job control on average in comparison to all other groups. This is possibly due to the lower number of responses in this category (n=6) or some protecting factor from newness in the field. However, it's possible that job control generally increases with experience in the field, though the lack of longitudinal data limits the ability to prove this effect. Nonetheless, the data do point to a need to support early career librarians as they establish their agency and build their perception of control particularly in the realm of library instruction. Regarding time since degree, it's interesting that Johnson's (2023) analysis of job control generally found that the length of time at their current institution, length of time since receiving their degree, and length of time they've been working in libraries were all not statistically significant. However, time since degree was statistically significant for job control when doing instruction. In that regard, the impact of time since degree (with job control increasing as time since degree increases) seems specific to library instruction, which may be related to gaining experience or learning more about how to do library instruction.

Similarly, whether or not training for library instruction was received did not have a statistically significant effect for job control in general but it does for job control with regard to instruction. This combination of the impact of time since receiving your degree and whether or not you received training to do library instruction may point to the value and impact of training, skill development, and experience on job control with regard to instruction. Building instructional skills may be important for increasing agency. In this regard in particular, it seems important that library schools continue to offer training related to library instruction and that academic libraries find ways to support their librarians' continued professional development related to instruction either through in-house programs, such as training or peer observation, or outside training, such as ACRL Immersion.

Limitations

The study sample is both a small percentage of the population being studied and a non-probabilistic, convenience sample, so the data are not generalizable and may include various biases due to the sampling and survey distribution methods. The survey questionnaire also employed the same job control scale twice, which could potentially effect responses in the second completion, though responses where a participant started the second scale but stopped (possibly because they thought it was duplicated in error) were removed for the analysis. Additionally, the linear regressions presented between burnout and job control may be used as a means of prediction but are not representative of a causal relationship, which is to say that limiting a worker's job control does not necessarily cause them to experience burnout. Similarly, the means testing conducted demonstrate statistically significant differences in means. This again doesn't imply that the factor studied causes a change in job control. There may also be significant nuance or confounding related factors which have led to the related difference in means. Further research is required to continue to build our understanding of job control as a phenomenon in academic librarianship.

Areas for Future Research

It may be illuminating to employ the job control scale as a pre- and post-test measurement of the efficacy of library instruction training programs to see how these programs contribute to changes in a librarian's perceived agency regarding library instruction. In addition to quantitative research using the job control inventory, additional qualitative research may demonstrate areas of additional consideration for improving job control. This study looked at some specific factors that were hypothesized to have an impact on job control; however, qualitative research may be more effective in revealing shared areas that impact job control for academic instruction librarians. Relatedly, this research looked very narrowly at academic instruction librarians and specifically considered the difference in job control when performing instruction. Further research could look at academic instruction librarians more broadly or consider differences in job control across other core responsibilities in librarianship.

Regarding instruction, further research could consider differences in job control across different types of instruction, such as one-shots, credit-bearing courses, or standalone workshops. In Johnson (2023), status and teaching workload were significant factors impacting job control generally; however, they were not significant for job control for instruction. It would be interesting to consider this further. In any of this future research, employing a randomized sampling technique would allow for the development of generalizable results across academic librarians.

Conclusion

Burnout is inversely correlated with both job control in general, and job control specifically regarding library instruction. As such, job control may be a predictor of burnout among academic instruction librarians. As we consider the characteristics of library instruction, we should consider how those characteristics impact librarian agency in teaching spaces and acts. In particular, librarians and library administrators should continue to consider the possible negative impacts on worker and organizational health as a result of our investment in the one-shot model as the primary means of instructional engagement for librarians. Further research should specifically consider the relationship between job control and one-shot lessons, and should possibly consider differences in job control when performing instruction via different modes and approaches.

For job control regarding instruction, training and experience may have specific impacts and should be pursued as a means to empower academic library instructors. Especially for librarians who are new to teaching, librarians may consider developing teacher training opportunities, such as building a community of practice, providing opportunities for peer observation or mentoring, creating a formal training program, workshop, or course, or encouraging participation in professional development activities such as ACRL Immersion.

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Appendix A: Survey

I've attempted to recreate the survey below. The information in brackets [] has been added to help explain the survey but didn't appear on the original survey.

[The first page of the survey was a consent form, which is not included here.]

Job Control (General)

The following set of questions seeks to measure your feelings of job control overall.
Read each question about job control on the left and choose a response from the columns to the right.

[The following five options were presented from left to right for each row: Very Little, Little, A moderate amount, Much, Very much. The questions are included in the appendix of Ganster (1989).]

Job Control (Instruction)

Please complete the set of questions again thinking specifically about the **instruction aspects** of your job.

> Please note: this is intentionally the same set of questions from the previous page.
> Please consider only the instruction aspects of your job as you answer them again.

Read each question about job control on the left and choose a response from the columns to the right.

[The questions were the same as above with the same response options.]

Burnout

The following questions are intended to measure your feeling of burnout.

[The questions are included in Kristensen et al., (2005) and used the response options provided below:

Questions 1-10 and 18-19 use the following scale:

- Always
- Often
- Sometimes
- Seldom
- Never-Almost Never

Questions 11-17 use the following scale:

- To a Very High Degree
- To a High Degree
- Somewhat

- To a Low Degree
- To a Very Low Degree]

Background and Demographic Information

The following questions will ask about different demographic information, your background, and your institution. This information will be used in survey data analysis in an attempt to determine some factors that might impact feelings of job control.

[The questions below were not numbered.]

1. What is your gender?
   - □ Agender
   - □ Genderqueer or gender fluid
   - □ Man
   - □ Nonbinary
   - □ Woman
   - □ Unsure
   - □ Prefer not to say
   - □ Identity not listed (please specify)

2. What is your gender modality? "Gender modality refers to how a person's gender identity stands in relation to their gender assigned at birth" (Ashley, 2022).
   - □ Cisgender
   - □ Transgender
   - □ Prefer not to disclose
   - □ Identity not listed (please specify)

3. What is your sexuality? Select all that apply.
   - □ Asexual
   - □ Bisexual
   - □ Gay
   - □ Lesbian
   - □ Pansexual
   - □ Queer
   - □ Straight
   - □ Prefer not to disclose
   - □ Identity not listed (please specify)

4. Are you disabled?
   - □ Yes
   - □ No
   - □ Prefer not to disclose
5. Which of the identities describe above have you disclosed at work or would you consider to be "out" at work? Select all that apply.
   - □ Gender
   - □ Gender modality

- □ Sexuality
- □ Disability
- □ None
- □ Not listed (please specify)

6. Please describe your race/ethnicity? Select all that apply.
   - □ African
   - □ African American/Black
   - □ East Asian (e.g., Chinese, Japanese, Korean, Mongolian, Tibetan, Taiwanese)
   - □ Hispanic or Latinx/Latine
   - □ Indigenous American, Native American, First Nations, or Alaska Native
   - □ Middle Eastern or North African (e.g., Lebanese, Iranian, Egyptian, Syrian, Moroccan, Algerian)
   - □ Pacific Islander (e.g., Native Hawaiian, Samoan, Chamorro, Tongan, Marshallese)
   - □ South Asian (e.g., Bangladeshi, Bhutanese, Indian, Nepali, Pakistani, Sri Lankan)
   - □ Southeast Asian (e.g., Burmese, Cambodian, Filipino, Hmong, Indonesian, Laotian, Malaysian, Mien, Singaporean, Thai, Vietnamese)
   - □ White
   - □ Prefer not to disclose
   - □ Not listed (please specify)

[Questions 7-9 were presented in a grid with the same set of response options.]

7. How long (in years) have you worked at your current institution?
   - □ Less than 1
   - □ 1-5
   - □ 6-10
   - □ 11-15
   - □ Greater than 15

8. How long (in years) have you been in a librarian position after receiving your degree (in library science or equivalent)
   - □ Less than 1
   - □ 1-5
   - □ 6-10
   - □ 11-15
   - □ Greater than 15

9. How long (in years) have you worked in libraries in any capacity?
   - □ Less than 1
   - □ 1-5
   - □ 6-10
   - □ 11-15
   - □ Greater than 15

10. Which of the following best describes the type of institution where you work?

- □ Doctoral university
- □ Master's college or university
- □ Baccalaureate college
- □ Associate's college
- □ Not listed (please specify)

11. Which of the following best describes the institution where you work?
- □ Public
- □ Private, non-profit
- □ Private, for-profit
- □ Other (please specify)

12. Which of the following best describes your current position?
- □ Permanent, full time
- □ Permanent, part time
- □ Temporary, full time
- □ Temporary, part time

13. What is your annual salary or income (before taxes, etc.) in US Dollars?
- □ Less than $20,000
- □ $20,000 to $34,999
- □ $35,000 to $49,999
- □ $50,000 to $74,999
- □ $75,000 to $99,999
- □ $100,000 or greater
- □ Prefer not to disclose

14. Which of the following best describes your employment status at your current institution?
- □ Faculty, tenure-track
- □ Faculty, non-tenure-track
- □ Academic staff
- □ Staff
- □ Not listed (please specify)

15. Are librarians at your institution eligible for tenure or an equivalent status?
- □ Yes, tenure
- □ Yes, similar status
- □ No
- □ Not listed (please specify)

16. [If either yes option in question 15 was selected:] Have you obtained tenure or its equivalent at your institution?
- □ Yes, I am tenured
- □ Yes, I have attained an equivalent status

□ No
□ Not listed (please specify)

17. Are you represented by a union?
□ Yes
□ No
□ In the process of unionizing
□ Unsure
□ Not listed (please specify)

18. Have you received formal training in library school or on the job specifically intended to prepare you to teach?
□ Yes, in library school and on the job
□ Yes, only in library school
□ Yes, only on the job
□ No
□ Not listed (please specify)

19. [If any of the yes options in Question 18 were selected:] Do you believe this training adequately prepared you for teaching?
□ Highly
□ Somewhat
□ Not at all

20. Which of the following best describes your teaching workload?
□ Far too light
□ Slightly light
□ Just right
□ Slightly excessive
□ Far too excessive

21. The second phase of this study will involve follow-up interviews over Zoom. Are you willing to be contacted about a follow-up interview opportunity?
□ Yes
□ No

[If yes is selected in Question 21:] In order to further explore factors and structures that contribute to feelings of job control of lack of job control, a second phase of this study will include in-depth interviews with survey participants who experience significantly high or significantly low job control. Interview participants are expected to be compensated for their time, which will be approximately 60 minutes. Please note that if you agree to be considered for a follow-up interview and provide your email address below, your responses will no longer be anonymous; however, your responses will still be confidential. Your responses will be used to inform inclusion criteria for the in-depth interviews and to inform the design of the interview protocol. Please be aware that it may be up to a year before you are contacted for an interview.

Please provide your email address below:

Health Sciences and Beyond: An Investigation into Canadian Librarian Participation in Systematic Reviews Across Disciplines

Catherine Boden, Susan Bolton, and Angie Gerrard

The aim of this survey was to describe academic librarian roles in systematic reviews (SR) in any discipline, as a follow-up to a previous survey of Canadian academic health sciences librarians. A convenience sample of librarians at Canadian universities who support SRs were invited to complete a survey. Respondents were asked about their roles, training, knowledge, and barriers to providing SR services. Ninety-four librarians responded to the survey. The most common roles were in the literature search; time and training were the most frequently reported barriers. Librarians are supporting reviews in multiple, diverse disciplines, primarily as expert searchers.

Introduction

Systematic reviews aim to synthesize scientific literature in a rigorous, transparent, and unbiased manner. With a history in the health sciences and the Evidence Based Medicine movement, systematic review methods were developed to answer questions about the effectiveness of health interventions (Djulbegovic and Guyatt 2017). Systematic review methods have since been adapted and adopted to other types of questions and disciplines, respectively. This has led to a proliferation of review types whose methods are derived from systematic reviews, such as scoping reviews (Arksey and O'Malley 2005; Colquhoun et al. 2014), realist reviews (Pawson et al. 2005), and rapid reviews (Khangura et al. 2012). At the core of all these review types (hereafter referred to collectively as 'synthesis reviews') is a comprehensive search for which librarian expertise is ideally suited. In fact, funding bodies (e.g., Canadian Institutes of Health Research 2010) and handbooks (Higgins et al. 2022) recommend the inclusion of librarians on systematic reviews.

Health sciences libraries have provided support for systematic reviews, and subsequently, other related review types (e.g., scoping reviews), for many decades. The librarian's role has traditionally been guiding researchers in formulating a searchable research question and developing the search (i.e., selecting databases, developing the search strategy, managing references), but librarians can also engage in other roles, such as peer reviewing review articles (Beverley

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et al. 2003; Spencer and Eldredge 2018) or supporting reviewers. Supporting reviewers can entail reference or consultations, instruction or training, and/or collaboration. These services are referred to using various terminology, including systematic review services, synthesis review services, and knowledge synthesis services. More recently, synthesis reviews have been conducted by researchers in disciplines beyond the health sciences, and library services are beginning to follow suit (Kallaher et al. 2020). The present study is an update of a previous survey describing Canadian university health sciences librarian roles in systematic reviews (Murphy and Boden 2015) but aiming to be inclusive of disciplines beyond the health sciences.

Literature Review

While librarians are traditionally relied upon for their expertise in the literature search, the variety of roles that librarians can play has expanded beyond that of just expert searcher. In 2003, Beverley et al. outlined ten potential roles for librarians in the systematic review process ranging from project leader to literature searcher to disseminator. Subsequent studies have also delineated the various responsibilities librarians contribute to synthesis reviews (Dudden and Protzko 2011; Spencer and Eldredge 2018).

Systematic reviews and other types of rigorous reviews are now being conducted in disciplines beyond the health sciences (Brereton et al. 2007; Kallaher et al. 2020; Miljand 2020; Premji et al. 2022; Riegelman and Kocher 2018; Slebodnik et al. 2018). In response, libraries have expanded their services to meet these needs (Kallaher et al. 2020; Riegelman and Kocher 2018). As the demands for systematic review services have continued to increase, more Canadian libraries have formalized services (McKeown and Ross-White 2019), and researchers across Canada from disciplines beyond the health sciences are now seeking systematic review support. This flourishing of synthesis review services in libraries is challenging the sustainability of the service and demanding innovative ways of reimagining how these services should be offered (Luca and Ulyannikova 2020).

Not only have librarians' roles and the disciplines they support expanded, but there have also been recent developments in health sciences systematic review methods. Significant updates were made to the *Cochrane Handbook for Systematic Reviews of Interventions* in 2019 (Higgins et al. 2022) and an extension to the PRISMA statement for reporting literature searches in systematic reviews has been published (Rethlefsen et al. 2021). In the field of conservation and environmental management, the Reporting Standards for Systematic Evidence Syntheses (ROSES) were published in 2018 (Haddaway et al.). Further, in 2019, the Campbell Collaboration MECCIR Conduct and Reporting Standards were updated (The Methods Coordinating Group of the Campbell Collaboration; The Methods Group of the Campbell Collaboration). There has also been a proliferation of new systematic review types and typologies in a variety of disciplines (Munn et al. 2018; Sutton et al. 2019).

Thus, the environment in which librarians are providing systematic review services has been evolving. In spring 2014, a benchmarking survey focusing on Canadian university health sciences librarians was conducted on the roles of librarians in systematic reviews and barriers and facilitators to librarian engagement (Murphy and Boden 2015). Roles were examined based on Beverly et al. (2003). Similar to the recent findings of Schvaneveldt and Stellrecht (2021), the 2014 survey suggested that university health sciences librarians engaged primarily in roles related to the literature search stage of a systematic review and to dissemination (Murphy and Boden 2015). There were relatively few reports of library policies or guidelines

on the systematic review services; and time and training were the most common barriers at that time.

The authors felt it was an ideal time to repeat the 2014 survey to: (1) understand how the landscape has changed, and what has remained unchanged, in the past eight years; (2) provide evidence-based information about the current state of involvement of librarians working at Canadian universities in systematic reviews in all disciplines; (3) identify other review types that are also being supported; and (4) describe barriers that need to be addressed.

Methodology

A short (about fifteen minute) online questionnaire with multiple choice, Likert, and dichotomous (yes/no) questions was created and distributed using Survey Monkey software (https://www.surveymonkey.com) (Appendix A). As this was an update of a previous benchmarking study (Murphy and Boden 2015), the questionnaire replicated the original with only minor modifications to align with the expansion of the target population. As previously, the questions addressed the level and nature of librarian support to faculty, students, and administrators conducting systematic reviews, based on librarian roles in systematic reviews identified by Beverly et al. (2003). There were questions about the current state of librarian knowledge and training needs, as well as barriers to providing systematic review services. Information about librarian participation in other kinds of knowledge syntheses was also gathered. Given the growth in requests for systematic review services beyond health sciences disciplines (Kallaher et al. 2020) since the original benchmarking study, the inclusion criteria for participation were expanded to include librarians from any discipline. Therefore, a question was added about the disciplines for which the librarian provides systematic review services to understand the diversity of disciplines and, possibly, any unique characteristics or barriers to the provision of systematic review services in different disciplines. The survey was distributed in English and French, the two official languages in Canada.

A convenience sample of librarians working at Canadian universities who had participated in a systematic review in the twelve months prior to the survey were recruited to participate in the study. Non-librarians, and librarians working at an institution other than a university, working outside Canada, or who had not participated in a systematic review within twelve months of the date of the questionnaire were not eligible to participate. The invitation to participate and a link to the online questionnaire was distributed by email to academic librarians across Canada via librarian listservs for the following associations: Canadian Health Libraries Association; the Association of Faculties of Medicine of Canada; Canadian Association of Professional Academic Librarians; Association of College and Research Libraries: Education and Behavioral Sciences Section, Evidence Synthesis Methods Interest Group, University Libraries Section; and the Medical Library Association. The email invitation also encouraged recipients to forward the invitation to other colleagues who may be eligible to participate in the study but were not subscribed to one of the listservs. The survey was distributed on April 18, 2022. Respondents had three weeks to complete the survey, and reminders were sent out two weeks, one week, and one day prior to questionnaire closure.

According to the 2018 Census of Canadian Academic Libraries (Canadian Association of Professional Academic Librarians CAPAL Advocacy Committee 2019) there were 777 librarians working at universities in Canada. Of those, 54 percent offered reference services and might, therefore, provide systematic review support. Based on these values, the population

of interest was estimated to be approximately 419 librarians. A power calculation indicated that 201 participants were needed to achieve a margin of error of 5 percent and a confidence level of 95 percent. This is likely an over-estimate of the target population as not all reference librarians provide systematic review support services. The study received approval from the University of Saskatchewan Behavioural Research Ethics Board on March 3, 2022.

Data were analyzed by calculating descriptive statistics using SPSS software (version 28.0.1.0), and tabulating short answer questions where an 'Other, please specify' option was given. To understand any unique characteristics or barriers to the provision of systematic reviews services in different disciplines, respondents were grouped into three broad categories: specifically those that exclusively support health sciences disciplines; exclusively support non-health sciences disciplines; and support a mix of health sciences and non-health sciences disciplines. This categorization was based on a multiple-choice question about the academic disciplines supported by the respondent. The disciplines listed in the survey question were identified by an environmental scan of disciplines listed on Canadian university websites, followed by a process of combining like but differently named disciplines. As this was a comparison to a previous study about university health sciences librarians (Murphy and Boden 2015), categories for this study were based on whether or not health sciences disciplines were being supported, recognizing that other labels or categorization schemes were possible. See Table 1 for the definitions of health sciences and non-health sciences categories and disciplines. If a respondent indicated supporting one or more of the health sciences disciplines and one or more non-health sciences disciplines, the respondent was considered to be supporting "mixed" disciplines. The categories were used specifically in analyzing (1) the librarian roles in systematic reviews during consultation, instruction, and collaboration, and (2) the challenges or barriers to participation in systematic reviews.

TABLE 1
Definitions of Health Sciences and Non-Health Sciences Categories and the Health Sciences and Non-Health Sciences Disciplines in Each Category

Discipline Category	Discipline	Frequency of Response
Health Sciences*		
	Biomedical/Life Sciences	18
	Community Health & Epidemiology	17
	Dentistry	7
	Kinesiology	19
	Medicine	36
	Midwifery	2
	Neuroscience	7
	Nursing	29
	Nutrition	8
	Pharmacy	7
	Rehabilitation Sciences	20
	Public Health	28
	Veterinary Medicine, Animal Science, Zoology	6

TABLE 1
Definitions of Health Sciences and Non-Health Sciences Categories and the Health Sciences and Non-Health Sciences Disciplines in Each Category

Discipline Category	Discipline	Frequency of Response
	Other: Applied Disability Studies	1
	Other: General Health Sciences	1
	Other: Health Information Science/Health Informatics	1
	Other: Occupational Health	1
	Other: Optometry	1
	Other: Psychiatry	2
Non-Health Sciences**		
	Agriculture, Bioresources, Soil Science	2
	Biology, Botany, Plant Science	4
	Business, Commerce, Management	7
	Chemistry	0
	Computer Science	3
	Education	8
	Engineering	7
	Environment & Sustainability	3
	Forestry	0
	Geography & Planning, Community & Regional Planning	1
	Geology, Earth Sciences, Ocean Science	0
	Indigenous Studies	5
	Land and Food Systems	2
	Physics, Astronomy, Astrophysics, Atmospheric Science	0
	Psychology	24
	Political Studies, Public Policy	2
	Sociology, Social Work	10
	Toxicology	0
	Other: Communication	1
	Other: History of Medicine	1
	Other: Music	1

N.B. One respondent indicated support for all disciplines, so was coded as providing support for 'Mixed' disciplines.
* If a respondent indicated supporting exclusively health sciences disciplines listed below, the respondent was coded as providing support for the "health sciences" discipline.
** If a respondent indicated supporting only one or more of the non-health sciences disciplines listed below, the respondent was coded as providing support for "non-health sciences" disciplines

Results

There were 126 individuals who chose to participate in the survey. Of those, 107 were eligible to participate but only ninety-four completed questions beyond the two initial inclusion questions. Of the ninety-four respondents, three provided minimal data (two answered the last four questions of the survey; one answered only the questions about policy and other review

types). Thus, there was relatively complete data from ninety-one respondents and very limited data from an additional three.

The majority of respondents reported working as librarians for ten years or more (0-3 years, n = 9; 4-6 years, n = 11, 7-9 years, n = 16; 10 or more years, n = 55). This pattern of more experienced librarians responding to the survey was consistent across the disciplines (Health Sciences, Non-Health Sciences, Mixed).

Of the ninety-one respondents who indicated the discipline(s) to which they provide systematic review support, forty-one (45 percent) supported health sciences disciplines exclusively, seventeen (19 percent) supported disciplines other than health sciences, and thirty-three (36 percent) supported a mix of health sciences and non-health sciences disciplines (see Table 1). The top five most frequently reported health sciences disciplines were: public health (n = 38), medicine (n = 36), nursing (n = 29), rehabilitation sciences (n = 20) and kinesiology (n = 19). For the non-health sciences disciplines, the five most frequent disciplines were mostly in the social sciences: psychology (n = 24), sociology, social work (n = 10), education (n = 8), business/commerce/management (n = 7), and engineering (n = 7).

Of the sixty-eight respondents who reported their job title using the list provided in the survey, Liaison Librarian (n = 46) was the most frequently selected; Reference Librarian (n = 8), Public Services Librarian (n = 6), Subject Librarian (n = 5), Branch Head (n = 3), and Knowledge Synthesis Librarian (n = 1) were the least frequently reported job titles from the list. The 'Other' responses (n = 22) were grouped into five broad categories (see supplemental material for more detail): Teaching and Learning (functional) (n = 6), Research Support Services (functional) (n = 5), Mixed/Cross-category roles (n = 5), Librarian (unspecified) (n = 3), and Health Sciences (specifically specified) (n = 3). One 'Other' response was re-coded to 'Liaison Librarian.'

Roles on Systematic Reviews

Ninety-one respondents indicated engagement within the past twelve months in one or more of the librarian roles identified by Beverly et al. (2003) when providing reference/research assistance, formal instruction, or as a member of a review team (or collaborator).

Respondents who provide systematic review reference or research assistance, reported assistance more frequently in the more traditional librarian roles of search strategy development (n = 73, 80 percent), database selection (n = 73, 80 percent), research question formulation (n = 67, 74 percent), reference management (n = 62, 68 percent), and document supplier (n = 45, 49 percent). Respondents reported providing research or reference assistance less frequently in the less traditional roles of critical appraiser (n = 24, 26 percent), report writer (n = 17, 18 percent), data extractor (n = 15, 16 percent), project leader (n = 14, 15 percent), project manager (n = 12, 13 percent), disseminator (n = 12, 13 percent), and data synthesizer (n = 9, 10 percent). Two respondents reported engaging in all systematic review roles when providing reference or consultation services.

Respondents reported providing instruction in the more traditional librarian roles of search strategy development (n = 61, 67 percent), database selection (n = 59, 65 percent), research question formulation (n = 55, 60 percent), reference management (n = 45, 49 percent), and document supplier (n = 32, 35 percent). For less traditional librarian roles, respondents reported providing instruction as critical appraiser (n = 16, 18 percent), report writer (n = 15, 18 percent), data extractor (n = 13, 14 percent), data synthesizer (n = 8, 9 percent), dissemina-

tor (n = 8, 9 percent), project manager (n = 4, 4 percent), and project leader (n = 2, 2 percent). One respondent reported engaging all systematic reviews roles.

When asked about membership on a systematic review team (collaboration), respondents reported participation primarily in the more traditional librarian roles of search strategy development (n = 66, 73 percent), database selection (n = 64, 70 percent), reference management (n = 55, 60 percent), research question formulation (n = 51, 56 percent), and document supplier (n = 35, 38 percent). Report writer, a non-traditional librarian role, was also frequently reported (n = 46, 51 percent). Participation in other non-traditional librarian roles were reported less frequently: disseminator (n = 7, 8 percent), project leader (n = 5, 5 percent), project manager (n = 4, 4 percent), data extractor (n = 4, 4 percent), critical appraiser (n = 3, 3 percent), and data synthesizer (n = 2, 2 percent). One respondent reported engaging in all roles as a member of a research team.

Comparison of these frequencies by discipline groups (Health Sciences, Non-Health Sciences, Mixed) followed similar patterns as the overall responses. Figure 1 provides a breakdown of the engagement in the Beverly et al. (2003) roles according to discipline (health sciences, non-health sciences, mixed) for the three types of service (reference/research assistance, formal instruction, member of the review team).

Knowledge and Training

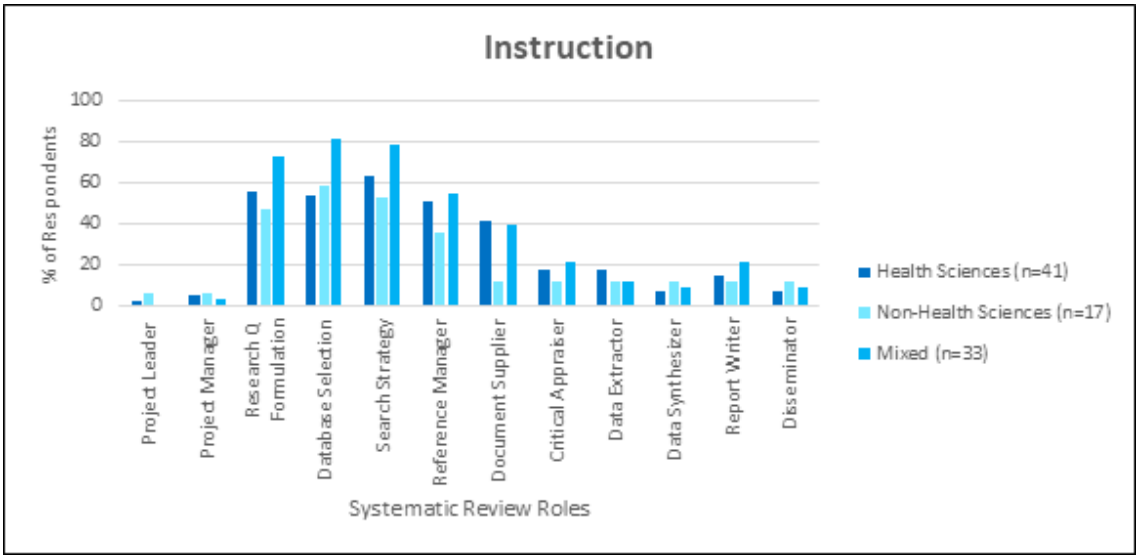
Respondents were asked to rank their level of training in, and knowledge of, a variety of systematic review activities and roles, using the scale of 0-3, where zero equals 'none,' one indicates 'some,' two equals 'pretty good,' three indicates 'extensive.' Respondents were also able to select 'Not applicable.'

Of the eighty-nine responses to this question, most ranked their level of knowledge as 'pretty good' or 'extensive' (combined) in the more traditional librarian systematic review activities of selecting appropriate databases and grey literature sources (n = 85, 96 percent), translating the search strategy (n = 84, 94 percent), documenting the search (n = 80, 90 percent), managing citations (n = 80, 90 percent), and formulating the research question (n = 73, 82 percent). Alternatively, respondents most often ranked their level of knowledge as 'none' to 'some' (combined) in less traditional librarian systematic review roles of conducting a meta-analysis (n = 79, 89 percent), conducting a risk of bias analysis (n = 74, 83 percent), extracting data from studies (n = 67, 75 percent), and selecting articles (n = 46, 52 percent). There were also five 'Not applicable' responses for the four less traditional roles.

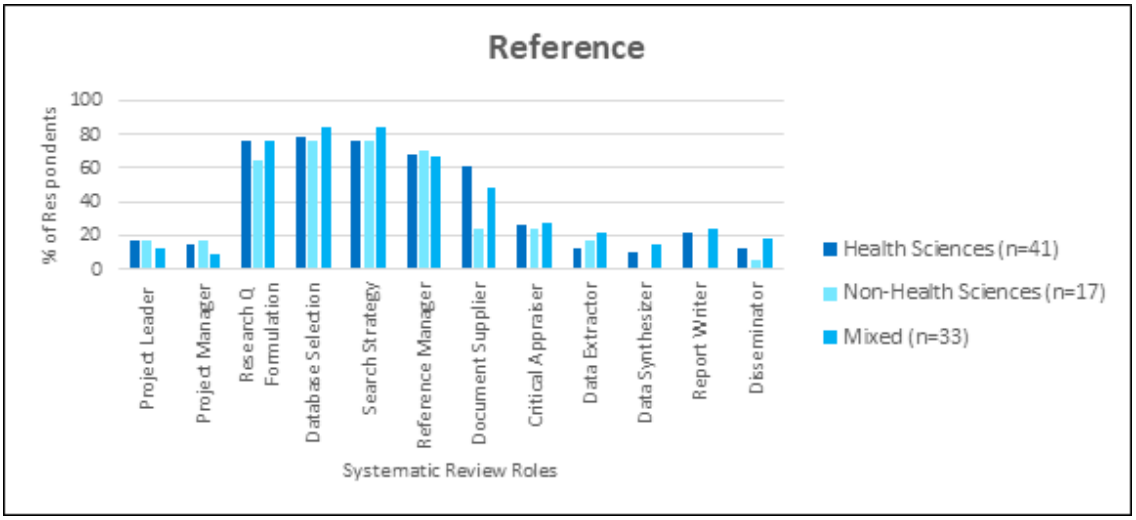
The responses to librarian levels of training for specific systematic review roles are consistent with the patterns noted above, where respondents reported 'pretty good' or 'extensive' (combined) training levels in areas that are typically within librarian purview when participating in systematic review activities. Specifically, of the eighty-nine responses, most reported adequate training to select appropriate databases and grey literature sources (n = 76, 85 percent), translate a search strategy (n = 76, 85 percent), document a search (n = 68, 76 percent), formulate a research question (n = 62, 70 percent), and manage citations (n = 61, 68 percent). Respondents however noted their level of training as 'none' to 'some' (combined) in the following systematic review roles: conducting a meta-analysis (n = 82, 92 percent), conducting a risk of bias analysis (n = 78, 88 percent), extracting data from studies (n = 74, 83 percent), and selecting articles (n = 58, 65 percent). Six respondents indicated these 'less traditional' roles were not applicable.

FIGURE 1
The percentage of respondents supporting health sciences (n = 41), non-health sciences (n = 17) and mixed (n = 38) disciplines who engage in systematic review roles of a systematic review when A. providing instruction, B. providing reference, and C. acting as a team member (collaborator)

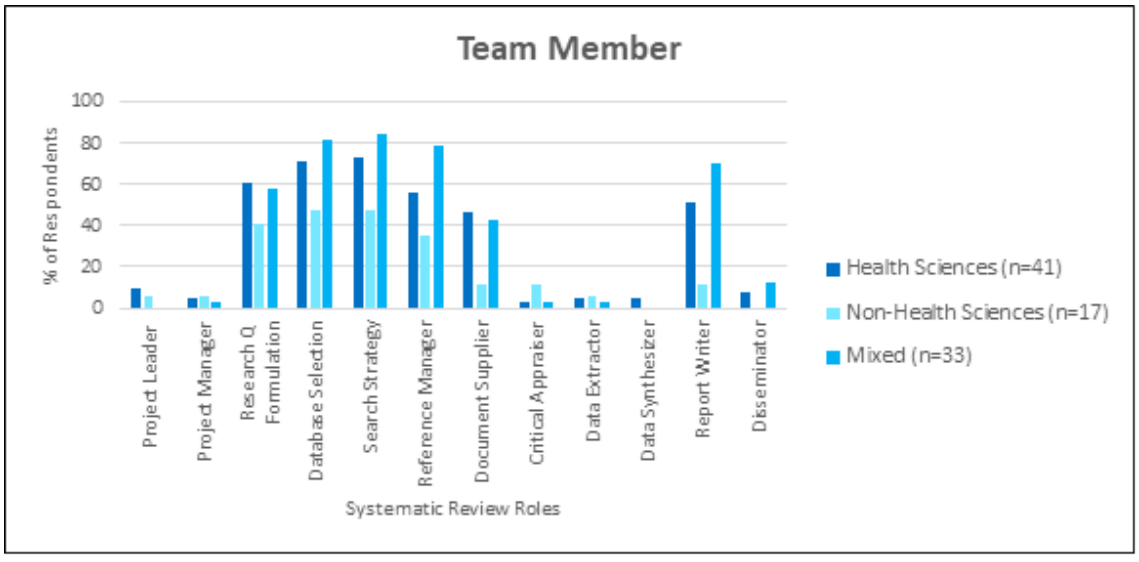
A



B



C



Barriers

Respondents were asked to select all barriers or challenges that had limited their ability to provide assistance with systematic reviews (in educator, support services/consultant, and/or partner in research roles). Not all respondents indicated barriers. The most common response was the lack of time (n = 59, 63 percent), with the second most frequently noted barrier being insufficient training (n = 28, 30 percent). This pattern was evident regardless of which disciplines were being supported. Less frequently reported challenges included systematic review assistance not being part of one's assigned duties (n = 11, 12 percent), a low institutional priority (n = 10, 11 percent), a lack of requests (n = 7, 7 percent), not being of interest to the librarian (n = 7, 7 percent), and insufficient access to databases (n = 3, 3 percent). No respondents reported that systematic review support was inappropriate for their rank (See Table 2).

TABLE 2
Frequency of Reported Barriers to Systematic Review Support Services by Discipline and in Total

	Health Sciences (n=41)		Non-Health Sciences (n=17)		Mixed (n=33)		TOTAL (n=94)	
	Frequency	%	Frequency	%	Frequency	%	Frequency	%
I don't have enough time	29	(71%)	9	(53%)	21	(64%)	59	(63%)
I don't have sufficient training	14	(34%)	8	(47%)	6	(18%)	28	(30%)
It is not part of my assigned duties	4	(10%)	3	(18%)	4	(12%)	11	(12%)
It is a low priority service at my institution	3	(7%)	3	(18%)	4	(12%)	10	(11%)
I am not interested	3	(7%)	2	(12%)	2	(6%)	7	(7%)
I have not received any requests	3	(7%)	3	(18%)	1	(3%)	7	(7%)
My institution lacks the breadth of database resources required to do a systematic review	1	(2%)	0	(0%)	2	(6%)	3	(3%)
It is not appropriate for my rank	0	(0%)	0	(0%)	0	(0%)	0	(0%)
Other (please specify)	7	(17%)	5	(29%)	7	(21%)	19	(20%)

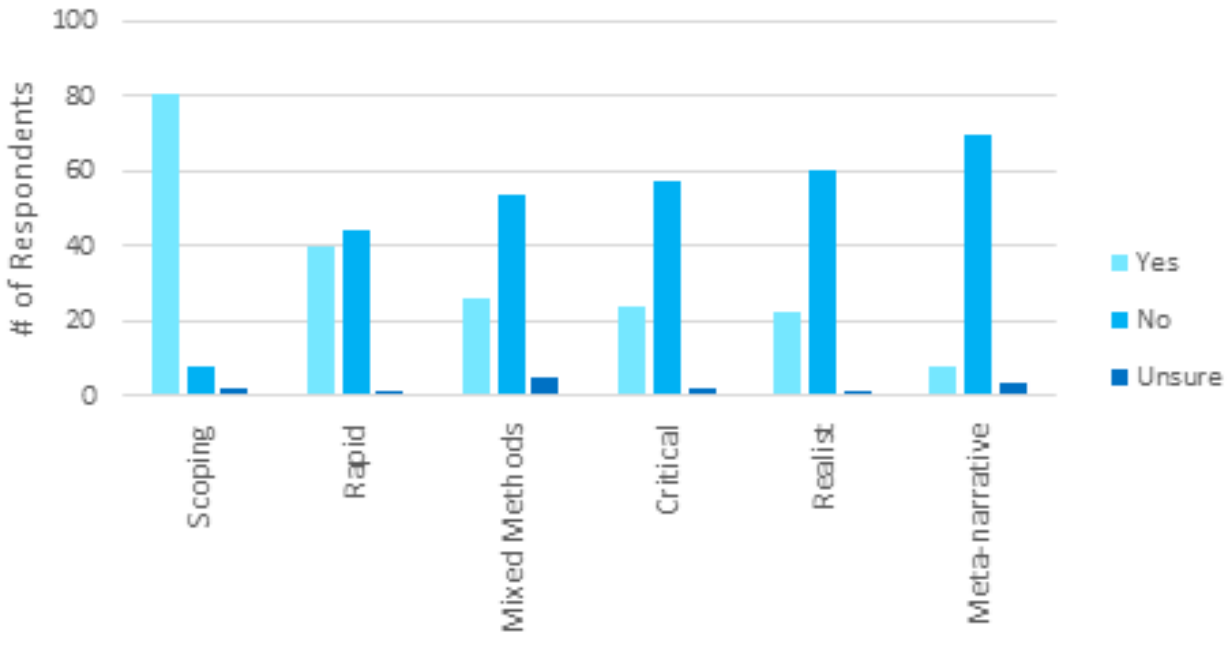
Twenty-two respondents included other barriers or challenges not included in the original list (see supplemental file). Of these, two responses were re-coded into existing categories and one response was simply providing context for their selection of an existing category. Thus, there were nineteen 'Other' responses. Four respondents reported lack of staff as the most common 'Other' reason that limited their ability to provide assistance with systematic reviews. Requestor's lack of knowledge, few requests, and no barriers/limitations were each reported by three respondents. Two respondents indicated lack of support from administrators, while one respondent each reported lack of disciplinary knowledge to support article selection, lack of sufficient professional development funding to attend training, and lack of

awareness of service and librarian expertise. One respondent reported how the barriers they experienced were causally related: "Because it's a low priority/sys revs are not supported with enough staff or resources, it thus makes it less enticing to seek out training."

