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Editorial

A Peek into *C&RL*'s Peer Review Process

It is always wonderful and an inspiring privilege to read, offer input, and shepherd so many colleagues' articles into the *C&RL* review process and beyond. Behind the scenes, there is a vibrant, lively network of conversation from peer reviewers, authors, editorial board, and ACRL staff, all working with me to help authors improve their work and share it with the world.

As of February 2024, *C&RL* has 110 peer reviewers in its system, which uses Open Journal Systems (OJS). Approximately ¾ of the 2023–2024 *C&RL* Editorial Board are reviewers in this list. Of this pool of reviewers, there is a wide range of expertise and research interests from which I draw. Sometimes when I cannot find a reviewer for a manuscript, I reach out to others in the field who have written or presented about the specific topic of the manuscript under review. This editorial aims to shed some light into the current *C&RL* review process as it stands.

Once I review a new submission to make sure it is anonymized and *C&RL* submission instructions have been followed, I send it out for double anonymous peer review. This part can often take a long time for a plethora of reasons. I invite 2–3 reviewers to review a submission. I rarely ever ask someone to review more than one submission at a time. Reviewers have one week to accept or decline the invitation. If accepted, reviewers are given four weeks to complete the review.

Given circumstances that happen in life and with a number of people involved, the whole peer review process may take more or less time than anticipated. The *C&RL* Author Guidelines currently state that the "…review process takes ten to twelve weeks. After the decision has been made, the editor writes to the author accepting the manuscript, accepting it contingent on revisions, or rejecting it." Although I try to make this deadline, sometimes for various reasons, it takes even more time. I encourage authors waiting for updates to write to me at ktotleben@library.rochester.edu. If I don't respond in a timely manner, please nudge me, and I will respond with updates.

The questions (with slight variation) the reviewers consider are in the Author Guidelines and in the corresponding "Guide for Authors and Reviewers," but for transparency, figure 1 shows what reviewers see when they begin reviewing a manuscript.

The editorial board and I have kept the current list of review questions the same since I have been in this role. As I understand it, the first question is repeated in the last question so that after the writing/feedback reflection period, the reviewer can determine if the answer is still the same or if there is the possibility to include the submission by thinking outside the box. There is also a choice to offer other feedback to the author(s) and/or to send exclusively to the editor for consideration.

After providing their comments, reviewers offer a recommendation: Accept Submission, Revisions Required, Resubmit for Review, Resubmit Elsewhere, or Decline Submission. When making decisions about the manuscript, I consider the reviewers' recommendations, plus their feedback. The feedback often tells me more about the recommendation and can assist with decision making. Sometimes the recommendations are the same or vastly different from one

FIGURE 1
***C&RL* Review Form Response**

Peer Review: Original Submission:
Does it meet the scope and guidelines of the journal?*
Was there an introduction of topic/research question/background information?*
Does the literature review place the study or opinions in perspective and build on existing research? Are the sources appropriately documented?*
Is the method used appropriate to the subject, describing the strategy used in detail and addressing reliability and validity?*
Assess the analysis and logic of argumentation. Does the evidence presented support the hypothesis or do the findings have implications for scholarship or practice?*
Does the author communicate clearly with an educated, yet not necessarily specialized, audience? Are there presentations and illustrations that enhance the analysis and data presented?*
What is the relevance to advancing knowledge in the field of academic librarianship? Does the manuscript make a new contribution to the literature or to practice, by virtue of the method or findings?*
Does it meet the scope and guidelines of the journal?*
* Denotes required field

reviewer to the next. That's when the reviewer comments really help distinguish why the recommendation was made and further assists me in making an editorial decision.

Although I have not provided direct advice or guidance on *C&RL* peer reviewers' comments to authors, I have a few suggestions to share in this editorial:

- When offering input, the more specific, the better. It will help increase understanding of what a reviewer wishes to see in the submission. A guiding question could be: How could comments be expressed to best help the author(s) make constructive improvements whether the submission is accepted or not? Be honest and respectful of the authors' work.
- The priority in offering feedback is to answer the questions by examining the content itself. They focus on what is essential to include in *C&RL* submissions. Are the foundational components of the research intact? Is the methodology and/or analysis sound? Why or why not?

- Stylistic choices, punctuation, etc. can always be fixed later by the author(s) and in the copyediting phase (after acceptance). They are low priority in the peer review process. That said, it is always important that authors follow the guidelines for submission. If there is a glaring inattention to the guidelines, it could prove troublesome for how the content is presented and thus problematic for the submission's acceptance.
- Use your own words to write the comments. Do not share the manuscript with anyone else (human or non-human). When authors submit a manuscript, there is an understood trust that the peer reviewer will not share their work with anyone or anything else, unless the author gives permission.

The *C&RL* pool of peer reviewers, editorial board, and ACRL staff are all working together to make the best *C&RL* issues we can and help authors bring their unique perspectives and contributions to the profession. If you are interested in becoming a peer reviewer, please email me at ktotleben@library.rochester.edu and include your research experience, research interests, and a brief note as to why you would like to serve as a peer reviewer. To all reviewers, I extend my heartfelt thanks. The reviewers, with their support and constructive feedback, are truly the heart of *C&RL* as they help authors improve their submissions.

Totleben
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"A Supernova that Sparks in Every Direction": A Long-Term Assessment of the Research Sprints Faculty Engagement Program

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The Research Sprints program offers faculty partners the opportunity to collaborate intensively and exclusively for one week with a team of librarians to achieve significant progress on research or teaching projects. This longitudinal study extends previous immediate and short-term assessments by interviewing Research Sprints participants at two research-intensive institutions 2–4 years after their concentrated week. The authors evaluate the enduring impact of the program on the participants' projects, research/teaching practices, and relationships with the library. Participants report achieving project goals, improved skills and student success, and greater awareness and appreciation of librarians' work.

Introduction

Close collaborations between university faculty and librarians lead to a variety of positive outcomes: improved library services, spaces, and student engagement through course-integrated projects;[1] increased student data and information literacy;[2] and stronger institutional

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alliances.[3] The Research Sprints program is one model for collaboration that places librarians and faculty together for a short burst of dedicated time to make significant and tangible progress on a faculty-led research or teaching project. This intensive, one-week collaboration model was developed at the University of Kansas (KU) in 2016 and adopted at the University of Minnesota (UMN) in 2017. There are two previous publications that describe short-term evaluations of Research Sprints programs. The first evaluation of KU's first iteration of three Research Sprint teams focused largely on the use of project management tools. They found that the three participating faculty were very satisfied and felt that goals were met.[4] The other study from UMN—a short-term evaluation of 19 Research Sprints over three iterations—found that this model is effective at building social capital, increasing faculty engagement with libraries, and establishing working relationships between faculty and librarians.[5] Given the immediate successes of these collaborations, a team of researchers from KU and UMN sought to determine the long-term outcomes and impacts of Research Sprints on participants' project progress, effects on their research/teaching practice, relationships with the libraries, and overall experience with the Research Sprints. To accomplish this, the research team conducted semi-structured interviews with faculty participants and employed a thematic analysis approach to determine that Research Sprints positively affected related scholarly and pedagogical outputs, faculty skill sets, and faculty relationships with the libraries and universities.

Research Sprint Structure

An annual Research Sprint cycle begins with a call for proposals. Faculty are invited to submit proposals that are evaluated by the librarian planning committee for feasibility and fit with librarian expertise. The planning committee assembles a sprint team based on project needs and staff capacity and assigns one team member as project manager. A Research Sprint team is typically composed of 3–5 library staff members with diverse skill sets and expertise, in addition to any additional research team members. Project teams have one or more pre-sprint meetings to set goals, prepare a work plan, identify any technology or resource needs, and complete necessary pre-work to ensure that the sprint week is successful and efficient. Team members may be assigned work on a specific component of the project, allowing them to work independently in close proximity or to join the team during scheduled intervals. The entire team meets frequently throughout the sprint to discuss progress and make decisions or adjustments to meet project goals. At the end of the sprint week, each team's progress and accomplishments are celebrated with a showcase or social gathering. A more detailed description of the structure of Research Sprints has been previously reported elsewhere.[6]

Research Sprints were originally scoped to provide support for a wide range of project types and subjects at large research institutions. Both universities are the flagship institutions of their states and hold a Carnegie Classification as an R1 Doctoral University with "very high research activity." UMN has nearly 50,000 students and over 3,800 staff, and KU has over 27,000 students and 2,600 staff. Examples of previous Research Sprint projects at KU and UMN include: a website and smartphone app that commemorate and teach users about the death of Emmett Till; a digital map of Twin Cities rivers, lakes, streams, and wetlands based on literature and land surveys that date back to pre-1900; and a journalism course redesign and a supplementary open textbook. Descriptions of all past projects, as well as tools and suggestions for implementation, can be found at researchsprints.org.

Origins of Research Sprints

New technology accompanying the advent of the internet has enabled new research methods, open access, and pathways to information which, along with shifting university priorities, have generated user-centered engagement models in libraries where both subject liaisons and functional specialists support faculty research and teaching.[7] The time-intensive engagement model requires librarians to collaboratively corral their skill sets and to develop new skills, such as those related to digital humanities and data management, to meet evolving faculty research and instruction needs.[8] Literature suggests librarians primarily connect with faculty through students;[9] instruction, courses, and curriculum;[10] and library spaces.[11] "Embedded librarianship" is one common tactic for building relationships with faculty through teaching, learning, and research, whether in-person or online.[12] Embedding a librarian from the early stages of a research project can ensure librarians efficiently and effectively meet a research group's needs. However, research projects can last years, and maintaining such a lengthy collaboration is not often feasible or scalable.[13] Still, they also have the potential to reconfigure traditional models of research support and streamline collaborations.[14]

Operating in a consultant model,[15] librarians at KU sought to develop a more sustainable model of embedded librarianship, using insight from two internal studies of faculty and graduate student engagement. In the fall of 2013, a survey of faculty and graduate students revealed that most respondents utilized the library's research consultation service, but a majority were unaware of unique services available to assist throughout the production and dissemination of research, such as data management, copyright, and scholarly communications services.[16] A subsequent study consisting of a focus group and interviews with faculty further assessed faculty research needs and practices to determine recommended engagement tools and methods. KU faculty expressed frustrations with time limitations that prevented them from developing new skill sets outside the "information silos" of their disciplines.[17] Positively, KU faculty viewed KU Libraries as a key "facilitator of research activity" and a place for dedicated research and gaining needed expertise through collaborations.[18]

KU librarians, valuing their own expertise and faculty need for dedicated time and space for collaborative research, assessed collaboration models commonly used outside of libraries. Hirotaka Takeuchi and Ikujiro Nonaka developed a framework for collaborative teams to move an idea from inception to prototype, similar to how a rugby scrum moves the ball to score a goal.[19] In the early 1990s-2000s, software developers further developed "scrums" into month-long "Agile" project management "sprints" for product development.[20] Google Ventures held a version of a product design scrum sprint that they termed a "research sprint."[21] The more direct forebear to Research Sprints comes from academia as the National Endowment for the Humanities-funded One Week | One Tool program at George Mason University's (GMU) Roy Rosenzweig Center for History and New Media. This program used scrums to produce small web applications in 2010.[22] A successful byproduct of One Week | One Tool is its ability to help faculty witness and better appreciate the expertise of their collaborators. Hoping to capture this collaborative appreciation and productivity, KU adapted GMU's model to fit an academic library in 2016. Founding Research Sprints organizers Pamella Lach and Brian Rosenblum aimed to build upon faculty familiarity and comfort with intermittent library consultations and address frustrations with project time limitations by designing an intensive week-long collaboration to support faculty through a compressed lifecycle of their research and teaching projects. Lach and Rosenblum proposed "a new type of user engagement based on

meaningful, mutually-beneficial" collaborations as discussed by Zsuzsa Koltay, Xin Li, Curtis Lyons, Danielle Mericle, and Gail Steinhart when assessing the lifespan of partnerships.[23] Lach and Rosenblum wanted these partnerships to "demonstrate the value of KU Libraries" and establish long-lasting relationships with faculty.[24] In the case study of the three inaugural KU Research Sprints, Lach and Rosenblum postulated that the development and use of project management tools were central to the success of the program.

Evolution of Research Sprints

KU held their first Research Sprints in 2016 and, after news of its initial success, UMN Libraries adopted KU's sprints model in 2017. To understand the short-term impact of the Research Sprints program locally, UMN librarians administered surveys to faculty and librarian participants at the end of the sprint week. A local analysis of the UMN surveys revealed that sprints are an effective way to build social capital with faculty across campus; that project management strategies must be carefully planned and vigorously applied; and that team dynamics are unpredictable and can impact the success of the week.[25]

To encourage the development of effective faculty engagement at their own and other institutions, KU and UMN librarians have also shared their program model and assessment findings in a variety of venues. They created a digital toolkit (researchsprints.org) with examples of past projects and resources for others to develop their own Research Sprints and presented the model at national and local conferences. Other institutions have begun to adopt this model too, including the University of Miami, the University of Michigan, the University of Oklahoma, and the University of Virginia.

Since 2017, UMN and KU librarians have continued to report on and assess the Research Sprints model.[26] Immediate surveys of participating faculty and librarian sprint experiences have allowed KU and UMN to adjust their project management tools and training, timing of sprints, scheduling, and team-building for each new iteration of sprints. The resources for the Research Sprints initiative requires extensive librarian labor and funding. To address the question of whether the sizable investment is worthwhile, the two institutions designed this exploratory longitudinal study to investigate the long-term impact that participation in Research Sprints has on the research and teaching agenda of faculty awardees.

Methods

Three years of Research Sprint participants are included in this study (Table 1). These faculty sprint participants were a self-selected group that applied to and were accepted for participation in the Research Sprints program at each respective institution.

TABLE 1
Number of Research Sprint Participants

	2016	2017	2018
KU	3	3	1
UMN	N/A	7	6

After receiving Institutional Review Board (IRB) approval at both institutions, all 20 faculty sprint participants at both institutions from 2016–2018 were invited to participate in this study by their own institution's Research Sprints planning committee, and 19 (95%) accepted on the condition that their responses would be de-identified in accordance with study protocols. Data were collected through semi-structured interviews conducted virtually via Zoom from February to June 2020. In order to minimize bias, KU librarians interviewed UMN participants, and UMN librarians interviewed KU participants.

The interview questions were developed by the research team and focused on describing the participant's project, recalling their Research Sprints experience, and describing the current state of the project and its relation to their career trajectory (see Appendix). Thus, the data relates to the participant's experience during the week of the sprints, but also focuses on the results of their project, both anticipated and unforeseen, in the months and years after the sprints. Each interviewer conducted one pilot interview with a research assistant from a sprint team included in this study; the pilot interviews were not included in the analysis. The faculty interviews were recorded using Zoom's built-in recording features, and the recordings were transcribed by a professional transcription service with research funding from KU.

The research team used a thematic analysis approach to describe and analyze the interview dataset. This method offered a flexible, yet systematic qualitative approach to organizing and describing a dataset in rich detail.[27] Additionally, it allowed the research questions to drive the analysis process, while accounting for all responses to the semi-structured interviews, even those that deviated from or went beyond the initial questions.[28] The research team followed the phases outlined by Virginia Braun and Victoria Clarke by having the data transcribed (by a third-party vendor), reading through the data and generating initial codes, creating a codebook, applying codes to the data, examining the coded data for themes, reviewing and describing the themes, and writing a final report.[29]

A subgroup of four researchers (two from each institution) coded the interview transcripts. The initial codebook contained codes for topics that were expected to arise in the conversation based on the questions. Code definitions were developed and revised iteratively, and new codes were added to the codebook as coders worked through the transcripts. The full research team was given the opportunity to weigh in on the code definitions as coding progressed.

NVivo was initially used to code the transcripts, but due to issues with collaborating in multiple releases of this software across institutions, NVivo was dropped in favor of applying comments to the transcripts in Microsoft Word. Coders employed a method called *unitizing* to enable a focus on meaning in the text, while also allowing coders to systematically compare their coding and establish a level of agreement.[30] In this approach, one researcher codes a transcript alone, and then provides the coded copy to the other coders with the code labels removed. In this way, secondary coders are simply applying labels to pre-coded segments of text. Then coders compare their work to see where their coding choices agree or differ. Following a pilot exercise using two transcripts, the remaining transcripts were coded in pairs. Discrepancies, whether in code labeling or the boundary of the coded text, were resolved by consensus.

Researchers developed themes in small groups before meeting as a large group. The full research group then met periodically to discuss how themes were emerging across research questions. The results of that analysis are reported in the Results section below. The results of this research were shared with faculty participants before public dissemination so they could review the results for accuracy.

Results

Respondents reported a variety of expected and unexpected outcomes of their Research Sprints experiences: accomplishment of project goals, improvements around student success and project management, increasingly positive views of the libraries and greater understanding of librarians' work, development of long-term relationships with librarians, and personal

benefits. They also described their own recommendations for improvements to the sprint model in the future.

The authors found respondents generally reported the sprints positively aided them in meeting project goals. Additionally, the sprints facilitated participants' learning and appreciation of librarians' expertise in research and project management and fostered an environment where team dynamics factored into their perception of a positive or negative experience. Finally, participants reported on their abilities to achieve their project goals, and the long-term impact of the sprints on their projects and relationship with the libraries.

In addition to discussing the outcomes of the sprints, faculty participants noted that the sprint structure itself was impactful: the special atmosphere facilitated by the format and proximity that comes from having all participants together. Faculty spoke to the appreciation for dedicated time afforded by the sprints, noting the importance of having a deadline, the immersive experience, and the unexpected amount of work that can be accomplished by a team in one week. The participants used a variety of energetic terms to describe the experience, such as *kickoff*, *reignition*, *accelerator*, *generator*, *head start*, *launch*, *bones*, *scaffolding*, *foundation*, and *supernova that sparks in every direction*. Even if the value was simple comfort, almost every participant commented on the benefits of the Research Sprints methodology and the value it brought to their immediate and future projects. One participant described it as follows:

> That collaborative atmosphere, knowing that I have these experts in their areas, that I could ask questions. And really anything was on the table. If I needed to know about something, I think I was really okay with being very open about my own ignorance, knowing that other people in the room probably had the answer and it was okay to ask. (Transcript 0004)

Scholarly & Pedagogical Outputs

The Research Sprints led to tangible outcomes such as grant funding, scholarly outputs (for example, manuscripts, protocols, or open access resources), and fiscal advancement for several of the projects. Funding for these projects ranged from internal (institutional) funding to large-scale national contracts and a grant for $750,000. One participant applied data management skills learned during the sprint to create "such a great, detailed data management plan" that it was significant in a funder's award decision. Faculty also reported several other scholarly outputs such as publications, conference presentations, websites, student research outputs or presentations, academic courses, and even national recognition. They felt the experience positively reshaped their anticipated final product: the sprints were a testing ground that ultimately added depth and nuance to their research, mostly through pedagogy and information literacy. As one participant reflected:

> And that's not something I would have been exposed to. I took a pedagogy class …when I was a grad student, but only one. And you're not really taught how to teach as much. You're taught about your discipline, but you're not taught how to teach. And that's not something that I had spent a lot of time focused on, certainly not a solid week with a bunch of experts supporting me. And that is something I wish everybody had the opportunity to do. I mean, it's really been a valuable, valuable experience from that perspective. (Transcript 0005)

Discussion of the sprints' outputs also focused on disseminating information and research, whether that was across departments within the university or more broadly via open access materials. One participant did not anticipate broad interest in the open access website that came out of the sprint, but they were approached by an interested colleague at a conference six months later, and the work has provided the evidence needed to change guidelines at the state level. Remembering these unanticipated outcomes, the participant explained:

> I thought "no one's going to care." We find it interesting. We're going to leverage it to do some other stuff, but I've been amazed by how many other researchers around the university do work in [topic]. In particular, there's [a center] here that has a journal about [topic] issues. … The director of that center, I saw him at a conference like six months after we did the project. And he said, "I saw that [project] you guys did. It's fantastic. We actually use it as the background for all our work we're doing." So, I think it had that sort of positive effect of an awareness thing with other researchers." (Transcript 0008)

Another participant expressed mixed feelings: pride in the international reach of a different open access website that was developed for their sprint and lament that they were personally unable to market it more strategically.