Other Review Types

Respondents were asked if they had participated in or supported review types other than systematic reviews. The most common other review type to be supported was scoping reviews (n = 81, 89 percent), followed by rapid reviews (n = 40, 44 percent). Fewer responses were noted for mixed methods reviews (n = 26, 29 percent), critical reviews (n = 24, 26 percent), realist reviews (n = 22, 24 percent) and meta-narrative reviews (n = 8, 9 percent) (see Figure 2). Some respondents indicated review types that were not listed as options in the survey (i.e. responses to "Other, please specify"), including integrative reviews (n = 2), literature reviews (n = 2), umbrella reviews (n = 2), evidence gap maps (n = 1), and rapid scoping reviews (n = 1).

FIGURE 2
The Number of Respondents Reporting Engagement in Review Types Other than Systematic Reviews



Policies

Of the ninety-one responses to the question about whether their institutions had guidelines, policies, or other materials to assist them in clarifying their roles and levels of involvement, sixty-two (68 percent) respondents indicated their institutions had a policy or guideline, eighteen (20 percent) indicated they did not, and eleven (12 percent) were unsure. For institutions with policies or guidelines, the characteristics of the policies or guidelines described by the respondents varied quite widely, including:

- service parameters and types (tiered, consultation vs. collaboration, roles)
- formality (formal or informal)
- means of sharing information (web page, LibGuide)

- audience (librarians or requestors, public facing or internal)
- process (determine eligibility, timelines, waitlists)
- forms (request, eligibility, service level agreements)

Three respondents indicated their institution's policies/guidelines were either under development or being revised. Three respondents also noted a lack of system-wide documentation and messaging, indicative of a siloed or unit-based approach (e.g., "on our sys rev libguide, NOT part of any central messaging"; "Only for the health science library… "; "lots of documentation created by other librarians. Not any on a system-level").

Discussion

The current survey describes systematic review engagement by librarians employed at Canadian universities. The demographics of the respondents for the current survey were similar to the previous survey (Murphy and Boden 2015), with a higher proportion of more experienced librarians (ten plus years of experience) with client focused job titles. A recent survey of business librarian involvement in systematic reviews also had a higher percentage of librarians with ten or more years of professional experience (Premji et al. 2022). Librarians supporting a wide range of disciplines responded to the survey, though a lower proportion of respondents supported only the non-health sciences disciplines.

Librarians are engaging in the full spectrum of potential roles during the production of a review, but to varying extents. Overall, librarians tend to engage most frequently in traditional roles regardless of the type of service being offered (consultation, training/instruction, collaboration) and the disciplines being supported. This echoes previous findings (Murphy and Boden 2015), unsurprisingly as these are the roles most closely aligned with librarian training and expertise. Those traditional roles were also evident in a scoping review of librarian roles in systematic reviews by Spencer and Eldredge (2018) and a survey of business librarians (Premji et al. 2022). Moreover, respondents in this survey ranked both their level of training and level of knowledge higher in more traditional librarian systematic review activities and lower in areas considered less traditional for librarian involvement in systematic reviews. Of special interest is that the 'Not applicable' responses to level of training and knowledge were identified only for non-traditional roles, thus indicating that some librarians may not see these roles as applicable to their work.

However, there is a small proportion of librarians reporting engagement in each stage of the review process. Thus, in some cases, librarians' expertise encompasses stages of the review process beyond the literature search. Both Spencer and Eldredge (2018) and Grossetta et al. (2019) point to roles for librarians outside those required to conduct a review (e.g., peer review). Roles beyond direct engagement in the production of a systematic review are interesting but were not included in the present survey as the focus was on librarian engagement in participating in or supporting systematic reviews.

As early as 2011, roles for health sciences librarians as collaborators on research teams were being mentioned (Dudden and Protzko 2011). The current survey results indicate that librarians supporting health sciences and mixed disciplines more frequently report collaborating on research teams than those that support only non-health sciences disciplines. Furthermore, the report writer role is also more frequently reported when librarians support health sciences and mixed disciplines than the non-health sciences. This may be indicative of maturation of systematic review services for health sciences and librarians supporting mixed disciplines.

Not all respondents indicated barriers to engaging in systematic reviews. A non-response on the barriers question could indicate a lack of barriers or simply that the respondent skipped the question. Of the respondents who did report barriers, the most common reasons were lack of time and insufficient training. Lack of time was clearly the most frequent issue. This is consistent with the previous findings of Murphy and Boden (2015) and Nicholson et al. (2017). Nicholson et al. noted that "Respondents reported difficulty balancing work on systematic reviews with other professional duties as well as an inability to keep up with the demand for support with systematic reviews at their institutions" (2017, 289). This suggests at least two potential interpretations of the 'lack of time' barrier: the balancing of multiple responsibilities and unsustainable demands for systematic review services. Saleh et al. noted that "Many information professionals are multi-tasking, such as is the case with academic health science librarians and hospital librarians, and therefore time management is of great interest in order to efficiently integrate systematic review searching into one's routine responsibility" (2014, 43). While a recent survey of business librarians (Premji et al. 2022) also found that time constraints and lack of training were among the top five barriers, their top two challenges were a lack of engagement in synthesis reviews by faculty and students in their discipline, and a lack of requests. Inter-disciplinary differences in synthesis review services and challenges should be explored in more depth.

Respondents reported 'Other' barriers that seemed to fall into three groupings: individual (e.g., lack of disciplinary knowledge), internal to the library (e.g., lack of staff to support systematic reviews), and external to the library (e.g., too few requests, lack of knowledge by the requestors). The latter barrier was also evident in the methods-related questions in Nicolson et al. (2017). Some of the most frequently reported challenges in the Nicholson et al. survey related to a lack of methodological knowledge by librarians and faculty, and lack of student support by supervising faculty.

An apparently paradoxical result is that respondents generally reported 'pretty good' or 'extensive' training levels, yet insufficient training was the second most frequently reported barrier. Closer examination suggests that confidence in training levels tended to be good for more traditional librarian systematic review roles and lower in less traditional roles. One explanation might be that the concerns about training levels are related to non-traditional roles (e.g., conducting a meta-analysis). Alternatively, respondents may not have felt they had sufficient training for skills that were not asked about in the survey (e.g., time management, communicating with research teams, how to have conversations about authorship (O'Dwyer and Wafford 2021; Thurow et al. 1999). Interpersonal challenges in collaboration on systematic reviews (e.g., dysfunctional team, researchers refusing requests for authorship) are relatively frequent (Nicholson et al. 2017). One could surmise that a librarian may feel knowledgeable and well-trained on the skills-based aspects of engaging in a systematic review but less comfortable with the interpersonal aspects. Another possibility is that respondents are supporting multiple disciplines or new disciplines and, thus, are having to learn new skills for each discipline (e.g., new databases, new terminology). Factors such as "experience level, the librarian's role, the nature and complexity of the systematic review, the level of engagement with other systematic review team members, and institutional expectations… " (Bullers et al. 2018, 204), as well as librarians not having "sufficient experience to reduce the amount of time they spend on discrete tasks" (Bullers et al. 2018, 205), may also contribute to the amount of time spent on systematic reviews. This finding deserves further examination to inform continuing education offerings.

There has been a proliferation of review types with their roots in systematic review methods but adapted for other purposes and disciplines. Much has been written to clarify typologies of these reviews (Moher et al. 2015; Munn et al. 2018; Paré et al. 2015; Sutton et al. 2019; Tricco et al. 2016). In the current survey, respondents were asked to indicate review types, other than systematic reviews, that they support. In both the 2015 (Murphy and Boden) and the current survey, scoping reviews were clearly the most common of the other review types supported by librarians. It is likely there are librarians working at Canadian universities exclusively supporting other review types (e.g., scoping reviews) who were not eligible for the present survey. Future research should explore synthesis review support by librarians more wholistically to better capture the roles of librarians.

One might surmise that the increase in respondents reporting institutional policies or guidelines from 2015 (50 percent; Murphy and Boden) to the current survey (68 percent) is related to a need by libraries to manage service requests and improve service sustainability. Structured service models have been suggested as a way of addressing some of the challenges arising in collaborations on systematic reviews (Nicholson et al.2017). The literature suggests that libraries are seeking to improve the sustainability of their systematic review services. Systematic review service models have been developed despite challenges with resources and experience (Lackey et al. 2019); services have been formalized to increase capacity and to address collaboration challenges (e.g., McKeown and Ross-White 2019); libraries have re-imagined their services (Luca and Ulyannikova 2020); and strategies have been identified and implemented to manage demand (Campbell and Dorgan 2015). Questions raised about burnout amongst medical librarians supporting systematic reviews (Demetres et al. 2020) may possibly be related to service (un-)sustainability. Future research should examine the effectiveness of service models (and particular configurations of service models), policies, and guidelines in managing demands on systematic review services and librarian workload.

This current study had some limitations. The sample was skewed toward more experienced librarians, as was the previous survey (Murphy and Boden 2015). This may reflect the reality of those supporting systematic reviews in Canadian universities, but it is not possible to be certain from the convenience sample. Furthermore, the sample is smaller than desired. In the preparatory stages of this study, a recommended sample size was calculated based on an estimate of the number of librarians working in Canadian university libraries who might support systematic reviews using statistics from the 2018 Census of Canadian Academic Libraries (Canadian Association of Professional Academic Librarians CAPAL Advocacy Committee 2019). The sample of ninety-four respondents was just under half of the calculated sample size. It should be noted that the total number of librarians supporting systematic reviews upon which that sample size was calculated may have been an overestimation for two reasons: (1) not all librarians providing reference support will provide systematic review services, and (2) not all librarians supporting synthesis reviews will have supported systematic reviews (one kind of synthesis review) within the twelve-month time-frame of our eligibility criteria. Overall, our results are indicative but difficult to generalize.

Conclusions

Not only are librarians supporting disciplines outside the health sciences, but they are also supporting reviews in multiple, diverse disciplines. This disciplinary porousness is possibly related to the emergence of functional roles and organizational structures now at many

Canadian universities which co-occur with or replace liaison models. Librarians' primary contributions to supporting systematic reviews are, unsurprisingly, in the literature search role. In addition, librarians continue to experience challenges arising from lack of time and the need for additional training.

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Appendix A – Survey Instrument (English version)

Benchmarking Synthesis Review Support in Academic Libraries - 2022

We are interested in the current state of librarian support (e.g., reference assistance, instruction) and collaboration (i.e., participating as a research team member) at Canadian university libraries for systematic reviews conducted by faculty, graduate students, and academic administrators.

1. During the past 12 months were you employed at a Canadian University Library?
   - □ Yes
   - □ No
2. Have you participated in a systematic review in the past 12 months? ('Participated' is defined as supported, collaborated or initiated an ongoing or new systematic review)
   - □ Yes
   - □ No
3. In which disciplines have you provided systematic review services in the past 12 months? Please select all that apply.

□ Agriculture, Bioresources, Soil Science □ Biology, Botany, Plant Science □ Biomedical/Life Sciences □ Business, Commerce, Management □ Chemistry □ Community Health & Epidemiology □ Computer Science □ Dentistry □ Education □ Engineering □ Environment & Sustainability □ Forestry □ Geography & Planning, Community & Regional Planning □ Geology, Earth Sciences, Ocean Science □ Indigenous Studies □ Kinesiology	□ Land and Food Systems □ Medicine □ Midwifery □ Neuroscience □ Nursing □ Nutrition □ Pharmacy □ Physics, Astronomy, Astrophysics, Atmospheric Science □ Rehabilitation Sciences □ Psychology □ Public Health □ Political Studies, Public Policy □ Sociology, Social Work □ Toxicology □ Veterinary Medicine, Animal Science, Zoology □ Other, please specify:

4. Think specifically about systematic reviews when answering the questions below. Please indicate the role(s) you have engaged with <u>in the past 12 months</u> when delivering formal instruction, providing reference/research assistance, and as a member of a review team. If your manner of engagement falls into a "grey zone" (i.e., your engagement does not fulfill ALL criteria), choose the role(s) that are <u>mostly</u> applicable. Select all that apply.

	Have you provided **formal instruction** in any of the following roles?	Have you provided **reference/ research assistance** in any of the following roles?	In which roles have you participated as a **member of a systematic review team**?
Project Leader - writing the initial grant (in conjunction with the rest of the team, if applicable), liaising with the sponsors, chairing project meetings, as well as co-ordinating the writing of the final report and dissemination of the review findings	Yes No	Yes No	Yes No
Project Manager - creating and regularly updating the project timetable in order to ensure that the review was completed both within the required timescale and according to budget	Yes No	Yes No	Yes No
Literature Searcher - Research Question Formulation	Yes No	Yes No	Yes No
Literature Searcher - Database Selection	Yes No	Yes No	Yes No
Literature Searcher - Search Strategy (developing, conducting & documenting)	Yes No	Yes No	Yes No
Reference Manager - managing the references – tracking and storing references identified by the search, de-duplicating	Yes No	Yes No	Yes No
Document Supplier - locating and retrieving the full-text of relevant articles and reports	Yes No	Yes No	Yes No
Critical Appraiser - reviewing articles for inclusion/exclusion based on stringent criteria	Yes No	Yes No	Yes No

	Have you provided **formal instruction** in any of the following roles?	Have you provided **reference/ research assistance** in any of the following roles?	In which roles have you participated as a **member of a systematic review team**?
Data Extractor - the selective abstracting of key components (population, setting, intervention(s), outcome(s), results, etc.) of the included studies	Yes No	Yes No	Yes No
Data Synthesizer - synthesizing the results as a narrative and/or meta-analysis	Yes No	Yes No	Yes No
Report Writer - assist in the writing of the paper or report	Yes No	Yes No	Yes No
Disseminator - providing current awareness or digest services to clinicians, making resources, particularly evidence-based products, readily available online, etc.	Yes No	Yes No	Yes No

5. Please answer the questions in the table below in the context of a systematic review. How would you rate your **level of training** in each area?
0 = none 1= some 2 = pretty good 3 = extensive Not applicable

	How would you rate your level of <u>training</u> in each area?
Formulating the research question	0 1 2 3 n/a
Selecting appropriate databases and grey literature sources	0 1 2 3 n/a
Translating the operational definitions of the concepts in the research question into a comprehensive search strategy	0 1 2 3 n/a
Documenting the literature search	0 1 2 3 n/a
Managing the citations (deduplication, storing citations)	0 1 2 3 n/a

Selecting articles for inclusion	0 1 2 3 n/a
Extracting data from included studies	0 1 2 3 n/a
Conducting a risk of bias analysis	0 1 2 3 n/a
Conducting a meta-analysis (or meta-synthesis)	0 1 2 3 n/a

6. Please answer the questions in the table below in the context of a systematic review. How would you rate your **knowledge** in each area?
0 = none 1= some 2 = pretty good 3 = extensive Not applicable

	How would you rate your knowledge in each area?
Formulating the research question	0 1 2 3 n/a
Selecting appropriate databases and grey literature sources	0 1 2 3 n/a
Translating the operational definitions of the concepts in the research question into a comprehensive search strategy	0 1 2 3 n/a
Documenting the literature search	0 1 2 3 n/a
Managing the citations (deduplication, storing citations)	0 1 2 3 n/a
Selecting articles for inclusion	0 1 2 3 n/a
Extracting data from included studies	0 1 2 3 n/a
Conducting a risk of bias analysis	0 1 2 3 n/a
Conducting a meta-analysis (or meta-synthesis)	0 1 2 3 n/a

7. Which of the following have limited your ability to provide assistance with systematic reviews (in educator, support services/consultant and/or partner in research roles)? Please check all that apply.
   - □ I don't have sufficient training
   - □ It is not part of my assigned duties
   - □ I don't have enough time
   - □ I am not interested
   - □ It is a low priority service at my institution
   - □ My institution lacks the breadth of database resources required to do a systematic review
   - □ I have not received any requests

- □ It is not appropriate for my rank
- □ Other (please specify):

8. Does your institution have policies, guidelines or other materials to assist you in clarifying your potential role(s) and level(s) of involvement to the requestor of a systematic review?
   - □ No
   - □ Not sure
   - □ Yes. Please include a brief description of no more than a sentence or two.
9. Which other types of literature reviews have you been involved with in the last 12 months? Being "involved" can include, but is not limited to, ongoing reviews that were started more than a year ago (e.g., you are just finishing up the final publication details, reading drafts, etc.) and new reviews that have just been established (e.g., the request came in yesterday).

Scoping Reviews [Map out and categorize existing literature from which to commission further reviews and/or primary research by identifying gaps in research literature]	Yes No Unsure
Critical Review [Aims to demonstrate writer has extensively researched literature and critically evaluated its quality. Goes beyond mere description to include degree of analysis and conceptual innovation]	Yes No Unsure
Mixed Methods Review [Refers to any combination of methods where one significant component is a literature review (usually systematic). Within a review context it refers to a combination of review approaches for example combining quantitative with qualitative research or outcome with process studies]	Yes No Unsure
Rapid Review [Assessment of what is already known about a policy or practice issue, by using systematic review methods to search and critically appraise existing research]	Yes No Unsure
Meta-Narrative "seeks to illuminate a heterogeneous topic area by highlighting the contrasting and complementary ways in which researchers have studied the same or a similar topic", using qualitative and mixed methods studies http://www.biomedcentral.com/1741-7015/11/20	Yes No Unsure
Realist Review/Synthesis "This approach offers the potential to expand the knowledge base in policy-relevant areas -for example, by explaining the success, failure or mixed fortunes of complex interventions." http://www.biomedcentral.com/1741-7015/11/21/abstract	Yes No Unsure
Other (please specify)	

10. What is your job title?
    - □ Liaison Librarian
    - □ Subject Librarian
    - □ Reference Librarian
    - □ Public Services Librarian
    - □ Knowledge Synthesis Librarian
    - □ Branch Head
    - □ Other (please specify)
11. How long have you been a librarian?
    - □ 0-3 years
    - □ 4-6 years
    - □ 7-9 years
    - □ 10+ years

Identifying Metadata Quality Issues Across Cultures

Julie Shi, Mike Nason, Marco Tullney, and Juan Pablo Alperin

Metadata are crucial for discovery and access by providing contextual, technical, and administrative information in a standard form. Yet metadata are also sites of tension between sociocultural representations, resource constraints, and standardized systems. Formal and informal interventions may be interpreted as quality issues, political acts to assert identity, or strategic choices to maximize visibility. In this context, we sought to understand how metadata quality, consistency, and completeness impact individuals and communities. Reviewing a sample of records, we identified and classified issues stemming from how metadata and communities press up against each other to intentionally reflect (or not) cultural meanings.

Introduction

Metadata are crucial to the dissemination and communication of research. As descriptors of "potentially informative object[s]" (Pomerantz, 2015, p. 26), metadata provide contextual, technical, and administrative information that facilitate the discovery, retrieval, and preservation of scholarly outputs. When created and maintained according to shared standards, metadata allow connections and relationships to be established between research and researchers, as well as across geographic, temporal, and discursive spaces (Gartner, 2016). These shared standards also enable metadata sharing through automated ingest and harvesting between platforms and services (Zeng & Qin, 2016), increasing the reach and, arguably, the use and impact of research.

Metadata are also technical, and "technological constraints should never be an excuse to diminish someone's personhood, or inaccurately reflect their identity" (Coalition Publica Metadata Working Group, 2021, p. 22). Subjective in nature, metadata elements constitute sites of tension and struggle between resource constraints, sociocultural representations, and standardized systems. Formal and informal interventions in these contested spaces may then be dismissed as metadata quality issues or be recognized as political acts to assert aspects of cultural identity or strategic curatorial choices to maximize opportunities for discoverability and visibility in research platforms and services.

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These tensions are simultaneously made invisible and problematic by the broader knowledge landscape in which metadata standards and values operate: a landscape that is overwhelmingly structured around the English language and Western publishing practices, despite the decidedly global and multilingual nature of scholarship (Khanna et al., 2022; Library Publishing Coalition, 2018). In such an environment, norms that are defined according to the needs and concerns of these twin hegemonies become systemic constraints for those not represented by them. Whether in metadata or other aspects of this landscape, deviations from normalized practice are at risk of being dismissed as issues of proficiency and quality.

In this context, and as members of organizations that create systems for managing scholarly metadata and as research users of this data, we were interested in understanding how metadata quality, consistency, and completeness impact individuals and communities. Specifically, we sought to identify the ways in which identities are erased or obscured in metadata.

Treating metadata records as informational objects in their own right, we take the position that metadata may be accurate and of high quality "only if it does not forcibly out or harm the person in the record" (Shiraishi, 2019, p. 192). We recognize the limitations of such a definition, as risks of harm vary by context. Working from a sample of records known to have erroneous, incomplete, or otherwise technically imperfect metadata, this project therefore set out to identify and classify the metadata quality issues stemming from how metadata and communities press up against each other to intentionally reflect (or not) cultural meanings.

Alongside this definition of quality, we define cultural issues as those issues that impact, or have the potential to impact, the representation of identities, roles, intentions, and other factors specific to social, regional, disciplinary, or publishing cultures. This scope attempts to distinguish between issues that relate to identity expressions and those introduced due to aesthetic choices or disciplinary practices, to focus on the ways in which individuals and communities actively seek to convey meaning. Issues found in such standardized fields as ISSNs and page numbers are considered safely out of scope.

Beginning with a review of the literature on metadata quality and a description of our methodology, this article goes on to provide an overview of the various metadata quality issues we identified and the categories we developed to better understand them. We conclude by discussing the implications of our findings and describing future work we intend to undertake.

Literature Review

Undertaking a study of metadata quality begins with understanding that "metadata quality is a multidimensional concept" which requires defining "what we mean by 'good' or 'bad' quality" (Zeng & Qin 2016, pp. 319 & 322). The possible range of metadata issues that can be identified will depend on how quality is defined. In the library community, the consensus is that quality metadata work accounts for user expectations to facilitate resource discovery and use (Bruce & Hillmann, 2004; Cataloging Ethics Steering Committee, 2020; PIE-J Working Group, 2013; Pomerantz, 2015).

Mapping the key user tasks defined in the IFLA Functional Requirements for Bibliographic Records (FRBR) model—finding, identifying, selecting, and obtaining information—to characteristics of metadata, Bruce & Hillmann (2004) determined six dimensions along which metadata quality could be defined. In addition to the completeness and accuracy of information in the record, they note that records should include elements and controlled vocabularies that "the community would reasonably expect to find" and that are "consistent with standard

definitions and concepts used in the subject or related domains" (p. 245). This metadata should also be provided alongside resources in a timely and accessible manner.

Bruce & Hillmann (2004) measure metadata quality according to its "fitness for use" (Zaveri et al., 2012, p. 2) for fulfilling user tasks. Addressing usability more concretely, Yasser (2011) reports incorrect values, incorrect elements, missing information, information loss, and inconsistent value representation as the most common metadata issues degrading the "utility of metadata records" (p. 60). A 2013 NISO working report provided recommendations for presenting and identifying e-journals. Common metadata issues identified include missing information about title changes and publisher history, incorrect citations and URLs, and inconsistent publication information.

This focus on utility extends beyond human users to machines as well. Studies exploring issues in quality have largely addressed the impacts of poor metadata on data aggregation, resource discovery and access, and interface functionality (Bruce & Hillmann, 2004; Malički & Alperin, 2020; Woodley, 2016; Yasser, 2011; Zaveri et al., 2012). These studies work toward goals for metadata sharing and interoperability, for which tools and processes for automated data exchange also introduce tensions, errors, and erasures in metadata (Heery & Patel, 2000; Jaffe, 2020; Zeng, 2018).

The literature tends to overlook the ways in which metadata "contribute to a story we are telling about ourselves as individuals, as organizations, and as a community" (Jaffe, 2020, p. 441). This is despite a general recognition of the "subjective nature of metadata practice" (p. 2), which is inflected by culture and context, biases and structural problems embedded in metadata systems and tools, and the power dynamics and politics of naming and description (Farnel, 2018). Király et al. (2019) propose metrics for evaluating the multilingual dimensions of metadata in the Europeana digital cultural heritage platform, however, the framework is limited to technical and functional aspects of metadata.

Most studies that do address sociocultural themes largely attend to cataloging standards, schemas, and vocabularies, including issues around the representation of non-English languages and non-Roman scripts, non-White and/or non-Western contexts, Indigenous knowledges and worldviews, and gender and sexuality, among other issues (Adler, 2017; Berman, 1971; Billey et al., 2014; Billings et al., 2017; Duarte & Belarde-Lewis, 2015; Ducheva & Pennington, 2019; Farnel et al., 2017; Mahmoud & Al-Sarraj, 2018; Matusiak et al., 2015; Olson, 2002; Rigby, 2015).

Far fewer studies engage with the sociocultural dimensions and consequences of metadata quality issues introduced during the publishing process. In 2021, the Equity and Metadata subgroup of the Coalition Publica Metadata Working Group in Canada reported on barriers to equitable and inclusive publication metadata, raising a critical question: "So perhaps we need to consider not just the practices around metadata but with whom lies the 'power to name' or ascribe metadata. Perhaps accountability in metadata needs to be considered as well?" (p. 15).

Multilingualism and Metadata

Language choices open or foreclose on opportunities to represent cultural meaning and identity across scholarly communications spaces. The role of English as *lingua franca* in academic and research spaces has been discussed and debated for decades (Canagarajah, 2002; Crystal, 2012; Turner, 2018). For instance, a shared language can foster communication and collaboration (Alhasnawi, 2021). Yet, scholars from a range of backgrounds point to the psychological,

economic, social, and other burdens that English-language preferences and requirements place on those who do not know English as a first language, or at all (Tomuschat, 2017; Alamri, 2021; Balula & Leão, 2021; Pho & Tran, 2016; Ge, 2015; Santos and Da Silva, 2016; Curry & Lillis, 2010). The language used to create metadata is then a political choice (Rigby, 2015).

From a usability standpoint, accurate multilingual metadata provides critical access to important resources for legal, cultural, and political purposes and also promotes understanding of regional cultures and histories (Mahmoud & Al-Sarraj, 2018; Matusiak et al., 2015). Zeng & Qin (2016) note that authors often provide "multiple local versions" (p. 142) of metadata values for titles, authors, keywords, and glossaries through inline and external parallel metadata. These localized versions refer to translations and references to multilingual glosses that allow authors to capture metadata values in both English and the original language of the materials being described.

Creating consistent multilingual metadata, whether automatically or manually, is a resource intensive process. It requires significant technical development and maintenance and human resources to establish, implement, and maintain (Matusiak et al., 2015; Soglasnova, 2018). They also require systems to be encoded and designed appropriately for communities and researchers to benefit from multilingual metadata and access critical information (Mahmoud & Al-Sarraj, 2018; Rigby, 2015; Shiraishi et al., 2021). This is especially true for languages that are not rooted in the Roman alphabet and have a directionality other than left to right.

In all cases, the appearance and functionality of multilingual metadata in user interfaces is contingent on the quality of language metadata and interface design. Missing or improper language codes and interface designs that fail to account for linguistic differences can prevent metadata in certain languages from being input and render content unintelligible and features unusable (W3C, 2022). Font properties and encoding issues may also prevent the display of characters with diacritics and ligatures used in Roman scripts and Romanizations (e.g., Dartmouth Library Metadata Services, n.d.).

The lack of standardized and widely adopted Romanization schemes for many languages itself results in errors and inconsistencies: localized standards may be developed and used in isolation; when multiple schemes exist like this, guidance may be referenced and applied inconsistently (Park, 2007); or Romanized forms may be decided on independent of any guidance. Moreover, the choice to record Romanizations only may preclude access to resources by users unfamiliar with such schemes or who would transcribe or transliterate differently (Rigby, 2015). This raises further ethical questions about who metadata caters to when rendered only in translation, transcription, or transliteration.

Names and Metadata

Assessing the quality of name forms and expression in MARC library records, Wisser (2014) identified common errors in encoding, typography, content, and format. Issues included variations in the ways that dates, geographic qualifiers, name parts, and abbreviations and initials are included (or not) and represented. Improper encodings and recordings that misrepresented the nature of the value (e.g., a corporate name encoded as a personal one), as well as misspellings and punctuation errors, were also noted.

Yet, the quality of name forms in metadata should not be measured solely by the well-formedness of these values for data exchange and bibliometric analysis. For members of the trans and gender non-binary community, for example, naming and surfacing previous/other

names may in fact produce harm. Best practices published by The Trans Metadata Collective (2022) include a section on recording former names, which opens with "Respect the wishes of the author regarding the use of their former name(s)" and goes on to recommend prioritizing the privacy and safety of the individual during metadata creation (p. 19). Several groups also recommend that journals respect retroactive name change requests in recognition of these harms (Coalition Publica Metadata Working Group, 2021; Committee on Publication Ethics, 2021).

As noted by the Coalition Publica Metadata Working Group (2021), individuals may also carry alternate or multiple names due to marriage and divorce, official government purposes, the use of stage names and/or pseudonyms, and myriad other reasons. While certain features of the ANSI/NISO Z39.96 JATS: Journal Article Tag Suite standard for journal publishing, including the alternative-name field and name-style attribute, allow for more robust name records, the Working Group notes that "'alternative name' is limited in scope… and 'name-style' is limited to Western, Eastern, Given-only, and Islensk (Icelandic) configurations" (p. 19).

Names and naming conventions are also deeply entwined in epistemic traditions and linguistic and cultural histories, and "writing personal names in forms other than [an author's] native languages is essentially a type of translation" (Kim & Cho, 2013, p. 88). As such, when a name is Romanized, nuances and differences in naming conventions can result in errors and information loss.

Methods

We constructed a purposeful sample of 427 records drawn from the Crossref API. Crossref is a non-profit organization that stores over 120 million metadata records from their over 15,000 members (primarily publishers). Our sample was not drawn randomly, since our goal was to learn about the types of metadata quality issues that exist. We hypothesized that records with at least one known issue, and additional randomly chosen records from the same publication by the same publisher would be more likely to yield cases where identity, language, and culture would appear as problematic records for our analysis.

As such, we used the expertise in our research team and from staff at Crossref to identify specific records and Crossref members whose data was known or suspected to have at least one metadata quality issue (e.g., titles in two languages included in a single field). The selected problematic records came from 51 DOI prefixes (typically corresponding to either a publication or a publisher) and were chosen without regard for the manuscript management or publishing platform used by the publisher. We then used the Crossref API to randomly select additional records from the same prefix. An additional three randomly chosen records were selected from 17 DOI prefixes from journals known to use the manuscript management and publishing platform Open Journal Systems (OJS). The choice to sample from OJS-based publishers stemmed from our own familiarity with the platform (with which several of the authors are affiliated), the documented international and multilingual reach (Khanna et al., 2022), and the previous work on its metadata quality, cited earlier (Nason et al., 2021). The seed list of publishers and the code used to extract related records is available online (Shi et al., 2023).

In the sample, 394 records (92%) correspond to research outputs by academic, industry, and government organizations, including journal articles, book chapters, book reviews, conference proceedings, and protocols. The remaining 33 records (8%) describe front and back matter (e.g.,

tables of contents, indexes), notices and communications, journals, journal issues and sections of journal issues, advertisements, and retractions (see Appendix A). As well, 140 records (33%) are associated with multilingual venues, including those that publish only titles, abstracts, and/or keywords in multiple languages and those that also publish full-text in multiple languages.

For each item, the JSON-formatted record (returned by the Crossref API) and the published document (at the URL pointed to by the DOI) were analyzed in tandem to enable us to consider issues present in the metadata as well as issues stemming from discrepancies between the published document and the record. Comparisons were also made with the item landing page and the container,* where further information, such as languages accepted for publication, were necessary. Issues were also investigated within and between records to determine isolated areas of concern and larger patterns. This approach is affirmed by Zeng & Qin (2016), who state that "to examine a metadata record, which can be regarded as a surrogate of an item, a comparison between the surrogate and the original item is absolutely necessary" (p. 322).

An initial analysis was completed on a subsample of 61 records to identify the metadata elements in which relevant issues were more likely to appear. After sorting records by DOI prefix, every seventh record in the dataset was selected for this scoping work to ensure an array of publishers were represented. When values were present, a close reading of the value was conducted alongside a comparison of the value with the corresponding information in the published document. The published document was also assessed to locate information absent from the metadata.

The potential political significance of cultural issues was noted and considered when issues could be read as deliberate interventions and/or for which specific motivations may be conjectured (correctly or not). Political significance may be specific to particular instances of an issue, all issues of a certain type, or may apply to a range of issue types.

From the initial analysis, the elements in Table 1 were found to be most pertinent to cultural identity and meaning. Metadata were categorized as either belonging to the work itself (i.e., item level, the contributors (i.e., person level), or the journal or other venue (i.e., container level). These categories provided support for considering the possible range of relevant issues.

Item-level metadata corresponds directly to the article page and PDF (when available) returned by the DOI. Person-level metadata describes the entities responsible for the creation of the item, which are typically individuals but can include groups or organizations. A "General" heading was also added to account for person-level issues that did not map directly to the three fields, such as the absence of some or all author names. Metadata at the container level relates to the nature, scope, and maintenance of the larger entity in which the item is found,

TABLE 1
Metadata fields of interest by item, person, and container

Item level	Person level	Container level
Abstract	Given Name	Publisher
Title	Family Name	Title
	Affiliation	Language
	General	Subject

* In this paper, "landing page" indicates the webpage or record for the item that is provided by the publisher or creator. "Container" reflects the language in the Crossref schema and refers to the publisher's platform for the larger work, such as a book or journal.

most often a journal or book in this sample. Issues in the "Subject" field were only noted for series and serials, as subject headings are not applied to books in the Crossref schema.

The "reference" element group for works cited in the published document were excluded from review to ensure a manageable dataset. A separate analysis could be conducted to specifically examine the presence of this element group, and of how issues of cited researchers and their works are represented in metadata records and the reference lists of published documents (Arastoopoor and Ahmadinasab, 2019, pp. 225-226).

It should be noted that this review is not intended to be exhaustive, and findings speak only to those records included in the sample. Cultural issues surfaced are limited to those noticeable to the reviewer and do not necessarily reflect accurately or fully the motivations of the individuals and organizations creating the metadata. Investigating the actual intentions of metadata creators is also out of scope of this work.

Results

This approach allowed us to identify 32 unique issues that took on five main forms (see Table 2). In total, we found 4,859 specific issues (an average of 11.4 issues per record). These issues were not all equally common, with eight comprising 75% (3,644) of the issues found. However, given the non-random sample used for this study, the number of each unique issue is less significant than the categories of issues found and their descriptions. As such, in the remainder of this section, the number of times an issue was identified is noted for transparency, but the focus is placed on the proposed organization and description of the issues themselves.

TABLE 2
List of 32 identified issues and their definitions, organized by their 5 main forms

Form	Issue	Sub-issue	Definition
Value absent			Value is absent from the record, including if the field itself is absent or the field is present but contains a "[]" or similar value. "Value absent" is both a form and a unique issue.
	translation absent		Translations are absent, when (1) items provide translations, (2) containers include multilingual content, or (3) publishers are based in areas where the language of the record is not a main or official language.
	value in original language absent		Value is not given in the original language or script and only a transliteration or English translation is provided.
	language attribute absent		Language of the value is not identified by an attribute, when (1) multiple languages appear in record, (2) journal publishes in multiple languages, (3) multiple language forms appear in a record (e.g., original and transliteration), (4) field is repeated in different languages, or (5) value is transliterated from a language other than the language of the record.
	language style absent	Romanization only	Value in original script is absent, when values that may be rendered in non-Roman scripts in their original language. Use is based on best guesses at times.