Several faculty participants also were pleased with how the Research Sprints impacted student success, whether that was due to a student's role as a part of the sprint team (for example, it helped them to advance their research skills and positively impacted their contributions to future projects) or as a beneficiary of an academic course that was created during the sprints (for example, it pushed instructors to stretch their creative boundaries). One participant reported on a course module created during the sprints that "[t]he students have benefited from our joint shared expertise in ways that they wouldn't have if it had just been me teaching this with what knowledge I had." In addition, one student who participated as a Research Sprint team member went on to develop expertise in systematic reviews and won a research award as a result. In fact, the faculty participant emphasized the importance of student scholars by reporting:

> I also have one student who is the team lead on this new systematic review and she's really become an expert in this research methodology because she was awarded an undergraduate research award on her own systematic review. So, she's applying the methodology to this. So, throughout this whole time, we've had presentations and we hope to have more publications using this research methodology that we initially learned and had set up through the Research Sprints. (Transcript 0004)

As with any interdisciplinary project or initiative, teams faced challenges due to different disciplinary approaches to research and an array of specialized experience. In some cases, this had a direct effect on scholarly output and progression of the project beyond the sprints week. When asked about the current status of the project, several faculty participants mentioned not having moved forward due to an overwhelming "deluge of information." An unexpected output was the excess of information gathered, which participants reported as

burdensome. Faculty described a lack of time, money, or energy to continue sorting through all the information collected for their sprint project. While sometimes expressed as a challenge, other times it was labeled as a negative outcome. Reflecting on their sprint experience, a researcher summarized the challenges in this way:

> I had been hoping to, with the specialist from each field, with the librarians to actually be able to go a bit into the content of the literature, to not end up with 3,000 titles, but to maybe look at 20 titles or 30 titles, be able to select and then do a snowball and dive deeper into some areas. And be able to actually use their expertise to qualitatively look at the content. That's not what ended up happening. What ended up happening, one of the librarians ended up basically just very mechanically pulling anything that had [topic] in it and putting it in EndNote, and then spending a ton of time attaching the PDFs to it. And she was clearly very, she just wanted to do that. And she wanted to be done with that process, which took four days. So there was no, there wasn't a lot of room to communicate that actually that wasn't so helpful to me. Because now I have an EndNote, I don't know, with 5,000 titles, but what do I do with that? (Transcript 0011)

Moreover, faculty faced factors outside of Research Sprints that delayed their projects moving forward in the years that followed their sprint experience. These factors included stalled university activities due to COVID-19 and loss or lack of funding, time, and project personnel. For instance, one researcher detailed why the project stalled after the initial collaboration in 2017:

> And while this database was really big, it wasn't big enough I don't think that it could overcome those kinds of statistical issues. And I think that's where, again maybe if we had somebody that really knew how to deal with the stuff working on it full time, that would have been fine. But we didn't have somebody to do that. (Transcript 0002)

Despite these reported challenges, researchers found the scholarly output from the Research Sprints week to have either directly or indirectly positively impacted their research process or course design.

Skill Building

Many participants mentioned specific technical, disciplinary, or methodological skills necessary for their project, and teaming up with librarians offered a chance for peer professional development in these skills. They repeatedly noted how the educational role librarians played was beneficial to the project and their career.

> I mean, again, I didn't know ArcGIS existed. I didn't know any of these things existed. So at least I'm much more knowledgeable and I can draw from that knowledge on even new projects. … So now when I submit this Fulbright and it has a GIS component, it's like, well, I didn't even know any of that existed before the

> sprints. So it's a different project, but the choices that I'm making in my research are different now. They're informed by my Research Sprint. (Transcript 0012)

As evidenced above, new technologies and uses of technology (such as GIS software, advanced Excel techniques, interactive websites, citation management tools, and subscription databases) were frequently lauded as beneficial in the long-term. One participant, who developed a technology protocol for under-resourced institutions, referred to their product as a "socio-technical linkage," emphasizing the potential for large-scale impact.

Faculty participants also developed new skill sets based on the disciplinary knowledge and actions of the librarians on the team. Comments ranged from advancing project management skills to inhabiting the role of a learner. In addition to developing technical and disciplinary skills, participants expressed gratitude for exposure to methodological skills, such as best practices in research data management or, "things that nobody teaches you," as one participant put it.

> Oh, the other thing I want to say that was really helpful is that they just also showed me how to organize things, how to just keep track like, "Okay, if you're going to do archival research and you're going to use a finding aid, here's how you track where you found things. Here's how you cite it. Here's how you keep your research organized. Here's a good way to handle your files." I mean I know this sounds really basic but as a social scientist, in humanistic social sciences, no one teaches you that. So really just being taught and having an opportunity to work with people who are, librarians are so meticulous and organized. I'm just not. So, spending time with them and having them help me figure that out was really helpful too. (Transcript 0007)

The synergy between researchers and librarians also led to creativity in cognitive processing: one faculty participant realized during the week that they were a "linear thinker," and the librarians' approach made them realize that it's okay to "get ahead of yourself" as you explore. Another participant "scrapped" what they thought they knew to follow the path that librarians laid out. The think-tank style of working as a team continued to be impactful for faculty participants, one of whom now adopts establishing personal connections as an educational approach, describing the librarians' "let's try this" approach to exploration as "fun! …like a jazz riff."

Social and Professional Connections

The impact of sprints on participants extended beyond the intensive week into ongoing collaborations. Participants noted a variety of ways in which they continued to work with individuals, their library generally, or with others at the university and beyond. Some mentioned greater comfort with library workers who encouraged them to seek out support and partnership in a way they had not done before. Many participants developed ongoing relationships with library staff in the form of course collaborations, research partnerships, and social connections.

> [The sprints team was] partners then and ongoing partners in the project. So both socially and sort of professionally, it was a good sort of bonding experience. (Transcript 0001)

Participants reported that they refer their departmental colleagues to the library for support. It was common for participants to have had existing relationships with one person in the library, but the sprints led to work with additional specialists and a broader network of individuals within the library.

> There are a lot of good solid resources and a lot of people in the libraries that have a lot of expertise and are willing to help in a variety of ways. So it definitely gave me more exposure to the structure of the libraries and what librarians are able to assist us with. (Transcript 0001)

Participants often noted the insular nature of their work and how the sprints expanded their social and professional networks at their universities. Overall, they expressed more awareness of university units beyond the library.

> I have strengthened my connections to faculty and staff throughout the university that were really helpful for interdisciplinary research design going forward. (Transcript 0007)

Participants appreciated the expertise and collaborative spirit of librarians, with one emphasizing that librarians were more supportive than their own department. These partnerships have often been ongoing and led to new opportunities for the faculty participants. Working closely with librarians also helped to validate the researchers' own research process: hypotheses were confirmed and there was security in "having the same vision come back to the [participant] from other people." One participant shared that "what was important became clear," and another stated that it was as if their research approach had gone through a filter and was validated by the sprints experience.

A somewhat surprising benefit of the sprints in the interviews was the sense of personal benefit and connection to community that the participating faculty felt as a result of the sprint. In some cases, it stemmed from the merging of professional research with personal interests. One participant stated that the experience was "beautiful for me personally and professionally" as it allowed for "truth-telling" and "unearthing new discoveries." A faculty participant provided detailed explanations of how they personally benefited from the sprints:

> I mean, one of the things that I thought was actually, it turns out that several of the people involved I have interacted with since then in different ways. Like [a librarian's] kid and my kids go to the same school, and so there's just a sort of familiarity with campus. And I did this sprint in my first year as professor, and so as I'm sure you know, you don't necessarily get out of the office that much when you're doing your science or your work, your research all the time. So this got me out, it got me to different parts of campus. I interacted with people doing all sorts of interesting stuff, and so I learned a lot that way. (Transcript 0002)

Communication Challenges

A few participants commented on communication challenges with their teams. The vast ma-

jority of negative commentary related to expectations and poor communication. The faculty member with the majority of negative comments reported displeasure that they were not given access to a branch librarian and their collections and that their team members were not able to compensate for this loss.

> We did not have the correct librarian with us. So we didn't have access to that library, the [branch] library has an entirely different search process. I mean you can't get, you actually I think physically either have to go to the [branch] library or you cannot get access online or if it's online, you have to be online on their computers. (Transcript 0011)

Two participants reported that communication problems encountered during the Research Sprints had a negative effect on their perception of the library. The problem occurred when a library staff member assigned to the sprint team was not engaged or presented a negative attitude toward the sprints. For one participant, the miscommunication made it difficult for some librarians to translate their subject knowledge in a way that would benefit the project.

> So some would get on what they know is their subject, and they couldn't get off it. And we would sometimes be like, yeah, we're not going to use that. That's not going to be interesting. And they would continue. (Transcript 0015)

Other participants encountering miscommunication with their team members did not report a negative perception of the library but did offer reasons for their teams' confusion. One faculty member reported a struggle to convey common expectations and commitments for project goals, work, and time outside of the Research Sprints. This disconnect then affected the team's ability to meet the faculty member's expectations for librarian labor beyond the one-week timeframe.

Another participant described how their emotional ties to the project affected their communications about project expectations.

> So that initial meeting was a little awkward because I had expectations and they had expectations and mostly it was just they had a better idea of what they knew they could do in a timeframe because they had worked on other projects before. But I think just, when anybody has expectations and they are or not met, you have an emotional response. And so there's just this awkward moment where I was like, "Well, what do you mean you can't do that?" But it was pretty obvious, now looking back at that moment, now that I've done a systematic review, that there's no way we could have done the next few steps. (Transcript 0004)

Another issue related to project goals was the differing approaches to information between librarians and faculty.

> So we would take a fact they gave us and then we'd start spinning on it, and then the librarian would get very nervous that we're not being accurate. And we

> would say, "Don't worry, this is all just ideas. None of this is real yet. We have to be able to spin it." That was fine. It just meant there was a lot of calming them down sometimes. It felt like: "You don't have to worry how we apply this, you don't have to worry, it's going to be okay. But I understand that." They're precious with their facts and I love that about them. [Subject area] is looking at a lot of emotional truth too. It's not just looking at facts. So anyway, I felt maybe like the one that had to kind of slightly monitor all that a little, but I don't think it's any different than [my usual work], frankly. (Transcript 0015)

While reporting negative experiences during the Research Sprints program, the faculty member who made the majority of negative comments has continued their instructional relationships with two librarians, though they have not encouraged their colleagues to apply for a sprint.

Suggested Improvements

Faculty members offered some insights into areas of improvement for the program. First, participants offered suggestions for communication and developing and aligning a common understanding of project goals and expectations of team members. Suggestions for improving communication began with putting more emphasis on the planning stage, mostly to help faculty understand the expertise of the assembled team and coordinate expectations. An additional communication suggestion was having a check-in during the sprint week to address issues and figure out what was not working.

Faculty participants specifically proposed solutions to the communication or unspecified challenges to participating in or accessing the program. Faculty members suggested "remedial" pre-sprints for individuals who might need lower-level support for similar types of projects, such as staggering such preparatory sessions throughout the year or offering shorter sprints.

> More of them. I know that it's intensive and good in summer, but I wonder if there couldn't be one offered, maybe a small one or a shortened, foreshortened version offered maybe even over winter break. In terms of that, I mean, I really like the immersive nature and the nature that every sprint is different based on what the needs of the project are. The adaptability of the librarians was great. (Transcript 0005)

Faculty also recognized that suggestions to expand the sprints were troubled by the cost and staffing of the program.

> More people, more people get offered this opportunity. But I don't know how they would do that because there's only so many of them, right? And they're taking out a whole week of their time. (Transcript 0009)

Discussion

As previously reported in a short-term evaluation study, Research Sprints require a great deal of librarian time, effort, and labor, yet some librarians feel as if Research Sprint activities un-

derutilized their professional skills and experience.[31] Additionally, informal conversations at both institutions raise concerns from librarians who are opposed to hosting Research Sprints altogether. These complexities beg the question: is it worth it? The findings from this study suggest specific considerations for developing or adapting a Research Sprints program that does indeed justify the effort.

Research Sprints Deepen Personal and Campus Connections

Faculty who participated in the sprints developed cross-disciplinary relationships with librarians, peer faculty, and other support units on campus that lasted, oftentimes years, after the sprint week. The "bonding experience" raised awareness of other campus units and led to the use of social connection as an educational approach to research practices—a refreshing pivot away from the often insular nature of faculty research. The value that participants placed on relationship-building points to a possible gap in the relationship between the university and the faculty members, especially new hires.

Junior faculty often have feelings of loneliness[32] and report a desire for connection with senior faculty as well as "experienced colleagues." This could happen within departments or across the institution.[33] Structured networking, mentorship, and orientations have been shown to provide encouragement, a sense of collegiality, and research assistance.[34] And intensive, tailored, small-group faculty development opportunities advance independence for early-career researchers.[35] While Research Sprints are not marketed as "faculty development opportunities" and the relationship between Research Sprint activities and mentorship should not be overstated, development and mentoring activities overlap with Research Sprints activities in many ways. Thus, Research Sprints might be sponsored and held in partnership with specific departments to advance the careers of new faculty. For example, Anne L. Harrison and Deborah G. Kelly reported that new faculty orientations were lacking in research opportunities, teaching skills, textbook access, copyright, and media materials:[36] all areas addressed by past Research Sprints. Additionally, Research Sprints have shown to increase social capital, individual and unit social connections that improve networks and trust[37]—the absence of which was a call to action for improved faculty mentoring and networking.[38] Research Sprints might advance social capital for new faculty, but also for faculty that feel isolated due to citizenship status and racial identity.[39] Using the sprints to build social capital for new or marginalized faculty members builds social capital for librarians as well by expanding their professional networks.

Scope and Scale Require Careful Consideration

Targeting new and marginalized faculty could also be an effective method for limiting the scale of Research Sprints, making them more feasible for new adaptors by putting less demand on librarians. Research Sprints are not designed to scale to the point that all faculty are offered the same opportunity. By their nature, the objective of the sprints is to create deep, meaningful, long-lasting interpersonal relationships and professional partnerships with a limited number of faculty. However, libraries should not be put off by the potential scale of the sprints model—the scale of the effort is less relevant than the sustainability of the relationship. In fact, due to the COVID-19 pandemic and related labor instability, as well as overall burnout in libraries,[40] smaller scale efforts might be the best way moving forward. A small-scale program with just one or two sprint projects could give a handful of librarians a

change from their daily pace of work without overextending anyone, and the deep relationships that can be built might be invigorating during this time when many feel burnt out.

The sprint structure can also be easily adapted to fit institutional needs, the demands of faculty participants, and the availability of library staff. The formats used by the two institutions represented in this study are illustrations of two different forms these can take. In terms of work environment, at UMN, the sprint projects form one large cohort with teams working in physical proximity and some library team members moving from one project to another depending on needs, while the KU teams typically operate in separate areas with discrete teams. In spring 2021 while most people were still working remotely, KU hosted its Research Sprints program entirely online. This option was more viable because the three project teams had similar goals and used similar methods, which allowed for large multi-project learning and discussion sessions, combined with dedicated working time within each team. Communication and collaboration for these sessions was facilitated by using Zoom and Microsoft Teams. While completely remote teamwork will likely not become the norm, this case illustrates the potential to adapt to varying circumstances.

Each institution has modeled this adaptability by hosting sprint spinoffs. KU has held "Hurdles" for smaller-scale projects with fewer library team members for applications not selected for a sprint week. Smaller scale models, like Hurdles, are a way to ensure that all faculty who applied for a sprint get library support. Hurdles or other connections with a librarian are a positive outcome that ensure faculty still have a chance to develop a relationship with the library and get project help. Alternatively, UMN has supported university-wide strategic team projects, as well as cross-unit "Teaching Sprints," with campus units like technology support, disability services, and educational innovation. These sprint offshoots demonstrate that the model can be adapted for both scale and scope to fit the unique needs at each institution.

The element of scale is important to consider not only during the sprint week itself, but also for the long-term relationships that are a key goal of the program. Each program should have a plan for how to cultivate and use those relationships in a way that benefits the faculty participant, library staff, and the institutional goals of the library and the university. Some faculty participants and library administrators have expressed reservations regarding the expectations of the long-term commitment of the librarian(s) to a project or relationship that is difficult to maintain given competing interests and demands.

It is vital that planning committees transparently communicate project scope and scale with participants, both in writing and verbally. An acceptance letter can serve as a formal notification of terms, laying out expectations for each party's commitment as part of the program. KU's Research Sprints website includes a list of areas of commitments for each party that set expectations for participation in the program (https://lib.ku.edu/sprints/apply). The decision to create a formal agreement and the form it takes depends on the existence (or lack of) financial incentive (a stipend), each library and librarian's ongoing commitments, protocols recommended by university counsel, and the institution's comfort and familiarity with formal documentation of each party's commitments. At the same time, a formal acceptance letter that helps set boundaries might also feel inhibiting to some participants. Overall, boundaries should be carefully considered and discussed by library administrators and library staff who will be implementing the sprints to ensure common understanding and agreement as well as reasonable expectations for both short- and long-term work.

The terms of the formal acceptance letter can be verbally reiterated during pre-sprints planning meetings and throughout the sprint to facilitate faculty understanding of librarian approach, methods, and skills. The need for effective verbal communication is apparent in one faculty member's recollection of their initial meeting with librarians as "a little awkward" because the librarians explained they would not be able to meet the faculty member's expectations. It is clear the initial discussion with librarians and subsequent sprint was a learning opportunity for the faculty member. Having completed the project, when pursuing another collaboration with the lead librarian, the faculty member now understands there was "no way" the team could have achieved what they had initially expected. Transparently communicating modifications and cross-training during the sprint allowed librarians to educate the faculty member about proper methods, develop effective team communication, and accomplish common goals. It is important to note, however, that librarians may not be able to completely mitigate misunderstandings or negative feelings.

Team Building is Critical to Success

Cohesive team dynamics are fundamental to a participant's sprint experience. While the team's ability to produce a tangible product is the incentive for faculty participants and a key appeal for library administrators,[41] this study indicated a faculty member's long-term perception of their team's success in accomplishing project goals was largely conditioned on their ability to work together. Alternatively, when team dynamics fell flat, there was the possibility of preventing faculty members from progressing in their project and establishing a long-term relationship with the library. This study revealed one team with reported dysfunctional dynamics: the faculty member expressed disappointment that subject expertise would not be available for the week, and one librarian team member worked independently to harvest unneeded research. Despite years gone by, the faculty member readily recalled the emotional toll of feeling out of sync with their team.

While it is not always possible to determine the exact origins of a negative experience or challenging team dynamics, it is apparent the Research Sprints can be a breeding ground for "group emotional contagion."[42] That is, if one team member lacks enthusiasm or energy for a project, their negative attitude can spread to other team members and reduce productivity.[43] This long-term evaluation builds on previous findings by identifying the ways in which faculty satisfaction was impacted by team dynamics. Initially, the planning committees believed project management skills, knowledge of tools, and subject expertise[44] would enable participants to race through Bruce W. Tuckman's four stages of team development—forming, storming, norming, and performing[45]—and accomplish their common goals. But building successful teams was a learning experience for the planning committees, who developed their organizational knowledge and understanding of necessary skill sets largely through trial and error. Building a team of relevant subject liaisons or experts with strong support by library administrations did not allow space for less interested librarians to decline working on a sprint team. This situation can set the tone for potential conflict. Finally, team dynamics initially did not factor into planning because the planning teams were largely led by newly hired librarians who did not know all of their colleagues or institutional context. To better anticipate such conditions, both KU and UMN modified their committees to include representatives from other library units and well-established librarians. Research Sprints planning committees should also consult with administrators or mentors with deep institutional knowledge.