TABLE 2
List of 32 identified issues and their definitions, organized by their 5 main forms

Form	Issue	Sub-issue	Definition
	language style absent	Romanization absent	Name in original script only, when records use a mix of transliteration, translation and original script.
	VoR license terms absent		License terms for the version of record (VoR) is not in the record, but licenses for other purposes are (e.g., text and data mining).
	author/s absent		All authors of the item are absent from the record.
	not all authors listed		Some authors of the item are absent from the record.
	ORCIDs absent		ORCIDs included in the item are not included in the record.
	not all persons listed		Contributors other than the author/s are identified in the item but not in the record.
	absent for all authors		No affiliations are provided for any authors.
	absent for all editors		Affiliations are absent for all editors, when editors are listed in the record.
	not all publishers listed		Co-publishers listed on the item or container site are not represented in the record.
	related orgs absent		Organizations other than publishers (such as rightsholder, content manager, or other parties with responsibilities like content hosting) are listed on the item or container site but not in the record.
	location absent		Location of the publisher is absent from the record.
	subtitle absent		The subtitle of the container or item title is absent. Recorded only for the subsample due to common mis-recording of this value.
Value in record does not match with information in the item			Identified discrepancies between information in the record and information on the item itself, its landing page, or the container site.
	outdated		Only the previous title of the container is in the record.
	registered URL out of date		DOI does not resolve but the item can be found through other means (e.g., Google Scholar).
	registered URL invalid		DOI does not resolve and the item cannot be found easily through other channels.
	value in record does not match information on container website		Information in record is incongruent with information on container website.

TABLE 2
List of 32 identified issues and their definitions, organized by their 5 main forms

Form	Issue	Sub-issue	Definition
	inaccurate		Language and/or subject/s noted in the record either incorrectly or inadequately represent that of the item or container.
Value does not match with the parameters of the field			Format or contents of the value does not conform to metadata schema or best practices.
	affiliations presented as authors		Affiliations recorded in a separate author-name element group, instead of within the associated author-name element group.
	multiple languages in single field		A single field contains information in more than one language or language form.
	multiple values in single field		More than one value is presented in a single field.
	original-title used incorrectly	includes value in original language but item is not a translation	Item title in original language input in original-title field but item is not a published translation. Per the schema, original-title is reserved for the title in its original language when the item is a published translation.
	original-title used incorrectly	value repeated	Value input in the title field is repeated in the original-title field, which is reserved for the title in its original language when the item is a published translation.
	all authors listed as first		All authors listed as "first" in the sequence field.
	first author not identified		All authors listed as "additional" in the sequence field.
	input in all caps		A title or person name is input in all caps.
	additional persons listed		Persons other than the authors of the item are included in the record.
Lack of completeness of the value			Issues within the contents of the value.
	value incomplete		Words or characters are missing from the value or are rendered improperly in the value, such as omitting characters with diacritics either by dropping the character entirely or entering its equivalent in the English alphabet.
	only provides initial/s		Only the first letter of the name is provided. Initials may be represented as X.Y. or X. Y. or XY or X Y or X-Y or X.-Y., etc.

TABLE 2
List of 32 identified issues and their definitions, organized by their 5 main forms

Form	Issue	Sub-issue	Definition
	acronym only		Value is entered as an acronym only. The acronym may be based on an organization name in the original language or in translation.
Incorrectly input	Several types of errors (see Figure 1 for examples)		Indicates that (1) information that does not belong in the field is present, or (2) a value is present but information is missing. Issues may be cultural or general.

Categories of Issues

In addition to wanting to identify unique metadata quality issues and their forms, our project sought to determine which issues pertained to cultural meaning and identity and which related to general quality. In some instances, however, the same type of metadata issue could fall under either category, or even both simultaneously. Still, we felt it useful to group issues into categories that could be used when discussing the cultural context from which issues arise. In making such categorizations, we acknowledge that distinctions are often difficult to discern without familiarity with specific regional, disciplinary, and publishing cultures from where the metadata emerged. As such, the following categories are only one interpretation of the possible themes and areas of tension that could be helpful in identifying metadata issues that pertain to cultural identity.

Through the analysis and description of the 32 unique issues, we were able to identify five common categories that would often reflect individual identities or other cultural characteristics: 1) language, 2) contributors, 3) names, 4) status, and 5) geography. These are described in more detail with examples of key issues in Table 3. Due to the complexity of identified issues, certain issues correspond to multiple categories depending on their nature and context. Appendix B provides a full mapping, with examples, of the 32 issues to the categories.

Within each category, we further identified key issues that, in our assessment, deserved special attention based on two factors: 1) the potential impacts of issues that may be deliberately introduced to assert cultural meanings or identity or to strategically present outputs for internationalization and increased visibility, and 2) the feasibility of automating an alert or solution to identify or resolve issues.

TABLE 3
Defined categories with key issues

Category	Definition	Specific Key Issues
Language	Issues are in relation to the languages and scripts of values and/or the way in which they are identified using language and style attributes.	• Translation absent • Value in original language absent • Language attribute absent • Multiple languages in single field • Language style absent • Inaccurate (for Language and Subject only)

TABLE 3
Defined categories with key issues

Category	Definition	Specific Key Issues
Contribution	Issues relate to the acknowledgment of contributors to the creation and publication of the item and its contents including, but not limited to, co-authors, funders, and co-publishers.	• Author/s absent (if all authors are absent) • Not all authors listed (if some authors are absent)
Naming	Issues relate to the recording of individual and organizational names in accordance with linguistic and cultural conventions. For Individuals, these can relate to full names and name parts, naming conventions, scripts, or Romanizations. For their affiliations or publishers associated with the work, these might relate to the use of acronyms and abbreviations.	• Incorrectly input (for Given and Family Names, Affiliation, and Publisher only) • Only provides initial/s (for Given and Family Names only) • Acronym only (for Affiliation and Publisher only)
Status	Issues relate to stylistic and content-based interventions to capture the status, seniority, or prestige of individuals or institutions.	• Use of honorifics in name fields • All authors listed as first • First author not identified • Input in all caps • Absent for all authors (for Affiliation only) • Affiliations presented as authors
Geography	Issues are caused by the absence or partial representation of physical location and its social and cultural associations.	• Location absent (for Publisher only) • Absent for all authors (for Affiliation only)

Examples of Issues

Using the categories above, we identified 4,387 (90%) of the 4,859 issues in our sample that could be linked to culture or identity. This corresponded to an average of 10.3 cultural issues per record with the potential impact of metadata quality, consistency, and completeness on individuals and communities across cultures is significant.

TABLE 4
Examples of issues by category

Example	Issue details Issue (field in example): reasoning
Language	
DOI 10.32598/jmsp.6.4.686 *Item* Item title, abstract, author names and affiliations, and journal title are provided in Persian and English. The full text is in Persian only.	Value in original language absent (all): According to this journal's policies, the full text of an article is published in Farsi/Persian only. Abstracts are published in Farsi and English, and bibliographies are published in English only. Given that Farsi is the primary language of this journal, the absence of Farsi in the record is significant.

TABLE 4
Examples of issues by category

Example	Issue details Issue (field in example): reasoning
Record Item-title: "The Impact of Institutional Quality and Exchange Market Pressure on Foreign Direct Investment : A Cross Countries Study" Author-1: Given-name: "Bahareh" Family-name: "Mofavezi" Author-2: Given-name: "Zohreh" Family-name: "Tabataba'i-Nasab" Author-3: Given-name: "Seyed Yahya" Family-name: "Abtahi" Container-title: "Quarterly Journal of The Macro and Strategic Policies"	
DOI 10.15750/chss..54.201411.007 *Item* Item title, abstract, and author information as well as container title and publisher are available in Korean and English. The full text is in Korean only. *Record* Author-1: family-name: "김성수" … Container-title: "CHUL HAK SA SANG - Journal of Philosophical Ideas" … Language: "en"	Assuming the language "en" is used to indicate the language of the record: Multiple languages in single field (Container title): In a single field, the container title is presented in Romanized Korean and English translation, where Romanization and translation are considered distinct language forms.* Language attribute absent (author-1 family name): The language of the record is set as English and a Romanization of the author's name is provided in the original item, however the record includes the author's name in Korean script only. Input in all caps (container-title): The Romanized journal title is set in all caps while the translated English title is set in regular case. It is assumed that this is related to the common Romanization practice of using all caps for the family name in Romanized Chinese, Japanese, and Korean names in all caps to distinguish name parts.

* From the scope notes and examples in the JATS Tag Library for the attribute @xml:lang, it is unclear what language should be assigned to a value when Latin scripts are used to record non-Latin languages (e.g., transliteration, Romanization, etc.): on the one hand, "Language-Script-Region: xml:lang="sr-Latn-RS" (Serbian written using the Latin script as used in Serbia)," but on the other hand, "Romanized Japanese name referred to as an "English" name" (NCBI & NLM 2021).

TABLE 4
Examples of issues by category

Example	Issue details Issue (field in example): reasoning
DOI 10.12681/jode.9694 *Record* Publisher: "National Documentation Centre (EKT)"	Multiple languages in single field (Publisher): The publisher's name is recorded in English translation. This is followed by an acronym in parentheses that is based on the publisher's name in Greek—Εθνικό Κέντρο Τεκμηρίωσης. Such use of multiple languages in one field may lead to confusion downstream.
DOI 10.1055/s-0038-1628298 *Item* Item title is included in original German only, however the item abstract is provided in the original German and translated English. *Item landing page* Item title and abstract are given in both original German and English translation. *Record* abstract: "<jats:title>Zusammenfassung </ jats:title><jats:p>Die Therapie der…" item-title: "Das Problem der Osteitis bei der Periprothetischen Gelenkinfektion"	Value in record does not match information on container website (all): An English translation of the item title that is provided on the item landing page is not given in the item itself or the record. Translation absent (all): English translations on the item landing page are not present in the record.
Contribution	
DOI 10.2307/3595240 *Item* *Zarte Liebe fesselt mich. Das Liederbuch der Fürstin Sophie Erdmuthe von Nassau-Saarbrücken. Teiledition mit Nachdichtungen von Ludwig Harig*. Hg. von Wendelin Müller-Blattau. Saarbrücken: Institut für Landeskunde im Saarland, 2001 (Veröffentlichungen des Instituts für Landeskunde im Saarland 39). 111 S., mus. Not., Abb., Tab., Reg.; Faks.-Beil.: 34 S., mus. Not., ISBN 3-923877. … Ulla Enfilin, Berlin	Additional persons listed (author-2, author-3): This item is a book review. Authors of the work reviewed are listed in the record alongside the reviewer (author-1). Incorrectly input: repeated values (author-4, author-5): Two author names (author-1, author-3) are repeated, which suggests that there are more contributors related to this work than there actually are.

TABLE 4
Examples of issues by category

Example	Issue details Issue (field in example): reasoning
Item landing page Reviewed Work: *Zarte Liebe fesselt mich. Das Liederbuch der Fürstin Sophie Erdmuthe von Nassau-Saarbrücken* by Ludwig Harig, Wendelin Müller-Blattau Review by: Ulla Enßlin *Record* author-1: given: "Ulla" family: "Enßlin" author-2: given: "Ludwig" family: "Harig" author-3: given: "Wendelin" family: "Müller-Blattau" author-4: given: "Ulla" family: "Ensslin" author-5: given: "Wendelin" family: "Muller-Blattau"	
DOI 10.12681/jode.9694 *Container* A note on the journal issue cover also states: "A periodical electronic publication of the Scientific Association: Hellenic Network of Open and Distance Education" *Record* Publisher: "National Documentation Centre (EKT)"	Value in record does not match information on container website (publisher): The journal website and journal issue cover reference the Hellenic Network of Open and Distance Education. Neither the translated English name nor the original Greek acronym in the publisher field refer to this network.
Naming	
DOI 10.15750/chss..54.201411.007 *Item* Author name is included in the original Korean as well as in Romanized Korean as "Kim, Sungsu." Author affiliation is provided in the original Korean only and includes their title alongside their departmental 철학과 (Philosophy) and university 서울시립대학교 (University of Seoul) affiliations.	Incorrectly input: with given name (family-name): Both family and given names for the author are recorded in the family-name field. As Kim & Cho (2012) note, "the three syllables of a Korean name can be written as all attached or spaced"; names written as attached may result in this kind of issue.

TABLE 4
Examples of issues by category

Example	Issue details Issue (field in example): reasoning
Item landing page Author name is provided in the original Korean as well as in Romanized Korean as "Sungsu Kim," depending on the selected language for the interface. The author's affiliation is only provided in the original Korean script at the university level. Record author: family-name: "김성수" affiliation: [] Language: "en"	Language attribute absent (family-name): Where the language of the record is stated as English, a language attribute should be used to signal that the author's name is written in Korean script. It is interesting that two different Romanizations appear in the item and item landing page, but neither are used in the record. Affiliation absent for all authors (affiliation): Neither the departmental nor the university affiliation is included in the record, although they are provided in the item and item landing page. An evaluation of how well a value aligns with linguistic and cultural naming practices requires the presence of a value in the record.
DOI 10.2307/4147866 *Record* author-1: given: "Ulla" family: "Enßlin" author-2: given: "Ludwig" family: "Harig" author-3: given: "Wendelin" family: "Müller-Blattau" author-4: given: "Ulla" family: "Ensslin" author-5: given: "Wendelin" family: "Muller-Blattau"	Language attribute absent (author, all): This record references one reviewer and two authors of the reviewed book, however five author names are recorded. Two author names in the original German contain characters not present in the English alphabet ("ß" in author-1 and "ü" in author-3), resulting in the repetition of these names in Romanized form using the English alphabet only ("ss" in author-4 and "u" in author-5, respectively). Language attributes are not included to note these linguistic distinctions. This stands in contrast to the "multiple values in single field" issue that is more commonly seen in container and item title fields but appears to stem from the same goal of representing information in multiple languages.
DOI 10.35143/jakb.v12i1.2485 *Item* Viola Syukrina E Janrosl, dan Yuliadi	Incorrectly input: repeated values (author, all): The second author's name in the item is given with only one name part "Yuliadi." In the record, however, this name appears in both the given and family name fields to suggest that their name is "Yuliadi Yuliadi."

TABLE 4
Examples of issues by category

Example	Issue details Issue (field in example): reasoning
Record author: given: "Yuliadi" family: "Yuliadi"	In Southeast Asian countries such as Indonesia, where this author is from, an individual's full name may have only one part. Given and family name fields are often set as "required," forcing these individuals to repeat their names or input filler text to advance in the interface.
DOI 10.12681/jode.9694 *Record* Publisher: "National Documentation Centre (EKT)"	Value in original language absent (publisher): The publisher's full name in the original Greek is absent from the record. This absence stands out especially in this record as the item abstract and title and container title are all given in Greek only.
Status	
DOI 10.28933/ajcsa-2017-05-1801 *Item* DR. IRAM MANZOOR Associate Professor Mr. F. S. Azeez Bukhari 4th Year MBBS *Record* author-1: given-name: "IRAM" family-name: "MANZOOR" author-2: given-name: "Azeez" family-name: "Bukhari"	Input in all caps (author-1, all): In the original item, the names of professors and associate professors are entered in all caps, while the names of students ("4th Year MBBS") are in regular case. This formatting distinction is replicated in the metadata record, although faculty and student titles are not included.
DOI 10.28933/ajcsa-2017-05-1801 *Item* Zubair Ahmad Research Scholar: Department of Statistics, Quaid-i-Azam University 45320, Islamabad 44000, Pakistan Zawar Hussain Assistant Professor: Department of Statistics, Quaid-i-Azam University 45320, Islamabad 44000, Pakistan	Not all authors listed (author-1, name and affiliation): The name of the first author is not included in the record, although their title as "Research Scholar" alongside their affiliation is included. Affiliations presented as authors (author-1, author-3): Instead of using the affiliation field for each author, affiliations, as well as titles, are recorded as independent authors of the item (author-1 and author-3).

TABLE 4
Examples of issues by category

Example	Issue details Issue (field in example): reasoning
Record author-1: name: "Research Scholar: Department of Statistics, Quaid-i-Azam University 45320, Islamabad 44000, Pakistan" sequence: "first" affiliation: [] author-2: given: "Zawar" family: "Hussain" sequence: "additional" affiliation: [] author-3: name: "Assistant Professor: Department of Statistics, Quaid-i-Azam University 45320, Islamabad 44000, Pakistan"	
Geography	
DOI 10.15750/chss..54.201411.007 *Item landing page* Publisher is identified, in both Korean and English, as 서울대학교 철학사상연구소 the Institute for Philosophy at Seoul National University. The author's affiliation is noted in Korean only as 서울시립대학교 (University of Seoul). *Record* Publisher: "Institute for Philosophy" Author-1: Affiliation: [] Language: "en"	Value incomplete (publisher): Per the item landing page, the publisher for this journal is a unit within a larger organization. In the absence of this larger organization's name in the record, however, "Institute for Philosophy" carries little contextual information about the publisher and its location, geographic and otherwise. Publisher location absent (publisher-location): Where the publisher-location field could have remedied the incomplete publisher name, whether by mention of Seoul or Korea, the absence of this field further prevents understanding of how and where to locate this publication. Value in original language absent (publisher): The original name of the publisher in Korean is not included in the record. While the inclusion of only the English translation may be because English is stated as the language of the record, this reasoning is weakened by the use of the author's Korean name instead of one of the two Romanizations used in the item and item landing page.

TABLE 4
Examples of issues by category

Example	Issue details Issue (field in example): reasoning
	Affiliation absent for all authors (affiliation): In the same vein as "Publisher location absent" above, the absence of the author's affiliation (and therefore, in this case, their geographic location) also limits understanding of the author's context. In this case, it is possible that the affiliation is not recorded because no English translation is available; only the original Korean is noted in the item or item landing page.
DOI 10.12681/jode.9694 *Record* Publisher: "National Documentation Centre (EKT)"	Location absent (publisher): The publisher-location field is not used and the location of the publisher is not immediately apparent from the value recorded for the publisher. Both the full name and acronym are official names used by the organization, however the absence of the full name in the original Greek may prevent educated guesses about the publisher's location based on language.

As noted earlier, some issues were more prominent than others, with eight issues classified as cultural appearing over 200 times within our non-random sample: 1) value absent, 2) language attribute absent, 3) publisher location absent, 4) affiliation absent for all authors, 5) language style absent: Romanization only, 6) incorrectly input, 7) value in original language absent, and 8) translation absent. Appendix C contains the full list of issues and the number of occurrences of each, by metadata level and field, in our sample.

Of these eight most common issues, all but one ("incorrectly input") refer to the absence of certain values or attributes from the record, with four correlating to language representation and two related to geographic and institutional location. Depending on the granularity of detail for affiliations, this field may also reflect disciplinary (and to a lesser extent, theoretical) locations.

Over half (n = 728, 54%) of the issues classed as "value absent" relate to rights and licensing information. Another 43% of absent values are in the abstract, language, and subject fields; the absence of a value in the language field is especially significant when multiple languages are present in the item and/or record or when the language of the record is different to that of the item.

Relatedly, when the language of individual values is different from the stated language of the record, a language attribute can be appended to the element. However, "language attribute absent" issues were frequently found in the container title, item title, and given and family name fields. In some of these cases, most notably in the name fields, only Romanizations or translations are provided. This raises further questions about the politics of naming and language, where researchers may choose Romanizations or other names for personal or professional reasons, or may not have a name in a non-Roman script.

In contrast, the "value in original language absent" issue corresponded most often with the publisher and affiliation fields, while "translation absent" occurred frequently with container

and item titles and abstracts; titles and abstracts in both original and translated languages were not included in any of the 140 records from multilingual venues included in the sample. These issues appear equally for container-level subjects; journals that recorded subject headings only provided headings in English, regardless of publication and record language/s. It is unclear if journals are able to apply non-English subject headings. The presence and accuracy of subject headings in records may also vary by publisher size, with smaller or independent journals less likely to assign relevant headings.

Other issues were not always so clearly of cultural significance. The "Incorrectly input" issue, for example, is an umbrella form that covers a variety of issues. Table 5 illustrates some of the issues under this umbrella and how they are designated as being cultural or non-cultural. Where deliberate motivations, such as using sentence case or all capitals to reflect seniority, are suspected, issues are recorded as cultural issues; this issue is noted as "input in all caps" for the item title field. In other cases where capitalization in the record may result from copy-pasting values from the published document, for instance, such issues are noted as "Other" (i.e., non-cultural). The authors recognize that such decisions are subjective.

TABLE 5
Examples of the range of issues of the form "incorrectly input"

Example	**Issue details** **Issue (field in example)**
Cultural issues	
DOI 10.17504/protocols.io.taheib6 *Record* author-1: given: "**Assoc**." family: "**Prof**. Vichien Srimuninnimit" author-2: given: "**Dr**." family: "Areewan Somwangprasert"	Incorrectly input: with titles only (given name) and Incorrectly input: with titles (family name) Definitions: • with titles only: person's title recorded in given name field without given name. • with titles: person's title is recorded in field with given name. Reasoning: recording titles in name fields may suggest the importance of seniority and rank. Suggested citations on the landing page that include these titles reflect downstream consequences.
DOI 10.7705/biomedica.v28i2.101 *Record* publisher: "Instituto Nacional de Salud (**Colombia**)"	"Incorrectly input: with location in parentheses" (publisher) Definition: value includes location, which is not part of the official name/title. Reasoning: including the publisher's location suggests the importance of place to organizational identity. Location is even more significant for organizations with less unique names such as this one. In many cases (as in this one), the publisher-location field is not used.

TABLE 5
Examples of the range of issues of the form "incorrectly input"

Example	Issue details Issue (field in example)
DOI 10.14710/jadu.v2i2.7641 *Record* publisher: "Institute of Research and Community Services Diponegoro University (**LPPM UNDIP**)"	Incorrectly input: with acronym of original lang value (publisher) Definition: value includes an acronym of the organization or container name in the original language. The acronym is not part of the official name or title and it often appears alongside an English translation of the name or title. Reasoning: an acronym of the original name is read as resisting linguistic erasure, providing a familiar access point to the organization's local community, or maintaining a consistent identity across languages over time.
Non-cultural issues	
DOI 10.1080/10587259408027158 *Record* affiliation-1: name: "**a** Department of Chemistry , Humboldt-University […]" affiliation-2: name: "**b** L. Dähne Institute of Organic Chemistry, […]"	Incorrectly input: with footnote marker (affiliation) Definition: numbers or punctuation marks (e.g., asterisk) for footnotes included incorrectly in field, with or without text of footnote. Reasoning: footnote marker likely included by accident due to copy-paste style of data entry.
DOI 10.15530/urtec-2017-2670073 *Record* author-1: given: "**null**" family: "**null**"	Incorrectly input: as null (given and family name) Definition: value entered as "null" and without actual value. Similar issues with "none," "not provided," and punctuation marks like "—" and ".." Reasoning: where "null" appears in multiple fields in the record, the issue is likely to be the result of an issue related to automated metadata creation or because the item does not have a dedicated author (e.g., editorials, full volumes, etc.).
DOI 10.1055/b-0037-147455 *Record* title: "6.4 Vorgehen bei äußeren Laryngozelen"	Incorrectly input: with chapter and section numbering (title) Definition: chapter and/or section number included with title; however they are not part of the title itself. Reasoning: chapter and section numbering possibly included by accident due to copy-paste style of data entry or a lack of other appropriate elements in the user interface.

TABLE 5
Examples of the range of issues of the form "incorrectly input"

Example	Issue details Issue (field in example)
Issues that are not clearly cultural or non-cultural	
DOI-1 10.24114/konseling.v19i2.30476 *Record (1a)* Title: "Citra Diri Penyandang Tunanetra terhadap Diskriminasi dari Lingkungan Sosial" *Item (1b)* CITRA DIRI PENYANDANG TUNANETRA TERHADAP DISKRIMINASI DARI LINGKUNGAN SOSIAL Widya Lestari1 Riski Fitlya2 Program Studi Psikologi, Universitas Muhammadiyah Pontianak1,2 *DOI-2* 10.24114/konseling.v19i2.30439 *Record (2a)* Title: "META ANALISIS GRATITUDE INTERVENTION PADA WELL-BEING" *Item (2b)* META ANALISIS GRATITUDE INTERVENTION PADA WELL-BEING *Levina Wicaksono* *Universitas Surabaya, Fakultas Psikologi, Magister Psikologi Profesi*	Incorrectly input: input in all caps (title-2) Definition: item title for the second article is input in all caps. Reasoning: In the first article, the authors appear to be non-faculty members and the item title is recorded in regular sentence case in the record. By contrast, in the second article, the author is a faculty member and the item title is recorded in all caps in the record. It is possible that capitalization choices are based on the seniority of the author, however it is just as possible that this stems from inconsistent practice. Further analyses of other records from this journal would be needed to determine if a pattern emerges and the issue leans more toward cultural or non-cultural.

Discussion

While many of the identified issues may, in fact, be due to poor metadata practice, it is apparent from the findings that the potential cultural motivations behind their presence in the metadata cannot be ignored. Measured against the possibility of harm to the individuals and communities most affected by a resource, there is clearly a need to consider metadata while engaging in broader conversations about the effects of homogenizing standards and equitable participation in research. The consequences of providing bibliographic information in English only for an article that is published wholly in another language, as is the case in some instances in our sample (e.g., Table 4, example 1 under "Language"), are not trivial and cut across these broader conversations.

Intentional or not, deviations from standards and so-called "best practices" for metadata entry affect the representations of cultural meanings and identities in substantive ways and should not be preemptively dismissed as input errors or problems with quality. While certain

issues may be more significant than others, they all create the possibility of confusion and, in aggregate, reduce trust in the reliability of metadata for conveying meanings and identities. The issues and the questions they raise require further research and consultation with stakeholder groups in scholarly publishing as well as with regional and disciplinary communities to ascertain if and how communities are variously impacted.

Specific to the categories identified in this review, consultation with publishers, editors, authors, and other creators of metadata is needed to confirm the nature and scope of issues (as technical or cultural, and intentional or accidental). While our analysis was able to determine the breadth of issues that have a cultural dimension, more work is needed to understand the reason why the issues exist, including metadata creators' intentions when inputting or recording data in these ways. Such discussions would also need to identify current and desired uses and functionalities of metadata, and to determine how tools and infrastructure can be adjusted or created to enable quality metadata creation and transmission.

In the absence of established good practices for multilingual metadata creation, community engagement would also provide critical insights for policies, recommendations, and guidance that address issues related to the Language category. The COAR Task Force on Supporting Multilingualism and non-English Content in Repositories (2022) confirms and addresses the issue of missing language attributes, recommending that repositories "include a tag in the language metadata field that identifies the language of the resource, and a tag that identifies the language of the metadata" in all records. These tags inform how systems parse and index content, which means that proper tagging will result in more accurate and effective discovery and indexing services. More consistent tagging should therefore be coupled with improvements to multilingual indexing in scholarly systems.

Training and guidance materials may also help increase awareness, understanding, and use of elements and attributes available in schemas and standards. For instance, the @xml:lang Language attribute in the JATS schema allows subtags for defining the language, script, and regional variant used for the content of an element (NCBI & NLM, 2021). Their adoption would enhance records that contain a mixture of values in translation, transliteration, and original scripts (such as example 2 under "Language" in Table 4) by indicating the various languages present; they may also help prevent issues such as the inclusion of multiple languages in a single field. Lapeyre & Usdin (2011) provide detailed guidance on the JATS elements and attributes that can be used to create records that are reflective of multilingual content.

Our view of articles with issues related to publishing in a language other than English or in multiple languages (which may or may not include English) suggests that some editors may struggle to produce metadata that reflects the diversity of their contributors and their linguistic practice, and/or to locate the sufficient financial, human, and technical resources required to translate and process metadata. It may very well be that, in areas where resources are particularly constrained, the presence of translated titles and abstracts in metadata depends on the ability and/or willingness of authors to provide their own translations.

For some journals seeking more plural representation, policies or recommendations have been developed to support representing a more holistic range of languages, conventions, and practices. Some strategies are: requiring titles, abstracts, and keywords be provided in the language of the manuscript as well as the publisher's national language and for affiliation names to be given in their national language (Revista, n.d., sec. Language and study areas); committing to publish author names in Chinese, Japanese, and Korean alongside English vari-

ants and providing technical guidance for doing so (AIP Publishing, n.d., sec. Guidelines for Using Chinese Japanese, and Korean Names); or suggesting that authors "provide a second abstract in their native language or the language relevant to the country in which the research was conducted" (British Ecological Society, n.d., sec. Manuscript Specifications).

These approaches need not be mutually exclusive; however, they may depend on the affordances and restrictions of schemas and interfaces for inputting and displaying metadata. Publishing tools and solutions in place should first be tested to ensure that metadata entered into the system can be transmitted and displayed accurately along both technical and cultural lines. The utility and impact of such strategies may also depend upon where additional language versions are published: in the journal platform and/or in the article PDF, for instance. Journal publishing services might also explore linked data methods to support multilingualism and cross-linked name references in publication metadata (Niininen et al., 2017; El-Sherbini, 2018; Hardesty & Nolan, 2021). Fields already exist for persistent ORCiD identifiers for researcher profiles, which can be utilized for linked data initiatives.

Certain issues may be unique to those assuming an English-first approach with the goal of increased indexing and discoverability. For items providing titles and abstracts in multiple languages, metadata records may only include the English version regardless of the language of the text itself. This approach could also result in publisher names, journal titles, and institutional affiliations appearing in English translation and/or transliteration only, regardless of the accepted language/s for publication or the original language of names and titles (e.g., Table 4, example 1 under "Geography"). Such a strategy may be indicative of the influence of prominent indexing services on the construction of metadata (Arastoopoor & Ahmadinasab, 2019, 223). To be considered for inclusion in Clarivate's Web of Science citation database, for instance, journals must provide titles and abstracts in English and bibliographic information in Roman script, regardless of the language of publication (e.g., Clarivate, n.d.).

Many issues in the Naming and Status categories relate to the use of fields to record information that does not align with the defined scope of the field; this may be due to an absence of more appropriate options or lack of clarity around existing ones. Obstacles for authors, journals, and other metadata creators to present names and status information appropriately may appear more immediately in journal publishing and hosting systems and user interfaces, or downstream in indexing and discovery platforms. Elements related to persons and their attributes and scope notes could also be revised or expanded to account for a broader range of naming conventions, and to enable notations of status and/or titles alongside affiliations. Such changes would accommodate cases like the one described in Table 4 by allowing Indonesian authors to input a single or multipart given name with no family name—common name forms in Indonesia—instead of repeating their given name in the family name field to comply with required fields. It could also lead to a decreased presence of titles like "Dr." or "Professor" or the use of capitalization in given and family name or other fields to indicate seniority and status, as the examples in Table 4 and 5 show.

Directions for Future Research

More than providing definitive conclusions about the state of metadata quality, this study raises further questions that warrant the attention of the scholarly community. While our team has been intent on addressing the first of the following questions (Donathan II et al., forthcoming), we call on the community to seek to address the following:

- To what extent are the metadata issues identified in this study present in the scholarly record?
- How does technical infrastructure exacerbate these issues? For instance, are indexing and discovery services capable of handling metadata in different languages well, and are user interfaces designed for non-Roman characters and multidirectionality? How well do systems operate independently and together to enable metadata exchanges that remain culturally attuned?
- Are English translations or Romanizations used intentionally to increase opportunities for indexing and metadata harvesting? How do these choices impact the discoverability and accessibility of content by those working in non-English languages and/or non-Romanized language forms?
- Whether because personal names are closely tied to identity or because Romanizations make professional interactions smoother, when are Romanized names in fact the preferred name of an author? When are Romanized names in fact the only names for an author?
- When affiliations are noted, how often are home institutions recorded as compared to affiliated or partner institutions? What are the consequences of including one or the other, or both?
- What should best or good practices be for journals that accept and publish full-text articles in multiple languages or publish titles and abstracts in multiple languages? If a journal changes its language policy, should metadata be retroactively updated to reflect or make note of this change? Would such updates have meaningful impacts?
- How can standards, best practices, and goals for interoperability be balanced against heterogeneous cultural, epistemic, and resourcing realities?
- Who is metadata being created for, for what purpose/s, and why?

Limitations

As previously stated, this review is the result of one author's interpretation of the sampled records and articles. It is therefore an incomplete picture of the cultural issues present in the sample and across all journal article metadata. Any issues that were overlooked or misinterpreted deserve attention, and efforts should be made to address these in other projects.

Scoped by the elements available in JSON-formatted records, the authors do not fully address issues resulting from the absence of elements—in the schema, data model, or end-user interface—to which values can be assigned, such as keywords, Romanization or transliteration styles, or professional or community titles. Studies to identify elements and standardized values that could be added to metadata schemas and standards to enhance cultural representation would provide further clarity for next steps. Where this research did not involve a rigorous close reading of the associated articles, separate studies may also attend to cultural issues related to the quality of subject analysis as well as relationships between the accuracy of subject analysis and the prevalence of cultural metadata issues.

This review hopes to prompt further investigations into metadata practices and issues specific to given disciplines, cultures, regions, and languages that are not explored in depth here. Likewise, the impact of regional publishing and research norms on metadata creation, the size and resourcing available to publishers, or the cultural downstream effects of the identified issues may be taken up in the future. Focusing largely on academic journal articles in this review, later studies might also examine metadata for other primary and secondary

resource types. Building on the work of Barnett at al. (2010), further studies specific to the ways in which metadata are interpreted downstream by systems and organizations, such as search and cataloging platforms, libraries, and citation management systems, would also be useful.

Conclusion

Viewing metadata as informational objects in their own right encourages us to consider records beyond functional objects requiring technical accuracy to support resource use and discovery. As we build, refine, and expand our publishing infrastructures and resource discovery systems, we must recognize that metadata is not a mechanism created solely to connect end users to resources. Cultural issues should be foregrounded during the review and development of local journal policies, research and publishing practices, technical training, and metadata systems and standards.

Instead, as informational objects, metadata records should be treated as sites in need of critical, intellectual engagement to surface the perspectives and identities embedded and obscured in their creation. In taking up the responsibility of describing a researcher's output in a record, journal editors and publishers also have a responsibility to the researcher to ensure that their contributions and identity are represented as fully as relevant and possible to their work and the communities most affected by it.

Efforts such as the 2019 Helsinki Initiative on Multilingualism in Scholarly Communication, 2021 Coalition Publica Metadata Working Group report, and COAR Task Force on Supporting Multilingualism and non-English Content in Repositories, struck in August 2022, speak to the importance of supporting the dissemination of and access to locally relevant research and nurturing regional publishing infrastructures. Ensuring metadata appropriately and respectfully represent cultural identities and nuances is one step toward that goal.

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Appendix A

Count of item types other than journal article

article	309
proceedings	29
book review	14
chapter	12
technical report	11
protocol	9
digitized backfile	6
journal issue	4
letter to editor	4
retraction	3
editorial	2
encyclopedia entry	2
end matter	2
index	2
news	2
advertisement	1
bibliography	1
book	1
brief	1
communication	1
contributor list	1
editor note	1
issue section	1
journal	1
listicle	1
miscellanea	1
notice	1
notice of meeting	1
technical note	1
table of contents	1
translation	1

Appendix B

Mapping of 32 unique issues to the categories, with examples

Issue	Language	Naming	Status	Geography	Contribution	General
value absent	10.1590/s1516-44462005000100001 (field: language)		10.1590/s1516-44462005000100001 (field: affiliation)	10.1590/s1516-44462005000100001 (field: publisher-location)	10.18535/jmscr/v7i5.40 (field: author)	10.1590/s1516-44462005000100001 (field: license)
translation absent	10.54161/jrs.v2i1.61 (field: abstract and title)					
value in original language absent	10.32598/jmsp.6.4.686 (field: all)	10.3820/jjpe.22.s57 (field: publisher)		10.1080/23802359.2019.1710605 (field: affiliation)		
lang attribute absent	10.1163/1571805042782109 (field: title)					
lang style absent: Romanization only	10.1556/ahista.47.2006.1-4.6 (field: publisher)	10.1016/s1003-6326(20)65424-3 (field: author-family)				
lang style absent: Romanization absent	10.15750/chss..35.201002.013 (field: author)					
vor license terms absent						10.1530/acta.0.0070017ff (field: license)
author/s absent					10.28933/ijsr-2020-12-1605 (field: author)	
not all authors listed					10.31080/asol.2021.03.0355 (field: author)	
ORCIDs absent					10.32598/sija.16.2.1600.1 (field: author)	

Issue	Language	Naming	Status	Geography	Contribution	General
not all persons listed					10.2478/v10008-007-0012-2 (field: N/A – absent person is translator)	
affiliations absent for all authors			10.15556/ijsim.01.02.001 (field: author)			
affiliations absent for all editors			10.1055/b-0036-132151 (field: editor)			
not all publishers listed					10.29252/rmm.5.1.44 (field: publisher – university co-publisher absent)	
related orgs absent					10.1111/j.1945-5100.1996.tb02122.x (field: assertion – rightsholder absent)	
location absent			10.18535/jmscr/v7i5.40 (field: author-1 – affiliation listed as an author)	10.1016/j.forpol.2020.102283 (field: publisher)		
subtitle absent						10.32598/sija.16.2.1600.1 (field: container-title)
outdated						10.1530/acta.0.0070017 (field: container-title)

Issue	Language	Naming	Status	Geography	Contribution	General
registered URL out of date						10.15556/ijiim.02.01.003 (field: doi)
registered URL invalid						10.15556/ijsim.01.02.003 (field: doi)
value in record does not match information on container website					10.29252/archhygsci.8.2.119 (field: publisher)	10.17504/protocols.io.8ihhub6 (field: abstract)
inaccurate	10.3820/jjpe.22.s57 (field: language)					10.15556/ijsim.01.02.003 (field: subject)
affiliations presented as authors	10.15863/tas.2014.02.10.30 (field: author)		10.15863/tas.2014.02.10.30 (field: author)			
multiple languages in single field	10.1163/1571805042782109 (field: container-title)	10.14710/jadu.v2i2.7641 (field: publisher)		10.1590/0074-02760210176 (field: author-affiliation-name)		
multiple values in single field	10.1016/s0005-2760(98)00140-4 (field: container-title)	10.14710/jadu.v2i2.7641 (field: publisher)	10.29252/archhygsci.8.2.119 (field: author-2 and author-3 – affiliations listed as authors)		10.1590/0074-02760210176 (field: publisher)	
original-title used incorrectly: includes value in original language but item is not a translation	chss.72.201905.006 (field: original-title)					

Issue	Language	Naming	Status	Geography	Contribution	General
original-title used incorrectly: value repeated	10.18535/jmscr/v8i4.83 (field: original-title)					
all authors listed as first			10.12697/akut.2019.25.07 (field: author-sequence)			
first author not identified			10.2118/206525-ms (field: author-sequence)			
input in all caps		10.1016/s1003-6326(20)65424-3 (field: author-family)	tpmj/2009.16.02.2939 (field: author)			
additional persons listed					10.2307/4147866 (field: author-1 and author-2 – authors of reviewed work)	
value incomplete	10.1093/ehr/cel085 (field: title)	10.20523/sapereaude-ano4-vol-12-pg-143-165 (field: author-family)				10.20527/jurnalsocius.v3i2.3259 (field: container-title)
only provides initial/s		10.15863/tas.2019.06.74.35 (field: author)				
acronym only		10.1590/1807-1929/agriambi.v19n4p317-323 (field: publisher and author-affiliation)				

Appendix C

Count of all issues, total and by level and field

Issue	Total	Item DOI	Item Abstract	Item Title	Item License	Person General	Person Given Name	Person Family Name	Person Affiliation	Container Publisher	Container Title	Container Language	Container Subject	Container Rights
registered URL invalid	14	14	0	0	0	0	0	0	0	0	0	0	0	0
registered URL out of date	18	18	0	0	0	0	0	0	0	0	0	0	0	0
value absent	1348	0	221	14	318	0	23	0	1	0	0	253	108	410
translation absent	207	0	51	48	0	0	0	0	0	12	39	0	57	0
value in original language absent	214	0	8	19	0	0	1	2	44	58	25	0	57	0
incorrectly input	246	0	16	37	0	8	24	55	25	63	15	0	3	0
original-title used incorrectly	22	0	0	22	0	0	0	0	0	0	0	0	0	0
language attribute absent	641	0	44	106	0	0	123	134	13	64	112	0	45	0
multiple languages in single field	63	0	3	3	0	0	0	0	9	0	48	0	0	0
value incomplete	21	0	2	0	0	0	0	2	3	10	4	0	0	0
value in record does not match information on container website	71	0	3	2	0	0	0	0	0	49	17	0	0	0
vor license terms absent	63	0	0	0	63	0	0	0	0	0	0	0	0	0
additional persons listed	6	0	0	0	0	6	0	0	0	0	0	0	0	0
author/s absent	41	0	0	0	0	41	0	0	0	0	0	0	0	0
not all authors listed	19	0	0	0	0	19	0	0	0	0	0	0	0	0
all authors listed as first	2	0	0	0	0	2	0	0	0	0	0	0	0	0
first author not identified	13	0	0	0	0	13	0	0	0	0	0	0	0	0
ORCIDs absent	6	0	0	0	0	6	0	0	0	0	0	0	0	0
not all persons listed	1	0	0	0	0	1	0	0	0	0	0	0	0	0

Issue	Total	Item DOI	Item Abstract	Item Title	Item License	Person General	Person Given Name	Person Family Name	Person Affiliation	Container Publisher	Container Title	Container Language	Container Subject	Container Rights
language style absent	290	0	0	0	0	0	120	130	2	23	15	0	0	0
only provides initial/s	72	0	0	0	0	0	66	6	0	0	0	0	0	0
absent for all authors	297	0	0	0	0	0	0	0	297	0	0	0	0	0
absent for all editors	4	0	0	0	0	0	0	0	4	0	0	0	0	0
acronym only	28	0	0	0	0	0	0	0	7	21	0	0	0	0
affiliations presented as authors	42	0	0	0	0	0	0	0	42	0	0	0	0	0
multiple values in single field	56	0	0	0	0	0	0	0	18	33	5	0	0	0
location absent	401	0	0	0	0	0	0	0	2	399	0	0	0	0
inaccurate	158	0	0	0	0	0	0	0	0	0	0	47	111	0
not all publishers listed	6	0	0	0	0	0	0	0	0	6	0	0	0	0
related orgs absent	4	0	0	0	0	0	0	0	0	4	0	0	0	0
outdated	7	0	0	0	0	0	0	0	0	0	7	0	0	0
subtitle absent	6	0	0	2	0	0	0	0	0	0	4	0	0	0
total count	4387	32	348	253	381	96	357	329	467	742	291	300	381	410

Why Does SoTL Happen in a Librarian-Free Zone?

Anne Grant, Kyle Feenstra, and Mills Kelly

This exploratory study seeks to gather preliminary information about the roles that academic librarians in the United States (US) and Canada play in the Scholarship of Teaching and Learning (SoTL) work on their campuses. It also provides insight into how librarians at US Carnegie Research 1 (R1) classified universities and U15 Group of Canadian Universities (U15) participate in SoTL, to discover ways by which these librarians might grow these roles, as well as their understanding of SoTL expertise, to better support students. Data was collected through an internationally distributed survey. The authors used thematic analysis along with descriptive statistics to examine how academic librarians participated in SoTL practices as consultants, developers, partners, and scholars. Results from this study expand upon prior research on the role of librarians in this field of study and examines how barriers can be broken down to improve the working relationships between teaching faculty and librarians at research intensive universities to enhance student learning.

Introduction

The Scholarship of Teaching and Learning (SoTL) involves research in "which faculty frame and systematically investigate questions related to student learning—the conditions under which it occurs, what it looks like, how to deepen it, and so forth—and do so with an eye not only to improving their own classroom but to advancing practice beyond it" (Hutchings & Shulman, 1999, p. 8). SoTL scholars have unprecedented access to information through databases and other library resources; yet, how much of their research in this complex web of information involves librarians? Based on anecdotal evidence and the authors' experiences, scholars appear to rely most often on individual knowledge of their university's resources rather than partnering with their institution's information specialists, academic librarians. This becomes problematic because SoTL scholars not only need to be fluent in the information landscape of their own field of research, but they must also be familiar with the vast literature on teaching and learning.

The authors framed this introductory, exploratory study around two research questions:

- In what ways are academic librarians in the United States (US) and Canada involved in SoTL on their respective campuses?

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- What are the barriers and opportunities for librarians in their participation in SoTL?

In order to preliminarily explore these questions, the authors chose to focus on library employees at institutions that encourage research activity. They distributed a survey to gain a glimpse into the involvement of academic librarians involved in SoTL at research intensive universities. The researchers chose to focus on R1 (US) and U15 (Canadian) universities because their identification as research intensive institutions fit this criterion (*Doctoral Universities…*, 2020; *U15,* 2020). This paper specifically builds on the work of McClurg et al. (2019), who describe four potential roles for librarians in SoTL: consultant, developer, partner, and scholar. Through an exploration of these four roles, this paper examines the extent to which a sample of academic librarians at R1 or U15 libraries are involved in SoTL activities in their campus communities.

Literature Review

SoTL and Academic Librarianship

While librarians were not mentioned in early SoTL publications such as Boyer's (1990) *Scholarship Reconsidered: Priorities of the Professoriate*, nor those about SoTL in Higher Education in particular, such as in Murray's (2008) *Scholarship of Teaching and Learning in Higher Education*, librarian involvement in SoTL is increasing, as is evident in more recent publications such as *The Grounded Instruction Librarian: Participating in the Scholarship of Teaching and Learning* (Mallon et al., 2019). In one chapter of this book, Coonan notes that SoTL "offers teaching librarians not only the tools and insights required to conduct formal inquiry into their practice, but also the means to confront deeper questions about themselves and their identities; about the roles they play and the responsibilities these roles bring" (2019). Academic librarians at research intensive universities have great potential to play key roles in SoTL activity on campus because of their knowledge about interdisciplinary databases and information sources, and efforts have been made to extend opportunities for support as seen in blog entries and hashtag campaigns like #librarianSoTL (Sancomb-Mora, 2017). If teaching faculty and academic librarians are able to collaborate in meaningful ways, student learning has the potential to be maximized and SoTL efforts vastly improved, as Peter Otto said: "The likelihood that students will acquire skills in information-seeking behavior surely increases in proportion to librarians' well-developed pedagogical skills and knowledge" (2014, 77-78).

In order to better understand the connection between academic librarianship and SoTL, it should be noted that SoTL research involves studies conducted in partnership with students, and then taking that research and making it public. Academic librarians teach and interact with the public in a myriad of ways every day, which provides many opportunities for librarians to take this work to the next level and publish their discoveries about their practice (Felton, 2013). Miller-Young and Yeo (2015) link the following learning theories to SoTL: Behaviorism, Constructivism, Cognitivism, and Humanism. That is, instructors are working with students as they seek to understand how they best learn course content. Knowing this can help librarians understand how they might apply these theoretical frameworks to their own teaching and then add to the scholarship that already exists. Hutchings et al. describes SoTL as "an approach to teaching that is informed by inquiry and evidence (both one's own, and that of others) about student learning" (2011, p. 3) However, while there are many benefits to the publication of research involving teaching practice, there are challenges for SoTL because—on many university campuses across the US and Canada—SoTL research is not strictly disci-

plinary. Therefore, some Tenure, Promotion, and Reappointment (TPR) committees will not count this work as scholarship toward tenure or promotion, which could limit the willingness for tenure-track faculty to engage in this work. Academic librarians may have an advantage here, as teaching and learning is a part of the discipline of librarianship and thus this kind of research would be seriously considered for the tenure and promotion process in this field.

Roles of Librarians in SoTL

The present study primarily builds on McClurg et al. (2019) in which the authors discuss the overlaps between scholarship of teaching and learning, and information literacy research. The authors of this work describe four models for librarians participating in SoTL research and practice. These include: *Consultant*, *Developer*, *Partner*, and *Scholar*. These models indicate a range of engagement in SoTL, from a supporting role to independent researcher and author.

Consultant

In the Consultant role, librarians provide support to facility researchers by guiding the literature reviews process. McClurg et al. argue that, because librarians are comfortable conducting searches in broad, interdisciplinary topics where there are no established controlled vocabularies or subject-based databases on their expertise, they "can help scholars of teaching and learning 'step into the unknown' to share or edit a literature search to ensure it… fully supports the project" (2019, p. 6). Others suggest that serving as an "information consultant" can be a higher level of involvement in a project and that it can imply more of a partnership than the smaller role suggested by McClurg et al. (Frank et al., 2001). Still others conclude that "viewing librarians as consultants emphasizes the value of both communication and expertise" (Eldridge, et al., 2016, p.162). In the Consultant role, librarians are considered to be least engaged in the research process.

Librarians often find themselves supporting the research of faculty and students, but they do not often participate in research on teaching. Hays and Studebaker examined the teaching identity of librarians as seen through the development of SoTL and noted that librarians defined themselves differently when it came to teaching—some did not initially see themselves as teachers but, by reconsidering their roles, they identified more as teachers (2019). Coonan notes that librarians often fall in a unique space between academic support, and instructional and research support (2019). The American Library Association also notes that many librarians participate in SoTL, yet does not directly mention the role that librarians could play in supporting faculty in their own SoTL research ("Keeping up with," 2017). In the role of Consultant, librarians can bring their expertise to the table as they offer advice about how to navigate the research environment.

Developer

As Developers librarians could be embedded in their institution's teaching and learning center—which would allow them to work more collaboratively with educational developers and faculty members as they design student learning experiences—or they could be connected with these centers more tangentially. In this Developer role, librarians are able to be more involved in departmental problem solving and planning, and can extend support for faculty research and publishing by working with educational developers. This role can provide librarians the opportunity to learn more about teaching and learning and to improve their own practices,

and it can provide spaces for cross-disciplinary conversations (Perini, 2014). One theme that emerged from a survey of non-library faculty was that "librarians have the capacity to build bridges and relationships across campus and disciplines, which can further the work of the CTLs (Centers for Teaching and Learning)" (Mader & Gibson, 2019, p. 788). Others contend that "in the new environment of learning centres, the academic library extends the concept of useful and valuable information further than scientific and technological information" (Schopfel et al., 2015, p. 69). Other scholars acknowledge the importance of librarian collaborative involvement:

> Faculty members bring to the table expertise in their disciplines, knowledge of their students, and skill in teaching. Librarians also bring to the collaborative table special expertise, in a way similar to the expertise that consultants bring to any entity. Librarians offer knowledge of resources, information search skills, teaching skill, and understanding of the research process and questioning strategies honed at the reference desk." (Donham & Green, 2004, p. 315).

This quote helps to illuminate the many ways that librarians can be brought into SoTL projects especially considering many faculty who are undertaking SoTL work are often experts in their discipline, but not in the area of educational research. For example, if a professor in physics was interested in understanding how their students were engaging in an active learning assignment, they may not know where to go in the literature to find information about active learning or educational theory. In this case, a librarian with experience in educational research would be an invaluable collaborator.

Partner

In a third role, at a higher level of engagement, librarians can also serve as equal Partners in SoTL research projects. In this role librarians can contribute their expertise in "data analysis… writing, presenting and publishing to the overall research process" (McClurg et al., 2019, p. 8). McClurg et al. (2019) also point out that because of their unique relationship to students, often acting as safe advisors, librarians are able to gain valuable insights into student learning, which makes them ideal collaborators on SoTL projects. The existing literature on collaborations between librarians and faculty/academic staff engaged in SoTL work has largely cast academic librarians as resources, rather than as partners or as SoTL scholars in their own right. Moreover, librarians often frame their research as "information literacy" rather than as SoTL (2019, p. 4). When this happens, it can leave librarians out of SoTL conversations. Helping librarians and faculty to bridge this gap may be as simple as re-examining language and perceptions regarding the place of information literacy in SoTL research and practice.

When it comes to developing their teaching, Bradley (2009) discusses the possibility of collaboration between librarians and teaching development centers. Participation in SoTL has also shown that teaching skills of librarians can benefit alongside their faculty peers through the implementation of SoTL principles, as discussed by Hays (2017). This partnership can be further enhanced once teaching faculty realize the amount of technical expertise that librarians bring since librarians are often well informed about new technology and innovations in the field of research (Mitchell & Mitchell, 2015). Library staff in the United Kingdom revealed that "library staff see integration into the curriculum and partnership with academic colleagues as the way forward" (Hardy & Corrall, 2007, p. 86).

Scholar

In the final role discussed by McClurg et al. (2019), librarians act as Scholars when they work independently as SoTL researchers. In this role librarians are lead practitioners, researchers, and authors of their own scholarship. One study reported "Findings include that 1.38% of articles published in these journals were written by a librarian author or authors, most of who are employed at research institutions. Information literacy was the most common topic, and theoretical articles were the most popular article type" (Folk, 2014, p. 76). Lack of formal educational training for librarians can hold them back from scholarship in teaching and learning (Nimon, 2002). At this highest level of SoTL work, a librarian would be fully responsible for a research project and its publication.

Methodology

In order to address the exploratory research questions, data was collected through an online survey distributed to librarians involved in instruction at research intensive (R1 and U15 libraries) in the US and Canada. The survey was distributed in January 2020 via library listservs, as well as through some direct emails to heads of research and instruction units at selected R1 and U15 universities; the survey remained open until the end of February 2020. In total, 47 surveys were completed by academic librarians from the universities contacted. Ethics approval from both Canadian and US Institutional Review Boards (IRBs) was granted for this project.

Recruitment

Two techniques were used to recruit participants. First, the authors compiled a list of librarians identified as leaders in library instruction at each U15 and R1 university library in Canada and the US. Librarians who met this criterion were listed either as heads, directors, or coordinators of library instruction on publicly available staff directories at U15 and R1 institutions. Each librarian selected was sent an invitation to participate in the study (Appendix B). The invitation also requested that those originally contacted please forward the survey to colleagues at their institution who were employed as librarians or library staff, and whose academic responsibilities included instruction or participation in SoTL. Second, a request for participation was distributed through listservs managed by American and Canadian academic library associations. Invitations were also sent internally to librarians at the institutions where each of the authors were employed.

The researchers recognize that, as a broadly defined discipline, many librarians may already be involved in various aspects of SoTL without personally identifying as SoTL workers or scholars, and that this could result in lower participation levels. The recruitment email, therefore, included a broad definition of the scholarship of teaching and learning, indicating that it is often used to denote a range of activities related to the study of teaching practices in higher education and that librarians employed at R1 and U15 universities involved in any aspect of SoTL met the criteria for participation. The researchers also recognize that there is a difference between those who work at academic libraries in the US and Canada as many Canadian library employees work in non-tenure track positions. In addition, the researchers acknowledge that the 47 completed surveys represent a small percentage of academic librarians at R1 or U15 institutions; nevertheless, even this modest sample can hopefully provide some direction for future research.

The Survey

The survey used for this study was adapted from the *Carnegie Academy for the Scholarship of Teaching and Learning* (CASTL) survey originally distributed in 2004 (Cox et al.). Adaptations made by the authors were based on an article by McClurg et al. (2019) focusing on four roles of academic librarians in SOTL collaboration identified in the article: Consultant, Partner, Scholar, and Developer. The survey was created and distributed using Qualtrics and included 14 multiple choice questions, each with additional space where participants could add comments to clarify their responses. Respondents were permitted to skip questions they preferred not to answer. The complete instrument can be found in Appendix A.

Participants

To maintain anonymity the survey did not require participants to disclose any self-identifying information. All respondents were required to indicate whether they were employed at a R1 or U15 institution in the US or Canada to ensure they met the criteria for participation. To gain a clearer picture of the employment status, respondents were also asked to indicate if they were employed as tenure track, non-tenure track, or as library staff. Academic librarians at R1 institutions may be employed as tenure track, non-tenure track, or library staff. At U15 universities librarians may have tenure track or non-tenure track appointments whereas the term library staff typically refers to support staff or library assistants. Tenured and tenure-track librarians are required to participate in the same type of research and service efforts undertaken by other faculty at the university, while those who are not in the tenure track usually focus less on research and more on their primary roles as librarians.

A majority of respondents identified as a member of academic institutions in the US (57%); respondents from Canadian academic institutions comprised 36.2%, and 6.4% of respondents choose not to identify. While the majority of respondents were from the US, the Canadian sample remains significant. At the time of the study there were 131 R1 universities with Canadian U15 universities comprising just 10% of total institutions potentially represented (Doctoral Universities, 2020 & U15, 2020). As for status of participants, most participants indicated faculty status, and only 8% identified as staff. A total of 55% of participants identified as tenure-track faculty.

FIGURE 1
Location of Respondents

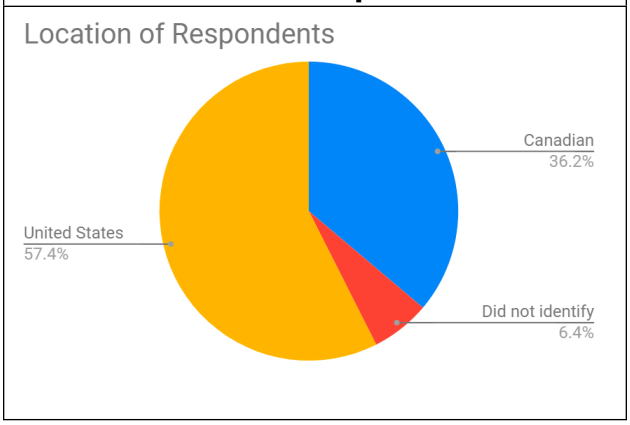
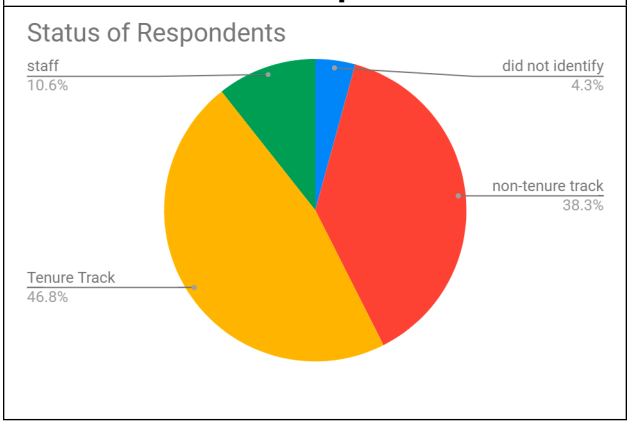


FIGURE 2
Status of Respondents



Data Analysis

Both quantitative and qualitative data was collected. Quantitative data was analyzed by looking at the descriptive statistics from the close-ended, multiple-choice questions and a thematic analysis was conducted on the qualitative data collected.

Quantitative Data Analysis

Quantitative data is represented graphically throughout this article. Simple graphs are used to display the total number of responses to the yes and no questions. JMP, a suite of computer programs for statistical analysis developed by a subsidiary of SAS Institute, was used to compare the results for selected areas (US or Canada) and status (type of employee). This was done for each question by creating a graph to explore the means for the responses according to the different countries and job status. The x-axis was represented as the location (two countries), the y-axis was the binary question response, and the overlay was the three types of library employee (faculty, tenure-track; faculty, non-tenure track; or staff). This type of graph allows the reader to visualize the difference in the means for the three different groups to determine the degree to which each group might be participating in the different areas according to their job classification.

Qualitative Data Analysis

According to Guest et al., the primary goal of inductive thematic analysis is to present "the stories and experiences voiced by study participants as accurately and comprehensively as possible" (Guest et al., 2012, p. 17). The survey produced 21 open ended responses that were coded by identifying themes. A coding manual was developed to describe these themes and then each researcher independently assigned codes to each of the comments. It was possible for one comment to have multiple codes depending on the content of the response. One author read through the comments and suggested eight preliminary codes, along with a coding manual to describe these codes. Next, the other two researchers used these suggested themes and individually coded the data to examine inter-rater reliability. It was determined via Fleiss's Kappa that the raters came to a fair agreement about the codes with a result of 0.382 expected agreement.

Results

The following information is summarized from the survey responses and arranged by the four roles of consultant, developer, partner, and scholar. This exploratory study examines the various models of engagement and how this engagement took place. Each section includes the quantitative results in two ways: the first chart for each question show the binary results for the "yes/no" questions along with the number of total responses and the second graph shows the mean of the response for each category of respondent (faculty, tenure track—those faculty who are tenured or who are on track to be tenured at their institution; faculty, non-tenure track—those faculty who are considered to be of faculty rank, but are not eligible for tenure; and staff—library employees who are not considered to be faculty) and shows the difference in that mean for the US and for Canada. Presenting the results allows for analysis of the reasons why librarians may choose to participate in SoTL, or not, at their institutions. All the qualitative responses for each section are also included for each role.

Consultant

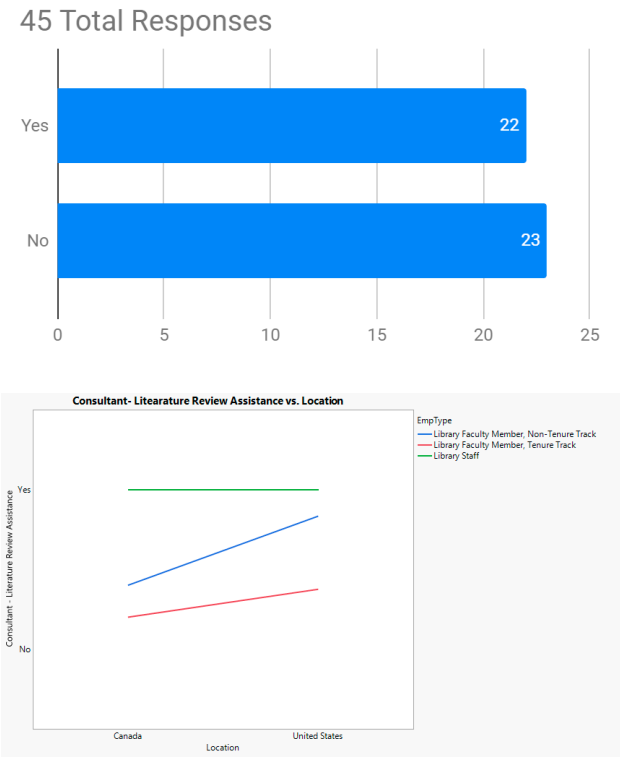
McClurg et al. define the role of consultant as when a "librarian acts as a consultant for the literature review for a colleague engaged in SoTL" (2019, p. 5). In Table 1, the survey reveals how these librarians have served in this role at their institutions.

The following were the comments made by respondents when asked to give the primary reason for not having worked in this area, if they indicated that they had not worked in the capacity of consultant:

Comments:

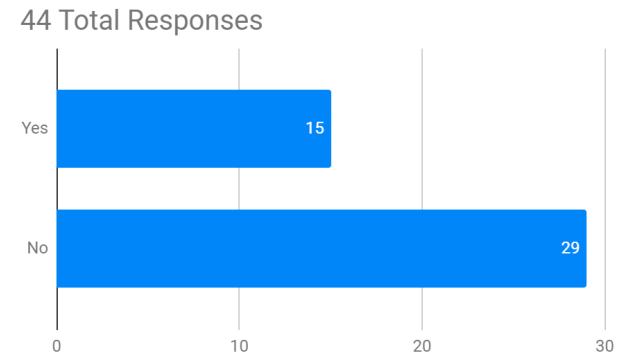
- Not my subject area, I do data support.
- I initiated a couple of total projects involving in different course/ program contexts. I am not Education liaison, as such I don't receive in support in other SoTL support.
- My position does not focus on teaching and learning in these ways (rather than the lack of time).
- Not been asked.
- I have worked with some of these capacities, but not in an integrated way. I think the reason why I have not engaged with more of these capacities is because the archives at time has not been included in some of the instructional activities (some of it has been because the archives have not been included in discussions and/or the person that has engaged with the instructional team and liaisons has not filtered down information so it results in a lack of knowing.
- professors were mainly not interested in this.

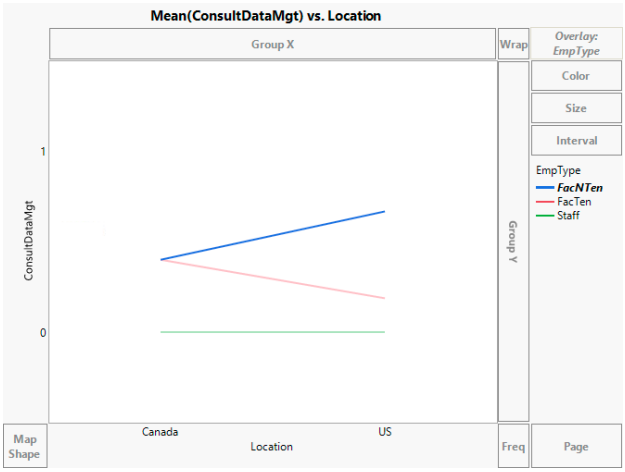
TABLE 1
Consultant

Survey Statement & Data Interpretation	Results
Survey Statement: I have worked with colleagues at my institution by assisting with literature reviews about topics dealing with teaching and learning. **Interpretation**: There is almost an equal number of yes and no responses to this question and almost all of the participants responded. Those who identified as staff were most likely to assist with literature reviews in either the US or Canada. Non-tenure-track faculty were more likely to participate in literature review consultations in the US than in Canada and were the second group most likely to participate in this activity. The least likely group to participate in literature review consultations were the tenure-track faculty; however, they were slightly more likely to participate in the US than in Canada.	

Survey Statement: I have worked with colleagues at my institution on their teaching and learning projects by providing information on research data management, or planning for securely storing and sharing documents, drafts, and data for the project's life cycle by, for instance, utilizing institutional repositories and developing filing systems with file names, login procedures, and organizations that keep the data appropriately discoverable and usable

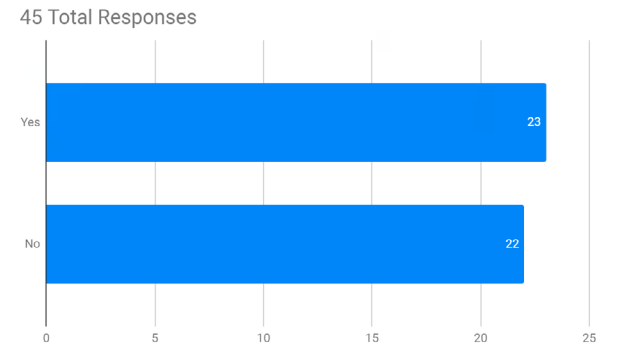
Interpretation: A large number of respondents provided data for this statement. Respondents were more than twice as likely to no have worked with colleagues on data management plans or other planning. Non- tenure-track librarians in the US were the most likely to have helped in this capacity while staff seem to be not involved at all in this process. Tenure-track librarians in Canada were more likely than those in the US to participate in this activity.

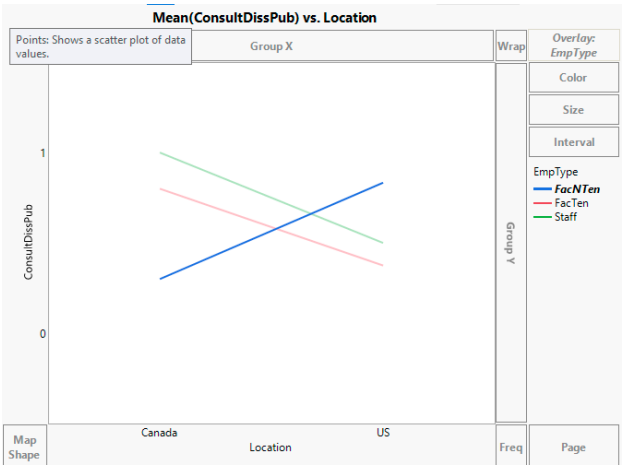


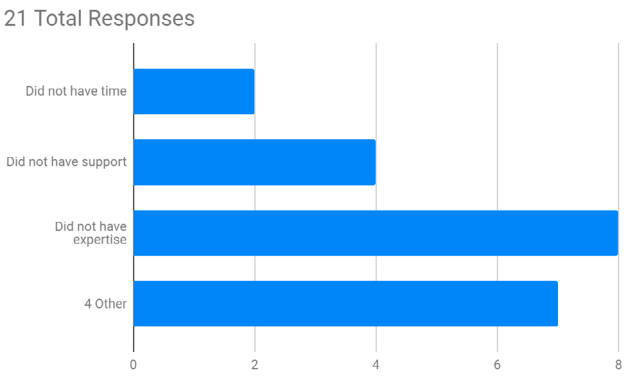


Survey Statement: I have worked with colleagues at my institution to identify places to disseminate the work they have done on their teaching and learning practices. For example, have you discussed open access, copyright, predatory journals, and knowledge mobilization beyond the scholarly journal can also inform decisions about where and how to go public with SoTL projects.

Interpretation: Almost all of the participants responded to this statement and the numbers were equal as to whether or not they have worked with their colleagues in these areas. Those most likely to have assisted with this were staff in Canada while those least likely to help with this were non-tenure-track librarians in Canada. US non-tenure-track librarians seem to have significantly participated in this area.





Survey Statement: If you have not worked in these capacities, what do you think was the primary reason? **Interpretation:** Only half of the respondents chose to engage with this statement. The most selected reason for not participating in these capacities was the lack of expertise, followed by lack of support, and finally lack of time.	

Developer

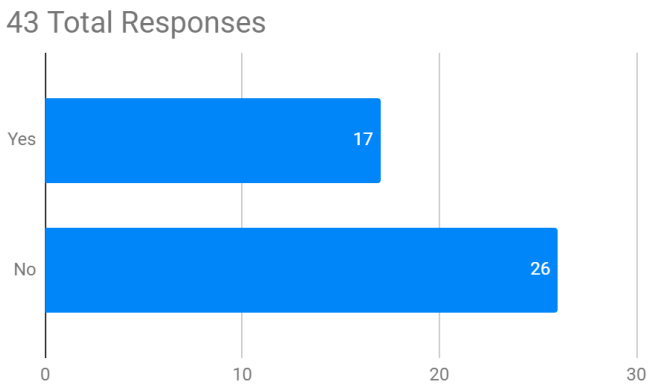
Librarians working in the role of developer would be ones who work closely with teaching and learning centers on campus. McClurg et al. describe this role as librarians who work "essentially as specialized educational developers," and who "enjoy a sense of membership in the unit and even a physical proximity to the center staff" (2019, p. 7)

The following were the comments made by respondents when asked to give the primary reason for not having worked in this area, if they indicated that they had not worked in the capacity of Developer:

Comments:

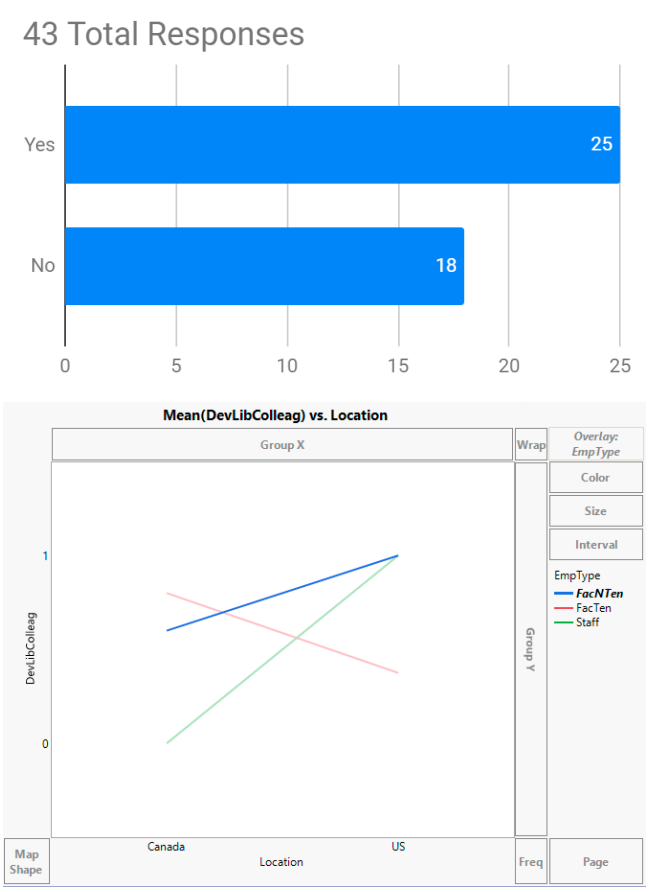
- My position does not focus on teaching and learning in these ways.
- I have recently assumed responsibility for Learning Services at the campus libraries, after a reorganization. Many of these areas of work are within my portfolio, and I will either participate directly or have others participating in the future.
- The Library has titled positions specifically for these purposes; mine is not one of them, although I do work with faculty on their teaching & student learning within my disciplines.

TABLE 2
Developer

Survey Statement & Data Interpretation	Results
Survey Statement: I have been a direct part in developing teaching and learning projects in collaboration with the campus teaching and learning center. **Interpretation:** A large number of participants responded to this statement and the majority indicated that they had not been a direct part of development.	

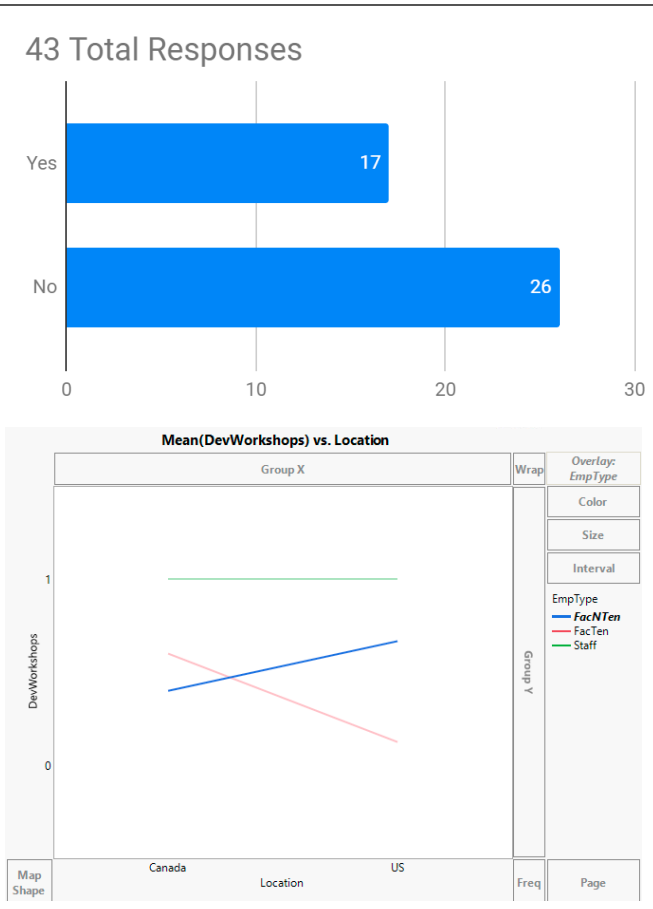
Survey Statement: I have directly collaborated with colleagues in my liaison/subject areas in framing and investigating questions about teaching and learning. For example, you have been included by teaching faculty on teaching and learning outcomes on the creation of information literacy assignments for their courses and have created reports on the student success in these assignments.