Developing a person-centered approach to managing sprint teams is integral to the success of the sprints. Planning committees refocused their efforts to include professional development opportunities as well as institutional context and work histories. First, considering sprints as a vehicle for professional development pushed planning committees to select projects that would allow librarians to develop and immediately apply new skills to their work. Often this fostered new services and broadened participants' perceptions of librarians' abilities. It also enticed many busy librarians to join sprint projects. Other times the sprint served as a test project to help the library administration determine if a service was sustainable. In one instance, a determination of unsustainability may have contributed to the stalling of one project reviewed here. In another instance, it proved a testing ground for a librarian to continue to cross-train colleagues and develop a full systematic review service.

The planning committees also strove to foster more positive team dynamics in subsequent iterations by balancing subject or functional expertise with personalities and work history. This sensitive aspect of team building required planning committees to remain respectful and confidential of colleagues' wishes. For example, after the first iteration, the KU planning committee expanded to be composed of members from various library units who might be better able to speak to subject and functional expertise as well as potential histories of conflict or comradery. Representative committee members also made themselves available to answer prospective team members' questions and to communicate concerns to the planning committee. In relation to applicants, KU encouraged faculty to specifically name librarians with whom they had established working relationships or believed would benefit their work. This allowed the committee to further support existing faculty-librarian partnerships and to clearly communicate respect for a librarian's efforts in developing the relationship and project. KU's planning committee came to value the sprints work environment and chemistry so much that the issue of camaraderie occasionally became the deciding factor between equally good projects. When initiating Research Sprints, planning committees and library administrators should be aware and mindful of the work environment and history in balance with the professional strengths of team members. Establishing a positive working environment will not only benefit the productivity of the project team but also contribute to building a long-term relationship with participating faculty. Of course, not all aspects of personality and teamwork are predictable, but this study found a relationship between team dynamics and greater faculty satisfaction.

Research Sprints Elevate Faculty Perception of Librarians

The Research Sprints program addresses a question in the library literature around how faculty perceive librarians and strategies for improving that perception. In the Ithaka S + R 2018 Faculty Survey, faculty have consistently considered the library's role as a "buyer" to be the most important function of the library, while "research support" is one of the lowest ranked functions.[46] This perception has been long-standing; a majority of faculty view librarians as "professionals," rather than faculty who are equal to teaching faculty.[47] Faculty who participated in the sprints were often pleasantly surprised to learn about library science and skills that librarians can bring to a research project, and perhaps for the first time, recognized library and information science as its own field of research.

Previous research on the short-term outcomes of Research Sprints found that the close-working relationship between librarians and faculty built social capital.[48] This longitudinal follow up confirms that faculty reported they gained trust and respect for librarians, in part due to

many new research skills and tools to which they were introduced. The truly significant finding in the current study is the peer professional development that led to some faculty changing how they conduct research. Some reported a change in thought-processes and the use of relationship-building as a research tool. This goes beyond social capital; these long-term effects fundamentally change the way those faculty see librarians, as innovative peers, rather than "buyers."

Thus, Research Sprints might be one successful way to embed librarians into an institution's core research mission by way of faculty advocacy for librarians as fellow research collaborators. In their 2020 study on how librarian faculty status impacts faculty perceptions of librarians, Cathy Weng and David C. Murray pose an intriguing proposition for future research: "new ways should be found to integrate librarians into academic processes … future studies could undertake to discover the precise circumstances under which librarians' considerable expertise might be brought to bear in innovative ways on core missions."[49] Faculty might champion librarians in inner circles such as faculty senates and committees, ultimately leading to librarians' embedded participation in campus research activities.

Conclusion

As described in the literature review, one of Lach and Rosenblum's goals for the Research Sprints was for faculty to develop deeper relationships with librarians and to gain a better understanding of the value of libraries.[50] Lach and Rosenblum and other prior reporting of results of the Research Sprints[51] showed that the sprints were successful in the short term; faculty walked away with overall positive experiences and the original goals of the sprints appeared fulfilled in the immediate wake of the event. While these prior studies focused on survey results collected at the end of the sprint weeks, this analysis examined responses from 2–4 years after the sprint, thereby collecting information about faculty perceptions significantly later and after faculty had time to continue their work beyond the goals of the sprint week. The results show that in the long-term, too, the Research Sprint is overall an effective and impactful means for creating and deepening faculty-librarian relationships and developing faculty understanding of librarian expertise and contributions.

Overall, the Research Sprints made a lasting impact on the faculty members who participated in them at KU and UMN. While the faculty participants' comments showed that the sprints model is not perfect, the lasting impression that most came away with was that the sprints were a spark of energy for their research. The Research Sprint model deepens personal and campus connections, opening the door for new recruitment strategies such as marketing sprints to new, junior, or marginalized faculty. They can be scaled up (for example, UMN's cross-departmental teaching sprints) or scaled down (for example, KU's Hurdles) based on capacity and are flexible enough to be adapted to an online environment. Scope should be formalized, by laying out parameters in written and verbal agreements. The main ingredient for a successful sprint is the thoughtful creation of a person-centered, well-balanced team. Research Sprints also elevate faculty perception of librarians, offering one possible avenue for integrating librarians into academic processes if executed well.

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Appendix. Interview Questions

1. Can you walk us through your Research Sprints experience?
2. Can you walk us through some of the major developments with your project since the sprints?
    a. Follow up with questions about when major highlights took place
    b. What has been the greatest success with this project?
    c. What has been your greatest struggle with this project?
3. What do you see as the biggest benefit of the sprints for you?
    a. Were there tools, skills, or relationships that you gained as a result of the sprints that you still use/maintain?
    b. How do you see the sprints as having affected your work/career?
    c. How do you see the sprints as having affected your research/instruction practice?
4. How did the intense and immersive nature of the sprints impact your project?
    a. How did the four days in a row experience impact your project?
    b. How did the close proximity to collaborators impact your project?
5. How could we improve the sprints?
6. How has your participation in the sprints affected your perception of/relationship with the Libraries?
    a. In what ways have you continued to engage with the Libraries?
7. How have you shared your experience in the Research Sprints with others?
8. Is there anything else you'd like to tell us about your experience with the Research Sprints?

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ADA Digital Accessibility on Academic Library Websites

Yan Quan Liu, Arlene Bielefield, and Jennifer Beckwith

Studying ADA accessibility at library websites of top universities selected from the *U.S. News and World Report*, the authors used WAVE and AChecker to assess data in compliance with WCAG 2.0 standards. Almost 8 out of 10 public university academic libraries reported accessibility errors as one of the major findings. Low color contrast was becoming a more commonly occurring accessibility issue, making it difficult for people with vision impairments to perceive the color of the image. The outcomes of the study suggest that academic libraries around the world should continue improving their website accessibility.

Introduction

We are embarking upon the 2020s with assistive and accessible websites continuing to elude many public academic library websites. This became more evident when we faced a global pandemic beginning in 2020. It included a lockdown that shut down schools, universities, and many public libraries, forcing students of all ages and abilities to learn from home via the internet. Digital accessibility (or the lack thereof) became more evident during this time since the most adversely affected students were those with disabilities. Inaccessibility and incompatibility in educational software, hardware, and websites became increasingly apparent when the students had to use varied devices and internet services to learn.

Under Title II of the Americans with Disabilities Act (ADA), public universities must provide equal access to services and programs including activities and architectural changes to physical facilities,[1] yet digital accommodations and access still face legal scrutiny. Common inaccessibility errors and noncompliance issues include but are not limited to improper text size, missing alt text in images, missing labels for input text types, anchor links with no text, incorrect H1 or header tag placement, and images with low-contrast text.[2]

In determining the level of accessibility for individuals with disabilities accessing academic library websites at public universities, this study collected data starting in 2019 and continued through the global pandemic in 2020 and 2021. The intent is to demonstrate the importance of digitally accessible library websites for students and others with disabilities.

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Literature Review

Research on the accessibility of websites can be found everywhere in the world. Website inaccessibility errors significantly affect users with disabilities. In their 2018 study, Acosta-Vargas, Acosta, and Lujan-Mora[3] used the Web Accessibility Evaluation Tool, WAVE[4] to study Latin American University websites and found that many of them lack accessibility in one key area—alternative image text.

In a 2019 qualitative study conducted by Mulliken,[5] eighteen blind library users tested an academic website using screen readers, a common assistive technology.[6] One of the results from the study demonstrated that screen readers significantly increase the amount of time needed for disabled students to access information. A task that would take a few minutes for the nondisabled person to complete took upwards of 20 to 30 minutes[7] for an individual with disabilities to complete. Even with a screen reader, a student with a degree of low vision would need much more time to complete something as simple as an essay question and could quickly fall behind.

Cassner, Maxey-Harris, and Anaya[8] reviewed public academic library websites for usability with people with disabilities as the end users. Focusing specifically on the topic of accessibility, the topics they explored were the library services offered or which should be offered for easily locatable services or items from library websites. Their recommended general guidelines of accessibility were: ease of website navigation, a friendly welcoming website, and a site that is designed with accessibility for end users versus staff.[9]

Liu, Bielefield, and McKay in their 2018 study examined 122 library homepages of Urban Library Council [ULC] members and found that only 7 homepages presented as error free when tested for compliance with the Section 508 standards.[10] Following this examination, Liu led another team probing private colleges in 2020.[11] This evaluation indicated that although errors described as *missing form label* still occur on these websites, other known accessibility errors and issues have been significantly improved compared to the results found five years earlier.

Susan B. Asselin stressed the importance of knowledge in the area of learning/assistive technologies for the success of students with disabilities.[12] She believes that the accessibility of these technologies gives the student necessary flexibility and addresses their unique needs to successfully learn in the ever-growing digital academic environment.[13]

Relevant studies and articles indicate recommendations for improving digital accessibility through training and updated information. Library staff members must be better informed through training sessions to understand the updates of ADA law and assistive technology advancements. For web designers, ADA accessibility should be included in the development of websites. Accessibility, usability, and inclusion must be considered with the current and well-established guidelines such as WCAG. Deque University[14] offers accessibility training and certification on their website, www.dequeuniversity.com. Professional organizations such as International Association of Accessibility Professionals (IAAP) are also leading the way for certifications including resources, membership, and international chapters.[15]

The related literature shows accessibility is never over and done with; it is a constantly evolving responsibility. In light of the global pandemic, critical work, along with continued improvements in technology and employee training, should provide greater digital accessibility for all.

Legal Implications

Disabilities are not just physical but can also be mental. An individual with a disability can

be defined as a person who has a physical or mental impairment that substantially limits one or more major life activities; has a record of such impairment; and/or is regarded as having such impairment. Being disabled, one can acquire employable skills and tools, but without accessible places of employment, it can be a struggle to support oneself and gain personal independence. The inception of the ADA made way for individuals with disabilities to lead independent lives that would not segregate them from working, living, and accessing the physical world along with their nondisabled peers.[16]

Until recently, many plaintiffs with disabilities had a difficult time gaining access to most websites.[17] Even now, despite the uptick of litigation and the requests for clarification, there is no clear legal resolution to the issue of cyberspace being a public place of accommodation.[18] Websites and online communications based on the fundamentals of availability ought to appear accessible to all.[19] In 2019 there was some movement in the legal discussion of digital space as a public arena of accommodation. At that time, however, the U.S. Supreme Court declined to hear an appeal from Domino's Pizza Inc. [*Domino's Pizza v. Robles*] over its website and mobile app and whether they were required to comply with federal disability law.[20] In short, it was deemed that all websites with physical public locations must be accessible to disabled citizens.

During the inception of the ADA in 1990, Section 508 was written without digital accessibility in mind. Given the current digital world, an update was needed. The "Refresh of 2018" began in January 2017 when revisions and court interpretations gave way to updated requirements for information and technology to Section 508.[21] The Refresh became effective on January 18, 2018.[22] The major requirements included in the Refresh were: the functionality of the web page, accessibility for individuals with disabilities, and keeping pace with advances in technology.[23] The Refresh also included how software, operating systems, and the equipment interact with assistive technologies.[24]

The Internet does not have geographic borders and can be accessed globally. With global accessibility in mind, the Refresh of 2018 incorporated the global standards from the *Web Content Accessibility Guideline*s under the federal guidelines. These global standards are more commonly known as WCAG 2.0 under the W3C. Section 508 was now using recognized and accepted global standards of practice for accessibility, including giving clarity on the use of assistive technologies, and creating and displaying accessible content on the web.[25]

Research Design and Methodologies

As a continuing effort from earlier studies of the ADA and digital accessibility on ivy league library websites[26] and urban public libraries websites,[27] this study combined quantitative and qualitative content analysis to examine the library websites of 100 Top Ranked U.S. Public Universities and Colleges from *U.S. News and World Reports*.[28]

A population sample this size would allow for the review of a broad range of colleges and universities with various student body sizes from across the United States, plus be large enough to examine trends and patterns within the results. In this way, the results of the study would impact a larger number of students.

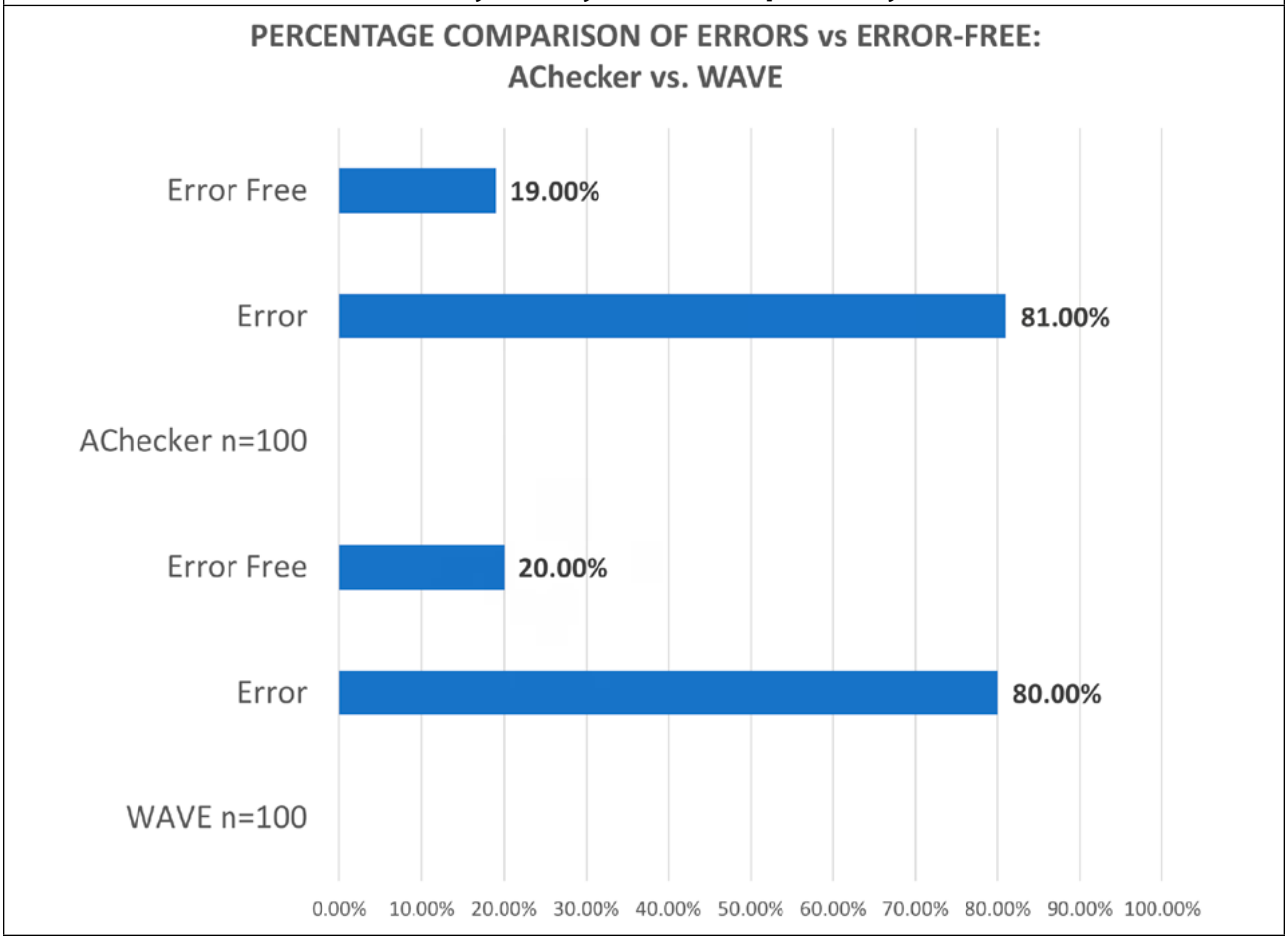
Globally recognized website evaluators, WAVE & AChecker, evaluate a website's accessibility by checking its HTML and XML codes. Both WAVE and AChecker aim to check websites against Section 508 standards and WCAG 2.0 guidelines. Studies that successfully identify website accessibility issues using WAVE can be seen in *Challenges to Assess Accessibility in Higher Education Websites: A Comparative Study of Latin American Universities*[29] and *Evidence of Our Values:*

Disability Inclusion on Library Instruction Websites in 2018.[30] A recent study using AChecker to evaluate website accessibility can be found in *Journal of King Saud University—Computer and Information Sciences* titled *Accessibility of Indian Universities' Homepages: An Exploratory Study* written by Ismail and Kuppusamy.[31] Data collection occurred over an extended period from 2000 to 2015 in a review of digital accessibility at universities in India.[32]

In this study, each library's home webpage was put into the WAVE and AChecker tools and outcomes for the number of total accessibility errors were recorded. After the data was collected, Excel spreadsheets were used to record precise data in a custom-designed codebook. Each of these randomly selected errors was recorded, calculated, and reviewed, with recommended options to fix them. The objectives were to identify errors using Web Content Accessibility Guidelines along with human evaluation and observation of web content, and then pinpoint them into these categories: reported errors, contrast errors, alerts, features, and structural elements.

WAVE and AChecker found errors that were labeled differently; in WAVE as *reported errors* and in AChecker as *known problems*. For the simplicity of this research study and limitation of time, data from the tabs *reported errors* and *known problems* were compiled and the specific errors: *missing form label* and *low contrast* under WAVE and *img element missing alt attribute* and *id attribute were not unique* under AChecker were randomly selected and quantified.