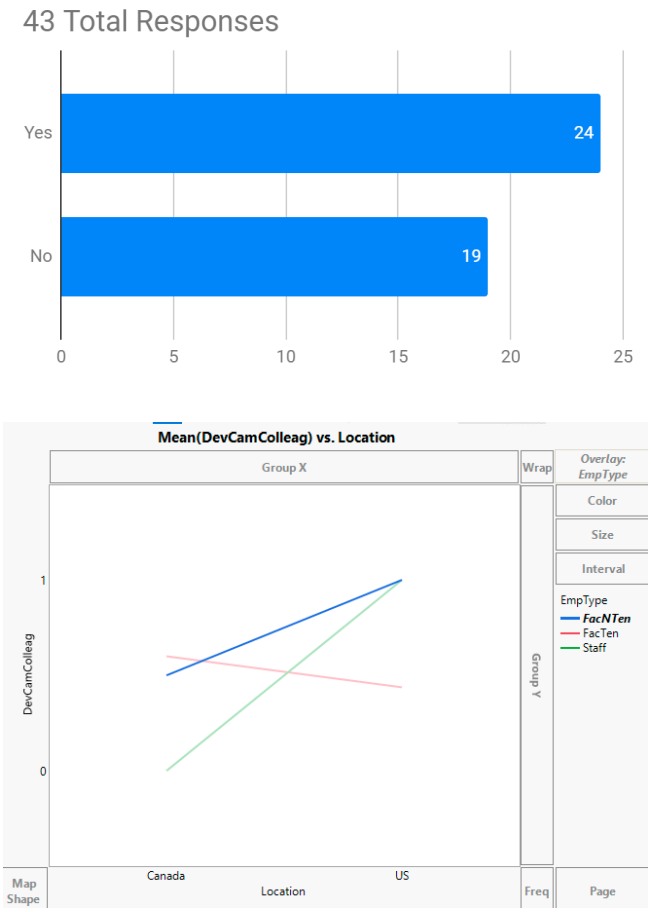
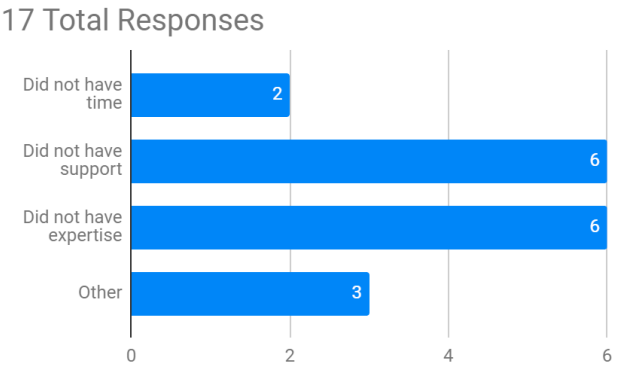
Interpretation: More participants indicated they have worked with faculty in their liaison areas on SoTL projects. Staff from the US and non-tenure-track librarians from the US were the two groups most likely to have assisted in this capacity. Staff in Canada were least likely to work in this capacity. Tenure-track faculty in Canada seem to have worked in this area.



Survey Statement: I have provided workshops designed specifically to help faculty improve their SoTL work on topics such as conducting effective literature reviews or providing information on publication and/or data management.

Interpretation: More respondents responded negatively than positively to this statement indicating that fewer have provided workshops on SoTL. For those who have, it seems as though staff in both the US and Canada were most likely to offer such training. Tenure-track faculty in the US were least likely to provide this type of training.

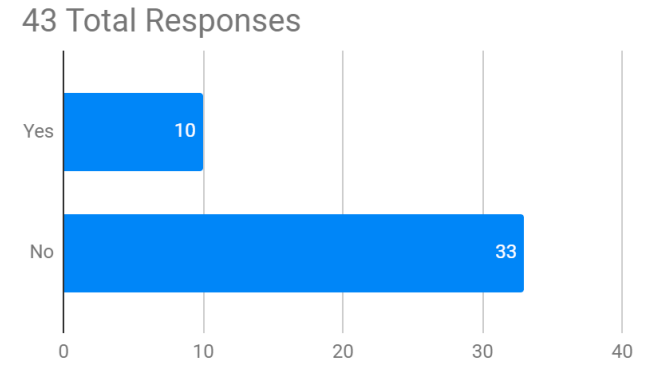
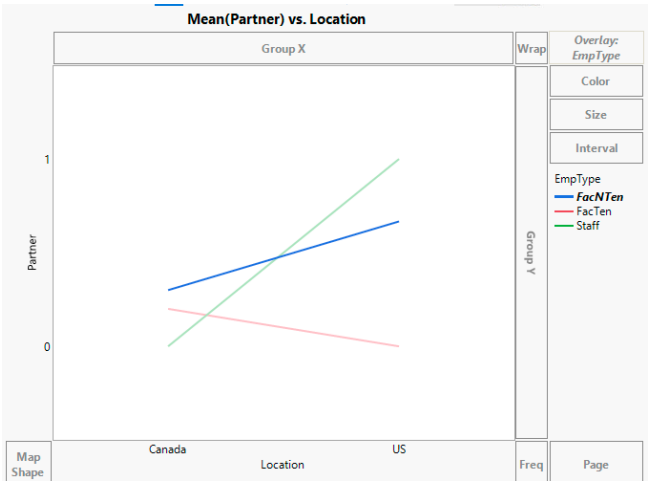
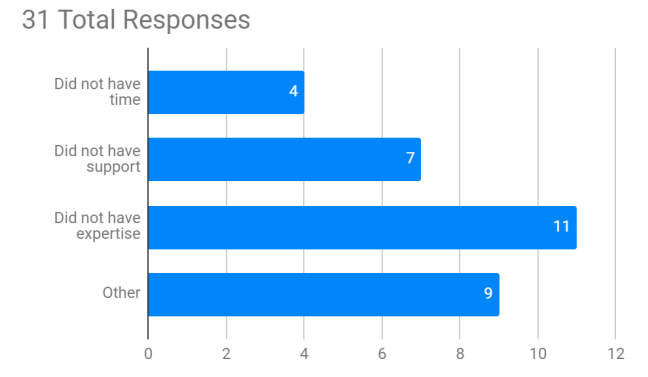


Survey Statement: I have participated in campus faculty learning communities on SoTL topics. **Interpretation:** The majority of respondents had participated in some kind of SoTL faculty learning opportunity. Staff and non-tenure-track faculty in the US were most likely to have participated, and staff in Canada were least likely to have participated.	
Survey Statement: If you have not worked in these capacities, what do you think was the primary reason? **Interpretation:** Only a fraction of participants chose to engage with this statement. Of the respondents, there was an indication that both the lack of support and expertise were equally problematic.	

Partner

The role of partner is the most involved as in this capacity, "librarians are full collaborators or members of a team throughout a project, from design to data analysis to dissemination. They contribute to the vision, direction, scope, and scale of the project. They bring their perspectives and areas of expertise to the data analysis, as well as the work of writing, presenting, and publishing" (McClurg, 2019, 8) Table 3 visualizes the responses of the participants.

TABLE 3
Partner

Survey Statement & Data Interpretation	Results
Survey Statement: I have been a full collaborator or member of a team throughout a SoTL project, from design to data analysis to dissemination. For example, I have contributed to the vision, direction, scope, and scale of the project or I have brought my perspectives and areas of expertise to the data analysis, as well as the work of writing, presenting, and publishing. **Interpretation:** The majority of respondents had not participated in SoTL as a partner. Those most likely to have done so were staff in the US, and those least likely were staff in Canada. US library employees appear to be more involved in this area than Canadian library employees.	 
Survey Statement: If you have not worked in these capacities, what do you think was the primary reason? **Interpretation:** Almost all of the participants responded to this statement—more than any of the other three areas by a large margin. The most cited reason for not participating as a Partner is because of a lack of expertise.	

The following were the comments made by respondents when asked to give the primary reason for not having worked in this area, if they indicated that they had not worked in the capacity of Partner:

Comments:

- Did not have opportunities.
- External challenges.
- My position does not put me in a place to do these activities.
- Not been asked.

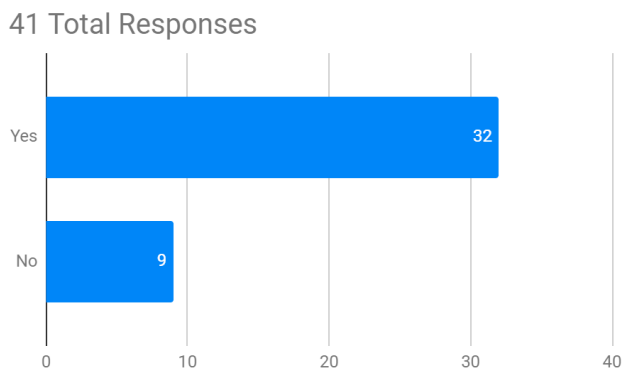
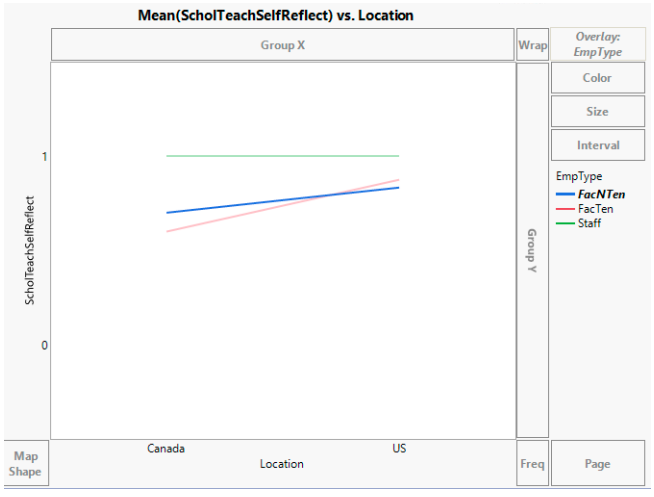
- None of the above.
- We lost our teaching and learning center after the recession and have not gotten it back.
- Both don't have the time to focus on teaching and learning in these ways, and it's not in my academic or research interests.
- Same answer as before; we have an Instruction Librarian and an UG Experience Librarian, with these specific areas of responsibilities. My responsibilities concentrate in other aspects of academic librarianship.
- The ones I haven't done I haven't sought to do, as I am more effective in the areas I do focus on.

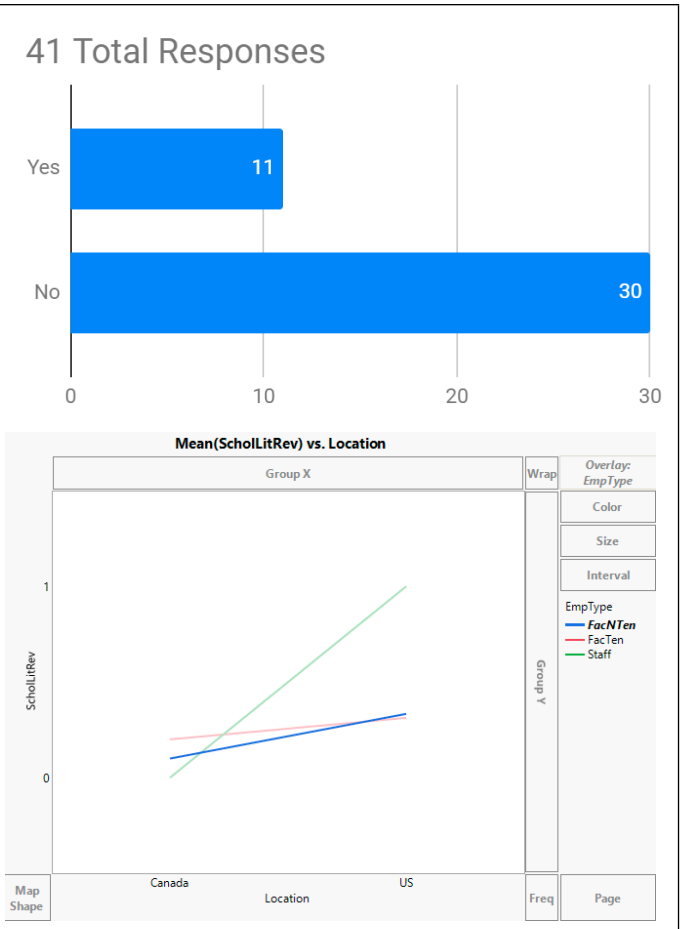
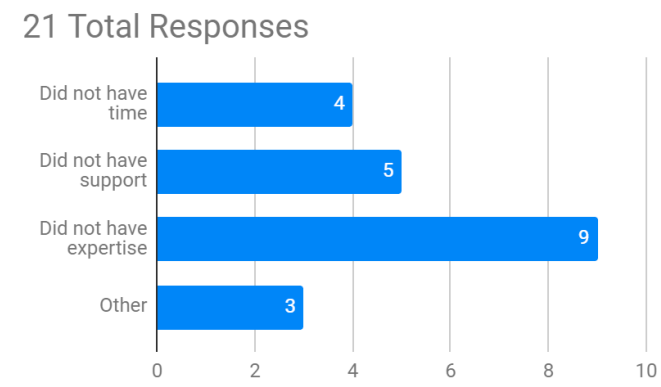
Scholar

In this final role, librarians are in full control of the research taking place. As a SoTL Scholar, they "are sole researchers, well equipped to conduct studies drawing on their existing expertise, experiences, and contexts" (McClurg, 2019, p. 9).

The following were the comments made by respondents when asked to give the primary reason for not having worked in this area, if they indicated that they had not worked in the capacity of Scholar:

TABLE 4
Scholar

Survey Statement & Data Interpretation	Results
Survey Statement: I have framed and investigated questions about teaching and learning within my own classroom. For example, you have used student learning outcomes and session evaluations to determine the extent of student learning. **Interpretation:** A large majority of respondents had participated in SoTL as a scholar. Staff in both the US and Canada are the ones most likely to have participated in this capacity with tenure-track faculty in Canada being least likely to have participated in this way.	 

Survey Statement: I have worked or am currently working on a SoTL project by discussing my teaching in a systematic review, scoping review, evidence summary, meta-analysis that synthesize and evaluate the work that's been done, or other format. **Interpretation:** The majority of respondents indicate that they had not worked on literature reviews for SoTL projects. Of those that have, staff in the US are most likely to have done so, and staff in Canada are least likely.	
Survey Statement: If you have not worked in these capacities, what do you think was the primary reason? **Interpretation**: Less than half of the participants responded to this statement. The most cited reason for lack of participation as a SoTL scholar is because of a lack of expertise.	

Comments:

- Did not have the opportunities.
- I have few classes that are my own.
- My responsibilities are distributed over too many programs to devote this level of effort to any one, singly—instead, I support faculty and student research in targeted, specific ways.

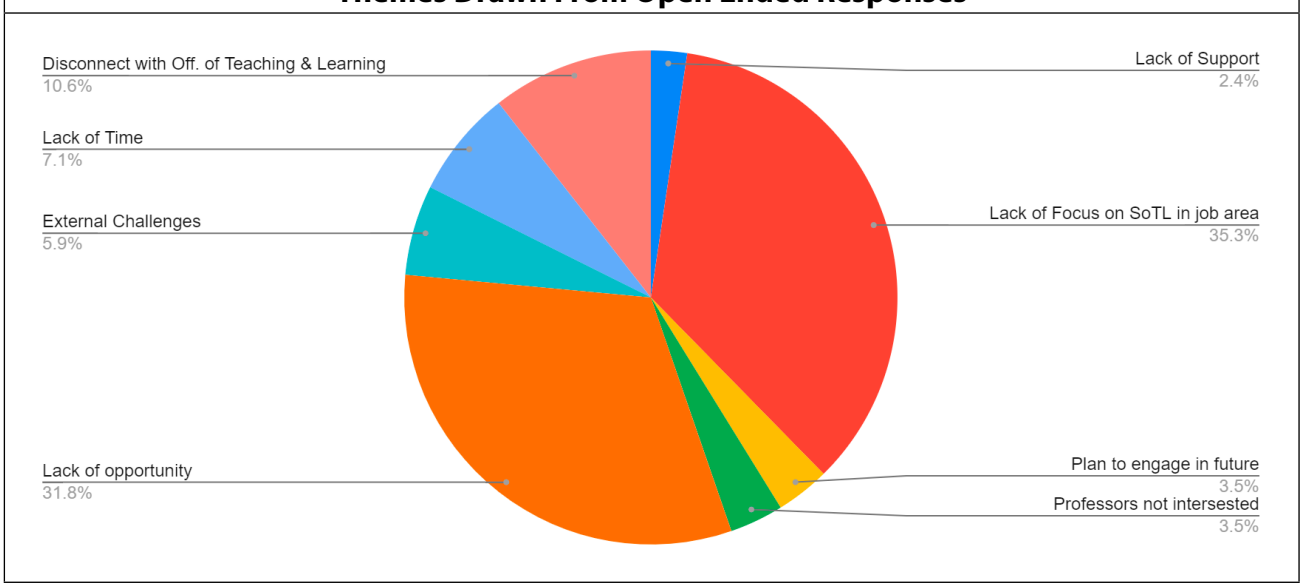
Thematic Analysis of Open-Ended Responses

Upon the review of the qualitative responses, the researchers found that themes or topics emerged via an initial open coding by one of the researchers. A coding manual was developed and shared with the other two researchers, and then each person coded the responses

to follow guidelines about memo writing to provide more information about each theme (Corbin & Strauss, 2015). A total of eight themes emerged as those commenting expressed their insights to the question: "If you have not worked in these capacities, what do you think was the primary reason?" Here are the themes extracted from the responses:

- Lack of support
- Lack of focus on SoTL in job area
- Plan to engage in future
- Professors not interested
- Lack of opportunity
- External challenges
- Lack of time
- Disconnected with office of Teaching & Learning or with the topic in general

FIGURE 3
Themes Drawn From Open Ended Responses



Discussion

The data from this survey provide deeper insights into the nature and scope of the working relationships between faculty and academic staff engaged in SoTL and their librarian-partners at research intensive universities, the degree to which the librarians surveyed engage in SoTL scholarship, and the forms that this scholarship takes. Through these results, it is possible to examine the current role of librarians in SoTL activities on their campuses as well as the barriers and opportunities that have been presented by participants.

Current Role of Librarians in SoTL

Regarding the Consultant role, the survey data indicates that librarians were about evenly split on those who supported faculty with literature reviews (22) and those who were not currently working with other faculty members (23). The weakest area reported was in support of data management with 15 librarians saying they had worked with faculty on managing data related to a SoTL project and 29 indicating they had not provided such assistance. The main

reason librarians did not help in this area was they felt as though they had a lack of expertise. Librarians also found it difficult to find faculty who were involved in SoTL projects.

The strongest area for librarians who responded to the survey appears to be in the Developer area or, more specifically, working with faculty to develop learning outcomes for students in the areas of information literacy. Twenty-five librarians indicated that they had participated in this activity and 18 said they had not. Overall, librarians felt that they did not have the expertise to help with SoTL projects and instead felt more qualified to assist with subject related research in their areas of expertise. Respondents also indicated that they did not feel supported in their pursuit of SoTL projects.

Most respondents indicated they have not felt they have partnered with faculty on SoTL work in their current roles, with 33 librarians reporting they have not partnered and 10 stating they have been a partner. This is similar to their responses regarding their role as Scholar, where 11 librarians indicated they were currently participating on a project with faculty and 30 were not engaged in a project. Either the faculty interest was not there, or librarians did not have connections with teaching and learning centers on their campuses.

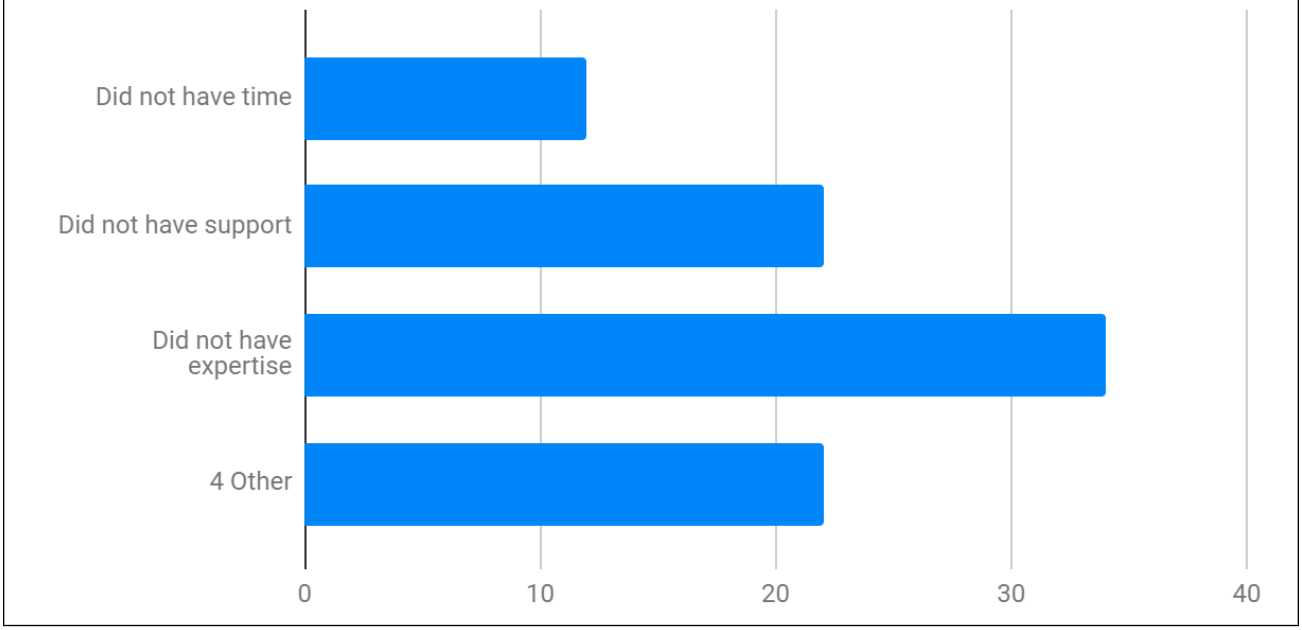
In response to survey questions about the scholar role librarians felt that they were often seeking ways to improve their teaching, but that they did not have the time to write up their findings for a public audience. This was often because they did not feel they had the time along with their other job duties. Overall, librarians indicated an interest in SoTL, but found there were barriers to full participation.

Barriers to Productive Librarian Relationships with SoTL

There seem to be three main barriers to productive librarian relationships with SoTL on their campuses: lack of expertise, lack of support, and exclusion from campus SoTL activities. First, many librarians who responded to this survey felt that their lack of expertise was a major reason that they had not worked more in SoTL. This may be indicative of a lack of training in teaching and pedagogy available to librarians through graduate programs and professional organizations. Confidence and expertise in teaching are also derived from experience and, while other academics are responsible for teaching full courses, librarians are typically only invited to lead 'one-shot' instruction sessions. Looking outside of librarianship, the sense that one lacks expertise in SoTL may be common amongst other academics as an additional hurdle mentioned by librarians was the lack of faculty interest in SoTL. Overall, this contributes to the scarcity of opportunities to become involved in SoTL projects.

The second barrier is that librarians felt that they had no support to pursue SoTL projects and that time was a constraint. This could be the result of administrative priorities or professional demands that limit the time available to librarians for SoTL research and practice. Finally, librarians indicated that they simply are not asked to participate in SoTL projects either because those professors who are active in SoTL are not thinking to include librarians, or because librarians are not well connected to staff at their teaching and learning center who may be able to assist with arranging librarian-faculty collaborations. An additional challenge for both librarians and teaching faculty lies in the fact that SoTL is not part of the traditional faculty system and "Upsetting the current rewards, cultural, and power system that privileges basic or discipline-based scholarship above both SOTL and teaching practice will not come easily" (Asarta et al., 2018, p. 741). This will be a huge cultural shift that will be difficult for library faculty to tackle on top of their daily workloads.

FIGURE 4
Reasons for Non-Participation in SoTL



Opportunities for Productive Librarian Relationships to SoTL

In light of these barriers, engagement in SoTL offers a number of opportunities for librarians at R1 and U15, including professional development, opportunities to participate in research, and deeper involvement in teaching on campus.

Professional Development

First, a theme emerged from the data that showed librarians feel that they need to gain more expertise in the area of SoTL in each of the four roles. This helps explain why more librarians are not involved in SoTL at their institutions. Addressing this issue could begin in library school by integrating SoTL into programming for Library and Information Science students. As McNiff and Hays (2017) suggest: "Using SoTL to develop LIS students who are reflective practitioners may create more proficient instruction Librarians" (p. 374). This idea was reinforced during a panel discussion where SoTL practices were described as beginning in library schools (MacMillian et al., 2016). Graduates of LIS programs may not be aware of the degree to which academic librarians are typically involved in teaching and should have the opportunity to participate in both information literacy and SoTL research prior to employment.

Opportunities to Participate in Research

Another opportunity to increase librarian involvement in SoTL would be to more clearly define what SoTL means for librarianship, which would facilitate more consistent conversations about how librarians can be involved. The main solution, however, would be to support librarians in the area of scholarship because librarians are often doing the work of SoTL, but are not taking the initiative to publish the results of their work. This could include more education when it comes to setting up a research project and producing research articles. There have also been successful programs offered via teaching and learning institutes that have incentivized SoTL activities and these could be opportunities for librarians to be involved

as well (Wright et al., 2011). Librarians could also be encouraged to "ride the third wave" of SoTL, with the first wave being the introduction of the practice, and the second being the rise of interdisciplinary research in SoTL. The third would be about future possibilities, such as moving SoTL research into mainstream, disciplinary literature and bringing more attention to research in teaching and learning, according to Gurung and Schwartz (2010). There is considerable opportunity for librarians, faculty, and university administrators to explore SoTL collaborations as "a close relationship between librarians and education developers is central to integrating information literacy into the learning and teaching strategies of universities, as well as into curricula" (Fallon & Breen, 2008, p. 148). In some cases, faculty would benefit from gaining more awareness of the ways librarians can contribute to SoTL research and practice. A great deal of collaboration could follow from a deeper investigation into the many ways that information literacy and SoTL practice overlap each other, perhaps in the form of conferences, symposia, panel discussions, or publications.

Deeper Involvement in Teaching on Campus

According to the data gathered, there seem to be opportunities for librarians to provide support for SoTL projects on campus by providing expertise in data management. However, communication both within and without the library will be crucial to the increased confidence and involvement of librarians in SoTL. Librarians who do not have direct contact with instruction librarians or public services departments indicated they felt cut off from information regarding instruction opportunities.

However, as mentioned by the respondents in this study, any such collaborations in the areas of professional development, research, or collaboration would benefit from the support of university administrations who value SoTL research, and who provide faculty and librarians the required time, resources, and rewards.

Study Limitations

While many efforts were made to recruit participants for this study, the overall response rate was low. Another limitation is that the survey was clearly related to SoTL, thus it's possible that this survey and research study may have appealed to those who are already familiar with SoTL, and participants may have had a bias. It would have also been helpful to clarify the questions in the Developer portion to determine if librarians are working on SoTL projects or if they are working on information literacy projects with subject faculty. By leaving the survey anonymous, it was also impossible to determine which institutions were represented and it could be possible that many librarians from only a few institutions participated in the study.

Future Research

This introductory research was specific and produced a small research sample. Future research could take these preliminary results and focus on specific areas that would help librarians move past these barriers. In particular, librarians feel as though they have a lack of expertise, lack of support, and feel excluded from campus SoTL activities. Each of these areas could be investigations in and of themselves. Interviews with librarians to gather more detailed qualitative data about ways that librarians could feel more involved in SoTL would be helpful. Increased international communication about different approaches to teaching in both Canada and the US, as well as looking to other countries and their teaching practices, would

also be useful. Discovering what specific programming or practices could encourage librarians to participate more in the role of Scholar, in particular, would be interesting to learn more about via future studies. Finally, it would be interesting to see the link between SoTL work and tenure track status: is it more likely that librarians who have tenure or are on tenure track are the ones who are pursuing projects that more deeply explore teaching and learning? The bottom line is that librarians have a great deal to offer explorations into SoTL work and could make a positive impact on student learning.

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Appendix A: Survey

Modified CASTL (Carnegie Academy for the Scholarship of Teaching and Learning) Survey, 2004 based on the article by Nancy Chick and the four areas she highlighted:

Participation in the Scholarship of Teaching and Learning
The phrase "the scholarship of teaching and learning" may be used to denote a range of different kinds of activities and work. We are interested in knowing what kinds of activities you have engaged in since becoming involved in the scholarship of teaching and learning.
Are you:
Faculty
Staff
Other

Have you engaged in the following activities in the following capacities?

Consultant

1. I have worked with colleagues at my institution by assisting with literature reviews about topics dealing with teaching and learning. For example, have you worked with either individual faculty members or with an office of teaching development on your campus?
NO YES

2. I have worked with colleagues at my institution on their teaching and learning projects by providing information on research data management, or planning for securely storing and sharing documents, drafts, and data for the project's life cycle by, for instance, utilizing institutional repositories and developing filing systems with file names, login procedures, and organizations that keep the data appropriately discoverable and usable.
NO YES

3. I have worked with colleagues at my institution to identify places to disseminate the work they have done on their teaching and learning practices. For example, have you discussed open access, copyright, predatory journals, and knowledge mobilization beyond the scholarly journal can also inform decisions about where and how to go public with SoTL projects.
NO YES

4. If you have not worked in these capacities, what do you think was the primary reason?
Did not have the time to focus on teaching and learning in these ways
Did not have the support (training, release time, lack of interest from colleagues) to pursue these activities.
Did not have enough expertise to explore these activities.
Other:

Developer

5. I have been a direct part in developing teaching and learning projects in collaboration with the campus teaching and learning center.

NO YES

6. I have directly collaborated with colleagues in my liaison/subject areas in framing and investigating questions about teaching and learning. For example, you have been included by teaching faculty on teaching and learning outcomes on the creation of information literacy assignments for their courses and have created reports on the student success in these assignments.
NO YES

7. I have provided workshops designed specifically to help faculty improve their SoTL work on topics such as conducting effective literature reviews or providing information on publication and/or data management.
NO YES

8. I have participated in campus faculty learning communities on SoTL topics.
NO YES

9. If you have not worked in these capacities, what do you think was the primary reason?
Did not have the time to focus on teaching and learning in these ways
Did not have the support (training, release time, lack of interest from colleagues) to pursue these activities.
Did not have enough expertise to explore these activities.
Other:

Partner

10. I have been a full collaborator or member of a team throughout a SoTL project, from design to data analysis to dissemination. For example, I have contributed to the vision, direction, scope, and scale of the project or I have brought my perspectives and areas of expertise to the data analysis, as well as the work of writing, presenting, and publishing.
NO YES

11. If you have not worked in these capacities, what do you think was the primary reason?
Did not have the time to focus on teaching and learning in these ways
Did not have the support (training, release time, lack of interest from colleagues) to pursue these activities.
Did not have enough expertise to explore these activities.
Other:

Scholar

12. I have framed and investigated questions about teaching and learning within my own classroom. For example, you have used student learning outcomes and session evaluations to determine the extent of student learning.
NO YES

13. I have worked or am currently working on a SoTL project by discussing my teaching in

a systematic review, scoping review, evidence summary, meta-analysis that synthesize and evaluate the work that's been done, or other format.
NO YES

14. If you have not worked in these capacities, what do you think was the primary reason?
Did not have the time to focus on teaching and learning in these ways
Did not have the support (training, release time, lack of interest from colleagues) to pursue these activities.
Did not have enough expertise to explore these activities.
Other:

Appendix B: Invitation Email

Dear Librarian,
Are you familiar with the Scholarship of Teaching and Learning (SoTL)? Have you been involved in the study of teaching and learning in higher education with other librarians or faculty?

The phrase "the scholarship of teaching and learning" is used to denote a range of activities related to the study of teaching practices in higher education. As a broadly defined discipline we recognize that many Librarians may already be involved in various aspects of SoTL without personally identifying as SoTL workers or scholars.

The purpose of this survey is to collect data on the involvement of librarians with teaching responsibilities employed at R1 (United States) and U15 (Canada) universities in any aspect of the scholarship of teaching and learning (SoTL). If you fit these criteria, please tell us more about your involvement in higher education teaching and learning by responding to the survey below. It should only take a few minutes of your time and all results will remain anonymous*.

https://clemson.ca1.qualtrics.com/jfe/form/SV_8xj65LTVjVi7EBD

Author 1

Author 2

Author 3

*By completing the survey you consent to participate in this study. Participation in the study is voluntary and you may withdraw from the survey at any time without consequence. Information from incomplete surveys will be discarded.

*Participants interested in viewing a brief report on the survey findings will be able to download a copy from MSpace (University of Manitoba institutional repository) after May 1, 2020.

Developing a Training Program for Student Library Assistants to Make Scanned PDFs Accessible: A Case Study

Aneta Kwak

Introducing accessibility initiatives is increasing across academic libraries and effective library staff training is one of the factors for the successful implementation and continuity of any accessibility endeavours. This case study outlines the development of a training program to teach student library assistances to format scanned PDFs to be accessible. This study frames the development of the training program within the context of accessibility training in academic libraries, considerations for training student assistants, cognitive load theory, and training delivery options. This article will be of interests to libraries developing services to format scanned PDFs to be accessible.

Introduction

Scanning initiatives, like mass digitization projects, Interlibrary Loan, local Scan and Deliver services, and Course Reader services, can improve access to print collections in academic libraries (Cancilla et al., 2017; Olubiyo et al., 2022; Shrauger & Dotson, 2010; Wu et al., 2022). However, scanning print material does not always mean improved accessibility for everyone. Users with visual impairments and print accessibility needs often encounter scans that are not usable with their assistive technology (Beyene, 2018; Mulliken & Falloon, 2019; Southwell & Slater, 2012).

Most institutions have processes in place for individuals with disabilities to request alternative formats of library material in response to legislature requirements such as the Accessibility for Ontarians with Disabilities Act (AODA) (Integrated Accessibility Standards, 2011). Nonetheless, these processes often require the person with a disability to spend additional time and energy to access the same material that sighted users have immediate access to. The processes for requesting alternate formats are often not completed in a timely manner, and the lack of timeliness getting accessible material is a major barrier for visually impaired users (Kilmurray et al., 2005; Mulliken & Falloon, 2019; Reed & Curtis, 2012). To address the issue of inaccessible scanned material, some academic libraries are engaging in proactive endeavours, such as incorporating best practices for scanning to improve image quality, processes to recognize the text in scans, and workflows to apply semantics and alt text to scanned PDFs

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(Kwak & Newman, 2018; Lee, 2020; Wu et al., 2022; Zhou, 2010).

As academic libraries embark on initiatives to improve the accessibility of their scanned material, they will also need to develop training programs that address the technical aspects of making scanned material accessible. The process of formatting scanned PDFs to be accessible requires a degree of technical precision, repeated over hundreds of documents. Effective training is fundamental to ensure a high level of quality in the finished PDF that is consistent across multiple staff producing the accessible documents over time. This article will contextualize the issue of inaccessible PDFs and describe the development of a training program for student library assistants (SLAs) to make scanned PDFs accessible, incorporating considerations from cognitive load theory and training delivery options.

Background

Ableism and the Impacts of Inaccessible Library Material

Acknowledging that readers may have varying degrees of understanding about accessibility, this section briefly contextualizes ableism in academia and academic libraries, describes the impacts of inaccessible library material, and introduces the social model of disability as a framework for addressing accessibility barriers.

Academia perpetuates ableism and contains barriers that make it challenging for anyone with a disability to enrol and complete a degree (Dolmage, 2017). Ableism is defined as:

> a system of assigning value to people's bodies and minds based on societally constructed ideas of normalcy, productivity, desirability, intelligence, excellence, and fitness. This systemic oppression leads to people and society determining people's value based on their culture, age, language, appearance, religion, birth or living place, "health/wellness," and/or their ability to satisfactorily re/produce, "excel" and "behave." (Lewis, 2022)

In the context of higher education, "academia powerfully mandates able-bodiedness and able-mindedness… and this demand can best be defined as ableism" (Dolmage, 2017, p. 70). Academia sets able-bodiedness and able-mindedness as the default or the norm, and students who do not fit within this frame must seek out retrofitted accommodations to engage in the classroom pedagogy (Dolmage, 2017). By making inaccessible library materials available to patrons, academic libraries contribute to the systemic oppression that is ableism and reinforce societal ideas of normalcy that assume all patrons accessing these materials are able-bodied. Patrons with disabilities frequently encounter inaccessible library materials, including scanned materials; they must rely on accommodations that require medical documentation of a disability to access the same material that is readily available for their able-bodied counterparts (Mulliken & Falloon, 2019).