FIGURE 1
Overall Errors of University Library Websites reported by Website Evaluators



Research Findings

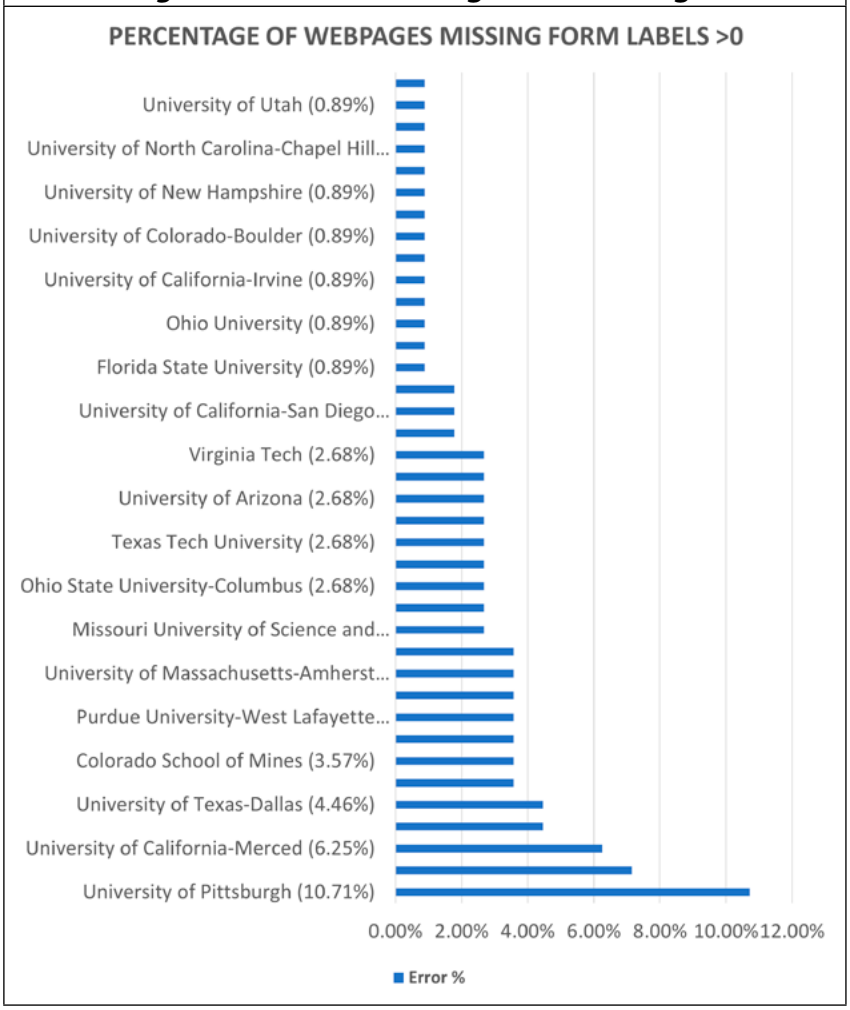
Samples of accessibility errors were reviewed, tabulated, and analyzed in this study indicating there are continued obstacles to accessibility despite the Refresh of 2018. Accessibility errors continue to be a major issue on most university library websites. While WAVE and AChecker report issues differently, the online tools give out a similar percentage of the overall error-free count. Both evaluators employ the global WCAG standards to run their error reports with independent algorithms and programming parameters, but both reach similar conclusions.

Overall error reporting results from WAVE and AChecker indicated that 80 percent and 81 percent of public university academic libraries had accessibility errors under WCAG 2.0 (Level A) guidelines [See Figure 1] and conversely 20 percent and 19 percent respectively were error-free. Software overlap in error-free data was found in two universities: Montclair State University and University of Wyoming.

Top Major Error

In WAVE, the *missing form label* error means "a form control does not have a corresponding label."[33] In Section 508, *missing form label* is defined as a text label for a form control is missing or hidden.[34] Form labels provide important descriptions for screen readers and help disabled users navigate around a page and perform simple tasks like searches and data input. If there is no associated text label, screen readers will not read what is on the screen and disabled users will be unable to input information. The *missing form label* error represents a failure of basic website accessibility and creates a deterrent to academic success and independent learning for individuals with disabilities.

FIGURE 2
***Missing Form Label* Percentage in Ascending Order**



Statistics from the data set analyzed by WAVE indicated that 38 percent of schools had the *missing form label* error and 62 percent did not. Figure 2 displays the percentage of the webpages with errors in ascending order. The reported errors ranged from less than 1 percent to 10.71 percent as the highest.

In terms of the mean, it was 1.12 of *missing form labels* per school; in terms of num-

bers, the lowest count was 1 and the highest individual count at 12 was the University of Pittsburgh.

WAVE's recommendation to correct or avoid the *missing form label* error is: "If a text label for a form control is visible, use the <label> element to associate it with its respective form control. If there is no visible label, either provide an associated label, add a descriptive title attribute to the form control, or reference the label(s) using aria-labelled (sic) by. Labels are not required for image, submit, reset, button, or hidden form controls."[35] This study recommends that when labels are hidden (implicit) visually, then the website developers need to provide code that is supported by assistive technology.

Additional Errors

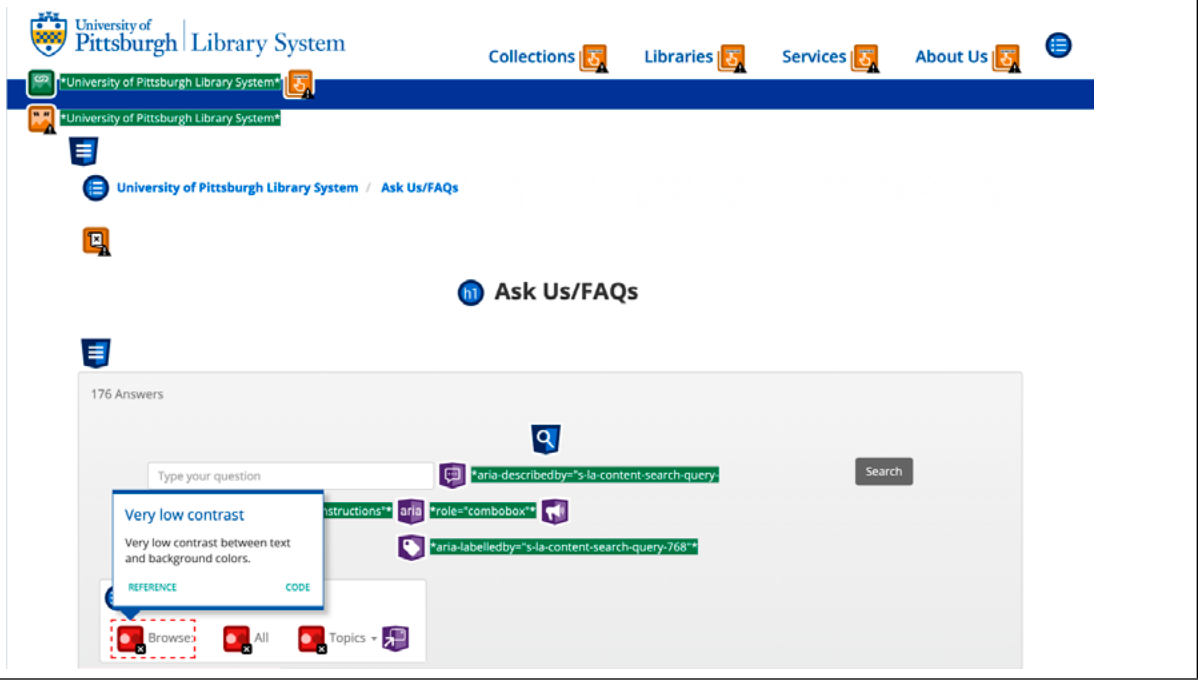
Low Contrast

The *low contrast* error per WAVE occurs when there is little color difference or contrast between foreground and background colors.[36] This error can affect (but is not limited to) color blind and low vision individuals. Many individuals with colorblindness have specific shades or color frequencies that are difficult to distinguish in both digital and non-digital environments. One example of a *low contrast* error would be a white font on a yellow background.

Of the 100 academic library websites reviewed with WAVE, 94 percent reported *low contrast* errors. Purdue University-West Lafayette had the largest sum of reported errors per school, with 111 *low contrast* errors. Only 6 percent of universities had error-free presentations: Arizona State University-Tempe, Temple University, University of Connecticut-Storrs, University of Maryland-College Park, University of Virginia, and the University of Wisconsin-Madison. The mean was 4.01 errors; the adjusted mean removing the skew of 111 contrast problems from Purdue University, went down to 2.90 errors.

When text and images of texts are utilized, contrast ratios must be 4.5:1 according to WCAG 2.0 (Level AA) Distinguishable rule 1.4.3.[37] When utilizing larger text, a minimum of

FIGURE 3
Example of Low Contrast of Screen View[38]



18 point should be used.[39] The minimum font size for smaller content is 14 points, with a bold font size of 14. A contrast ratio of at least 3:135 is required for both text sizes.[40]

A screen view sample of the *low contrast* error from the University of Pittsburgh (www.library.pitt.edu/) is shown in Figure 3. The lighter lettering appears to be difficult to read on the white background. The recommended fix would be to use a larger, black font. This would correspond with the WAVE guideline for enhanced contrast.

Id Attribute is Not Unique

The *id attribute is not unique* error resulted in a roughly 50/50 split between schools with and without the error. Forty-four percent of the 100 data points had an *id attribute that is not unique* error, while 56 percent did not. With assistive technology at the heart of ADA accessibility, this finding is highly disheartening since the need for unique identifiers while using assistive technologies is essential for disabled users.

This data shows that over half of the public universities studied do not acknowledge or accommodate assistive devices. A student with a disability attending a state institution may have a tough time navigating their college library website with this kind of oversight. Failure to accommodate disabled users significantly limits college options for students with disabilities who may already face financial challenges, whether they choose to live away from home or stay close to home. Because not all universities provide the same programs or the same level of accessibility with those programs, disabled students end up limiting their career or life aspirations.

The University of California System provides a good example of assistive technology incompatibility. Because several schools appeared on the sample set, they were regarded as a good sample within the data set demonstrating this error. The error computations were a statistical inverse of the overall data set, which was an intriguing side note. Nonetheless, they revealed how many universities within a single state were adversely affected. More than half of California public colleges' academic libraries lacked software or hardware that made websites accessible to people with disabilities. In comparison to the entire data, the compatibility vs incompatibility of assistive technology accessibility is almost 50/50. When looking for schools in California, students with disabilities may find it difficult to believe that less than half of the California university library websites recognize their assistive technology. Table 1 shows compatibility and incompatibility among the California Public Universities.

TABLE 1
California Public Universities Assistive Technology Compatibility Results

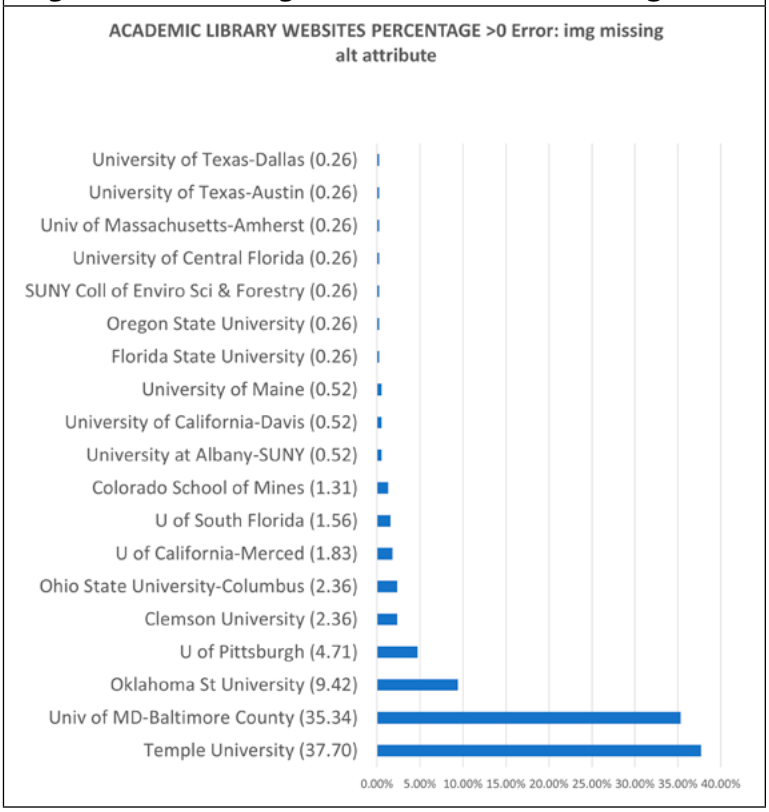
Compatible
Davis
Los Angeles
Santa Barbara
San Diego
Incompatible
Berkeley
Irvine
Merced
Riverside
Santa Cruz

Img Element Missing Alt Attribute

The *img element missing alt attribute* is an ongoing source of frustration for people with disabilities. Missing image alternative text and attributes, or the *img element missing alt attribute*, was found in 19 percent of the surveyed institutions, with the total error count of 382 and a mean of 3.82. Skewed data occurred from two universities with very high counts of this error:

University of Maryland-Baltimore County (135) and Temple University (144). When removed from the mean for skewness; the adjusted mean went down to 1.05 errors per university. The data indicated that there is often only one error per full webpage, which is somewhat encouraging, but means there is still work to do. Figure 4 illustrates 19 schools with the percentage *img element missing alt attribute* error per academic library website; the remaining 81 schools had a zero count. The percentages ranged from 0.26 percent to 37.70 percent.

FIGURE 4
***Img Element Missing Alt Attribute* in Ascending Order**



Individuals with auditory and visual disabilities are most affected by the *img element missing alt attribute*, which as stated in the WCAG 2.0 (Level A) guideline 1.1 requires that organizations provide a text equivalent for every non-text element on a webpage. In the same way that the *missing form label* hampered academic achievement, the *img element missing alt attribute* hampered digital access, academic performance, and autonomous learning at the post-secondary level. According to the reasoning of this study, individuals with visual disabilities can use alternate text to substitute for the image they can't see, while those with auditory disabilities can read.

For any image or video on a page, there needs to be alternate text and/or closed captioning (CC). When using CC, it is important to review and edit it, as errors in automatic transcription from audio software may occur. When observed on the University of Pittsburgh's website (www.library.pitt.edu), the label "GIVE NOW" had no explanation, audio, or alternate text of its purpose. When using assistive technology, the user would hover over the box with their assistive technology, with no alternate attribute of the image to what is the box's function. A study recommendation: place a tag next to the "GIVE NOW" with a simple explanation and label for those using screen readers or similar tools.

Conclusion and Future Study Perspectives

According to "WCAG Guideline 1.3. Adaptable," to be adaptable for individuals with disabilities, content should be presented in accessible layouts that don't lose the content or structure of the webpage and make it easier for disabled users to operate and navigate content. At the very least, website designers should supply alt text for images so there are detailed descriptions of what an image is. A bigger fix would be to run their pages through WAVE or AChecker and correct all the errors they can.

Section 508 was updated in 2018 with technological and legal improvements, including the adoption of WCAG standards that are universally acknowledged. Many parents, educators, and researchers were reminded by the ongoing epidemic that a lack of academic accessibility for people with disabilities was becoming more obvious than ever. According to the findings of this and other studies, there is a dearth of substantial support for digital accessibility in the United States, especially assistive technology detection. When students are looking for post-secondary institutions, a lack of accessibility may obstruct or interfere with their college choices, academic achievement, as well as life goals such as independent living and future earning potential.

Additional longitudinal studies revisiting the same data set in the future would be valuable and advantageous by comparing data from the studies in a quantitative way over time. The argument for using the same data set is that collecting error data and using the same error samples would disclose a lot of important information for suggestions on how to improve accessibility and/or make modifications, as well as how to design more error-free websites. This study's findings confirm and reinforce the necessity of digital accessibility in today's ever-changing digital ecosystem, where it is required, achievable, and possible.

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Appendix A. Table of Relevant Studies

Alphabetical by author.

SOURCE	KEY POINTS
Acosta-Vargas, P.; Acosta, T; Lujan-Mora, S. (2018) *Challenges to Assess Accessibility in Higher Education Websites: A Comparative Study of Latin America Universities*	Study on web accessibility at Latin American universities. The universities had a lack of alternative text on images. WCAG and WCAG-EM were used as benchmarks and WAVE was used as a research and evaluation tool.
Carter, C.J. (2004) *Providing Services for Students with Disabilities in an Academic Library*	Study delved into bibliographic instruction, web page design, and staff training. Focus was on students with disabilities, yet all students could benefit from the different learning styles and develop sensitivity to those different from themselves.
Cassner, M.; Maxey-Harris, C.; Anaya, T. (2011) *Differently Able: A Review of Academic Library Websites for People with Disabilities*	Study on academic library websites for individuals with disabilities. Topics included services offered, services that should be offered, and ease of access of library homepage for disabled users. Recommendation by the authors included: ease of navigation, positive tone to create a welcoming website, and cater website to end users instead of staff.
DeLancey, L.; Ostergaard, K. (2016) *Accessibility for Electronic Resources Librarians*	Study explained how to make resources electronically accessible and how universities can create strategies in initiating accessibility. WCAG was discussed.
Fulton, C. (2011) *Web Accessibility, Libraries, and the Law*	Article details background federal laws and how the states use the ADA law; discusses how and why librarians are "gatekeepers of information and research resources and should be on the forefront of making information 'unrestricted and unhindered.'"
Graves, S.; German, E. (2018) *Evidence of Our Values: Disability Inclusion on Library Instruction Websites*	Study looked for visible evidence of inclusive practices in library instruction programs; content analysis of library instruction websites and accessibility language was studied. WAVE was used as a web accessibility tool for library content.
Hackett, S.; Parmanto, B. (2005) *A Longitudinal Evaluation of Accessibility: Higher Education Web Sites*	Websites were viewed from 1997–2002. The findings in the study were that the more complex a website became, the more inaccessible it was. At the time of the study, there were limited longitudinal studies to explore study subject matter.
Jaeger, P.T. (2002) *Section 508 Goes to the Library: Complying with Federal Legal Standards to Produce Accessible Electronic and Information Technology in Libraries*	Discusses the active role librarians can take to make their website technology accessible using vendors and manufacturers of software. It should not be considered a matter of cost and complexity but a matter of accessibility and usability.
Mullican, A. (2019) *Eighteen Blind Library Users' Experiences with Library Websites and Search Tools in U.S. Academic Libraries: A Qualitative Study*	A qualitative study with blind academic library users. The users found the first time using the website that navigation was time-consuming. Each human subject used screen readers, a common adaptive technology. Some subjects found it took them upwards of 20 to 30 minutes versus a few minutes for sighted user to use the website; the constant time constraint would add more pressure to keep up with academic course load than their sighted peers.

SOURCE	KEY POINTS
Stitz, T.; Blundell, S. (2018) *Evaluating the Accessibility of Online Library Guides at an Academic Library*	Reviewed 18 online library resource guides against a rubric of 14 criteria from WCAG 2.0. Study showed that the library guides failed against seven of the rubric criteria.
Thompson, T.; Burgstahler, S.; Comden, B. (2006) *Research on Web Accessibility in Higher Education*	Bobby was used as an evaluation tool. Viewed the sample universities' websites such as university home page, campus directory, course listings, and employment home page. Bobby had limitations in testing accessibility yet still pulled some valuable data. Stressed the importance of informing faculty, administration, and web designers of accessibility needs.
Wentz, B.; Jaeger, P.T.; Lazar, J. (2011) *Retrofitting Accessibility: The Legal Inequality of After-the-Fact Online Access for Persons with Disabilities in the United States (2011)*	Various industries have a poor history of ADA compliance. Sites are not designed with accessibility in mind.