Accessibility legislature, such as the Accessibility for Ontarians with Disabilities Act, which requires academic libraries to provide alternate formats of library material for persons with disabilities upon request (Integrated Accessibility Standards, 2011), is a step towards more equitable access of library material. However, this legislature reinforces socially constructed ideas of normalcy and the medical model of disability, which "establishes disability as an individual problem" (Cameron, 2014, p. 100). As Dolamage (2017) highlights, "the accommodations offered still demand that the student must accommodate him or herself to

the dominant logic of classroom pedagogy" (p. 80). In the case of providing alternate formats of library material, the individual is viewed as the problem, as opposed to the materials that are inaccessible as being the problem; the patron becomes responsible for ensuring the library materials they need are accessible through accommodation requests. Individuals with disabilities spend additional time and labour collecting required documentation of their disability, registering with the correct offices, and waiting for the material they need to be made accessible. Often times, the material is not made accessible in a timely manner, which sets these individuals behind in their course work, making inaccessible material a major academic barrier (Kilmurray et al., 2005; Reed & Curtis, 2012). In their conference presentation with Bruce et al. (2022), blind scholar Ashley Shaw states: "a system dependent primarily on accommodations is designed to place undue burden on the individuals seeking accessible materials, limiting our collective power to remove systemic barriers that impact all of us" (17:44).

An alternative approach to providing accessible materials is one that follows the social model of disability, which "shift[s] the attention away from the functional limitations of individuals with impairments onto the problems caused by disabling environments, barriers, and cultures" (Barnes, 2013, p. 18). A move towards the social model of disability is to change the way academic libraries approach their services, spaces, and collections by taking accessibility into consideration from the start and examining how the library itself perpetuates the need to accommodations. This accessibility-first approach replaces the assertion that able-bodiedness is the norm with the expectation that a person with a disability will engage with library material and that, therefore, all library material and the resources should be readily available in an accessible format.

It is important to acknowledge that not all accessible formats are suitable for all accessibility needs or preferences, as noted in Mulliken and Falloon (2019). Therefore, accommodations may still be required until libraries are able to make material available in multiple accessible formats, for example HTML, PDF, ePub and MP3. Nonetheless, as Shaw in Bruce et al. (2022) explains: "libraries have a responsibility to ensure that their materials are accessible to everyone, including patrons who use screen readers" (17:22). Beyond responding to requests for accommodations, academic libraries have a responsibility to address calls from individuals with disabilities to improve the accessibility of library material. By using the social model of disability framework and by considering accessibility first, academic libraries can help remove the barrier of inaccessible resources that places undue burden on people with disabilities, and can contribute to dismantling systemic barriers within academia.

DG Ivey Library

The DG Ivey Library is a small academic library within the larger University of Toronto Library system. Our library is located at New College, one of the seven colleges within the Faculty of Arts & Science college system at the University of Toronto St George Campus, which provides students with a smaller community within the larger institution (New College, 2023a). The library supports both New College students and the students enrolled in the interdisciplinary programs at New College, which include Critical Studies in Equity and Solidarity and the Disabilities Studies program. New College and the interdisciplinary academic programs at New College emphasize "equity, diversity, community engagement and social justice" (New College, 2023b). Within this context, our library is positioned to approach our services,

collections and spaces with an equity driven lens.

Our library employs nine to ten student library assistants (SLAs) to help with day-to-day operations and to support library services. One of the core services offered by the library to faculty and sessional instructors is the Online Course Reader Service. Through the service, the library provides students enrolled in participating courses free access to their course readings, while adhering to Canadian copyright provisions and existing library licenses. We provide direct links to electronic resources, upload scans of material only available in print, and place print books on short term loan for the duration of the term (Kwak & Newman, 2018). Scanned material is analyzed on a case-by-case basis following the University of Toronto *Fair Dealings Guidelines,* which outlines a process for determining if a work meets Canadian *Copyright Act* provisions that "permit dealing with a copyright-protected work…for specified purposes [including] research, private study, education…"(University of Toronto, 2012, p. 1). If material that does not meet *Fair Dealing Guidelines*, we collaborate with the Scholarly Communications and Copyright Office to obtain licenses or permissions from the rights holders to use the works for the duration the course. Scanned material that meets *Fair Dealing Guidelines,* has a license purchased, or permission from the rights holder obtained is made available to students in participating courses through our learning management software, Quercus.

In the winter term of 2018, we adopted the social model of disability framework to re-examine our Online Course Reader Service and introduced a new procedure, the "Accessible PDF Procedure," through which our SLAs format all scanned PDF readings to be accessible (Kwak & Newman, 2018). Our in-house Accessible PDF Procedure is comprised of the following three processes:

1. The Scanning process, which follows best practices for scanning to produce high quality scans.
2. The OCR process, which includes image correction and performing optical character recognition on the scans using the software ABBY FineReader.
3. The Tagging process, during which PDFs are tagged to be accessible following the Web Content Accessibility Guidelines 2.0 recommendations for PDF accessibility using the software Adobe Acrobat Pro.

Incorporating the Accessible PDF Procedure into our regular operations introduced additional training requirements. There are videos and tutorials available online which demonstrate how to make PDFs accessible. However, these tutorials focus on digital-born PDF's and do not cover the additional complexities of making scanned documents accessible, which include:

- ensuring there is little shadow or pencil markings, which can impact the characters that are recognized during the OCR process,
- verifying that the content of the document is recognized as the appropriate content type (e.g., images are marked as images, text is marked as text, and so on), and
- ensuring that the recognized characters accurately reflect the content in the scan, as this impacts the text layer of the PDF with which screen readers engage.

With these considerations in mind, our library worked on developing an effective program to train our staff to format scanned PDFs to be accessible.

Literature Review

A literature review was conducted to examine the current landscape of accessibility training in academic libraries, considerations when training student library staff, the application of cogni-

tive load theory for training, and training delivery methods specific to student library assistants.

Accessibility Training in Academic Libraries

Most studies on accessibility training in academic libraries focus on accessibility awareness training or training for library staff who directly support patrons with accessibility needs. Content covered in these training programs includes the legal requirements, best practices for providing customer service to persons with disabilities, as well as assistive technology available at the library (Brannen et al., 2017; Carter, 2004; Charles, 2005; Chittenden & Dermody, 2010; Forrest, 2007; Mellon et al., 2013; Roth et al., 2018). Brannen et al. (2017) describe collaborating with their institution's accessibility office to develop their training program. Schroeder (2018) briefly mentions PDF training in their overview of accessibility initiatives at their institution; however, no details about the training program are provided. The scope of topics covered in accessibility training programs has broadened to include accessibility in online instruction. Lewitzky and Weaver (2022) describe an online training on Universal Design for Learning for asynchronous (pre-recorded) online library instruction, which covers making content accessible. Although the scope of accessibility training is expanding, there remains a gap in the literature that details a training program for library staff to format scanned and accessible PDFs.

Training Student Library Assistants

Libraries often rely on student employees as a cost-effective way to maintain library operations (Mitchell & Soini, 2014); however, employing students requires additional considerations when developing training programs. Student employees have a higher turnover rate and limited employment periods since they are often employed only for some duration of their academic enrolment. A high-turnover rate makes training student staff more time consuming as libraries often hire and train new staff each year. Libraries often have a short period of time to complete training and integrate new staff into the schedule (Kathman & Kathman, 2000). As part-time employees and students, they may only have partial commitment to their jobs and their understanding of library services is limited when compared to full-time library staff (Kathman & Kathman, 2000). Additionally, academic libraries generally hire new staff at the start of each academic year, which means that staff are trained during a time when students are managing a new school year (Wetli, 2019). Libraries need to find the right balance of spending enough time training SLAs so they can adequately perform their duties while also not overwhelming them with the duration of training and the amount of information shared.

Cognitive Load Theory in Training

When developing a training program for a complex process, it is valuable to explore best practices for reducing the amount of cognitive load required to learn the content. Broadly speaking, cognitive load theory (CLT) is the concept that:

- learning takes effort (Martinez, 2014),
- humans have the capacity to learn a limited number of new elements at a given time (Cowan, 2001), and
- "learners are often overwhelmed by the number of new information elements" (Paas et al., 2004, p. 1).

CLT also assumes that there will be a capacity limit for the focus of attention (Cowan,

2001), and that less cognitive effort is needed when new information is associated with existing knowledge (Pickens, 2017).

When applying CLT to training student library assistants, one study recommends: "organizing content of training sessions so that they include chunks of related material or tasks" (Martinez, 2014, pp. 556–557). Additionally, trainers can apply specific training techniques to help reduce cognitive load, such as "increasing difficulty" (ID), "part-task training" (PTT), "training wheel," and "scaffolding" (Hutchins et al., 2013; Martinez, 2014; Wickens et al., 2013). The ID technique follows the principle of training less complex tasks first and increasing the complexity of the task as the training progresses (Wickens et al., 2013). The PTT technique refers to dividing a multi-part task into individual parts and training staff on one part of the process at a time (Martinez, 2014). PPT allows learners to gradually layer on their new knowledge and build skills over time, which lessens the cognitive load on learners (Martinez, 2014). The training wheel technique refers to the use of lockouts that prevent learners from accessing actions or content that are not relevant to the current phase of learning (Hutchins et al., 2013). Once learners acquire the required skills to complete the current phase, the next relevant content is made available to the learner (Hutchins et al., 2013). Scaffolding refers to providing learners with instructional support when they are introduced to new concepts or skills (Hutchins et al., 2013). Hutchings et al. (2013) found that scaffolding techniques are more effective when the instructor is not present.

Methods for Delivering Training to Student Library Assistants

Although delivery methods for training SLAs vary across academic libraries, some common methods include in-person, online, and hybrid training.

In-person training techniques

A survey administered to student staff supervisors across North America found in-person training to be the most common delivery method (Mitchell & Soini, 2014). Group in-person training sessions offered multiple times to accommodate varying schedules are described as effective methods to train multiple employees (Becker-Redd et al., 2018; Vassady et al., 2015). Becker-Redd et al. (2018) found an increase in the retention of information when using a mandatory in-person group training session, rather than online training modules.

Although a common delivery method, in-person training has its own challenges, especially with the time commitment from the trainer and scheduling training sessions where all students are available to attend (Boeninger, 2013; Connell & Mileham, 2006; Michalak & Rysavy, 2018; Vassady et al., 2015). Connell and Mileha (2006) note that although in-person training may be preferred, it is time consuming to conduct. Vassady et al. (2015) found that scheduling students to attend in-person group training sessions was one of the biggest challenges they faced with their in-person group training. To combat this issue, Becker-Redd et al (2018) suggest offering one-on-one training, as opposed to a group training session

Online training techniques

The current literature describes online training as an option that allows for greater flexibility than scheduling an in-person training session, provides learners with easy access to information, and gives the learners autonomy over the pace at which they complete the training (Bell, 2016; Manley & Holley, 2014; Mitchell & Soini, 2014). Online training can help reduce the

amount of hands-on staff time needed to train student library assistants and creates a standardized training plan to help with consistency in training (McKenna, 2020). Online training also reduces the need for "refresher training on the more detailed information required of the job" (Mitchell & Soini, 2014, p. 602).

When it comes to online training, there are a variety of tools and strategies available, including the use of videos, library guides, or sharing content on electronic learning management systems (Bell, 2016; Boeninger, 2013; Macnaughton & Medinsky, 2015; Manley & Holley, 2014; Michalak & Rysavy, 2018). Boeninger (2013) recommends using videos as an alternative to in-person training when the training is designed to demonstrate a tool, software, or web application. Videos allow the trainer to "use the same methods to demonstrate a resource that they would use if they were to teach someone how to do something in person" (Boeninger, 2013, p. 178). A key strategy for successful use of videos for training is to keep the videos short, ideally under five minutes (Boeninger, 2013; Manley & Holley, 2014). This approach makes it easier for learners to go through the content in a short period of time and at their own pace and makes it easier for the trainer to update the content (Boeninger, 2013; Manley & Holley, 2014).

One of the challenges with online training is the onset investment of time to develop the content. However, McKenna (2020) notes that the long-term amount of time saved by using online training makes it worth the initial investment.

Hybrid training techniques

Taking the benefits of face-to-face and online training into account, Manley and Holley (2014) and Wetli (2019) describe the use of hybrid training techniques. In the case of Manley and Holley (2014), students were given one week to watch video clips that introduced them to basic systems and procedures followed by in-person on-the-job training (Manley & Holley, 2014). Similarly, Wetli (2019) describes a hybrid model where staff were asked to complete an online course on Canvas (a learning management system) that included pre-assessment quizzes and modules. The staff were then required to attend a two hour in-person training session spread across three evenings, where they were able to practice what they learned in the online course (Wetli, 2019). Both Manley and Holley (2014) and Wetli (2019) found the hybrid training successful for information retention and saving time for training and re-training student staff. Wetli (2019) also noted the added benefit of the online component functioning as a knowledge repository that staff could access throughout their employment.

Developing a Training Program

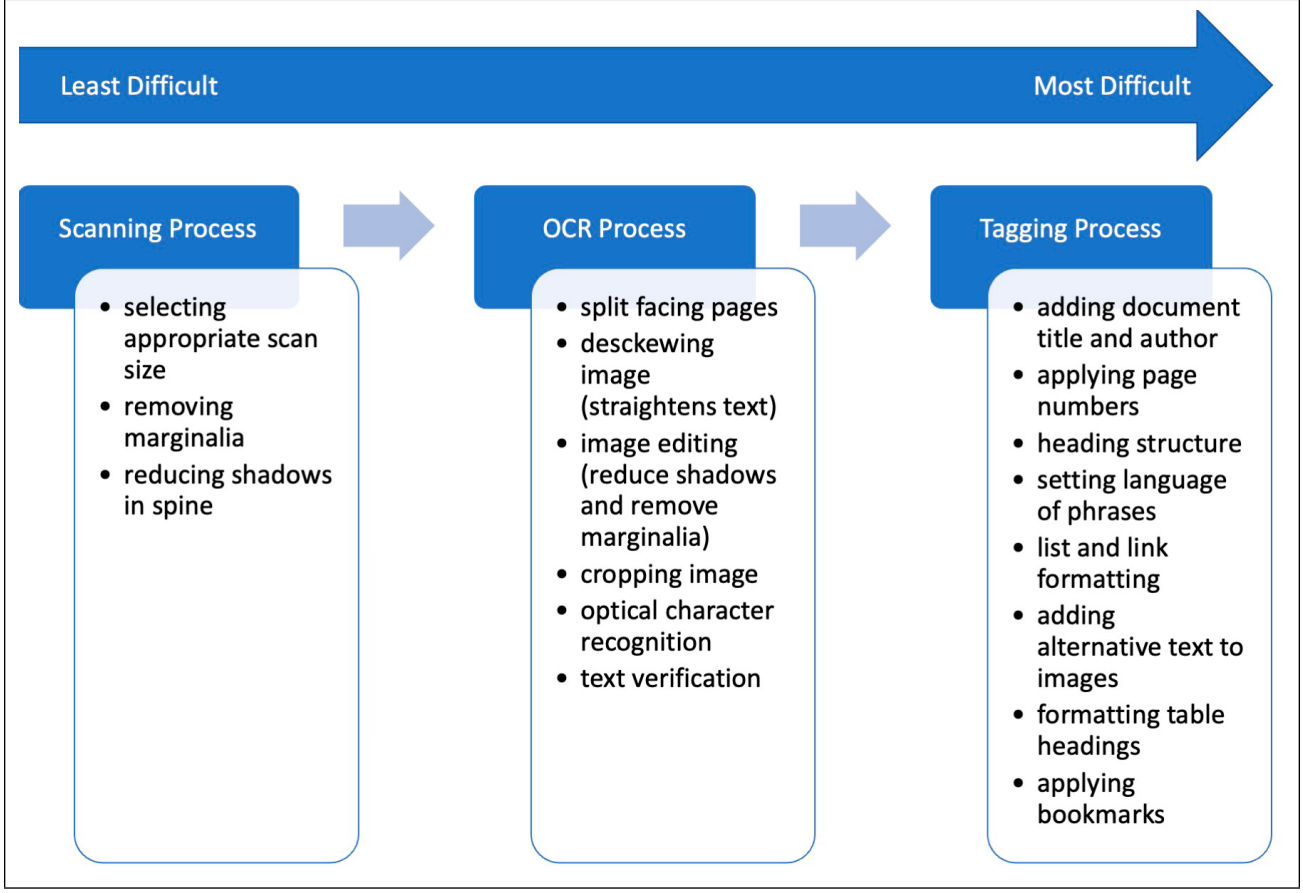
When developing the training program for the Accessible PDF Procedure, we took into consideration that SLAs have a high turnover rate and limited scheduling availability. We also had to find a balance between ensuring staff had all the information they needed to complete a complex process while not over loading SLAs with information. To achieve this balance, we took into consideration cognitive load theory and options for the mode of delivery.

Cognitive Load Considerations

The entire Accessible PDF Procedure is complex and can be overwhelming for a novice learner. We recognized early in the development of our training program that we needed to incorporate techniques from cognitive load theory to ensure information retention.

We incorporated part-task training (PTT) and increase difficulty (ID) by breaking apart the Accessible PDF Procedure into three smaller processes and trained staff on one process at

FIGURE 1
Diagram of the three processes within the Accessible PDF Procedure and the order in which training for each is completed. (Appendix 1 contains a Detailed Description of Figure 1.)



a time, in order from least to most difficult. Figure 1 displays the three processes, from least to most difficult, and the tasks associated with each process.

Staff are first introduced to the concept of a text layer within a PDF during the scanning training when we explain how marginalia (pencil mark-ups) impact the quality of the text created during OCR. During the OCR process training, we build onto this understanding by teaching SLAs that the text in this layer must reflect the content in the scanned image. Once they move on to the Tagging process training, they further build on their understanding of the text layer representing the content of the scan with the concept that this text layer needs additional mark-up (like headings and lists tags) to be properly understood by assistive technology. Building on their existing knowledge helps to reduce cognitive load by connecting new information with existing knowledge (Pickens, 2017).

We incorporated the "training wheel" technique, which encourages learners to focus on current learning objectives (Hutchins et al., 2013). In our case, staff complete the training for one process, demonstrate their understanding and mastery, and then are trained on the next process.

Additionally, we incorporated scaffolding into the training program by providing a sample training PDF for staff to use and by introducing a "feedback period" where staff are required to share at least three additional PDFs to be reviewed by the trainer. The training PDF is the same file used throughout the documentation and later in the videos. Using the

same file provides SLAs with a familiar starting point for their first attempts when learning each process and allows them to leverage their familiarity with the training PDF to build on their knowledge as they learn more complex processes. After SLAs are trained on each process, they enter a feedback period where we review the three PDFs that they have completed, provide feedback as needed and re-direct SLAs to training material if any issues are found. This provides us with an opportunity to verify if there is any loss in comprehension from the training and provide guidance when needed.

Mode of Delivery

Our library spent between 2018-2021 working on identifying the best mode of delivering this training. The following section outlines our process for selecting a mode of delivery that was the most effective for our library to train staff to format scanned PDFs to be accessible. Ultimately, we found that in-person training was not a good fit for this context, and that developing a series of complementary training videos proved successful.

In-Person training

The first iteration of the training program was offered in-person in 2018 to nine SLAS. When deciding which delivery method to use, we took into consideration our past experience successfully training SLAs on standard operations using in-person group training sessions along with the existing literature, which suggested in-person training was preferred by supervisors and staff (Mitchell & Soini, 2014, pp. 596–598; Vassady et al., 2015). As mentioned earlier, the SLAs were trained first on the scanning process, then the OCR process and lastly on the tagging process.

Training for the scanning and OCR processes occurred during the SLA's regularly scheduled shifts and followed a similar format, which included:

- providing SLAs with a reference printout of written documentation for the process being trained
- a live demonstration of each step in the process
- opportunity for the SLA to repeat the step(s) to demonstrate their understanding.

To ensure that SLAs could observe the live demonstrations, these sessions were conducted as one-on-one training due to space limitations around the scanner and single computer station that featured the software used for the OCR Process, ABBYY FineReader.

For the tagging process, we developed a two-hour in-person group training session and offered it twice based on availability. The session included a PowerPoint presentation introducing key concepts for accessibility and elements of an accessible PDF, as well as activities and a live demonstration of how to complete the Tagging process. To teach heading structures, we printed a two-page excerpt from a chapter and SLAs were asked to indicate the appropriate heading levels. This was followed by a take up with the correct headings shared and a discussion about why each heading level was applied. For alternative texts, we provided the group with two images and asked each SLA to write alt text based on the best practices covered in the instruction. We took up the descriptions and discussed the different approaches staff took to describe the images. Following the presentation and activities, we provided a live demonstration of the steps involved in the Tagging process. When demonstrating the more complicated steps in the Tagging process, we asked each SLA to practice under supervision of the trainer.

The training documentation used for all the processes was available to staff for review afterward on our SharePoint site.

Challenges with in-Person training

The first iteration of the in-person training program was offered for two cohorts of SLAs. After the second time running the training program, we found that delivering the training in-person was challenging because of scheduling conflicts and SLAs displaying low retention of information.

Scheduling in-person group training sessions for the tagging process proved to be a challenge, like the experience described by Michalak and Rysavy (2018) and Vassady et al. (2015). We were unsuccessful accommodating all SLAs to attend the multiple in-person group training sessions, despite selecting dates and times based on common availabilities by using the scheduling aid Doodle Poll. Due to these scheduling conflicts, we had to offer multiple in-person group instruction with smaller cohorts; offer one-on-one training sessions during the evenings for some SLAs; or forego training some SLAs on the tagging process.

Moreover, in-person training proved ineffective for retaining information. Many SLAs requested repeat demonstrations, particularly for the tagging process. Although SLAs had the opportunity to ask questions during the in-person training sessions, it was only once they began to attempt each process on their own that they uncovered questions about certain steps. We also noticed many errors in the practice PDFs that SLAs completed following the tagging training session. This led us to believe that there was too much information being shared during the in-person training sessions and SLAs were not able to retain all the information, even with the availability of supporting documentation.

Developing online videos

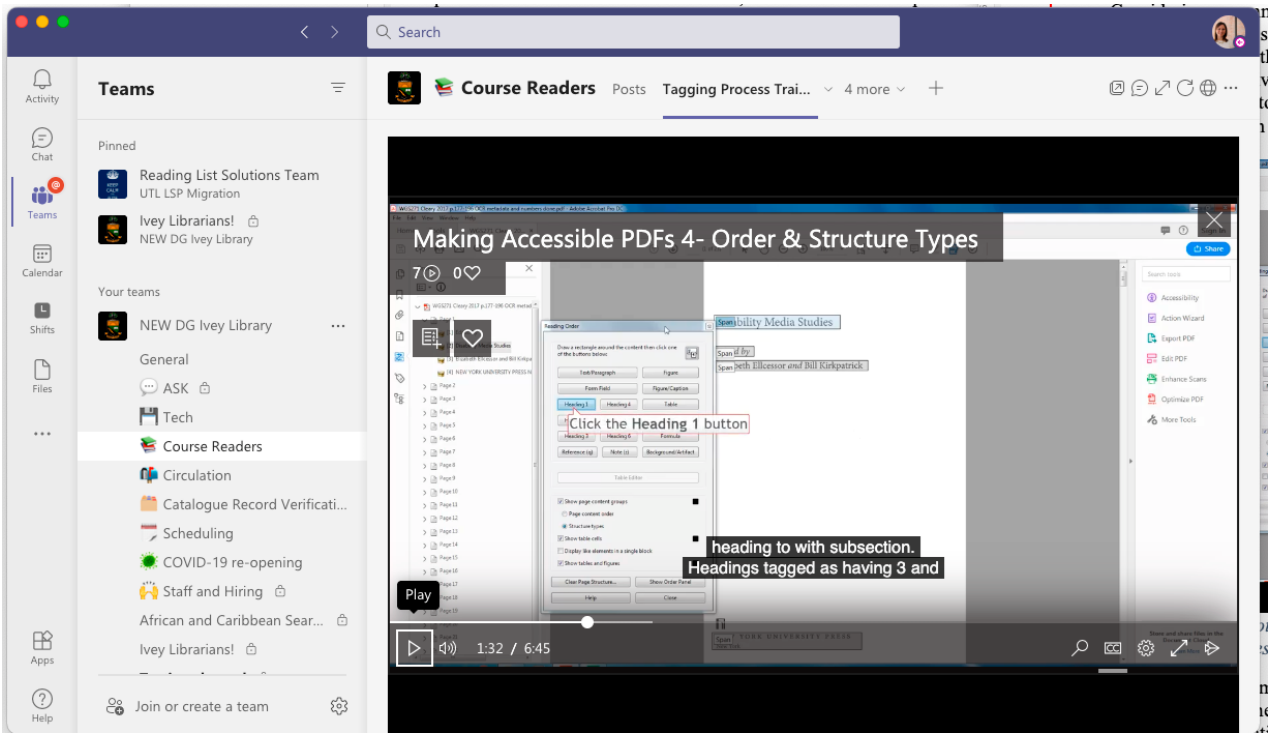
Ultimately, we explored developing videos for our training program. Training videos are a good alternative to in-person training, especially when training features the demonstration of software (Boeninger, 2013; Forrest, 2007; Mellon et al., 2013; Pionke, 2020). Using videos for training provides greater flexibility for the learner to proceed through the material at their own pace and to re-watch content when they need additional guidance (Boeninger, 2013; Mitchell & Soini, 2014).

We decided to pilot using videos with the tagging process first as this process is the most complex and one that SLAs had the most difficulty with. To develop the training videos, we collaborated with an experienced SLA who was familiar with the entire Accessible PDF Procedure. This served two purposes:

- leverage the perspective of an SLA who had undergone the previous training
- capture shortcuts and patterns discovered by SLAs while completing the procedure

The SLA was provided with the necessary equipment and 20 hours to make the training videos. When developing the videos, the SLA divided the content into short videos under five minutes each, which the literature suggests offers greater flexibility for editing and updating content and more flexibility for the viewer to watch the content at their own pace (Boeninger, 2013; Manley & Holley, 2014). The screen recordings included box highlights to draw the viewers' attention to specific areas of the screen and comment boxes with written instructions. Using on-screen cues is known as signaling and can help reduce split attention and cognitive load (Pickens, 2017). Figure 2 is a screenshot of one of the training videos and illustrates an example of the onscreen instructions and highlights. The screenshot of a training

FIGURE 2
Screenshot of tagging process Training Video 4.
Appendix 1 contains a Detailed Description of Figure 2



video shows the option for "Heading 1" in the Reading Order panel highlighted with a blue box and a comment box with the instruction "Click the Heading 1 button" to provide visual cues in addition to the audio instructions. (See Figure 2)

Incorporating videos in the existing training program

In March of 2019, we introduced the tagging process training videos into the Accessible PDF Procedure training program. We continued to train SLAs on the scanning process and OCR process through one-on-one in-person sessions. Once staff displayed a mastery of the OCR process, they were trained on the tagging process. We shared a link to "Tagging Process Training Videos" playlist, an untagged copy of the same PDF that was used in the training videos, as well as documentation for the tagging process. SLAs were instructed to watch the videos, read the associated documentation, and practice on the training PDF during their regularly scheduled shifts. We did not place a time frame for completing the training (i.e., one or two shifts), instead, we encouraged staff to work through the training videos and the practice PDF at their own pace. Based on our previous experience with the in-person training, we recognized that some individuals benefited from more time to learn the tagging process.

We also encouraged library staff to communicate via Teams chat if they had any questions about any steps in the process. Having this support available throughout the training ensured that SLAs had the instructional support they needed to succeed. SLAs notified us once they completed making the training PDF accessible, we then reviewed the training PDF, provided feedback, and directed them to specific videos when issues with the training PDF were discovered. Once the training PDF met accessibility standards, the SLA entered the feedback period.

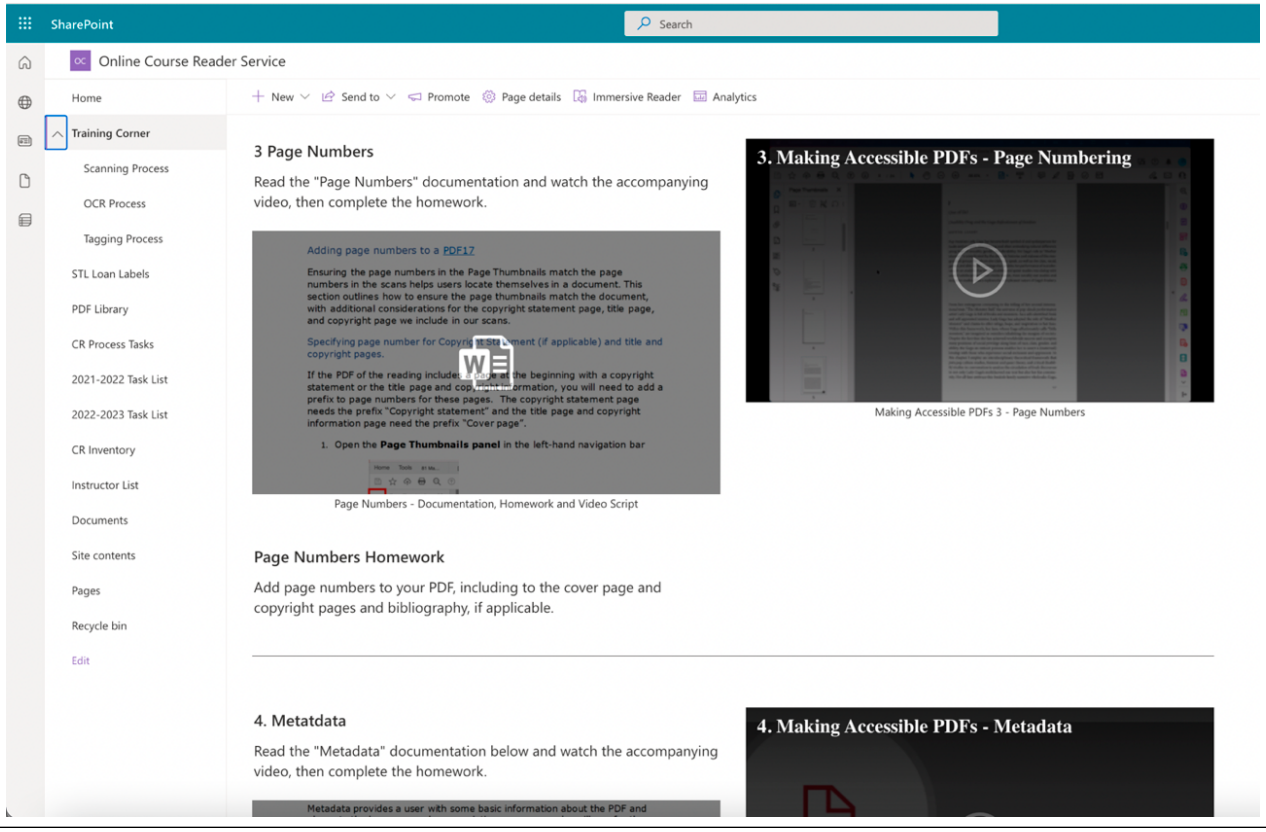
Benefits of online videos

Incorporating videos into the training program was observed to increase learning and offer greater flexibility for training the tagging process than in-person group training sessions. A new cohort of SLAs completed the training using the videos and successfully produced high quality tagged PDFs.

The videos were effective for information retention since SLAs were able to watch the training videos at their own pace during their variously scheduled shifts, and to pause or re-watch content as needed. The videos also supported the use of a training PDF more effectively, as SLAs were able to practice on the training PDF in sync with the progression of the training, as opposed to having to recall all the information covered in a one-time training session. The flexibility of allowing SLAs to rewatch content and work on the practice PDF with immediate access to a demonstration of the steps resulted in fewer requests for training refreshers (e.g., repeating demonstrations or repeating content covered in the training) and fewer errors in the PDFs submitted for review.

Using videos offered greater flexibility in terms of which SLAs were able to participate in the training. Since the SLAs were able to complete the video training during their existing shifts, there were no issues with scheduling training sessions and coordinating with student schedules. This also meant all SLAs were able to participate in learning the tagging process, as opposed to only SLAs that were able to accommodate the additional training time. Using online videos also allowed SLAs to work through the core content independently and rely on the librarian for support on more complex questions or concerns.

FIGURE 3
Screenshot of the Training Corner on the DG Ivey Library Course Reader Service SharePoint website. Appendix 1 contains Detailed Description of Figure 3.



Transition to a fully online training program

The benefits of incorporating the tagging process pilot videos prompted us to develop additional training videos to replace all in-person training for the entire Accessible PDF training program. The OCR process was chunked into four sections, an introduction to ABBYY, image editing, optical character recognition and tables. The scanning process was kept as one part since the process is less complex.

With the move to training videos for the entire Accessible PDF Procedure training program, we developed a page on our SharePoint site dedicated to training, similar to the repository Wetli (2019) described. This page includes:

- links to all the training videos,
- accompanying documentation,
- the training PDFs that are used throughout each stage of the training program, and
- homework for each step

Figure 3 is a screenshot of the training page and illustrates the structure of each section, including relevant documentation, video(s), and homework.

We provide new SLAs a link to the training section for a single process at a time and instruct them to watch the video, read the documentation, and complete the homework using the training PDFs provided. As SLAs complete the training, they are encouraged to ask questions. Once SLAs complete their training PDFs we review their work and provide feedback. When the SLAs are able to produce a training PDF with no issues, they enter the feedback period to ensure they are able to consistently produce a high-quality PDF after which SLAs are assigned PDFs as part of their regular workflow.

Discussion

The development of our training program spanned several years as we explored different delivery methods to help our SLAs learn the intricate steps involved in making scanned PDFs accessible. Overall, we found it beneficial to incorporate the following into our training program:

- techniques to help reduce cognitive load, including part-task training, increasing difficulty, the training wheel, and scaffolding; and
- videos to efficiently demonstrate the steps involved in complex and multi-step processes.

Since transitioning to a fully online training program using videos in 2021, we have successfully trained eleven new SLAs on the Accessible PDF Procedure. We found moving to online videos increases retention of information, offers greater flexibility for SLAs to complete the training at their own pace, eliminates scheduling issues, and reduces the need for refresher training. Creating short videos also makes it easy to update content, which has been necessary as updates to best practices for accessible PDFs emerge.

Another benefit to using online videos for the training program was being able to continue to train our students during the COVID-19 pandemic, which rendered in-person training impossible due to social distancing measures that were in place. As with many academic institutions, our library had a social distancing policy in place during the height of the pandemic to ensure the health and safety of our staff. Our library tried to remain open as much as possible during the pandemic to be able to provide students with access to technology that was required for their studies and to maintain the operation of our services, like Online Course Reader Service. Several staff were not yet trained on the Accessible PDF Procedure

when social distancing was in-place so having an entire online training program with videos allowed us to continue to train staff on this key procedure in a safe way.

For libraries considering using online videos for training, we recommend taking the time to explore screen recording software options and select an option that can be used by all staff in your library. This will help if you experience staffing changes that might impact who is able to update the content or create new content for the videos.

Future Directions

A possible future direction for the training program is to migrate the program from our library SharePoint to a learning management system (LMS). Macnaugton and Medinsky (2015) and Bell (2016) describe transitioning to an LMS to train library staff because it offers flexibility for the learner to engage at their own pace and provides the trainer with opportunities to create engaging learning objects. Transitioning to an LMS would allow us to incorporate some of the structured training wheel techniques by locking access to content until the learner displays their existing knowledge of the current content through assessment tools. Additionally, migrating to an LMS would help facilitate sharing the training program with other libraries within the larger University of Toronto Library system or beyond our institution.

Conclusion

Inaccessible library material, including scanned material, contributes to an inequitable library and educational experience. Providing users with accessible library material is needed to live up to claims of equity, diversity and inclusion within academic libraries and librarianship. Processes that require medical documentation, registration with specific offices, and individual requests are often described as "very time consuming and …. very frustrat[ing]" (Bruce et al., 2022, 2:00). Examining library services, spaces, and collections through the social model of disability framework will allow libraries to identify societal barriers that prevent patrons with disabilities from engaging with the library materials without the need for an accommodation.

As libraries strive to make their collections, services, and spaces more accessible, we need to consider the training implications for staff. It is important for institutions interested in developing a training program to consider:

- the impact of cognitive load on the trainee and apply cognitive load theory to help reduce the strain on the learner,
- unique considerations when training part-time student library staff, and
- the mode of delivery that best suits the needs of the library.

In terms of developing a training program for formatting accessible scanned PDFs, our library's experiences lead us to recommend:

- incorporating part-task training, increase difficulty and training wheel techniques to help reduce cognitive load,
- incorporate self-paced videos to improve information retention and reduce (or remove) scheduling issues for training, and
- homework for trainees and provide feedback to trainees.

Our experience supports the literature in suggesting that training videos offer both greater flexibility when scheduling issues arise and provide library assistants the affordance to review material at their own pace. We also recommend sharing the videos online along with relevant documentation so that library assistants have consistent access to the materials.

The training recommendations presented in this paper are transferable to other accessibility initiatives within all libraries, such as the creation of electronic accessible recourses with word processors or creating accessible library guides (LibGuides).

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Appendix

Detailed Description of Figure 1

Figure 1 displays a process diagram for the Accessible PDF Procedure. Along the top of the diagram is an arrow pointing from left to right. At the start of the arrow on the left side of the diagram is the label "Least Difficulty" and at the tip of the arrow on the right side is the label "Most difficult". The process diagram below contains 3 process categories labeled (from left to right) Scanning process, OCR Process, and Tagging process. Each process has a list of steps.

The Scanning process includes:

- selecting appropriate scan size
- removing marginalia
- reducing shadows from spine

The OCR Process includes:

- split facing pages
- deskewing image (straightens text)
- image editing (reduce shadows and remove marginalia)
- cropping image
- optical character recognition
- text verification

The Tagging Process includes:

- adding document title and author
- applying page numbers
- heading structure
- setting language of phrases
- list and link formatting
- adding alternative text to images
- formatting table headings
- applying bookmarks

Detailed Description of Figure 2

Figure 2 is a screenshot from the training video titled "Making Accessible PDFs 4 – Order & Structure Types". On the screen, the training PDF is open to the book cover page. The reading order pane is open on the left-hand side and the Reading Order panel is open. The text "Disability Media Studies" in the PDF is selected and Heading 1 option in the Reading Order panel is highlighted blue, with a comment bubble contains the text "Click the Heading 1 button."