Appendix B. Data Set

College Name	Library Website
Arizona State University-Tempe	https://lib.asu.edu/
Auburn University	https://www.lib.auburn.edu/
Ball State University	https://www.bsu.edu/academics/libraries
Binghamton University-SUNY	https://www.binghamton.edu/libraries/
Clemson University	https://libraries.clemson.edu/
College of William and Mary	https://libraries.wm.edu/
Colorado School of Mines	https://www.mines.edu/library/
Colorado State University	https://lib.colostate.edu/
Florida International University	https://library.fiu.edu/
Florida State University	https://www.lib.fsu.edu/
George Mason University	https://library.gmu.edu/
Georgia Institute of Technology	https://www.library.gatech.edu/
Illinois State University	https://library.illinoisstate.edu/
Indiana University-Bloomington	https://libraries.indiana.edu/
Iowa State University	https://www.lib.iastate.edu/
Kansas State University	https://www.lib.k-state.edu/
Louisiana State University-Baton Rouge	https://www.lib.lsu.edu/
Miami University-Oxford	http://www.lib.miamioh.edu/
Michigan State University	https://lib.msu.edu/
Michigan Technological Institute	https://www.mtu.edu/library/
Missouri University of Science and Technology	https://library.mst.edu/
Montclair State University	https://www.montclair.edu/library/
New Jersey Institute of Technology	http://library.njit.edu/
North Carolina University-Raleigh	https://www.lib.ncsu.edu/huntlibrary
Ohio State University-Columbus	https://library.osu.edu/
Ohio University	https://www.library.ohio.edu/
Oklahoma State University	https://library.okstate.edu/
Oregon State University	https://osulibrary.oregonstate.edu/
Pennsylvania State University-University Park	https://libraries.psu.edu/directory
Purdue University-West Lafayette	https://www.lib.purdue.edu/
Rowan University	https://www.lib.rowan.edu/
Rutgers University-New Brunswick	https://www.libraries.rutgers.edu/
Rutgers University-Newark	https://www.libraries.rutgers.edu/dana
San Diego State University	https://library.sdsu.edu/
Stony Brook University-SUNY	http://www.library.stonybrook.edu/
SUNY College of Environmental Science and Forestry	https://www.esf.edu/moonlib/
Temple University	https://library.temple.edu/
Texas A&M University-College Station	https://library.tamu.edu/
Texas Tech University	https://www.depts.ttu.edu/library/

College Name	Library Website
University at Albany-SUNY	https://library.albany.edu/
University at Buffalo-SUNY	https://library.buffalo.edu/
University of Alabama	https://www.lib.ua.edu/#/home
University of Alabama-Birmingham	https://library.uab.edu/
University of Arizona	https://new.library.arizona.edu/
University of Arkansas	https://libraries.uark.edu
University of California -Los Angeles	https://www.library.ucla.edu/
University of California-Berkeley	http://www.lib.berkeley.edu/
University of California-Davis	https://www.library.ucdavis.edu/
University of California-Irvine	https://lib.uci.edu/
University of California-Merced	http://library.ucmerced.edu/
University of California-Riverside	https://library.ucr.edu/
University of California-San Diego	https://library.ucsd.edu/
University of California-Santa Barbara	https://www.library.ucsb.edu/
University of California-Santa Cruz	https://library.ucsc.edu/
University of Central Florida	https://library.ucf.edu/
University of Cincinnati	https://libraries.uc.edu/
University of Colorado-Boulder	https://www.colorado.edu/libraries/
University of Connecticut-Storrs	https://lib.uconn.edu/
University of Delaware	https://library.udel.edu/
University of Florida	http://www.uflib.ufl.edu/books.html
University of George	https://www.libs.uga.edu/
University of Hawaii-Manoa	http://manoa.hawaii.edu/library/
University of Houston	https://libraries.uh.edu/
University of Idaho	https://www.lib.uidaho.edu/
University of Illinois-Chicago	https://library.uic.edu/
University of Illinois-Urbana Champaign	https://www.library.illinois.edu/
University of Iowa	https://www.lib.uiowa.edu/
University of Kansas	https://lib.ku.edu/
University of Kentucky	http://libraries.uky.edu/
University of Louisville	http://library.louisville.edu/home
University of Maine	https://library.umaine.edu/
University of Maryland-Baltimore County	https://library.umbc.edu/
University of Maryland-College Park	https://www.lib.umd.edu/
University of Massachusetts-Amherst	https://www.library.umass.edu/
University of Massachusetts-Lowell	https://www.uml.edu/library/
University of Michigan-Ann Arbor	https://www.lib.umich.edu/
University of Minnesota-Twin Cities	https://www.lib.umn.edu/
University of Mississippi	https://libraries.olemiss.edu/
University of Missouri	http://library.missouri.edu/
University of Nebraska-Lincoln	https://libraries.unl.edu/

College Name	Library Website
University of New Hampshire	https://www.library.unh.edu/
University of New Mexico	https://library.unm.edu/
University of North Carolina-Chapel Hill	https://library.unc.edu/
University of Oregon	https://library.uoregon.edu/
University of Pittsburgh	https://www.library.pitt.edu/
University of Rhode Island	https://web.uri.edu/library/
University of South Carolina	https://sc.edu/about/offices_and_divisions/university_libraries/
University of South Florida	https://www.lib.usf.edu/
University of Tennessee	https://www.lib.utk.edu/
University of Texas-Austin	https://www.lib.utexas.edu/
University of Texas-Dallas	https://www.utdallas.edu/library/
University of Utah	https://lib.utah.edu/
University of Vermont	https://library.uvm.edu/
University of Virginia	https://search.lib.virginia.edu/
University of Washington	https://www.lib.washington.edu/
University of Wisconsin-Madison	https://www.library.wisc.edu/
University of Wyoming	http://www.uwyo.edu/libraries/
Virginia Commonwealth University	https://www.library.vcu.edu/
Virginia Tech	https://lib.vt.edu/
Washington State University	https://libraries.wsu.edu/
n=100 Source: *U.S. News and World Reports*	

Appendix C. Overall Error Counts for Wave

Totals in descending order

College Name	Quantity Error	Error Y=1, N=0	Error Free Y=1, N=0
University of New Hampshire	84	1	
University of Pittsburgh	42	1	
University of South Florida	34	1	
University of California-Davis	29	1	
Ohio State University-Columbus	26	1	
University of Kentucky	25	1	
University of California-Santa Cruz	24	1	
University of Texas-Austin	23	1	
Iowa State University	22	1	
Pennsylvania State University-University Park	22	1	
University of California-Santa Barbara	21	1	
University at Albany-SUNY	20	1	
Illinois State University	18	1	
University of Texas-Dallas	17	1	
University of California-Merced	16	1	
University of Maryland-Baltimore County	16	1	
University of Massachusetts-Amherst	16	1	
Ohio University	14	1	
University of Mississippi	12	1	
University of New Mexico	12	1	
Rowan University	11	1	
University of Colorado-Boulder	11	1	
University of Illinois-Chicago	11	1	
Florida International University	9	1	
New Jersey Institute of Technology	9	1	
Purdue University-West Lafayette	9	1	
Texas Tech University	9	1	
University of Connecticut-Storrs	9	1	
University of Delaware	9	1	
Virginia Tech	9	1	
University of Alabama-Birmingham	8	1	
University of Utah	8	1	
Clemson University	7	1	
Michigan Technological Institute	7	1	
University of Maine	7	1	
University of Tennessee	7	1	
Kansas State University	6	1	

College Name	Quantity Error	Error Y=1, N=0	Error Free Y=1, N=0
Miami University-Oxford	6	1	
Missouri University of Science and Technology	6	1	
San Diego State University	6	1	
University of California-Los Angeles	6	1	
University of Hawaii-Manoa	6	1	
University of Minnesota-Twin Cities	6	1	
Virginia Commonwealth University	6	1	
University of Georgia	5	1	
University of Michigan-Ann Arbor	5	1	
Arizona State University-Tempe	4	1	
Colorado School of Mines	4	1	
Florida State University	4	1	
Oregon State University	4	1	
Temple University	4	1	
University of Arizona	3	1	
University of California-San Diego	3	1	
University of Central Florida	3	1	
University of Houston	3	1	
University of Maryland-College Park	3	1	
Binghamton University-SUNY	2	1	
SUNY College of Environmental Science and Forestry	2	1	
University of Arkansas	2	1	
University of California-Berkeley	2	1	
University of Iowa	2	1	
University of Louisville	2	1	
University of Missouri	2	1	
University of North Carolina-Chapel Hill	2	1	
Washington State University	2	1	
Ball State University	1	1	
College of William and Mary	1	1	
Colorado State University	1	1	
George Mason University	1	1	
Louisiana State University-Baton Rouge	1	1	
North Carolina University-Raleigh	1	1	
Oklahoma State University	1	1	
Texas A&M University-College Station	1	1	
University of California-Irvine	1	1	
University of Florida	1	1	
University of Idaho	1	1	

College Name	Quantity Error	Error Y=1, N=0	Error Free Y=1, N=0
University of Nebraska-Lincoln	1	1	
University of Rhode Island	1	1	
University of Wisconsin-Madison	1	1	
Auburn University	0	0	1
Georgia Institute of Technology	0	0	1
Indiana University-Bloomington	0	0	1
Michigan State University	0	0	1
Montclair State University	0	0	1
Rutgers University-New Brunswick	0	0	1
Rutgers University-Newark	0	0	1
Stony Brook University-SUNY	0	0	1
University at Buffalo-SUNY	0	0	1
University of Alabama	0	0	1
University of California-Riverside	0	0	1
University of Cincinnati	0	0	1
University of Illinois-Urbana Champaign	0	0	1
University of Kansas	0	0	1
University of Massachusetts-Lowell	0	0	1
University of Oregon	0	0	1
University of South Carolina	0	0	1
University of Vermont	0	0	1
University of Virginia	0	0	1
University of Washington	0	0	1
University of Wyoming	0	0	1
TOTALS	**758**	**79**	**21**
	7.58	**79.00%**	**21.00%**
	mean	**percent**	**percent**

Appendix D. Total Known Errors with AChecker

This table is in descending order.

College Name	Quantity Error	Error Y=1, N=0	Error Free Y=1, N=0
Stony Brook University-SUNY	106	1	
Montclair State University	94	1	
Colorado State University	72	1	
Florida State University	69	1	
North Carolina University-Raleigh	49	1	
University of Nebraska-Lincoln	48	1	
Purdue University-West Lafayette	43	1	
Binghamton University-SUNY	43	1	
Pennsylvania State University-University Park	35	1	
University of New Mexico	27	1	
Texas A&M University-College Station	26	1	
University of California -Los Angeles	25	1	
University of Alabama-Birmingham	25	1	
San Diego State University	23	1	
Kansas State University	23	1	
Illinois State University	23	1	
Florida International University	23	1	
University of Oregon	22	1	
Washington State University	21	1	
University of Colorado-Boulder	21	1	
University of California-San Diego	21	1	
University of California-Riverside	20	1	
University of Washington	18	1	
Miami University-Oxford	17	1	
University of California-Davis	15	1	
University of California-Irvine	12	1	
University of North Carolina-Chapel Hill	11	1	
University of Minnesota-Twin Cities	11	1	
University of Central Florida	11	1	
University of California-Berkeley	11	1	
Ohio State University-Columbus	11	1	
Louisiana State University-Baton Rouge	11	1	
University of Virginia	10	1	
University of Idaho	10	1	
University of Alabama	9	1	
Auburn University	9	1	
University of Missouri	8	1	

College Name	Quantity Error	Error Y=1, N=0	Error Free Y=1, N=0
University of California-Santa Barbara	8	1	
Rowan University	8	1	
Colorado School of Mines	7	1	
Ball State University	7	1	
Arizona State University-Tempe	7	1	
University of Maine	6	1	
Missouri University of Science and Technology	6	1	
Michigan State University	6	1	
University of New Hampshire	5	1	
University of Georgia	5	1	
University of Florida	5	1	
University of Arizona	5	1	
Temple University	5	1	
University of Mississippi	4	1	
University of Massachusetts-Lowell	4	1	
University of Iowa	4	1	
University of California-Santa Cruz	4	1	
New Jersey Institute of Technology	4	1	
Michigan Technological Institute	4	1	
Indiana University-Bloomington	4	1	
Clemson University	4	1	
Virginia Tech	3	1	
University of Kansas	3	1	
University of Houston	3	1	
Georgia Institute of Technology	3	1	
College of William and Mary	3	1	
University of Wyoming	2	1	
University of Rhode Island	2	1	
University of Pittsburgh	2	1	
University of Michigan-Ann Arbor	2	1	
University of Massachusetts-Amherst	2	1	
University of Maryland-Baltimore County	2	1	
University of Delaware	2	1	
University of Arkansas	2	1	
University of Texas-Dallas	1	1	
University of Tennessee	1	1	
University of South Florida	1	1	
University of Maryland-College Park	1	1	
University of Illinois-Urbana Champaign	1	1	
University of Cincinnati	1	1	

College Name	Quantity Error	Error Y=1, N=0	Error Free Y=1, N=0
University at Albany-SUNY	1	1	
Rutgers University-Newark	1	1	
Rutgers University-New Brunswick	1	1	
Oregon State University	1	1	
Virginia Commonwealth University	0	0	1
University of Wisconsin-Madison	0	0	1
University of Vermont	0	0	1
University of Utah	0	0	1
University of Texas-Austin	0	0	1
University of South Carolina	0	0	1
University of Louisville	0	0	1
University of Kentucky	0	0	1
University of Illinois-Chicago	0	0	1
University of Hawaii-Manoa	0	0	1
University of Connecticut-Storrs	0	0	1
University of California-Merced	0	0	1
University at Buffalo-SUNY	0	0	1
Texas Tech University	0	0	1
SUNY College of Environmental Science and Forestry	0	0	1
Oklahoma State University	0	0	1
Ohio University	0	0	1
Iowa State University	0	0	1
George Mason University	0	0	1
TOTALS	**1,186**	**81**	**19**
	11.86	**81.00%**	**19.00%**
	mean	**percent**	**percent**

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Exploring the Cost Effectiveness of Services in Academic Libraries: A Case Study with the Use of Time-Driven Activity-Based Costing

Barbara Kissa, Zoe Georganta, Elias Gounopoulos, and Fotis Kitsios

Over the past decade, the financial crisis has led to reduced government funding for academic libraries in Greece. Now more than ever, it is imperative for library managers to improve their knowledge and understanding of cost behavior, in order to effectively deliver high quality services at decreasing costs. To do so, they need to apply clearly-defined costing methods, such as Time-Driven Activity-Based Costing (TDABC), that allow them to identify the various costs involved in the library processes. In our study, we applied the TDABC method at the medium-sized library of the University of Macedonia (UoM), in Thessaloniki, Greece, to evaluate the costs of the Inter-library Loans (ILL) services. Since the library managers did not adopt a cost allocation method, the cost estimation of the UoM ILL services was rather simplistic and rudimentary. Our research provides empirical evidence of the advantages of TDABC in an academic library setting. Namely, the TDABC method can help library administrators decide how to successfully allocate the available resources and improve the efficiency of the library processes.

Introduction

The global economic crisis has affected the academic libraries in Europe and the USA.[1] Due to limited state funding and an increasing cost of information, academic library managers need to apply effective costing methods to improve the allocation of library resources and offer high quality services at diminishing costs.[2] They need to use reliable management techniques based on effective information regarding cost assessments and library processes.[3]

Many studies have applied cost analysis for university library services using contemporary costing methodologies such as Activity-Based Costing (ABC) or Time-Driven Activity-Based Costing (TDABC).[4] ABC is a useful management tool for academic library managers, because it informs them about the costs of services and cost drivers. The ABC system was introduced

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by Cooper and Kaplan in the mid-1980s as an alternative costing system and was first applied to manufacturing companies. According to the ABC system, the cost of resources is allocated to activities using cost guides (i.e. number of book orders, number of loans between libraries, number of machine hours, etc.), and the cost of activities is allocated to cost objects based on the relevant cost guides.[5]

Although the ABC system can be a sufficient costing method, there are several limitations. Firstly, ABC can take a long time to implement due to the complexity of the activities. Secondly, ABC includes only one cost driver per activity. In reality, there is more than one cost driver per activity. Thirdly, library managers need to update the results regularly, which makes ABC implementation more costly.[6]

In 2003, Kaplan and Anderson introduced TDABC as a time-driven, improved version of the ABC method that would overcome the difficulties of implementing and constantly updating the ABC system. TDABC is faster to update and uses time as the only cost driver. TDABC is considered an easy-to-implement method since it only estimates for each activity two simple parameters: 1) The cost/time unit of the resource (i.e., personnel, library management system) and 2) the time units (usually estimated in minutes) required to perform an activity by the resource.[7]

TDABC method is considered a management accounting innovation that allows managers with no experience in accounting science to perform cost analysis activities efficiently.[8] In fact, many researchers consider TDABC to be a simple, easy-to-learn and easy-to-apply costing system for libraries. However, there are only a few studies that evaluate whether the technique of TDABC is effective for the most important library services like lending, cataloguing, acquisition, and the interlibrary loan (ILL) services.[9]

The aim of our study is to evaluate the application of the TDABC method to the academic library of the University of Macedonia (UoM), Thessaloniki, Greece, to estimate the costs of ILL services.

The UoM serves approximately 9,120 undergraduate students and offers eight undergraduate and 39 master's and doctoral degrees. According to the Carnegie classification of institutions of higher education, the university is considered a middle-sized university and is representative of the Greek Universities since most of them (i.e., 43–45%) are also middle-sized.[10] The UoM library may also be considered a representative case study for the Greek academic libraries since the procedures and policies applied in the Greek academic libraries are almost the same.

Although TDABC could improve the cost management of many library processes, we have focused our research/analysis on the inter-library loan services. As the number of interlibrary loans has increased in recent years, ILL is considered a popular service among academic libraries.[11] However, the existing cost analysis of ILL often either overestimates or underestimates the costs associated with these services. Although the cost of simple and complicated ILL requests vary significantly, most studies divide ILL cost by the number of ILL transactions (requests).[12] Hence, allocating the same cost to different type of requests produces inaccurate cost estimates.[13]

The results of our in-depth TDABC cost analysis may help library managers better understand the origin of ILL services' costs. The UoM library managers cannot allocate cost for each library service, so they have to accept inaccurate and rough cost estimations. Moreover, the detailed TDABC results with costs, time, and resources for each activity will help them

optimize processes and understand which activities need to be improved or discarded. The results of our study will help library administrators make optimal decisions for the efficient allocation of library resources.

The remainder of this paper is structured as follows: in the literature review section, we present the TDABC technique. In the methods and results section, we describe the TDABC implementation steps for the ILL process at the UoM library. Finally, in the two last sections we discuss the findings of our study and the implications and contribution for library practice.

Literature Review

Academic libraries must provide high quality and cost-effective services. The cost effectiveness of the library services must be assessed with efficient cost analysis methods. However, the total cost of the library services is usually estimated by traditional costing systems rather simplistically, as the sum of direct costs (i.e., material and labor) and indirect costs (i.e., a percentage of overheads).

Conventional costing systems are considered cost-efficient if indirect costs are low and the range of services is limited. Nowadays, the indirect costs have become more significant compared to the direct costs, especially in organizations with a wide range of services such as libraries.[14] As a result, the traditional costing systems cannot provide accurate cost information to library managers.

Activity-based costing (ABC) is an alternative costing technique that aims to correct the restrictions of traditional methods by evaluating the cost of the activities for each process.[15] Thus, ABC helps determine which activities are significant or expensive.[16] However, ABC is primarily based on subjective information. The preferred method of data collection is through interviews, in which the organisation's employees state the percentage of time they spend on different activities of each process.[17] Another disadvantage of the ABC system is that it needs to be updated very often to reflect current practice, which further increases its operating cost.[18]

To overcome the difficulties of implementing and constantly updating the ABC system, Kaplan and Anderson introduced TDABC as an improved version of the ABC method.[19] TDABC records analytical information for each activity, such as duration, frequency, and the staff who carried out each activity. The TDABC method provides detailed cost data through process maps, which essentially outline a sequence of activities.[20] The time to perform each activity is measured via direct observation.

TDABC uses a simple time equation to estimate the duration of the process, which is calculated as the sum of the time of the activities in the process. The time equation can evaluate all the possible scenarios for each process (i.e., different combination of activities). The costs are assigned to the cost object by multiplying the cost per time unit of the resource by the time required to perform the activities.[21] The TDABC method provides significant information on inefficient activities, that may need to be eliminated to reduce costs. For example, the application of TDABC to a multinational distributor of scientific products helped them transform 1,200 activities to just 200 department processes.[22]

TDABC was applied in various business fields such as manufacturing, banks, hospitality, healthcare, and nonprofit organizations such as libraries. Everaert et al. used the TDABC method to evaluate the cost of the logistic processes of a wholesaler company in Belgium. While the application of the ABC method ignored the complexity of operations and misallocated 55 percent of all costs, TDABC provided a detailed cost analysis. Thus, the company managers

could evaluate more accurately the profitability for each customer. This new information helped them improve the company's profitability by introducing new discount policies and renegotiating contracts with customers and suppliers.[23] Keel et al. reviewed the empirical application of TDABC to the health care sector. TDABC can evaluate efficiently and accurately the cost of the complex processes and achieve operational improvement. Thus, it should be gradually incorporated into functional systems to control the cost and create value in health care.[24]

Given its simplicity and efficiency, many researchers have chosen to apply the TDABC method to evaluate one or more services at academic libraries. Stouthuysen et al. applied TDABC in order to reduce the cost of activities connected with the acquisition process in a university library in Belgium.[25] Kont focused her analysis on the same process at two Estonian university libraries,[26] while Sigüenza-Guzmán et al. presented the use of TDABC for a library cataloguing process at a Belgian library.[27] They have also used TDABC to analyze lending and returning processes at the Katholieke Universiteit Leuven (KU Leuven). Kissa et al. have applied the TDABC method to the lending processes at the UoM library, Greece.[28] All of the above researchers conclude that the TDABC method seems to be a cost management technique that provides credible cost information for the most important library services.

For many years, ILL has been considered a very important process for an academic library as, "*it is generally used to fill the gap between academic libraries collections and what their patrons actually need*."[29] The first major cost study for ILL services, was conducted during 1974 from Vernon Palmour et al. for the association of Research Libraries (ARL). While the volume of ILL transactions more than doubled in the previous five years, the academic libraries did not equally share the costs. The researchers surveyed 189 academic libraries and examined various ways to finance interlibrary loans. They recommended the use of coupons sold by a central clearing house.[30]

ILL is still a popular service among academic libraries. Lars Leon and Nancy Kress researched twenty-three medium-to-large academic libraries in the United States. They evaluated the cost of resource-sharing services, such as ILL borrowing and lending copies and loans. They concluded that the largest cost is staff cost.[31] Recently, the Online Computer Library Center (OCLC) introduced a free internet-based tool (i.e., OCLC Interlibrary Loan Cost Calculator) that may be used as a real-time ILL cost calculator in order to help library administrators and practitioners better understand the costs associated with sharing collections.[32]

However, very few researchers have used the TDABC method to evaluate ILL service at an academic library.[33] Moreover, the estimated ILL cost is actually difficult to compare.[34] Marc-André Simard et al. reviewed ILL cost studies from 1997 through 2017.[35] They found that, due to methodology problems, the ILL cost per transaction varied significantly from $3.75 up to $100.00. For example, some researchers counted only the filled ILL requests, while others counted both filled and unfilled ILL requests. However, Jackson's estimation of ILL cost at $17.50 remains the guideline for most researchers and librarians because she examines ILL with methodological rigor.[36]

In 2007, Pernot et al. provided a whole new approach based on TDABC by calculating the cost data for every activity of the ILL processes.[37] This in-depth TDABC analysis was implemented at the ILL services of the Arenberg Library of the Katholieke Universiteit Leuven (KU Leuven) in Belgium. According to the results of that study, TDABC could decrease the cost management of the library services given that it breaks down the cost per transaction. Thus, TDABC can improve the library processes by estimating the activities which are costly

and with no added value. However, no further research has been conducted based on ILL's TDABC cost analysis.

Methods and Results

The aim of our research is to evaluate the implementation of TDABC at an academic library. In particular, we have implemented the TDABC method to estimate the cost of the ILL service. Since it is not feasible for the library to buy everything its patrons request, ILL is considered one of the most important and difficult library services. This service provides patrons with quick access to information whenever they need it.[38] As a result, accurate cost estimation is important because the operating costs of this service are high, and the requests are very time-consuming to process. Furthermore, ILL is a service which requires experienced staff with high linguistic and digital skills.

The academic library studied was the UoM library, Thessaloniki, Greece. The UoM library is operated by approximately 20 full-time-equivalent employees (FTE). The number of registered users is estimated to be about 8,270 per academic year. In order to provide ILL services efficiently, the UoM library is a member of the Hellenic Interlibrary Loan Network (HILL-net) and the ILL Service of Scientific and Technological Libraries National Network. This cooperation with other Greek libraries is an effective way to overcome budgetary constraints.[39] The UoM library also cooperates with the Document Supply Service of the British Library (BLDSS) and a cooperative German document delivery service called Subito. The aforementioned partnerships reduce Library Management System (LMS) costs (i.e., hardware, software and networking) and accounting costs (i.e., clearance, accounting and payments).

However, there is no accurate and detailed cost analysis for each library service.[40] All the library costs are processed in the central accounting system of the University of Macedonia through the budget-reporting system. There is also no cost allocation for individual library services, such as ILL. Moreover, all ILL cases are estimated at the same cost, without taking into account different types of ILL requests or different types of providers.

We implemented TDABC method combining qualitative and quantitative methods to ensure the reliability of our results. Our mixed method analysis may increase the rigor and enrich the findings of our research.

In the next paragraphs we thoroughly explain the six-step application of TDABC at the UoM library.[41] According to our analysis of the UoM ILL service, we have identified four different ILL processes. Each ILL process is a sequence of activities and may have several scenarios or cases. Each activity is described with a letter abbreviation (i.e., a, b, c …k). In detail:

Step 1: Identify the most important ILL processes

We have thoroughly studied the UoM library guide, which describes the library processes. We then interviewed the UoM ILL staff and the UoM library manager using open questions. The ILL processes were identified by separating outgoing and incoming requests. In particular, the UoM library borrows items that are not available in its collections from other libraries (outgoing requests), or lends items from its collections to other libraries or patrons (incoming requests). If the ILL requests are for books, they are entered to the Institutional Research Information System (IRIS) ILL system. If the ILL requests are for journal articles, they are entered to the ILL system of the National Documentation Center (NDC). As a result, we have identified the main activities for each ILL process and the task that each staff member undertakes in these processes.

We have identified four main ILL processes, which include various activities and sub-activities. These processes are: 1) Incoming requests for books, 2) Incoming requests for articles, 3) Outgoing requests for books and 4) Outgoing requests for articles.

Step 2: Estimate the total cost of each resource group

The cost data were based on real data provided by the financial and human resources manager. We also derived cost data from various UoM library reports. All the financial data like labor costs, library management system costs, and overhead costs were collected for the year 2018.

According to the annual UoM accounting reports, the total annual cost of library services includes both direct and indirect costs.

The direct costs are:

- Labor costs: The personnel assigned to the above processes represent 1.5 full-time employees (FTE). The total monthly cost is about € 2,026 and the total yearly cost is about € 24,312*1.5= € 36,468
- Library management system costs, which include hardware (e.g., Radio-frequency identification [RFID] technology) and software (e.g., specialized software for ILL services) costs. The yearly cost is approximately € 7,220

The indirect costs are:

- Staff overhead costs (e.g., management, accounting, cleaning, utilities, stationery material). It is approximately € 85,083
- Library management system overhead costs (e.g., leasing photocopier, depreciation of equipment [e.g. electronic, furniture]). It is approximately € 21,805

Step 3: Estimate the time of each resource group (practical capacity time)

Practical capacity is specified without the assessment of idle time, which may be: maintenance, vacation, illness, education and meetings, or other.[42] We have estimated the practical capacity of each resource group at 80% of theoretical time capacity for people, and at 85% for machines (excluding maintenance and repair time).[43] This approach was selected to simplify the cost calculations of our study.

According to the Greek labor legislation, staff must work forty hours per week (theoretical capacity). We have calculated the practical capacity as follows:

> 80% × 40 hours/week × 52 weeks/year × 60 min/hour = 80% × 124,800 min = **99,840 min/year.**

According to step 2, there are 1.5 full-time equivalent (FTE) for the ILL processes, thus the practical capacity time for staff is 99,840 min/year * 1.5 = **149,760** min/year. The 1.5 FTE is related to the work of three employees. The first employee responsible for the ILL service is working 100 percent of her/his time, while the second and third are working 30 percent and 20 percent of their time respectively. The UoM library is open to the public from 8:00 a.m. to 8:00 p.m. for weekdays, and from 8:30 a.m. to 3:00 p.m. for Saturdays. This time accounts in total for 66.5 hours per week and represents the theoretical time capacity for LMS. Thus, the practical capacity for LMS is = 66.5 hours × 85% ×52 weeks/year ×60 min/hour =**176,358** min/year.

Step 4: Calculate the unit cost of each resource group

The cost per time unit (1) is equal to the total cost of the resource (step 2) divided by the practical capacity (step 3) [44]:

Cost per time unit = total cost of the resource/practical capacity (1)

The staff and LMS costs include the staff and LMS overhead costs respectively. The resulting costs are presented in table 1.

TABLE 1
Unit Cost Per Resource Group

Resource group	Calculations	Cost Per Minute (€/min)
Staff labor costs	(36,468/149,760) + (85,083/149,760) = 0.24 + 0.56	**0.80**
LMS	(7,220/176,358) + (21,805/176,358) = 0.041 + 0.124	**0.16**

The highest cost is the staff labor cost (0.80 €/ min). As shown in step 2, that is because of the high direct staff and staff overhead costs (36,468 € and 85,083 € respectively).

Steps 5 and 6: Estimate the total time (step 5) and the cost/activity (€) and total cost (step 6) for all the different cases of each ILL process

In the last two steps, we have modeled the workflow of each ILL process using Business Process Modeling Notation (BPMN) and estimated the total time and cost for each process. The ILL processes are: ILL incoming requests for 1) books (figure 1) or 2) articles (figure 2), and ILL outgoing requests for: 3) books (figure 3) or 4) articles (figure 4).

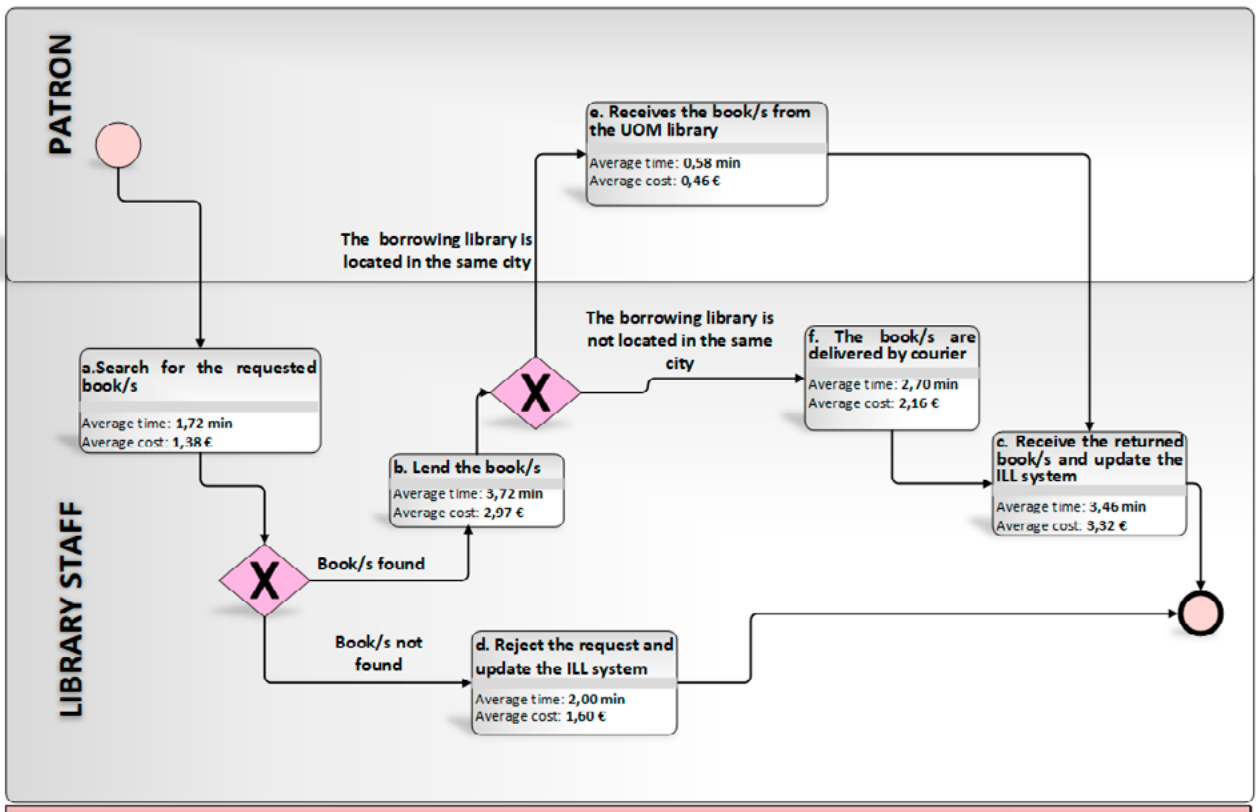
In step 5 we calculated the time required to complete one unit of an activity for each one of the four main ILL processes. The time data was gathered via direct observation with the excellent cooperation and contribution of the ILL staff. We carried out the data collection using a stopwatch. The data collection lasted for the whole academic year 2018–2019 (October 2018–September 2019) to cover all the different cases of ILL requests at the UoM library. To avoid bias, we validated the results by repeating the data collection several times for all cases. The total number of observations was large (140). We have estimated the average time for each activity to facilitate time calculations.[45]

In step 6 we estimated the cost for each process. We estimated the cost/activity (€) and total cost for all the cases of each ILL process by multiplying the unit cost of each resource group (step 4) by the time required to perform the activity (step 5).[46] We created four cost tables (tables 2–5) (Appendix A) to calculate the cost for each one of the four main ILL processes mentioned in step 1. In particular, table 2 and table 3 (Appendix A) estimate the explicit costs for the incoming requests of books and articles respectively, while table 4 and table 5 (Appendix A) estimate the costs for the outgoing requests of books and articles accordingly. We calculated and presented separately the cost of the standard and optional activities for each process. At the end of each cost table (Appendix A), we calculated the cost of all the possible cases (i.e., case A, case B, case C, etc.) for each ILL process. For simplicity's sake, in the detailed analysis of each process that follows and in the tables in Appendix A, requests are treated as requests for a single item, with the understanding that requests may be made for multiple items at the same time. Requests for multiple items would, understandably, take more time.

In detail:

I. *Incoming requests for books (figure 1)*

FIGURE 1
Incoming Requests for Books



CASE	TASKS	DESCRIPTION	TOTAL TIME (min)	TOTAL COST (€)
A	a, b, e, c	The borrowing library is located in the same city	9,48	8,13
B	a, b, f, c	The borrowing library is not located in the same city	11,6	9,83
C	a, d	The UOM library does not possess the requested book/s	3,72	2,98

The UoM library staff check the IRIS system daily for new requests. When they receive a new request, they search for the requested book (activity **a** time: 1.72 min). If the UoM library does not possess the requested item, the ILL staff respond negatively through the IRIS system to the library that requested the book (activity d time: 2 min). If they find the book, they enter the request to the KOHA (Open source library automation software) and IRIS lending management systems (activity **b** time: 3.72 min). Then, they deliver the book in one of two ways: **1)** if the borrowing library is located in the same city (i.e., Thessaloniki), the book is delivered from the UoM library (activity **e** time: 0.58 min), or **2)** if the borrowing library is located outside the city, the book is delivered by a courier service (activity **f** time: 2.70 min).

After the successful delivery of the book, the UoM library staff close the request. If the collaborating library is located in the same city, the patron returns the material to the UoM library with no charge. If the material is returned by a courier service, the patron has to pay for the courier costs. The UoM library staff receive the book and return it to the shelf. They also update the KOHA and IRIS systems about the completion of the ILL process (activity **c** time: 3.46 min).

The resulting equation in minutes for the total time of incoming requests is as follows:

SUM1= a + b + c + [(**e** {if the borrowing library is in the same city} +**d** {if the requested item is not available} + **f** {if the borrowing library is located outside the city}]

There are three cases related to the incoming requests for books:

Case A: If the borrowing library is located in the same city:

***SUM1 of case A* = a + b + e + c** = 1.72+3.72 + 0.58 + 3.46 = **9.48 min**

Case B: If the borrowing library is not located in the same city:

SUM1 of case B = **a + b + c + f** = 1.72+3.72 + 3.46 + 2.70 = **11.6 min**

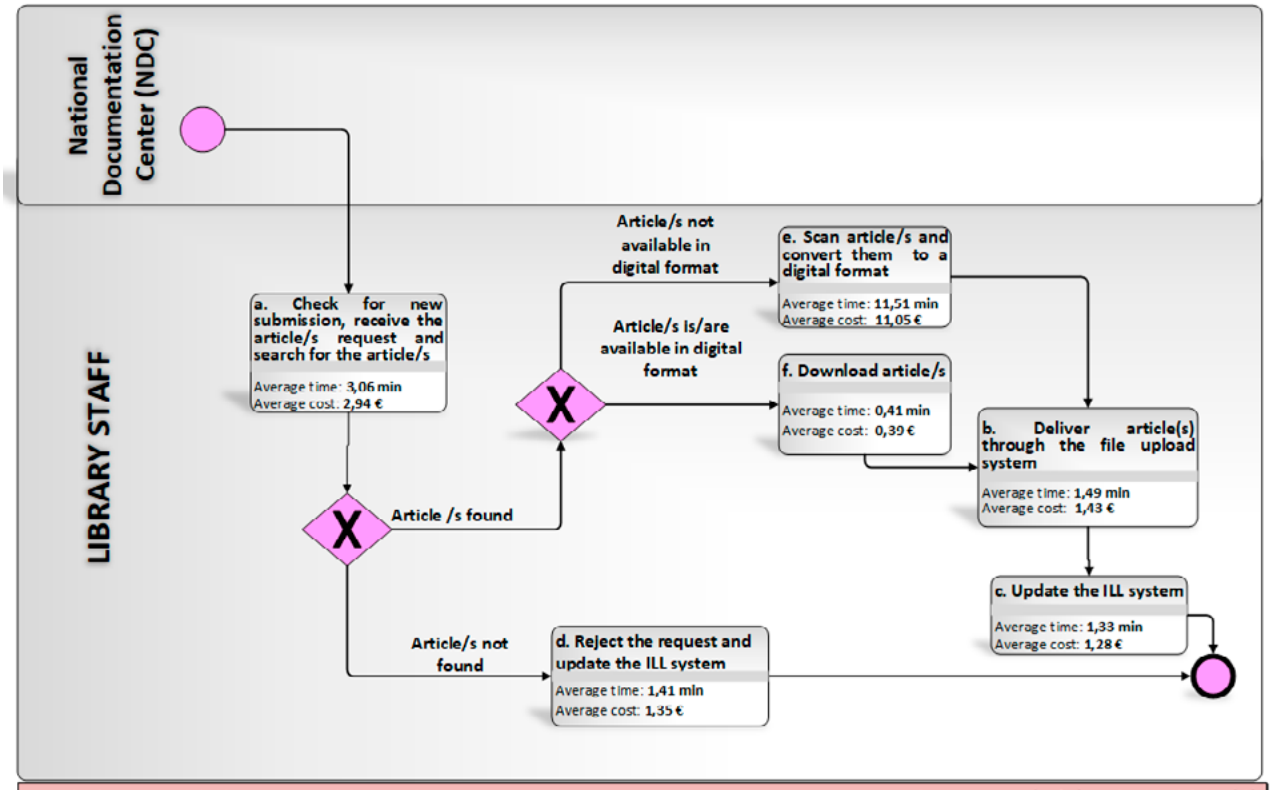
Case C: If the library of the University of Macedonia does not possess the requested item:

SUM1 of case C = **a +d** = 1.72+2= **3.72 min**

The cost of the ILL process for the incoming requests for books depends on the location of the cooperating library (table 2). If the borrowing library is located in the same city, the ILL process cost is 20.9% less compared to the cost when the borrowing library is located in another city. According to our results, the two standard activities of lending (a) and returning (b) the books are the most costly. The cost of these activities is €2.97 and €3.32 respectively.