Detailed Description of Figure 3

Figure 3 is a screenshot of the section "Three Page Numbers" from the Tagging Process within the Training Corner of the Online Course Reader Service SharePoint site. In the left side site navigation, the Training Corner option is at the top of the list and includes links to the Scanning Process, OCR Process, and Tagging Process. In the main content area of the page is the section titled "Three Page Numbers," which is divided into two. On the right side, below the section title, are the following instructions "Read the 'Page Number" documentation and watch the accompanying video, then complete the homework." Below these instructions is a file viewer titled "Page Numbers – Documentation, homework and video script." To the right is a video thumbnail titled "3. Making Accessible PDFS – Page Numbering."

Below the section titled "Three Page Numbers" is the section titled "Page Numbers Homework" with the following text "Add page numbers to your PDF, including the cover page and copyright pages, and bibliography, if applicable."

The Impact of the Research Data Management Toolkit: Assessing a RoadShow Workshop

Abigail Goben, Megan Sapp Nelson, and Shaurya Gaur

The "Building Your Research Data Management Toolkit" was developed to provide introductory research data management skills training to liaisons in academic libraries. This paper assesses the participants' perceived change in knowledge, behaviors and attitudes as a result of participation in the RoadShow program. Long term changes in knowledge, skills and behaviors are suggested by the resulting data.

Introduction

As academic librarians continue to self-educate and reskill, the profession often seeks to meet their needs through the development of professional development tools and training programs. These programs and materials are seemingly created in waves, as new initiatives and trends emerge within the profession. One such wave emerged around 2013-2015 in response to the need for broad research data management upskilling throughout academic libraries. Most of the materials produced relied upon individual self-direction and efficacy. Due to the distributed nature of these interventions, there was limited opportunity to directly assess the impact of these materials.[1–9]

Library professional organizations, and the field of librarianship as a whole, recognized that these materials would be insufficient to bring a critical mass of individuals up to speed on the topic. Therefore, new solutions were developed that trained large groups in one structured intervention. For example, the Institute of Museum and Library Services (IMLS) funded massive open online courses on topics of data management in 2016.[10,11] Likewise, the Association of College and Research Libraries (ACRL) commissioned the "Building Your Research Data Management" Toolkit in 2015. It was developed to teach groups of up to 120 participants at a time about the basic principles of research data management from the perspective of liaison librarians.

Over five years, the "Building Your Research Data Management Toolkit" RoadShow, aka the Research Data Management (RDM) RoadShow, traveled to fifteen sites, including one international location. Based on data from surveys administered to participants at three points—prior to participation, and again one month and six months after participation—conclusions can be

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drawn regarding the efficacy of the RDM RoadShow as a delivery modality for research data management fundamental skills and knowledge.

Purpose of This Paper

- Assess the impact of the RoadShow on individual librarians' personal knowledge, behavior and attitudes related to research data management.

The Development of the RoadShow

To gauge interest in the topic of research data management, a pre-conference workshop was hosted by ACRL in 2014 examining the fundamental tenets of research data management. Based on the response, ACRL issued a call in 2015 for curriculum developers to develop a one-day long workshop to teach the fundamental principles of research data management to academic liaison librarians.[12] The workshop was modeled after the popular ACRL Scholarly Communications RoadShow, which featured two speakers and six interactive modules. The workshop materials were licensed under a Creative Commons CC-BY-NC license and electronically housed on the ACRL Scholarly Communication Toolkit website.[13] Unlike previous RoadShows, the Research Data Management RoadShow was developed in tandem with a research project to investigate the efficacy of the intervention.[14]

The RDM Road Show was designed as a single-day, in-person professional development event. This workshop included interactive sessions on research data management, applying library liaison skills to RDM, serving different disciplinary needs, planning for data management services, and developing campus partnerships. The workshop presented the following learning objectives:

- Participants will identify data within the research process and lifecycle in order to articulate the role of the libraries in the management of data to researchers.
- Participants will learn how to develop expertise in the nuances of disciplinary requirements for data management in order to educate their faculty and students about data best practices for their discipline.
- Participants will articulate specific existing skills that they already possess as librarians, which transfer to data services in order to begin building a toolkit of research data management skills.
- Participants will identify campus partners in research data management in order to create an environment of research data management support for their faculty.
- Participants will articulate the parts of a data management plan in order to describe its role as a living document within a research project.
- Participants will apply their relevant prior knowledge of their disciplines to create a research data management interview plan in order to facilitate faculty engagement.[15]

Assessment of Librarians and RDM Interventions

While assessment of impact is a critical component of any educational intervention, timely and comprehensive assessment of research data management professional development has been limited. Tenopir et al. have assessed, over time, the baseline skills of librarians related to research data management; however, their work focused broadly on the uptake of data management knowledge and behaviors, and this research has not been directly related to a specific educational intervention.[16,17] Additional evaluation research has sought to determine

the skill sets that librarians need,[18,19] surveyed how prepared librarians feel to provide data services,[20] assessed how librarians are perceived by researchers in the provision of data support,[21] or looked externally to libraries to understand faculty data needs.[22]

The literature primarily focused on the techniques and methods used for the development of each of the curricula.[23–25] Articles about assessing various curricula include a single institution case study, which only describes the implementation process, not the actual perceived impact nor use of the New England Collaborative Data Management Curriculum (NECDMC) with interdisciplinary graduate students.[26–28]

A complementary area where librarians have needed to take on new and advanced research responsibilities has been the rise of systematic review services in health sciences libraries, which has prompted the development of several in person multi-day workshops. A recent article provides a longitudinal evaluation of the efficacy of the University of Pittsburgh Systematic Review Workshop.[29] However, this workshop is highly competitive, such that many institutions could only send a single individual to a training and therefore a direct comparison to a less exclusive intervention like the RoadShow is difficult to make.

At the outset of the research project, our research question was

- Did the RoadShow impact individual participant knowledge, behavior, and attitudes related to RDM Services? If so, how?

Previous RoadShows had assessments of only a few sites (single presentations), typically conducted immediately after the event, and did not follow up on long term gains. This project is therefore unique in using multi-part assessment to identify indicators of efficacy for the RoadShow professional development methodology.

RoadShow Assessment Methodology

The purpose of this RoadShow assessment was to better understand the knowledge, behaviors, and attitudes of participants prior to their attendance and then at one- and six-month intervals following the workshop in order to identify changes attributable to the intervention. To assess this, the authors developed a series of three surveys, which were reviewed by Institutional Review Boards and assigned an Exemption by Purdue University # 1603017411 and University of Illinois Chicago # 2016-1069.[30] These surveys consisted of seventeen questions containing sixty assessed statements addressing knowledge, behavior, and attitudes of RoadShow participants related to research data management as well as implementation of the knowledge, behavior, and attitudes after the RoadShow at their home institution. The surveys were built and conducted using the Qualtrics software. Access to the raw data was limited to the two lead authors. Question formats included Likert scales (5 point for questions, 3 point for impact of the RoadShow) and short answer related to job title and institution. Personally identifiable information for individuals was limited to institution and job title. A participant could leave any question blank.

All pre-registered participants received the first survey invitation in advance of participating in the workshop. De-identified summary data from the preliminary survey was provided to the workshop instructors to assist in their instruction preparation. Participants were then invited during the workshop to provide their email address separately if they wished to participate in the one- and six-month interval surveys. Respondents who provided their contact information received one notification email and one follow up email for each of the one- and six-month surveys. In order to limit participant re-identification, responses were not

correlated by any form of demographic information across the three surveys.

Data was organized into Summary Tables, and summary statistics were performed on all data. Data analysis was conducted in R, using the packages readxl, dplyr, and likert. Likert charts were then created using Excel, Google Sheets, and ChartExpo.

Results

Summary Statistics

Data was captured over the course of four years from a total of 15 Roadshows. At least 558 participants attended the RoadShows, with 216 participating in the pre-survey, 202 participating in the one-month post-survey and forty-five participating in the six-month post-survey. As personal identifiers were deliberately not captured, individual reported change over time is not traced through the data. Due to the limitations of the data and the small overall sample sizes, responses are provided in percentages rather than absolute value counts.

Individual Impact of the RoadShow

This paper focuses on the responses specifically from nine survey questions related to: the knowledge and skills of the target workshop audience (i.e., liaison librarians); their perceptions of opportunities for engagement; and their beliefs about the necessity of providing data services.

Participants were asked to rate their agreement to questions on a 5-point likert scale and the impact of the RoadShow on their agreement in one- and six-month post-surveys on a 3-point scale. Here, results for agreement are grouped for Agreement, Neutral, or Disagreement to assess overall trends, while results for impact are grouped by Very/Some Influence and Not Influential. Research data management, which was spelled out in each question, is abbreviated here to RDM.

Participant RDM Knowledge

Three questions were assessed to identify participant RDM knowledge and the participants' perceived impact of the RoadShow.

FIGURE 1

Likert chart of responses to the question "I have the skills, knowledge and training necessary to provide research data management services."

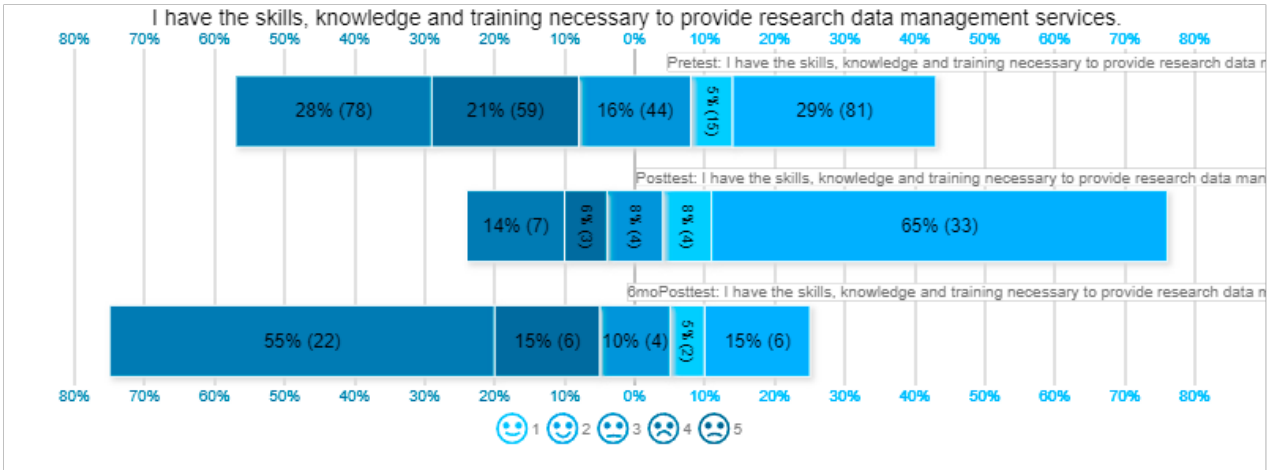
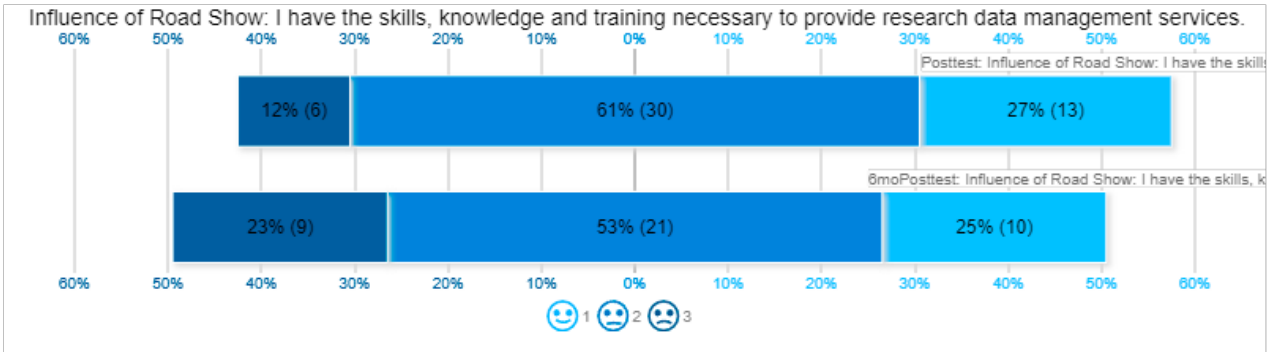


FIGURE 2
Likert chart of responses to the question "Influence of the Road Show on 'I have the skills, knowledge and training necessary to provide research data management services.'"



As an RDM knowledge content baseline, participants considered the question "I have the skills, knowledge and training necessary to provide research data management services." Figure 1 presents the agreement of participants with these statements in the pre-survey, the one-month post-survey, and the six-month post-survey. In the pre-survey, 34 percent of RoadShow participants agreed, 16 percent were neutral, and 49 percent disagreed. In the one-month post-survey, 73 percent agreed that they had the skills, knowledge and training, 8 percent were neutral, and 20 percent disagreed. At the six-month post-survey, 20 percent agreed, 10 percent were neutral, and 70 percent disagreed.

Participants were also asked to assess the impact of the RoadShow on if they had the skills, knowledge and training necessary. Figure 2 shows the perceived influence broken out by the one- and six-month surveys. In the one-month survey, 88 percent said that the RoadShow was very/somewhat influential and 12 percent not influential. In the six-month post-survey, 78 percent reported that the RoadShow was very/somewhat influential and 23 percent reported that it was not influential.

FIGURE 3
Likert chart of responses to the question "I can identify traditional library skills with correlates in research data management services."

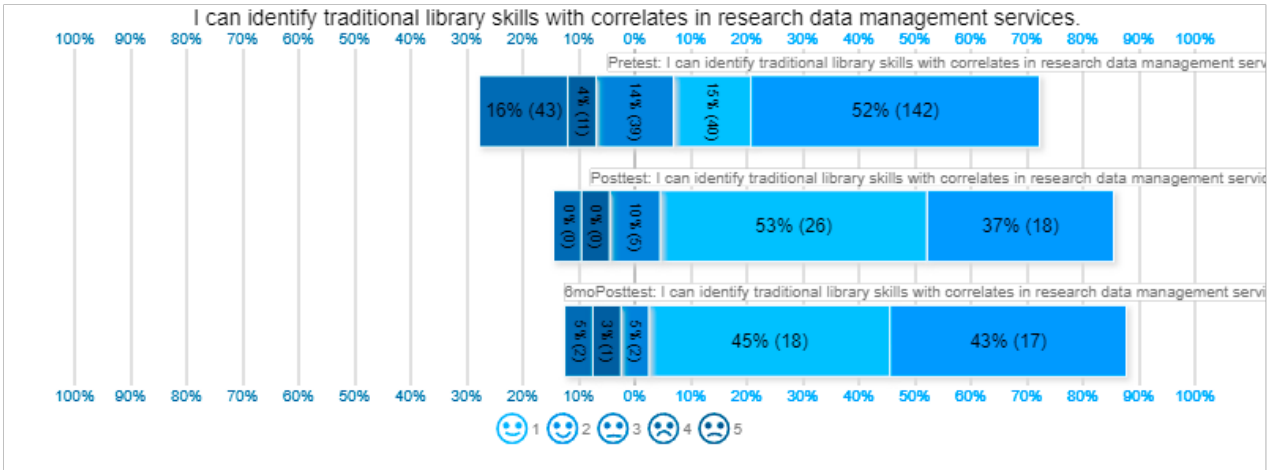
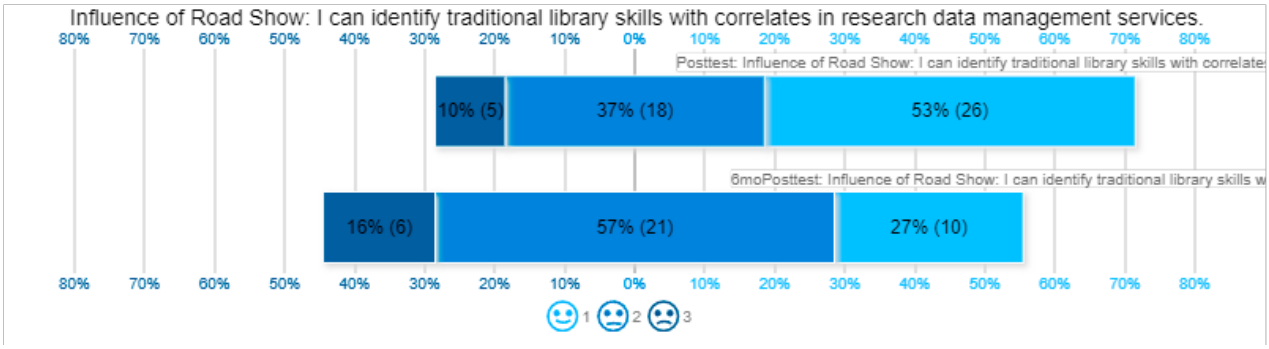


FIGURE 4
Likert chart of responses to the question "Influence of the Road Show: I can identify traditional library skills with correlates in research data management services."



The second knowledge question asked was: "I can identify traditional library skills with correlates in research data management services." Figure 3 presents the agreement of participants with these statements in the pre-survey, the one-month post-survey, and the six-month post-survey. In the pre-survey, 67 percent agreed, 14 percent were neutral, and 15 percent disagreed. In the one-month post-survey, 90 percent agreed, 10 percent were neutral and 0 percent disagreed. At the six-month post-survey, 88 percent agreed, 5 percent were neutral, and 8 percent disagreed.

Participants were asked to assess the impact of the RoadShow on their ability to correlate traditional library skills and RDM. Figure 4 shows the perceived influence broken out by the one- and six-month surveys. In the one-month survey, 90 percent said the RoadShow was very/somewhat influential and 10 percent said it was not influential. In the six-month post-survey, 84 percent reported that the RoadShow was very/somewhat influential and 16 percent reported that it was not influential.

The final knowledge question asked participants to assess whether, "I know the research data management requirements and expectations for my liaison disciplines." Figure 5 presents the agreement of participants with these statements in the pre-survey, the one-month post-

FIGURE 5
Likert chart of responses to the question "I know the research data management requirements and expectations for my liaison discipline."

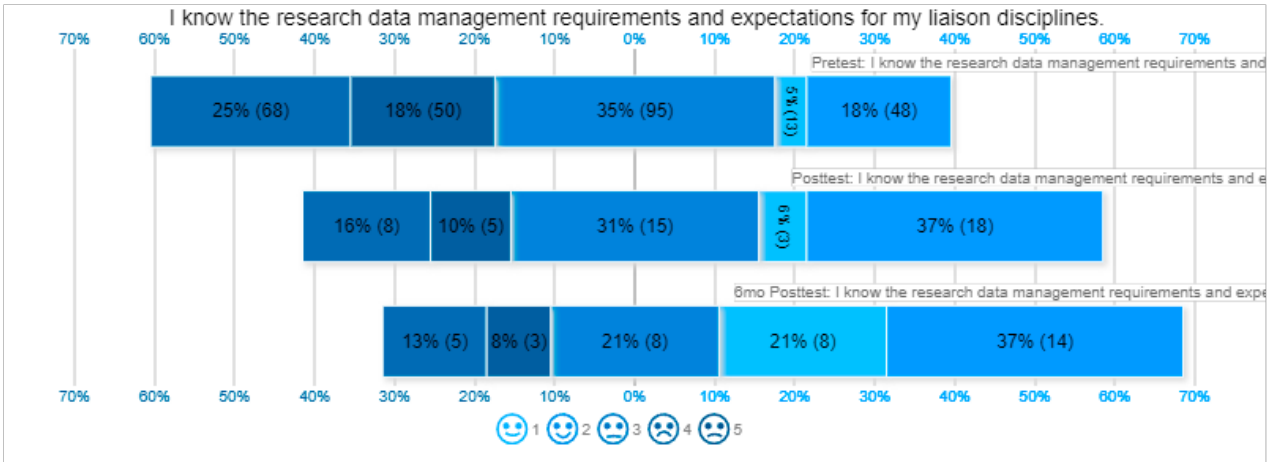
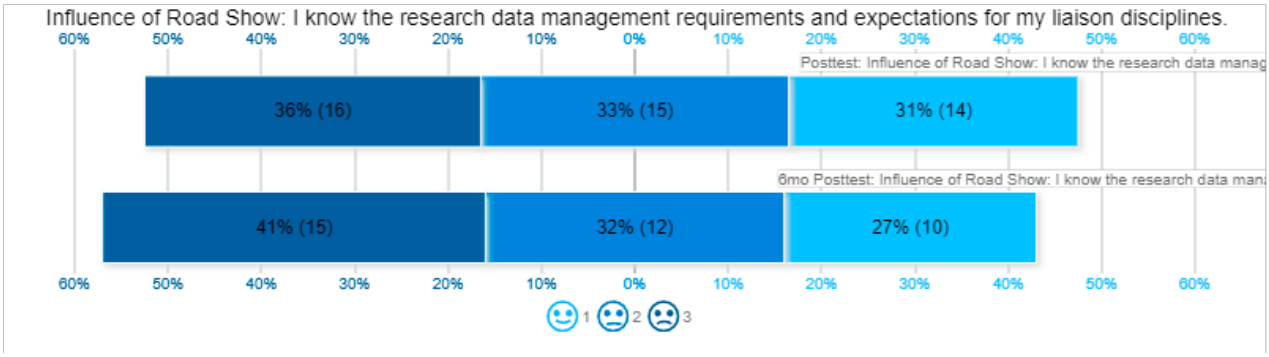


FIGURE 6
Likert chart of responses to the question "Influence of the Road Show: I know the research data management requirements and expectations for my liaison disciplines."



survey, and the six-month post-survey. In the pre-survey, 23 percent of RoadShow participants agreed, 35 percent were neutral, and 43 percent disagreed. In the one-month post-survey, 43 percent agreed that they knew the RDM requirements for their disciplines, 31 percent were neutral, and 26 percent disagreed. At the six-month post-survey, 58 percent of RoadShow participants agreed, 21 percent were neutral, and 21 percent disagreed.

Participants were asked to assess the impact of the RoadShow on if they knew the RDM requirements and expectations for their liaison disciplines. Figure 6 shows the perceived influence broken out by the one- and six-month surveys. In the one-month post-survey, 64 percent said the RoadShow was very/somewhat influential and 36 percent said it was not influential. In the six-month post-survey, 59 percent said the RoadShow was very/somewhat influential and 41 percent said it was not influential.

Opportunities for Engagement

As a learning objective of the RoadShow, the instructors sought to assist participants in finding ways to engage with RDM. Four questions addressed whether participants felt able to assess opportunities to engage in RDM activities.

FIGURE 7
Likert chart of responses to the question "I recognize opportunities for library involvement in research data management at each point in the data life cycle."

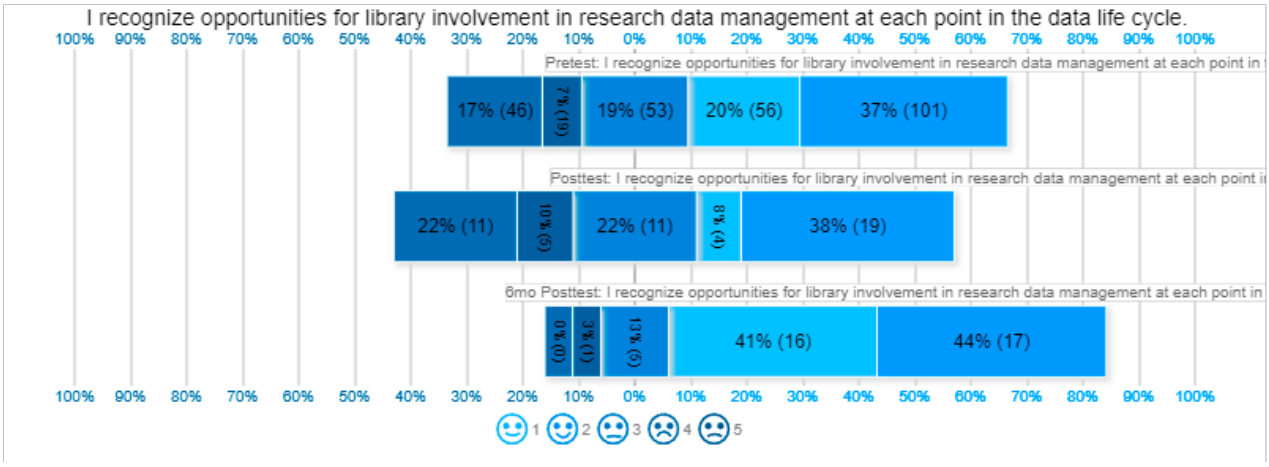
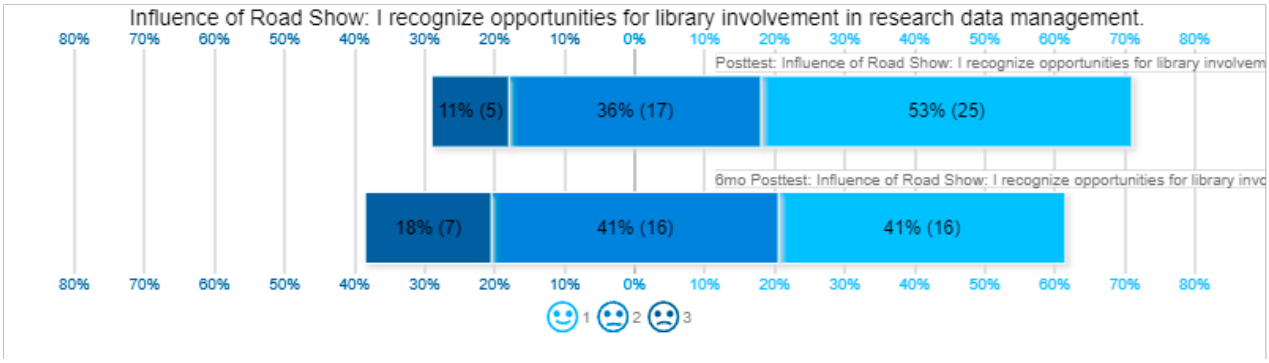


FIGURE 8
Likert chart of responses to the question "Influence of the Road Show: I recognize opportunities for library involvement in research data management at each point in the data life cycle."



As a baseline for gauging library engagement, participants considered the question: "I recognize opportunities for library involvement in research data management at each point in the data life cycle." Figure 7 presents the agreement of participants with these statements in the pre-survey, the one-month post-survey, and the six-month post-survey. In the pre-survey, 57 percent of RoadShow participants agreed, 19 percent were neutral, and 24 percent disagreed. In the one-month post-survey, 46 percent agreed that they recognized opportunities for library involvement in RDM, 22 percent were neutral, and 32 percent disagreed. At the six-month post-survey, 89 percent agreed, 13 percent were neutral, and 3 percent disagreed.

Participants assessed their perceived impact of the RoadShow with the question: "I recognize opportunities for library involvement in research data management at each point in the data life cycle." At the one-month post-survey 89 percent said the RoadShow was very/somewhat influential and 10 percent said it was not influential. In the six-month post-survey, 82 percent reported that the RoadShow was very/somewhat influential and 18 percent said it was not influential.

FIGURE 9
Likert chart of responses to the question: "As a librarian, I can create an interview plan to seek specific information about the state of data management practices or data curation needs."

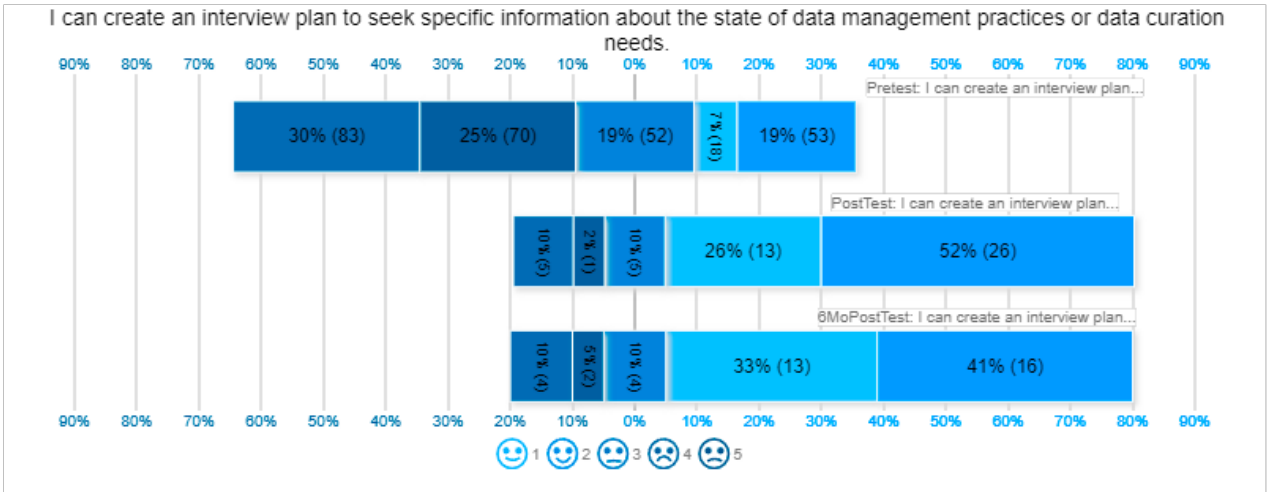


FIGURE 10
Likert chart of responses to the question "Influence of the Road Show: I can create an interview plan to seek specific information about the state of data management practices or data curation needs."

The next engagement opportunity question asked participants to consider if they felt they could agree that "I can create an interview plan to seek specific information about the state of data management practices or data curation needs." Figure 9 presents the agreement of participants with these statements in the pre-survey, the one-month post-survey, and the six-month post-survey. In the pre-survey, 26 percent of participants agreed, 19 percent were neutral, and 55 percent disagreed. In the one-month post-survey, 76 percent agreed that they could create an interview plan, 9 percent were neutral, and 15 percent disagreed. At the six-month post-survey, 74 percent agreed, 10 percent were neutral, and 15 percent disagreed.

Participants indicated their own perception of the impact of the Road Show with the question: "I can create an interview plan to seek specific information about the state of data management practices or data curation needs." Figure 10 shows the perceived influence broken out by the one- and six-month surveys. At the one-month post-survey 90 percent said the RoadShow was very/somewhat influential and 11 percent said it was not influential. In the six-month post-survey, 84 percent reported that the RoadShow was very/somewhat influential and 16 percent said it was not influential.

FIGURE 11
Likert chart of responses to the question: "As a librarian, I can discuss data management practices with a researcher informally or formally."

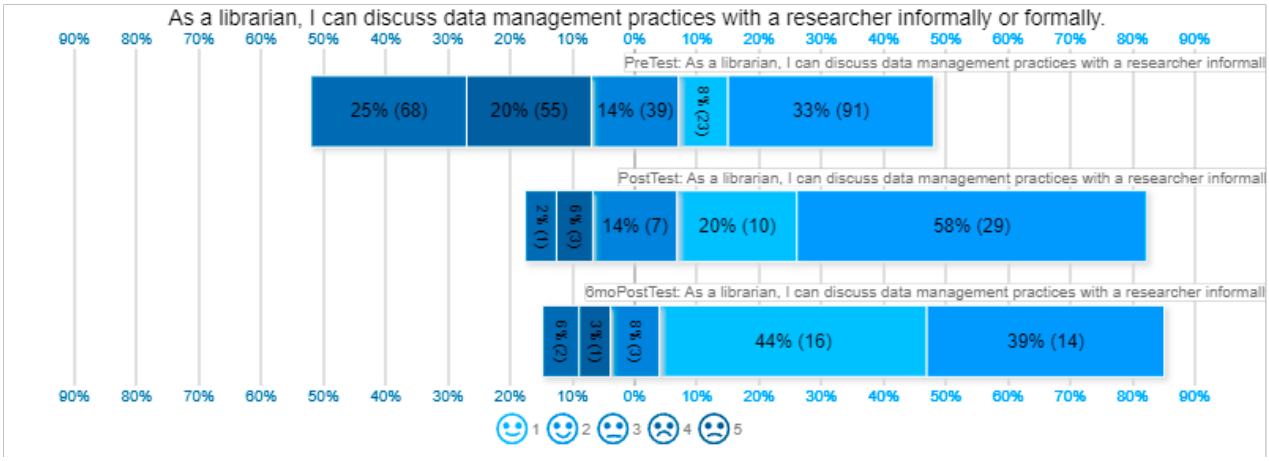
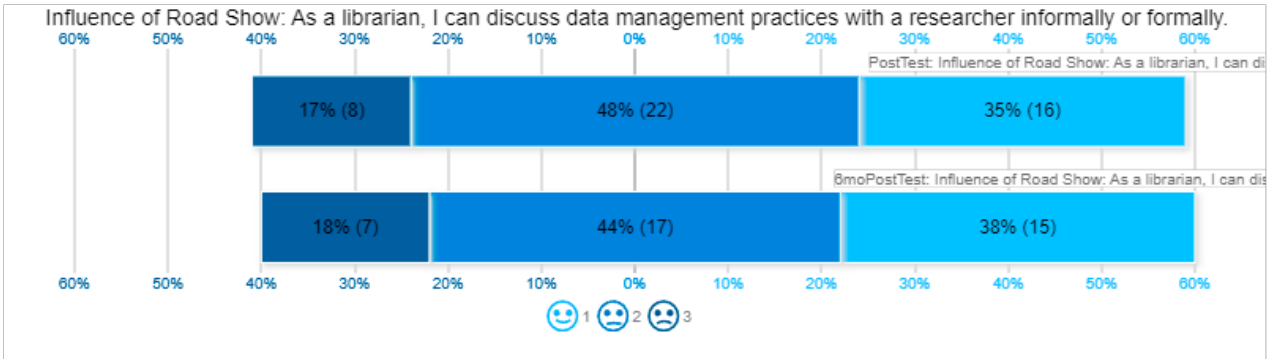


FIGURE 12
Likert chart of responses to the question "Influence of the Road Show: As a librarian, I can discuss data management practices with a researcher informally or formally."



Next, participants were asked about identifying their own potential for involvement working with a researcher, in answer to the question: "As a librarian, I can discuss data management practices with a researcher informally or formally." Figure 11 presents the agreement of participants with these statements in the pre-survey, the one-month post-survey, and the six-month post-survey. In the pre-survey, 41 percent of RoadShow participants agreed, 14 percent were neutral, and 45 percent disagreed. In the one-month post-survey, 78 percent agreed that they could discuss RDM with a researcher, 14 percent were neutral, and 8 percent disagreed. At the six-month post-survey, 83 percent agreed, 8 percent were neutral, and 9 percent disagreed.

For the statement: "As a librarian, I can discuss data management practices with a researcher informally or formally," in the pre-survey 42 percent of participants agreed, 14 percent were neutral, and 44 percent disagreed. In the one-month post-survey, 77 percent agreed, 15 percent were neutral, and 8 percent disagreed; 84 percent said the RoadShow was very/somewhat influential and 17 percent said it was not influential. In the six-month post-

FIGURE 13
Likert chart of responses to the question "I can make referrals to specific campus partners in research data management to solve researchers' problems in RDM."

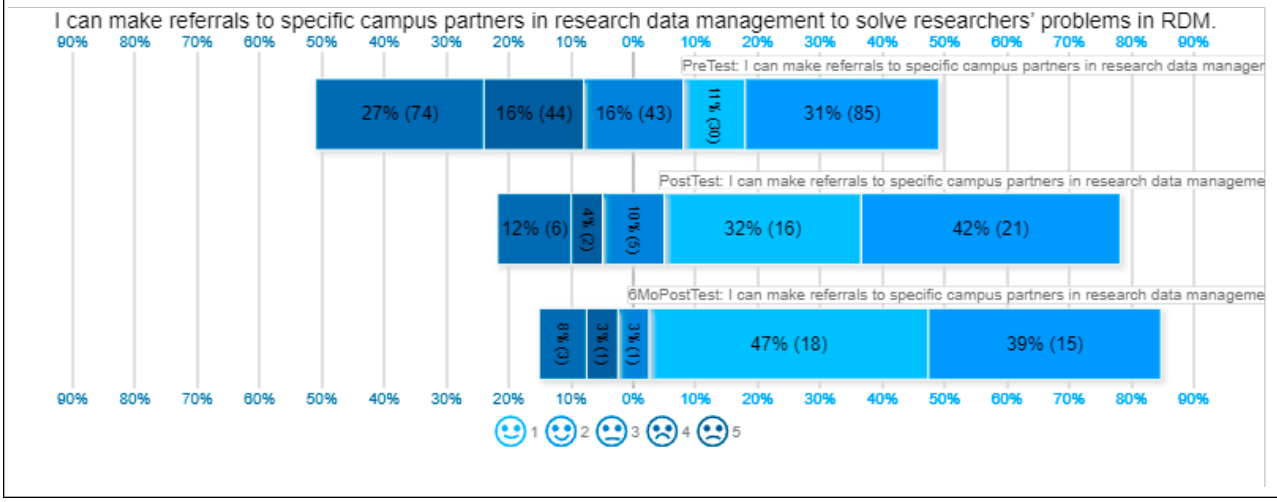
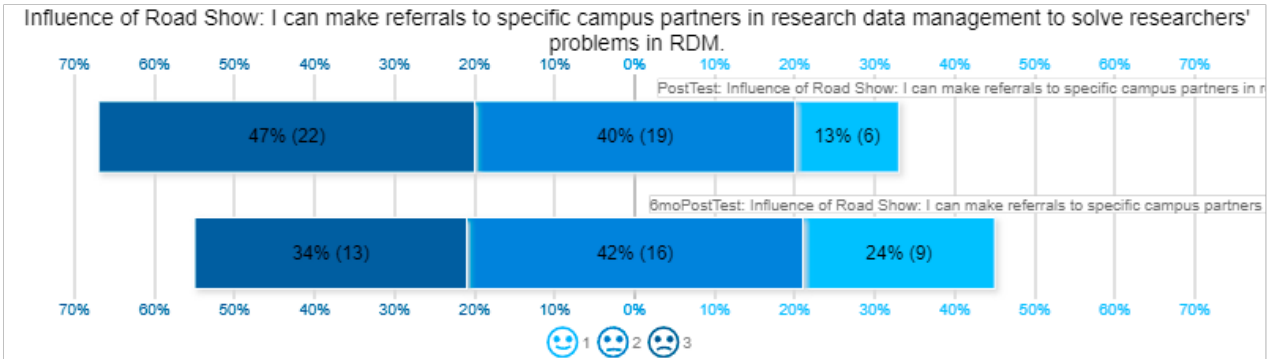


FIGURE 14
Likert chart of responses to the question "Influence of the Road Show: I can make referrals to specific campus partners in research data management to solve researchers' problems in RDM."



survey, 74 percent agreed, 10 percent were neutral, and 15 percent disagreed; 79 percent said the RoadShow was very/somewhat influential and 21 percent said it was not influential.