II. *Incoming requests for articles (figure 2)*

FIGURE 2
Incoming Requests for Articles



CASE	TASKS	DESCRIPTION	TOTAL TIME (min)	TOTAL COST (€)
A	a, e, b, c	The article/s is/are available in hard copy	17,39	16,70
B	a, f, b, c	The article/s is/are available in digital format	6,29	6,04
C	a, d	The UOM library does not possess the requested article/s	4,47	4,29

The UoM library staff receive a lending request by email from the ILL system of the NDC. They search for the requested article in the library collections (activity **a** time: 3.06 min). If they cannot find it, they record the request and inform the ILL NDC system (activity **d** time: 1.41 min).

If they find the article as a hardcopy, they must copy, scan, and convert it to a digital format (activity **e** time: 11.51 min). If they find the article in a digital format, they just download it (activity **f** time: 0.41).

They then deliver the requested article through the library file upload service (https://fs.lib.UoM.gr/) (activity **b** time: 1.49 min).

After the successful delivery of the article, the UoM library staff close the request in the ILL NDC system (activity **c** time: 1.33 min). The article remains in the possession of the collaborating libraries.

The resulting equation in minutes for the total time of incoming requests for an article is as follows:

SUM1 = a + **b** + **c** + [**e** {if article in hardcopy} + **d** {if the requested item, is not available} + **f** {if article in digital format}]

There are three different cases concerning the incoming requests for articles:

Case A: Incoming request for article, if the article is available in hard copy:

***SUM1 of case A* = a + b + c + e =** 3.06+1.49 +1.33 + 11.51 = **17.39 min**

Case B: Incoming request for article, if the article is available in digital format:

***SUM1 of case B* = a + b + c + f =** 3.06+1.49 + 1.33 + 0.41 = **6.29 min**

Case C: Incoming requests for article, if the UoM library does not possess the requested item:

***SUM1 of case C* = a +d =** 3.06 + 1. 41 = **4.47 min**

The most expensive activity of the incoming requests for articles (table 3) is when the UoM library staff have to convert the hardcopy article to a digital format (Case A cost = €16.70). The TDABC analysis shows that the cost of the case A is about 64% higher, compared to the case (Case B) where the article is available on a digital format (€6.04). The activity's cost is high (Activity e), because the time consumed to scan the article and convert it to a digital format is also high (11.51 min).

If the UoM library does not have the article, the staff respond negatively to the requesting library. In that case, the process cost is €4.29.

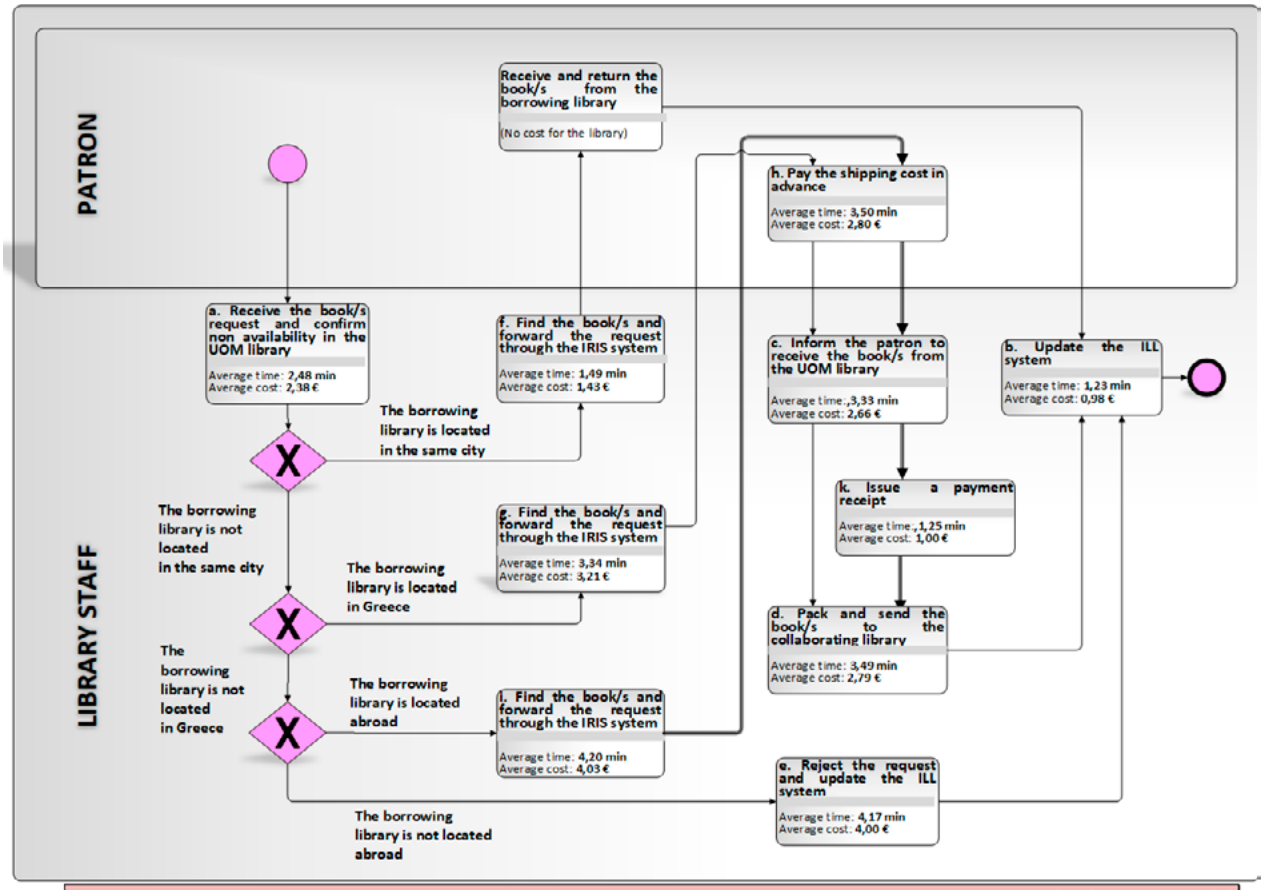
III. *Outgoing requests for books (figure 3)*

The patron checks the UoM Library's catalog to verify that the requested item is not included in the UoM library collections. Then, a request is completed in the ILL IRIS system.

The UoM library staff check the IRIS system daily for new outgoing requests. If they find a new request, they first search and confirm that the book is not available in the UoM library collections, and that if it is available, it is not freely available online (activity **a** time: 2.48 min).

Subsequently, the UoM library staff search for the requested book in the collections of the cooperating libraries that are located in the same city (i.e., Thessaloniki). If they find the requested book, they forward the request to the cooperating libraries (activity **f** time: 1.49 min).

FIGURE 3
Outgoing Requests for Books



CASE	TASKS	DESCRIPTION	TOTAL TIME (min)	TOTAL COST (€)
A	a, f, b	The book/s is/are located in the collections of the same city	5,20	4,79
B	a, g, h, c, d, b	The book/s is/are located in the collection of a Greek library not located in the same city	17,37	14,82
C	a, i, h, c, k, d, b	The book/s is/are located in a foreign library	19,48	16,64

If they do not find the book, they check the collections of other cooperating Greek libraries through the collective catalog of Greek academic libraries library systems. If they find it in a Greek library which is not located in Thessaloniki, they forward the request to the cooperating library through the IRIS system (activity **g** time: 3.34 min). The patron must pay the fee and the shipping costs in advance and in-person (activity **h** time: 3.5 min). According to the UoM library rules, the patron cannot pay in another way, such as e-banking.

If the UoM library staff do not locate the book in a Greek library, they check the collections from a foreign library using the BLDSS and Subito systems.

If they find it, they ask the patron to pay the expenses in advance. If the patron agrees, staff member forwards the request via BLDSS and Subito and updates the IRIS system (activity **i** time: 4.2 min). If the cooperating library responds negatively, the UoM ILL staff mark the request as unavailable and update the IRIS system (activity **e** time: 4.17 min).

At the end of the process, the UoM library staff issue a payment receipt and deliver the requested book to the patron. If the item is handled by the cooperating library in the same city, the patron receives a message to collect the book from the cooperating library.

If the item is handled by a cooperating Greek library outside of the city, the UoM library staff can expect to receive the book by courier (estimated delivery time: 1 to 3 days). If the

request is handled from a foreign library, the staff checks the order status through the BLDSS and Subito systems and waits for the arrival of the requested book (estimated delivery time: 1 to 3 weeks). When the library staff receive the requested book, they issue a payment receipt for the ILL fee (activity **k** time: 1.25 min). In these two last cases, the staff also issue an invoice through IRIS and notify the patron to pick up the book from the UoM library (activity **c** time: 3.33 min).

Finally, the patron returns the book to the UoM library. In case of delay, the UoM library staff is informed via IRIS and reminds the patron to return the book on time (activity **j** time: 1.2 min). When staff receives the book, they pack it and return it to the collaborating library (activity **d** time: 3.49 min). After the completion of the ILL process, the library staff update the IRIS system (activity **b** time: 1.23 min).

The resulting equation in minutes for the total time of outgoing requests for a book is as follows:

SUM1 = **a** + **b** + [**f** + {if the book is located in the collections of a cooperating library which is located in the same city} + **g** {if the book is located in the collections of a Greek library which is not located in the same city} + **i** + **k** { if the book is located abroad} + **e** { If the requested item isn't available}+ **c** + **d** + **h**{ if the book is located in the collections of a Greek library which is not located in the same city and abroad}+ **j** {if the patron delays the return of the book}]

There are three cases related to the outgoing requests for books:

Case A: if the book is located in the collections of a cooperating library which is located in the same city:

***SUM1 of case A*= a + b + f =** 2.48 + 1.23 + 1.49 = **5.20 min**

Case B: if the book is located in the collections of a Greek library which is not located in the same city:

***SUM1 of case B*= a + b + c + d + g + h =** 2.48 + 3.33 + 3.49 + 1.23 + 3.34 + 3.5 = **17.37 min**

Case C: if the book is located in the collections of a foreign library:

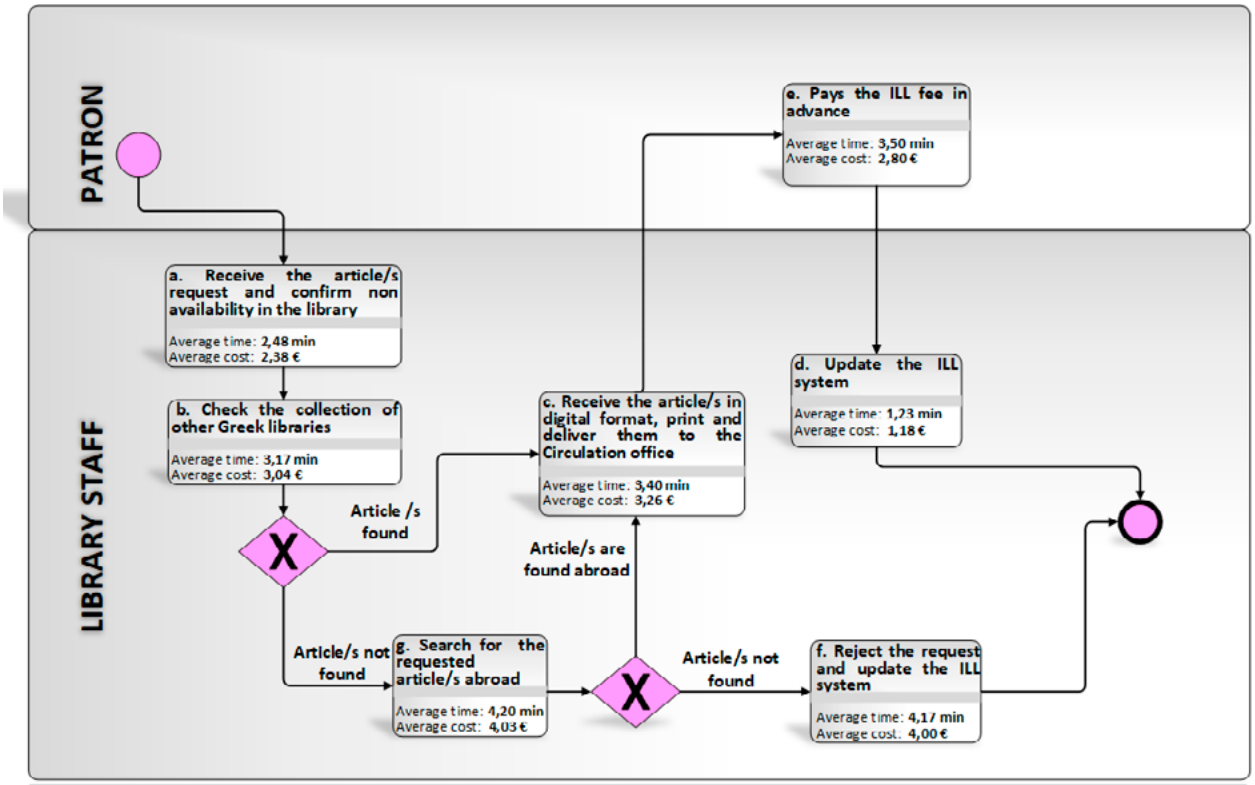
***SUM1 of case C*= a + b + c + d + i + k + h =**2.48 + 3.33 + 3.49 + 1.23 + 4.2 + 1.25 + 3.5 = **19.48 min**

The geographic location of the cooperating library is the most important factor in estimating the cost of outgoing requests for books (table 4). The TDABC analysis shows that if the borrowing library is located in the same city (Thessaloniki), only two activities are involved in the ILL process. In this case, the patron borrows and returns the book to the collaborating library without the participation of the library staff. Thus, the process cost remains low (case A). If the borrowing library is located abroad, the process cost is 12.28% higher (case C) compared to the case where the collaborating library is located in another Greek city (case B).

IV. *Outgoing requests for articles (figure 4)*

When the UoM library staff receive an outgoing request for an article, they check for the requested item in the same way as an outgoing request for a book. When they receive a new request in the IRIS system, they first search and confirm that the article is not available in the UoM library collections and that it is also not freely available online (activity **a** time: 2.48 min).

FIGURE 4
Outgoing Requests for Articles



CASE	TASKS	DESCRIPTION	TOTAL TIME (min)	TOTAL COST (€)
A	a, b, c, e, d	The article/s is/are located in a Greek library	13,78	12,66
B	a, b, g, c, e, d	The article/s is/are located in a foreign library	17,98	16,69
C	a, b, g, f	The UOM library does not possess the requested article/s	14,02	13,45

Then, the UoM library staff search for the requested article through the NDC. If they find it, they forward the request and update the IRIS system (activity **b** time: 3.17 min).

If the UoM library staff do not find the article through the NDC, they check the collections from a foreign library using the BLDSS and Subito systems. If they find it, they forward the request through the BLDSS and Subito, and update the IRIS system (activity **g** time: 4.2 min).

The staff receive the article electronically, issue an invoice, and handle the request through the IRIS system. Then, the patron gets an automated message to receive the article.

The staff prints the article, issues a receipt, and delivers the article to the circulation office where the patron can receive it (activity **c** time: 3.4 min). The patron pays the ILL fee in-person in advance (activity **e** time: 3.5 min). The article remains in the possession of the patron and is not returned. The library staff update the IRIS system after the completion of the ILL process (activity **d** time: 1.23 min). If the cooperating library responds negatively, the UoM ILL staff state that the request is unavailable and update the IRIS system (activity **f** time: 4.17 min).

The resulting equation in minutes for the total time of outgoing requests for articles is as follows:

SUM1= a + **b** + **c** + **d** + **e** + [**f** {if negative} + **g** {if the article is located in the collections of a foreign library}]

There are three cases related to the incoming requests for articles:

Case A: if the article is located in the collections of the NDC:
***SUM1 of case A*: = a + b + c + d + e =** 2.48 + 3.17 + 3.4 + 1.23 + 3.5 = **13.78 min**
Case B: if the article is located in the collections of a foreign library:
***SUM1 of case B*: = a +b+ g + c + d + e** = 2.48+3,17 + 4.2 +3.4 + 1.23 + 3.5 =**17,98 min**
Case C: if the article is not found
***SUM1 of case C*: = a + b + g + f** = 2.48 + 3.17 + 4.2 + 4.17 = **14.02 min**

The geographic location of the cooperating library is a cost determinant. Thus, when the article is found abroad (case B), the process cost is rising (€16.69), compared to the process cost (case A) when the article is located in the collections of the National Documentation Center (NDC) (table 5).

As reported by the results (tables 2, 3, 4 and 5), the borrowing and outgoing request costs for books range from €4.79 to €16.24, while the corresponding costs for articles range from €12.66 to €16.69. The lending and incoming request costs for books range from €2.98 to €9.83, while the respective costs for articles range from €4.29 to €16.70.

Discussion

In this research, we have evaluated the costs of the ILL services at the UoM library in Thessaloniki, Greece. We applied the TDABC method based on the six steps identified by Everaert et al.[47] Our case study showed how a widely applied costing method (i.e., Time-Driven Activity-Based Costing [TDABC]) can evaluate the most important library services, such as the ILL, in an accurate and easy-to-understand way.

The TDABC analysis provides library managers with a detailed costing analysis for each ILL process. As a result, TDABC may help managers reengineer the library processes by identifying the most inefficient or/and expensive activities. For example, in our analysis, the lending (activity b in table 2) and return (activity c in table 2) activities of the process: Incoming requests for books (figure 1) are relatively more time consuming. Since these repetitive activities are considered costly in terms of labor cost, the UoM library managers could automate them with the use of robotic services. Labor cost is the most important cost resource group (table 1), as also reported in previous studies.[48] The ILL cost may be reduced by assigning simple activities to trainee students (SLE), and educate staff on site or by web-based learning.[49,50]

Our ILL cost analysis may also help library managers sufficiently assess the ILL costs and compare them to what the library charges for ILL services. This comparison may help the library administration to accurately estimate the cost efficiency of the IIL processes and change the patron charges accordingly, if necessary. For example, in our analysis, ILL charges do not cover ILL costs in some cases. If the patron is a registered member of the UoM library, the library charges a much smaller fee (i.e. 6 € for book orders) compared to the charge to external users for the exact same process (i.e. €26 – €42). According to our results, the cost of the process ranges from €4.79 to €16.70.

However, our study has a few limitations. The applicability of our results is limited due to various factors such as the size of the library, the different library networks, the software used, and the availability of staff. The study is also limited to public research universities, and may not apply to private higher education institutions.

A suggestion for future research is to analyze ILL processes in other large academic libraries in Greece and/or abroad using the TDABC method. In this way, we can compare the

results of our research with TDABC implementation at other domestic and foreign libraries. Another suggestion is to perform a TDABC analysis of other important academic library services, such as the acquisition service. Although the purchase costs for this service are easy to estimate, the associated acquisition expenses are difficult to evaluate. The use of TDABC may provide important insights for cost improvement.

Conclusions

Our research provides empirical evidence about the effectiveness of the TDABC method in the cost evaluation of a complicated process (i.e. ILL) of an academic library. The TDABC method is effective for library services, since it may evaluate each case of a process with complex time drivers. The TDABC analysis provides managers with accurate, visualized, detailed, and easy to understand information, helping them identify the most and least important (i.e. non-value-added) activities.

The library managers may read and understand the TDABC analysis data effortlessly, given our study's easy-to-understand time equations, cost tables and BPMN diagrams. By implementing a thorough activity analysis, they can evaluate key data such as disaggregated costs per case, and identify which activities are the most time consuming and expensive. The interpretation of the results may also help the managers improve the efficiency of the library processes by saving time and cost. Moreover, they could perform a what-if analysis by adding or removing activities in time equations to evaluate the impact of changes in a process.