Another opportunity for an engagement question was whether participants felt they could agree with the question: "I can make referrals to specific campus partners in research data management to solve researchers' problems in RDM." Figure 13 presents the agreement of participants with these statements in the pre-survey, the one-month post-survey, and the six-month post-survey. In the pre-survey, 32 percent of RoadShow participants agreed, 16 percent were neutral, and 43 percent disagreed. In the one-month post-survey, 74 percent agreed that they had the skills, knowledge, and training, 10 percent were neutral, and 16 percent disagreed. At the six-month post-survey, 86 percent agreed, 3 percent were neutral, and 11 percent disagreed.

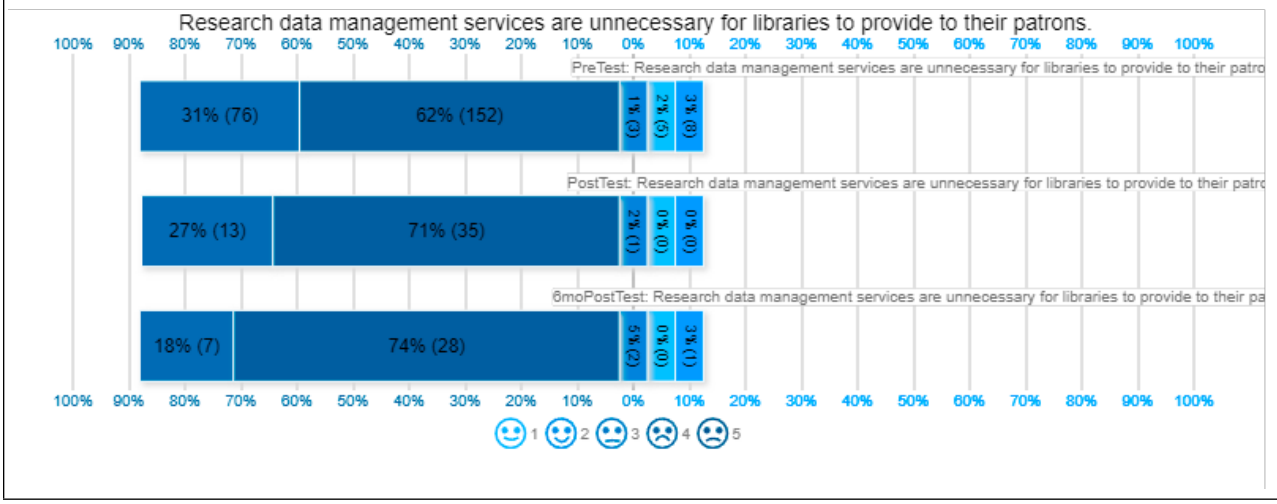
Participants assessed the impact of the Road Show with the question: "I can make referrals to specific campus partners in research data management to solve researchers' problems in RDM." Figure 14 shows the perceived influence broken out by the one-month and six-month surveys. At the one-month post-survey 53 percent said the RoadShow was very/somewhat influential and 47 percent said it was not influential. In the six-month post-survey, 66 percent reported that the RoadShow was very/somewhat influential and 33 percent said it was not influential.

Necessary for the Library

The final set of questions asked participants in the RoadShow events to assess whether they felt that RDM was unnecessary for libraries or as something for them, as individuals, to provide to patrons.

In the first questions about RDM necessity, participants considered the question: "Research data management services are unnecessary for libraries to provide to their patrons." Figure 15 presents the agreement of participants with these statements in the pre-survey, the one-month post-survey, and the six-month post-survey. In the pre-survey, 5 percent of RoadShow participants agreed, 1 percent were neutral, and 93 percent disagreed. In the one-month post-survey, 0 percent agreed that RDM was unnecessary for libraries to provide, 2 percent were neutral, and 98 percent disagreed. At the six-month post-survey, 3 percent agreed, 5 percent were neutral, and 92 percent disagreed.

FIGURE 15
Likert chart of responses to the question "Research data management services are unnecessary for libraries to provide to their patrons."



Participants identified the impact of the Road Show on their attitude regarding the statement "Research data management services are unnecessary for libraries to provide to their patrons." Figure 16 shows the perceived influence broken out by the one-month and six-month surveys. At the one-month post-survey 54 percent said the RoadShow was very/somewhat influential and 47 percent said it was not influential. In the six-month post-survey, 62 percent reported that the RoadShow was very/somewhat influential and 38 percent said it was not influential.

The second necessity question asked participants to determine whether "Research data management services are unnecessary for me to provide to my patrons." Figure 17 presents the agreement of participants with these statements in the pre-survey, the one-month post-survey, and the six-month post-survey. In the pre-survey, 6 percent of RoadShow participants agreed, 17 percent were neutral, and 78 percent disagreed. In the one-month post-survey, 16 percent agreed that they had the skills, knowledge and training, 5 percent were neutral, and 79 percent disagreed. At the six-month post-survey, 11 percent agreed, 5 percent were neutral, and 85 percent disagreed.

FIGURE 16
Likert chart of responses to the question "Influence of the Road Show: Research data management services are unnecessary for libraries to provide to their patrons."

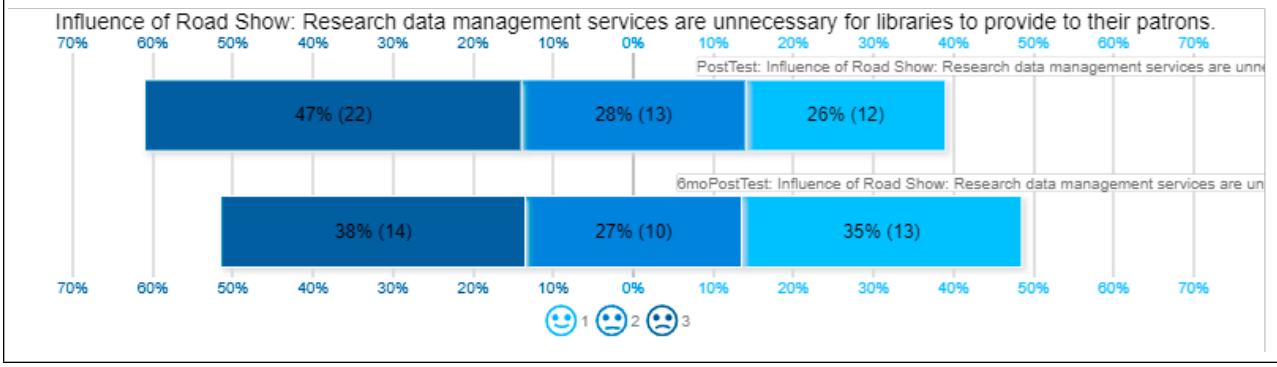
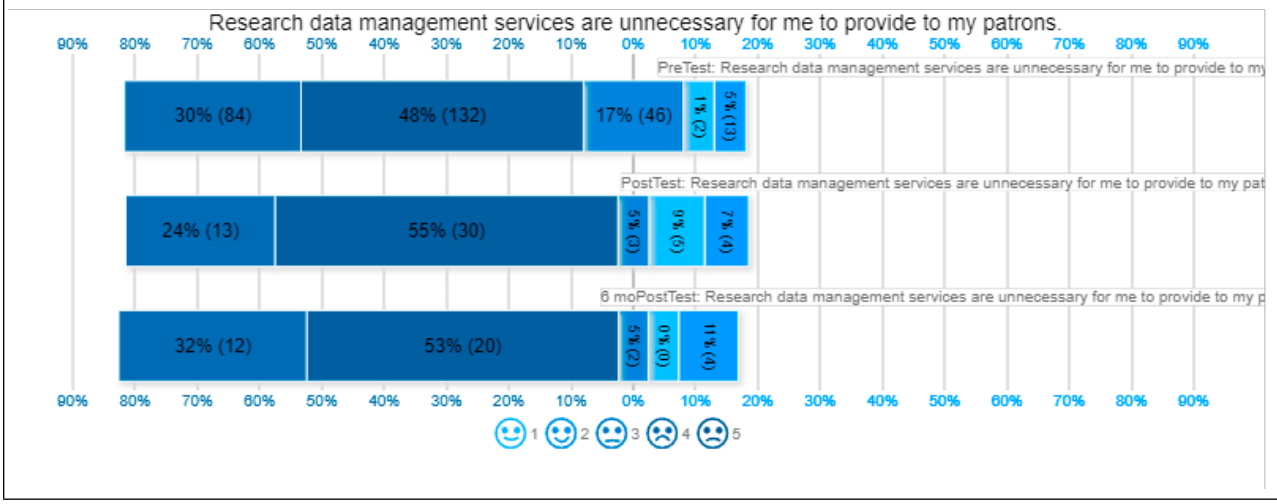
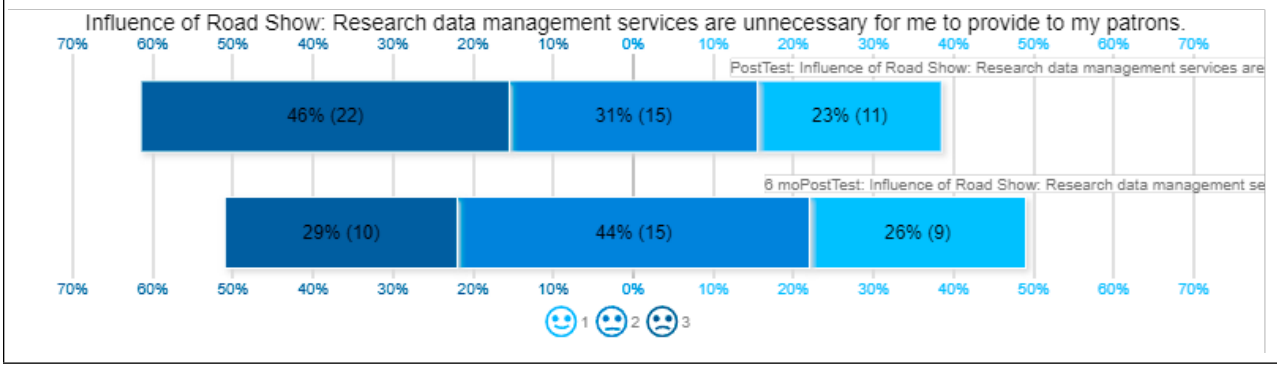


FIGURE 17
Likert chart of responses to the question "Research data management services are unnecessary for me to provide to my patrons."



Participants identified the influence of the Road Show on their perception of the statement with the question: "Research data management services are unnecessary for me to provide to my patrons." Figure 18 shows the perceived influence broken out by the one-month and six-month surveys. At the one-month post-survey 54 percent said the RoadShow was very/somewhat influential and 46 percent said it was not influential. In the six-month post-survey, 70 percent reported that the RoadShow was very/somewhat influential and 29 percent said it was not influential.

FIGURE 18
Likert chart of responses to the question "Influence of the Road Show: Research data management services are unnecessary for me to provide to my patrons."



Limitations

Limitations to the findings in this study include respondent heterogeneity, with participants including not only liaison librarians, but data librarians, other types of librarians who may not have data responsibilities, and participants from other campus partners. This was further exacerbated by the time between the first and last RoadShows captured in the survey, as several years had passed, and there was likely a change in general awareness of research

data management concepts. Finally, as we did not track individual participants over the three surveys, we are unable to make generalizable statements related to any particular group's growth or change in knowledge, behavior, or attitude.

Discussion

Across the various topics, participants in the RDM RoadShow showed a positive change in questions related to their personal knowledge, behavior, and attitudes surrounding research data management and their preparedness to engage in related activities. The strongest gains and the most significant impacts of the RoadShow appears to have been regarding the ability of participants to make referrals on campus with reference to research data management needs, as well as the ability of participants to create an interview plan regarding RDM, and to carry on formal or informal conversations with researchers regarding RDM. However, noted limitations prevent identifying improvements at the institutional or individual level and the documented individual changes are unlikely to reflect broad institutional preparedness or support for RDM.

Participant RDM Knowledge

Participant knowledge questions showed a significant positive change, with a nearly 30 percent improvement in agreement reported for each of the questions, suggesting that the RoadShow resulted in at least a one-month knowledge gain for responding participants. The introductory question of whether participants had skills, knowledge, and training for RDM showed an overall response of 49 percent disagreeing that they were prepared. This demonstrated that the workshop was reaching a significant number of participants for whom RDM wasn't a current responsibility and who were likely to most benefit. Further, with a target audience of liaison librarians, part of the goal of the workshop was not only to introduce RDM concepts, but to have participants identify these emerging requirements and obligations for the faculty and students with whom they were most likely to collaborate for instruction and research. Those reporting that they disagreed that they had the ability to do this decreased nearly by half in the first month (43 percent to 27 percent), suggesting that the workshop was able to provide participants a way to connect RDM with already held disciplinary information. However, at the six-month post-survey, 70 percent of participants disagreed that they had the skills, knowledge and training. This suggests that, by learning more about RDM, participants could then identify their personal knowledge gaps as time proceeded. This may suggest that the workshop knowledge gains may be short-lived or that by having integrated the foundational information provided by the workshop, the material seemed so introductory that it was no longer perceived as knowledge gain.

A primary objective of the RoadShow was that librarians who participated would be able to correlate their current responsibilities and skills to RDM. Figure 3, which shows—at the one-month post-survey and the six-month post-survey—a nearly 90 percent agreement with that statement, suggests that the RoadShow was able to meet that goal. This familiarized participants with RDM services within the context of the greater library and information science landscape.

Opportunities for Engagement

Beyond internal awareness and personal understanding of RDM, it is critical for liaisons to

engage with the campus community, connecting researchers with information, partners, and colleagues. It was amongst the opportunity questions that the biggest impact of the RDM RoadShow was documented, with 80 to 90 percent of respondents at the one- and six-month marks noting that the workshop was very or somewhat influential in this area. This was related to general opportunity identification, such as data lifecycles, as well as taking part in activities such as creating an interview plan or speaking to researchers about RDM. While data lifecycles are often considered commonplace, they were and continue to be a framework to facilitate identifying and navigating activities of research data management. Here, the data suggests that the RoadShow provided a variety of ways for librarians to see opportunities for engagement for themselves and their peers. The interview plan was likely the most direct correlate between traditional library skills, with its direct similarities to getting ready for or conducting a reference interview and engaging in RDM activities. This particular question saw a decrease from 55 percent disagreement that they could do the task to 15 percent, suggesting the workshop presenters succeeded in helping participants identify a specific activity where they could confidently get more information from researchers. This expanded into confidence related to speaking to researchers. When faced with new areas of knowledge, getting past the initial barriers or jargon to allow for conversations with researchers can lead to a lot more opportunities for data management conversations to happen organically. This could allow liaison librarians not only to participate in data conversations, but also provide appropriate handoffs to library colleagues or other campus partners. By expanding and normalizing the conversation, this further reinforces the role of libraries as part of the research data management ecosphere on campus.

An interesting point in the data is related to campus referrals. While there was a 30 percent increase in agreement by participants between the pre-survey and the two post surveys in their belief in their ability to do this, there was a surprisingly high disagreement with the impact of the RoadShow (47 percent and 34 percent, respectively). It is unclear why this wasn't seen as impactful despite the perceived confidence increase. The overlap of RDM referrals with the existing referral networks that the liaisons participate in during traditional disciplinary activities may well account for this high level of disagreement.

Necessary for the Library

The necessity of libraries and individual librarians to provide data services was likely impacted by the makeup of participants in the RoadShow, as the majority of participants self-selected to attend. There was not a significant shift in responses; nearly 90 percent agreed libraries should provide these services, with around three-quarters of participants identifying a role for themselves. As the RoadShow was presented over several years, during which time RDM services became more familiar in academic libraries, data-focused professionals' participation may have impacted these outcomes.

Individuals Versus Institutions

While this survey provides insight into individual participants, it does not reflect commitment or actual changes made in an academic library. Due to the short nature of the survey period, libraries were unlikely to have made significant changes in their institutional data practices, whether with full-time data management personnel or by assigning research data management duties on top of existing liaison roles.

This speaks to the difficulty of rapid institutional change. It also points to a challenge of the RoadShow format. Unless an institution was in the position to make changes in response to increased skills and interests of their liaisons, the skills gained through a one-shot format professional development session may be wasted, with participants reverting to earlier familiarity or lack of engagement. This challenge may have been exacerbated by the timing of the RoadShow contract in which one institution would hire the RoadShow at the point it was ready to make changes, but may have also invited other institutions to attend, whether or not those institutions were ready to change.

Without the correlation of timing, expectations for outcomes from the RoadShow need to be framed within the context of adult learning theory.[31] Framing learning within the context of pre-existing skills that individuals possess, as well as leveraging conceptual models that participants already have, will help ensure some level of information transfer to the audience of the RoadShow. While the content was introduced via the RoadShow in a frame of adult learning theory, if the skills are not practiced within the context of the home institution and the liaison's day to day practice, the learning will not be transferred efficiently. The RoadShow then becomes victim to the same problems of one-shot information literacy sessions.[32] Without practice and internalized concepts that are relevant to the lived experience, the learning will be shallow at best and may fail altogether.

The Need for Administrative Support

If library administrations sponsor RoadShows, anticipating that they will bring liaisons up to speed on a given topic, then library administrations should also be prepared to implement programs or services that engage the liaisons in the work related to the topic immediately upon completion of the RoadShow. While RoadShows present as a low bar to entry for an emerging area of Library and Information Studies, due to the nature of the format, they will only be effective in so much as the learner then practices the learned knowledge, skills, and attitudes as soon as possible and as frequently as possible. If a library is planning a RoadShow without the scaffolding in the local environment, the knowledge will be lost swiftly.

Additionally, it is important for the local institution to identify the most appropriate participants for a RoadShow. Those with extensive experience in research data management will most likely be bored by the introductory materials. Those participants affiliated outside Libraries and Information Science may find entire sections of the content less meaningful because the context of the RoadShow content is framed in Library service development and practices.

Consistent comments in the follow up survey indicate that liaisons who attended the RoadShow, but then failed to see concurrent support from library administrations, questioned the efficacy of the RoadShow model as well. The lack of continued investment or support for continuing professional development, combined with a situation that makes the practice of the learned skill difficult either by indifference or clear roadblocks and restrictions, diminishes the impact of the RoadShow at the individual as well as collective level.

Conclusion

The lack of regular, rigorous evaluation of continuing education programs aimed at librarians, particularly of those programs which received external funding, is notable and potentially problematic. We need to appraise the full impact or benefit of these programs, in order to

gain ongoing understanding of knowledge, behaviors, and attitudes of those participating.

By appraising the RoadShow, we were able to demonstrate the short-term knowledge gains perceived by participants and to begin to identify the utility of the workshop format of continuing education. However, to successfully implement research data management services, our institutions will have to do something more than bring in the RoadShow. While a single day of training is useful for introducing individuals to the foundational concepts, achieving long standing implementation of new initiatives requires additional resources such as time, funding, and personnel.

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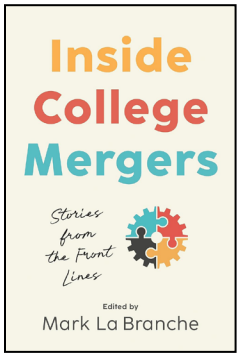
Appendix. Selected Questions from the RDM Road Show Survey

I have the skills, knowledge and training necessary to provide research data management services	Figures 1 & 2
I can identify traditional library skills with correlates in research data management services.	Figures 3 & 4
I know the research data management requirements and expectations for my liaison discipline	Figures 5 & 6
I recognize opportunities for library involvement in research data management at each point in the data life cycle.	Figures 7 & 8
As a librarian, I can create an interview plan to seek specific information about the state of data management practices or data curation needs.	Figures 9 & 10
As a librarian, I can discuss data management practices with a researcher informally or formally.	Figures 11 & 12
I can make referrals to specific campus partners in research data management to solve researchers' problems in RDM.	Figures 13 & 14
Research data management services are unnecessary for libraries to provide to their patrons.	Figures 15 & 16
Research data management services are unnecessary for me to provide to my patrons.	Figures 17 & 18

Inside College Mergers: Stories from the Front Lines. Mark La Branche, ed. Baltimore: Johns Hopkins University Press, 2024. 176 pp. Hardcover, $44.95, (978-1421448602)



Over the last several years, professionals in academia have grimly witnessed a growing number of colleges and universities across the United States close as casualties of the enrollment cliff and of other strong headwinds disrupting higher education.* In the last two years, this sobering trend has escalated at an alarming rate. For 2023, approximately two colleges per month announced closure or consolidation with another institution. This past spring, that average climbed to one a week.** During this age of contraction, institutions of higher education (especially small private colleges) must be flexible, proactive, innovative, and bold if they hope to avoid becoming another shuttered statistic. In this timely anthology, administrators of several private, nonprofit colleges document their respective institutions' journeys that culminated in mergers or creative partnerships with other colleges or universities and impart practical lessons learned from those experiences.

The institutions featured in this volume include Iowa Wesleyan College, Martin Methodist College (Tennessee), Montreat College (North Carolina), Robert Morris University Illinois, St. Andrews University (North Carolina), Wesley College (Delaware), and Wheelock College (Massachusetts). Apart from experiencing similar challenges as struggling private institutions, these colleges and universities shared little else in common. Though most were faith-based schools, Wheelock and Robert Morris Illinois stand apart as secular institutions. Wheelock and Robert Morris Illinois were located in major cities whereas Martin Methodist and Iowa Wesleyan operated in rural, remote areas. Moreover, the regional diversity between these featured colleges underscores the challenges facing various institutions of higher education across the landscape.

Beyond these varied institutional demographics, each college or university grappled with its own unique set of circumstances and pursued different solutions for long-term financial viability. Innovative partnerships included varied cost and resource-sharing arrangements between institutions. Even among the documented mergers, there are no identical unions. As Mablene Krueger, former president of Robert Morris Illinois wryly observes, "If you've seen one merger/acquisition in higher education, you've seen one merger/acquisition in higher education" (p. 98).

Despite the singularity of every arrangement, however, common themes transcend these differences. At the heart of every case study is the centrality of effective leadership. In these accounts, administrators and board members understood that the status quo was not sustainable. To preserve the missions and legacies of the institutions they served, these leaders were willing to consider bold solutions, take calculated risks, and implement difficult or unpopular decisions—including that most controversial and unthinkable of all: sacrificing institutional independence.

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* Higher Ed Dive. (2024, July 1). *A look at trends in college consolidation since 2016.* https://www.highereddive.com/news/how-many-colleges-and-universities-have-closed-since-2016/539379/

** Marcus, J. (2024, April 26). *Colleges are now closing at a pace of one a week. What happens to the students?* Hechinger Report. https://hechingerreport.org/colleges-are-now-closing-at-a-pace-of-one-a-week-what-happens-to-the-students/

In the coming decades, many colleges will have to forfeit their cherished autonomy if they hope to avoid extinction and extend their mission into the future. Recognizing that mergers are not indictments against administrators' stewardship but transformative opportunities for a consolidated, rebranded institution to continue serving generations of students is a radical departure from traditional leadership philosophy in academia. However unconventional, acceptance of this reality will separate the small colleges that adapt and survive from uncompromising peers that will inevitably close. As Mark La Branche, former president of Martin Methodist College frankly evaluates, "One of the obstacles to 'merger' thinking is in seeing a merger as a failure, or giving up the struggle that our institutions somehow win year in and year out. If we employ 'mission' thinking, then an opportunity to preserve, enhance, and expand the mission becomes a huge win" (31-32).

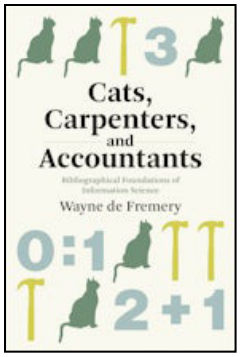
Throughout the work, authors describe several key elements necessary for ensuring that a union between institutions is mutually beneficial and successful. Paramount of all is proactivity: "Without question, the most important common lesson is that the time to contemplate any form of merger is before it becomes a last resort" (149). Multiple contributors stress the significance of proactively seeking and planning mergers. When administrators are strategic and deliberate in pursuing mergers, their institutions are better poised to secure favorable terms than when reactive campus leaders turn to them in desperation. The sooner administrators of vulnerable colleges begin this process, the better their chances for successful outcomes.

One criticism of *Inside College Mergers* is that multiple contributors cite questionable sources for quotations attributed to famous figures. Robert E. Clark II does this no less than three times in his chapter. While employing thought-provoking quotes to reinforce a concept or position is a timeless rhetorical strategy, such excerpts (as with all other types of information) must be drawn from credible sources. Websites like quotes.net and setquotes.com are not legitimate sources. Given academia's rigorous research standards, it is not unreasonable to expect more from administrators who presumably demand(ed) the best from their students and faculty.

This critique, however, does not detract from the value of the work. *Inside College Mergers: Stories from the Front Lines* provides a timely compilation of case studies that will guide other administrators in leading their vulnerable institutions to more sustainable futures. While college presidents and upper-level administrators will benefit the most from perusing this volume, scholars of higher education will also appreciate this addition to the literature. Academic librarians are encouraged to carefully consider the perspectives presented throughout the work to better understand the challenges their campus administrators may face for years to come. After all, our efforts to advocate for our libraries are most effective when they are guided by informed, realistic expectations. Academic libraries of all sizes, especially those serving small private schools or institutions with higher education graduate programs, should consider adding this title to their collections. *—A. Blake Denton, University of Southern Mississippi*

Cats, Carpenters, and Accountants: Bibliographical Foundations of Information Science, Wayne de Fremery, MIT Press, 2024. 296 p. Softcover, $45.00. 9780262547598**.**

The subtitle of Wayne de Fremery's entry in MIT Press's History and Foundations of Information Science series contrasts its intriguing title. de Fremery, Professor of Information Science and Entrepreneurship at Dominican University of California, is aware of the potential difficulty in engaging readers in a discussion of the relevance of bibliography today.



"Bibliography?" he asks, seeming to sense our incredulity (p. 1). While "bibliography" perhaps brings to mind only citational practices or evokes memories of "bibliographic instruction," de Fremery is insistent on using the term. He pushes against the notion that bibliography as a field of and a tool for study has ever gone away, writing, "The contrarian truth that I am pursuing is that bibliography could hardly be more integral to our intellectual and creative lives than it is now" (p. 1).

For readers less familiar with bibliography's history (such as this reviewer) or confused by the term's uses, de Fremery defines "bibliography" early on as "the study of representations and the practice of producing them" [p. 1]). In many ways de Fremery enacts the methods of bibliography he describes in returning to the definition again and again, exploring how it has been deployed in the service of other fields and in its own right as a discipline. While librarians may dwell primarily among representations (lists, records) *of* texts ("enumerative bibliography"), the field also encompasses the historical and literary-critical study of representations *as* texts ("descriptive," "analytical," and "critical" bibliographies). The debates about the dividing lines among these approaches, and even their status as bibliography proper, are part of this story, but they are not really the focus of de Fremery's argument.

de Fremery's task is not "reinvigorating" bibliography, as this implies its moribundity (p. 1), but a reinvigoration of our concern for it, "a quiet revolution of attention" (p. 4). Bibliography serves an "infrastructural" role in scholarship requiring "maintenance" (p. 1). The other side of an infrastructure's foundational role for disciplines is that it can disappear beneath that which it supports. Thus, we have the need to reinvigorate attention: it is difficult to maintain what has "faded from view as naturalized structures of our everyday life and intellectual work" (p. 81). Further, he argues that bibliographical methods should remain at the center of an information ecosystem where "books" (or, preferably, "texts") increasingly take new forms: "bibliography is fundamental to documenting and understanding the social forms that [data] take as they are articulated by an ever-expanding variety of expressive sociotechnological modes" (p. 25).

The list—as a concept, but also as a textual object, as in the title and as a method across his discussion—marks the first element of this project. The enumeration of lists is always an interpretive or "selective" act (p. 30): "a tool for drawing material and conceptual boundaries that articulate objects and their contexts" (p. 3). The focus on enumeration covers Part I of the book, while bibliographical description, which "attempts to put what has been enumerated into relations, often in pursuit of a desire to inscribe what can be considered essential" (p. 31), is the concern of Part II (and de Fremery promises discussions of bibliography's other elements in a later volume.)

de Fremery uses bibliographical description (and the history of its uses) as a lens to understand machine learning and artificial intelligence. This is likely of interest to many librarians, but his discussion is distant from practical classroom considerations. In its concern with relationships, given that texts are "data given social shapes" (p. 53), "bibliographical description generates knowledge and can, through its recursive accounts, provide ways to know how knowledge has been produced" (p. 116). Through several examples, de Fremery argues that any description is, like enumeration, subject to the judgments of those accomplishing it and the affordances of their technologies. Bibliography as a practice can reveal these mediating

factors, he claims, as it "insistently attempts to account for the choices and contingencies that have shaped human knowledge as it has been presented" (pp. 126-127).

So what does this have to do with artificial intelligence? If bibliographical description can "account" for how knowledge is subject to judgments, it helps us see how it has come to be, "how we know what we know" (p. 129). The paradigm of "New Bibliography" used description to present "an ideal through the meticulous documentation of individual copies of texts considered similar enough to be put into a descriptive schema" (p. 163). de Fremery argues that these practitioners' "inductive" methods work analogously to those of artificial intelligence and are therefore susceptible to the same critiques, namely that they focus only on "the minute material particulars of textual objects" (p. 168) detached from social context (p. 155).

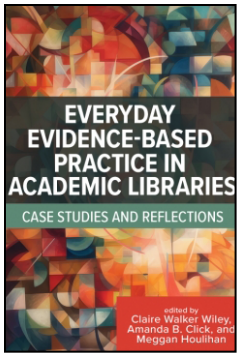
Machine learning, he argues, is an automated process of bibliographical enumeration and description (p. 203). Deep learning, as a "recursive" process of such "learning," can look a lot like New Bibliography when used to generate predictions of what is likely through pattern recognition, as the New Bibliographers sought to generate inductively an idealized, synthetic copy of an intended text by comparing all known copies (pp. 207-208). Among other issues, de Fremery highlights "how wrong our new bibliographical descriptions can be since they are so dependent on inductive methods" (p. 214). Returning to the critique of New Bibliography, particularly with the "counterfactual imagining" presented across the final chapter (p. 215), can help us lend a critical eye to the deployment of AI technologies, offering another reason to attend to bibliography's history.

This book can be slow going for anyone unfamiliar with the scholarly discussions de Fremery engages with, as he often provides close readings of debates around the nature of bibliography. The discussion of the main theoretical players would likely benefit from further contextualization for understanding the full significance of these readings. Perhaps relatedly, the textual seams of including previously published work may be apparent—especially in the author's restated aims—and signals to connections among particular points.

However, this repetition may be intentional as a form of building argument through drawing comparisons. With careful (recursive) reading, this book pushes us directly into the midst of these scholarly conversations. It is engaging and effective in its goal to have readers consider more closely those bibliographical aspects of the work of scholarship that can be easily overlooked.

Readers within librarianship may find de Fremery's description of bibliography's uneasy professional place interesting. He notes the in-betweenness of bibliography, its status as "marginal in the sociological sense of having many identities and affiliations" (p. 65). In being neither here nor there, bibliography can be viewed as mere preparation for the substantive work of any discipline. His statement that bibliography "sits between academic disciplines as means to disciplinary ends rather than the ends themselves," as (p. 26) echoes the marginal librarian's laments about "serving" research faculty as librarianship, too, "sits between academic disciplines." However, bibliography receding to near invisibility at the foundation of other disciplines is not evidence of its unimportance. It's quite the opposite. Perhaps librarianship too would benefit from its own "quiet revolution of attention."— John C. Rendeiro, University of Connecticut Library

Everyday Evidence-Based Practice in Academic Libraries: Case Studies and Reflections, Claire Walker Wiley, Amanda B. Click, and Meggan Houlihan (eds.), Association of College & Research Libraries, 2023. 376p. Softcover, $84.00. 9780838939857.



Everyday Evidence-Based Practice in the Academic Library: Case Studies and Reflections, edited by Claire Walker Wiley, Amanda Click, and Meggan Houlihan, builds on the framework developed by Denise Koufogiannakis and Alison Brettle in *Being Evidence Based in Library and Information Practice*. This edited collection emphasizes the importance of incorporating evidence-based practice (EBP) into daily academic library functions and seeks to present practices across various departments that can be adapted to fit the needs of different institutions. Readers of this edited collection can choose to read the whole book or decide to utilize chapters that are relevant to their professional or institutional needs. The collection is well thought out, and the inclusion of a wide variety of academic institutions and their experiences with EBP is one of the highlights of this volume.

Evidence is categorized into three distinct types: research, local, and professional. Appealing to a wide audience, the book is divided into five parts with 22 chapters which provide case studies and reflections from various academic libraries regarding their experiences implementing services, programs, and initiatives across departments.

Part I: "Understanding Users" suggests methods for collecting and applying evidence from various user groups to tailor services to student and faculty/staff needs. It begins with a chapter by Denise LaFitte (Koufogiannakis) and Alison Brettle where they revisit their earlier work and highlight the goal of taking a holistic perspective to evidence. They outline the 5A's used to approach the decision-making process: Articulate, Assemble, Assess, Agree, Adapt.

Also included in the first section are chapters surrounding needs of diverse students, implementation of innovative programs in the library space, and basic requirements of faculty to determine how the academic library can support and encourage use of its services. Authors provide detailed explanations as well appendices where readers can see examples of surveys, focus group scripts, and interview guides, which is especially helpful for any information professional looking to recreate similar practices at their own institution.

Part II: "Leadership and Management" covers how evidence-based practices in academic libraries can be implemented and used to guide libraries at an organizational level. The unifying theme through these chapters is the emphasis on collaboration and open communication within the organization, as well as with various stakeholder. Authors offer guidance on gathering input, assessing options, and implementing organization change while facing challenging situations, such as the COVID-19 pandemic, budget cuts, tight deadlines, and staffing constraints.

Part III: "Instruction and Outreach" articles illustrate initiatives that incorporated reflective practices into teaching. These chapters explore the challenges that librarians can face with traditional library instruction such as limited assessment tools, time consuming practices, and a lack of intersectionality in information literacy instruction practices. Using EBP assessment, three different institutions were able to evaluate and consider existing practices to make improvements to better facilitate student learning and create more inclusive and equitable environments.

The chapters in Part IV: "Collection" highlight various aspects of using evidence-based practice in library collection management. Though the issues discussed in these chapters vary, the common theme throughout is a commitment to ongoing assessment. Examples from this section include updating procedures and training processes to improve efficiency, perform-

ing a diversity audit and adapting the library collection based on results, large-scale weeding projects, and adapting collections to fit the needs of the student population and program requirements.

Part V: "Open Initiatives" wraps up the discussion and introduces different open initiatives taking place across three campuses. In one chapter, Evidence-based Library and Information Practice (EBLIP) is used to create a sustainable OER (Open Educational Resources) program that would provide ongoing and flexible opportunities for OER creation and engagement. Beth South's article addresses how OER outreach is developed and assessed at a smaller regional campus library, and Wu and Perrin's article explores how Open Access is promoted through a mediated approach to institutional repository deposits. Through each chapter, contributors outline how EBLIP can enhance the functioning of library services by leveraging partnerships with key stakeholders in all areas.

This edited collection will be valuable to any information professional interested in grounding academic library services, processes, or initiatives in evidence. Authors across all chapters have provided the tools to replicate or adapt these methods across institutions. The editors effectively communicate that evidence-based practice does not always have to be an all-encompassing endeavor. Rather, EBP can start small and grow to fit the needs of the practitioner. The conclusion of this collection reiterates that, by working EBP into daily workflow, libraries can begin to critically reflect on routines and workflows to uncover valuable insights into their decision making. It also advises information professionals to consider their positionality when utilizing EBP to ensure that their decision making is not hindered by biases. As with all chapters, the authors provide examples and questions to assist with this evaluation process.

This book is highly recommended for anyone interested in EBP in libraries at a post-secondary level. *Everyday Evidence-Based Practice in the Academic Library* provides valuable insight into a wide variety of examples that can be directly copied or adapted to fit the needs of any institution. — *Kathleen James, Learning & Engagement Librarian, University of Calgary*