In conclusion, this case study contributes to the cost accounting literature by highlighting the usefulness of the TDABC technique in practice. It shows how TDABC may assist library administrators to make strategic decisions about the improvement of the cost effectiveness of the library processes.

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Appendix A

TABLE 2
Incoming Requests for Books

	1. Activity	2. Resource group	3. Average time for each activity (min)	4. Unit cost of the resource group (€/min)	5. Total activity cost (€)	6. Dummy variable	7 (#)
Standard Activities	**The librarian checks for new submissions to the IRIS system, receives the book request and searches for the requested book**	**Staff labor costs**	1.72	0.80	1.38		**a**
	The librarian finds the book, enters the request to the KOHA and IRIS systems and lends the book	**Staff labor costs**	3.72	0.80	2.97		**b**
	The librarian receives the returned book, places it and updates the KOHA and IRIS systems	**Staff labor costs & LMS costs**	3.46	0.96	3.32		**c**
	Subtotal		**8.9**		**7.67**		
Optional Activities	**The librarian responds negatively to the requesting library and updates the KOHA and IRIS systems**	**Staff labor costs**	2	0.80	1.6	**If the UoM library does not possess the requested book**	**d**
	The patron receives the book from the UoM library	**Staff labor costs**	0.58	0.80	0.46	**If the borrowing library is located in the same city**	**e**
	The book is delivered by courier	**Staff labor costs**	2.70	0.80	2.16	**If the borrowing library is located outside the city**	**f**
Cases	**Case A: a + b + e + c** = 1.38 + 2.97 + 0,46 + 3.32 = € 8.13, **if the borrowing library is located in the same city**						
	Case B: a + b + c + f = 1.38 + 2.97 + 3.32 + 2.16 = €9.83, **if the borrowing library is located outside the city**						
	Case C: a + d = 1.38 + 1.6 = €2.98, **if the UoM library does not possess the requested book**						

TABLE 3
Incoming Requests for Articles

	1. Activity	2. Resource group	3. Average time for each activity (min)	4. Unit cost of the resource group (€/min)	5. Total activity cost (€)	6. Dummy variable	7 (#)
Standard Activities	**The librarian checks for new submissions to the IRIS system, receives the article request and searches for the article in the UoM collections**	**Staff labor costs & LMS costs**	3.06	0.96	2.94		**a**
	The article is delivered through the file upload service	**Staff labor costs & LMS costs**	1.49	0.96	1.43		**b**
	The librarian updates the National Documentation Center ILL system	**Staff labor costs & LMS costs**	1.33	0.96	1.28		**c**
	Subtotal		**5.88**		**5.65**		
Optional Activities	**The librarian rejects the request and updates the ILL system**	**Staff labor costs & LMS costs**	1.41	0.96	1.35	If the article is not available in UoM collections	**d**
	The librarian copies and scans the article	**Staff labor costs & LMS costs**	11.51	0.96	11.05	If the article is available in hard copy	**e**
	The librarian downloads the article	**Staff labor costs & LMS costs**	0.41	0.96	0.39	If the article is available in digital format	**f**
Cases	**Case A: a + b + c + e =** 2.94 + 1.43 + 1.28 + 11.05 = €16.70, **if the article is available in hard copy**						
	Case B: a + b + c + f = 5.65+ 0.39 = €6.04, **if the article is available in digital format**						
	Case C: a + d = 2.94 + 1.35=€4.29, **if the UoM library does not possess the requested item**						

TABLE 4
Outgoing Requests for Books

	1. Activity	2. Resource group	3. Average time for each activity (min)	4. Unit cost of the resource group (€/ min)	5. Total activity cost (€)	6. Dummy variable	7 (#)
Standard Activities	**The librarian receives the request and confirms non availability in the UoM library**	**Staff labor costs & LMS costs**	2.48	0.96	2.38		**a**
	The librarian updates the IRIS system	**Staff labor costs**	1.23	0.80	0.98		**b**
	Subtotal		**3.71**		**3.36**		
Optional Activities	**The librarian informs the patron to receive the book from the UoM library**	**Staff labor costs**	3.33	0.80	2.66	If the borrowing library is located in Greece or abroad, but not in the same city	**c**
	The librarian packs the book and sends it/them to the collaborating library	**Staff labor costs**	3.49	0.80	2.79	If the borrowing library is located in Greece or abroad, but not in the same city	**d**
	The librarian cannot find the requested book. She/ He rejects the request and updates the IRIS system	**Staff labor costs & LMS costs**	4.17	0.96	4.0	If the borrowing library responds negatively	**e**
	The librarian finds the book in the cooperating libraries, after he/ she forwards the request through the IRIS system	**Staff labor costs & LMS costs**	1.49	0.96	1.43	If the borrowing library is located in the same city (Thessaloniki)	**f**
	The librarian finds the requested book in a Greek library which is not located in the same city, and forwards the request through the IRIS system	**Staff labor costs & LMS costs**	3.34	0.96	3.21	If the borrowing library is located in Greece, but not in the same city	**g**
	The patron pays the ILL shipping costs at the library	**Staff labor costs**	3.5	0.80	2.8	If the borrowing library is located in Greece or abroad, but not in the same city	**h**

TABLE 4 (CONTINUED)
Outgoing Requests for Books

	1. Activity	2. Resource group	3. Average time for each activity (min)	4. Unit cost of the resource group (€/ min)	5. Total activity cost (€)	6. Dummy variable	7 (#)
Optional Activities	**The librarian checks and forwards the request through the BLDSS and Subito systems, and updates the IRIS system**	**Staff labor costs & LMS costs**	4.2	0.96	4.03	If the borrowing library is located abroad	**i**
	The return of the lending book is delayed. The librarian notifies the patron about an extra fine cost and to return the book	**Staff labor costs**	1.2	0.80	0.96	If the UoM library staff is informed for a delay	**j**
	The librarian issues a payment receipt	**Staff labor costs**	1.25	0.80	1	If the borrowing library is located abroad	**k**
Cases	**Case A: a + b + f =** 2.38+ 0.98 + 1.43 = €4.79 **if the book is located in the collections of the same city**						
	Case B: a + b + c + d + g + h = 2.38 + 0.98 + 2.66 + 2.79 + 3.21 + 2.8= €14.82, **if the book is located in the collections of a Greek library not located in the same city**						
	Case C: a + b + c + d + i + k + h = 2.38 + 0.98 + 2.66 + 2.79 + 4.03 + 1 + 2.8 = €16.64, **if the book is located in a foreign library**						
	In any case, if the return of the lending book is delayed, an extra cost is (€ 0.96) added (activity j).						

TABLE 5
Outgoing Requests for Articles

	1. Activity	2. Resource group	3. Average time for each activity (min)	4. Unit cost of the resource group (€/ min)	5. Total activity cost (€)	6. Dummy variable	7 (#)
Standard Activities	**The librarian receives the article request and confirms non availability in the UoM library collections or online**	**Staff labor costs & LMS costs**	2.48	0.96	2.38		**a**
	The librarian searches for the requested article through the NDC system and updates the IRIS system	**Staff labor costs & LMS costs**	3.17	0.96	3.04		**b**
	The librarian receives the article electronically, prints it, issues a receipt and delivers it to the circulation office, where the patron will receive it	**Staff labor costs & LMS costs**	3.4	0.96	3.26		**c**
	The librarian updates the IRIS system	**Staff labor costs & LMS costs**	1.23	0.96	1.18		**d**
	The patron pays the ILL fee at the library desk	**Staff labor costs**	3.5	0.80	2.8		**e**
	Subtotal		**13.78**		**12.66**		
Optional Activities	**The article is not available. The librarian rejects the request and updates the IRIS system**	**Staff labor costs & LMS costs**	4.17	0.96	4	If the borrowing library responds negatively	**f**
	The librarian checks the collections of foreign libraries, forwards the request through the BLDSS and Subito systems, and updates the IRIS system	**Staff labor costs & LMS costs**	4.2	0.96	4.03	If the article is located in a foreign library	**g**
Cases	**Case A: a + b + c + d + e =** €12.66, **if the article is located in a Greek library**						
	Case B: a + b + c + d +e + g = 2.38 + 3.04 + 3.26 + 1.18 + 2.8 + 4.03 = €16.69, **if the article is in a foreign library**						
	Case C: a + b + g + f = 2.38 + 3.04 + 4.03 + 4.0 = €13.45, **if the article is not found**						

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Library Managers' Experiences on the Tenure Track

Tara M. Radniecki and Emily E. Boss

Much has been written on tenure status among librarians due to the unique work responsibilities they have in comparison to other faculty across campus. This study explores one facet of work often unique to tenure-track librarians—long-term or permanent management responsibilities. In addition to gathering descriptive data about what type of managing work is being done on the tenure track, by whom and where, this study also analyzes how these roles and responsibilities impact one's success on the tenure track and vice versa, and how tenure-track work influences one's ability to manage. Eighty-seven librarians completed an online survey and the results show that, while there are some positives to being a manager while on the tenure track, including demonstrable leadership opportunities, most noted a lack of time to perform all required responsibilities in both areas. Other findings that emerged included a belief that managing did not count towards earning tenure and that other faculty colleagues, both in and out of the library, did not understand the full scope of managers' work. Recommendations include that library leaders consider if job roles with a heavy management focus should be tenure-track and if so, how tenure-track managers can be better supported and include their management responsibilities in promotion and tenure documentation.

Introduction

The tenure experience for any given librarian differs not only from non-librarian faculty, but also tenure-track librarians at other institutions and even from colleagues at one's own institution. Tenure requirements for librarians vary widely from institution to institution. There is also a marked difference between librarians' tenure expectations and those of traditional disciplinary faculty. Adding another level of complexity to the discussion of tenure-track status in librarianship is the myriad roles and responsibilities that a librarian may have. Tenure-track librarians may hold positions in public or technical services, which themselves have a multitude of functions that are far-ranging in scope. Librarians on the tenure track may also have supervisory or managerial responsibilities in addition to their primary duties—from managing resources and services to supervising staff and entire departments. Knowing that many academic librarians already find earning tenure in addition to preforming their primary duties stressful,[1] how such

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additional managing roles impact one's ability to earn tenure remain unclear. This study's aim was to begin the exploration of tenure-track librarians with management responsibilities to better understand their work, their challenges, and possibly even the benefits of being a manager while also on the tenure track.

Literature Review

The unique and complicated issues that are involved with academic librarians on the tenure track have been well-documented in the literature. A particular focus has been on the support needed for librarians to be successful in earning tenure. Research and publication is often cited as the most challenging aspect of earning tenure for librarians.[2] As a result, the prevalence and need for research support services and resources for librarians on the tenure track is widely discussed. It is often noted that librarians struggle to find the time for research and that they experience a lack of administrative support and funding.[3] Many believe the MLIS degree does not sufficiently prepare librarians to conduct original research by offering no or inadequate research methodology education.[4] This leaves libraries struggling to find ways to get new tenure-track librarians up to speed quickly. Such studies document and encourage adoption of mentoring programs, writing groups, release time, and financial support for professional development needs to address these gaps.[5]

Mentoring as a support service is of particular focus in the literature. A 2013 survey of Association of Research Libraries (ARL) Directors found that 83.3% of tenure-granting academic libraries provided librarians with some form of mentoring.[6] In their scoping review, Lorenzetti and Powelson analyzed 42 studies reporting on faculty mentoring programs within academic libraries. They identified four goals of mentoring programs, including orientation, professional development, promotion, and tenure.[7] When investigating mentoring programs specifically for librarians on the tenure track, Goodsett and Walsh found most programs specifically focused on promotion and tenure.[8] Peer mentoring in particular has seen a rise in recent years with a focus on supporting the research and publishing activities of junior faculty.[9] In all of these studies, management roles were not selected as a variable for analysis and therefore, we do not know if managing librarians on the tenure track may face different challenges or need different forms of support.

Studies have also looked at the low morale, stress levels, and burnout likelihood among academic librarians. Cameron et al. looked specifically at the occupational stress level of tenure-track librarians and found an above average rate of job stress severity among respondents, primarily stemming from a lack of institutional support.[10] Davis Kendrick found that tenure and promotion as a system, both being present or not in libraries, served as an enabler for low morale by creating problematic hierarchy, as well as encouraging librarians to keep tenured positions despite being unhappy in the job.[11] Shupe et al. found that librarians who experienced high role overload also experienced higher levels of stress, burnout, and job dissatisfaction.[12] The specific roles of academic librarians in these and other studies were either not present or did not clearly include management roles outside of Library Administration, such as middle managers. In a time where almost 50% of academic librarians are experiencing burnout,[13] it appears crucial to check in on the experiences of library managers who seem likely to have higher role overload than others, in addition to promotion and tenure expectations.

The omission of library managers from the tenure-related literature is problematic because, as Swan Hill points out, "Many library faculty positions carry administrative and

managerial functions (supervision, oversight, and evaluation) as a permanent and inextricable part of their duties."[14] Librarians can be responsible for the work of entire departments and campus-wide services. This differs from other academic departments where faculty seeking tenure generally work in a flat organizational structure and one is largely only responsible for their own teaching, research, and service. Non-librarian faculty may be elected or appointed to serve in an administrative position, such as chair of a department, but this typically happens only after achieving tenure plus full professor rank and is nearly always taken on a temporary basis.[15] Those faculty also often receive additional compensation and time-release from other daily responsibilities to take on a management role. As a result, tenured faculty from other departments may not understand how integral management is to the practice of librarianship, how it may impact what a managing librarian's scholarly output looks like, and why management should be reflected within a tenure application document.[16]

A study from 2019 surveyed the scope of work, roles, and responsibilities for academic librarians, both tenured and non.[17] Surveys were completed for 28 institutions and administration, defined as "management of branch library/service/unit/staff/faculty," was listed as the second most prevalent responsibility of tenure-track librarians at those institutions. However, their analysis of tenure documentation revealed no clear pathway for the inclusion of management responsibilities in tenure expectations and applications. In fact, the authors suspected there might be confusion occurring about whether management belongs in either the primary activity or service category. The lack of recognition by tenure documentation and policies is particularly worrisome given the large number of faculty librarians who have management, with all its time-consuming and non-research/teaching/service-related work, listed as part of their daily responsibilities.

Another study in 2006 looked at public service librarian opinions about job satisfaction as it related to job responsibilities, tenure, and education.[18] When asked which job component was least important and least emphasized in achieving tenure, the most selected answer was management. Additionally, 73% of participating librarians (who had formal job descriptions) said publishing was the most important job component in achieving tenure, though only 9% of these same librarians stated that it was given matching weight within their actual job description. The over-emphasis on publishing has the potential to be particularly overwhelming for librarians with additional management responsibilities. In 2018, Hughes surveyed librarians who had transitioned into a tenure-track position.[19] She found that while all librarians listed time management as a primary concern, those librarians in technical services and management positions stated that finding time for scholarship activities was even more difficult due to the nature of their daily responsibilities.

In light of the notable lack of depth in literature on this topic, this study sought to learn more about how management responsibilities impact librarians as they work towards earning tenure. It also investigated how those same tenure-track responsibilities and expectations, in turn, impact librarians' managerial work. The researchers wanted to understand whether those librarians who have experienced being a manager while on the tenure track thought it was a hindrance or a benefit. The findings of this study will add to the existing body of literature while shedding light on the struggles and potential solutions that may assist tenure-track managing librarians as they work to balance job expectations that may, at times, compete with each other.

Purpose and Methodology

This exploratory study used a primarily quantitative survey created in Qualtrics and sought to gain an understanding of the experiences of librarians who have a managerial role and are currently on the tenure track or those who have been on the tenure track while having management responsibilities (see Appendix).

The study addressed the following questions:

Q1: How do management responsibilities impact librarians working towards earning tenure and promotion?

Q2: How do tenure and promotion work and requirements impact librarians with managerial responsibilities?

Q3: Are there certain characteristics of being a tenure-track librarian with management duties that correlate to making the promotion and tenure process more difficult?

The researchers defined management as the supervision, oversight, and evaluation of others. The first section of the survey asked questions about the tenure process in general at the institution, additional support available, and how management responsibilities were reflected in that process. The second section inquired about the librarian's specific job and management responsibilities while on the tenure track. The third section asked questions about how management responsibilities did or did not impact their tenure success, either positively or negatively. The fourth and final section inquired about how tenure work and expectations did or did not impact their managerial success, either positively or negatively.

The questions were reviewed by a librarian with experience in survey creation and analysis and were changed for clarity based on feedback. The study was approved as exempt by the Institutional Review Board at the University of Nevada, Reno. Due to the lack of authoritative resources on which institutions grant librarians tenure, the study was sent to several professional email listservs covering a variety of specialties, including management, within academic libraries. These included lita-l@lists.ala.org, autocat@listserv.syr.edu, pcclist@listserv.loc.gov, sts-l@lists.ala.org, ALA-CoreNewDirectors@ConnectedCommunity.org, ALA-CoreMiddleManagers@ConnectedCommunity.org, and ALA-CoreProjectManagement@ConnectedCommunity.org. The survey ran for 38 days, opening on May 26, 2021, and closing on July 2, 2021. The survey was started by 99 participants. Twelve participants said they had never had management responsibilities while on the tenure track or did not provide any additional information beyond initial consent and screening questions. These were removed from the study and left 87 responses for analysis.

Qualitative data obtained from open-ended questions was analyzed thematically following the process described in "Qualitative research: A guide to design and implementation."[20] Both authors separately coded text-based answers into categories derived from the data. Resulting categories were discussed and then clustered together by both authors around similar concepts later used to illuminate particular themes. Simple frequency analysis was completed in Qualtrics for descriptive statistics and Pearson's chi-square test for independence was used to identify possible relationships between survey variables in IBM SPSS Statistics v28. The Pearson chi-square test compares observed frequencies with the frequencies expected if there was no relationship other than that occurring by chance.[21] While exploratory in nature, researchers were particularly interested in examining the extent to which mentoring, institution demographics and practices, presence of management in promotion and tenure documentation, and the role and responsibilities of the librarian related to how respondents felt about

the advantages (or disadvantages) of being a tenure-track manager and what specific areas of management and tenure work were viewed as most challenging.

Results

Demographics

Respondents were asked what type of institution they worked at while on the tenure track (Q4). Of the 87 participants who completed the survey, an overwhelming majority (80%) were working at doctorate-granting institutions while on the tenure track (see table 1).

TABLE 1
Respondents by Institution Type

Institution Type	*N*=87	%
2-Year (Associates) College	1	1%
4-Year (Baccalaureate) College	6	7%
Master's College or University	10	12%
Doctorate-granting University	70	80%

When asked about the FTE of the institution where they are or were tenure-track (Q5), over half of respondents (54%) were at institutions with 20,001 or greater FTE (see table 2).

TABLE 2
Respondents by Institution Size

Institution Size	*N*=85	%
0–5,000 FTE	3	4%
5,001–10,000 FTE	13	15%
10,001–20,000 FTE	23	27%
20,001+ FTE	46	54%

Similarly, when asked about the Carnegie Classification of the institution where they are or were tenure-track (Q6), about half of respondents (52%) were at R1, very high research activity institutions (see table 3). A surprising 11% of respondents were unsure of the Carnegie Classification of the institution where they are or were tenure-track.

TABLE 3
Respondents by Institution Classification

Institution Class	*N*=87	%
R1 – Very High Research Activity	45	52%
R2 – High Research Activity	12	14%
Neither	20	23%
Unsure	10	11%

The researchers were also interested in learning how many librarians at an institution were managers on the tenure track. When asked about how many managers, including themselves, were also on the tenure track at their institution (Q7), only two responses indicated they were the only managers on tenure track (see table 4).

TABLE 4
How Many Librarians at the Institution were Tenure-Track and Managers

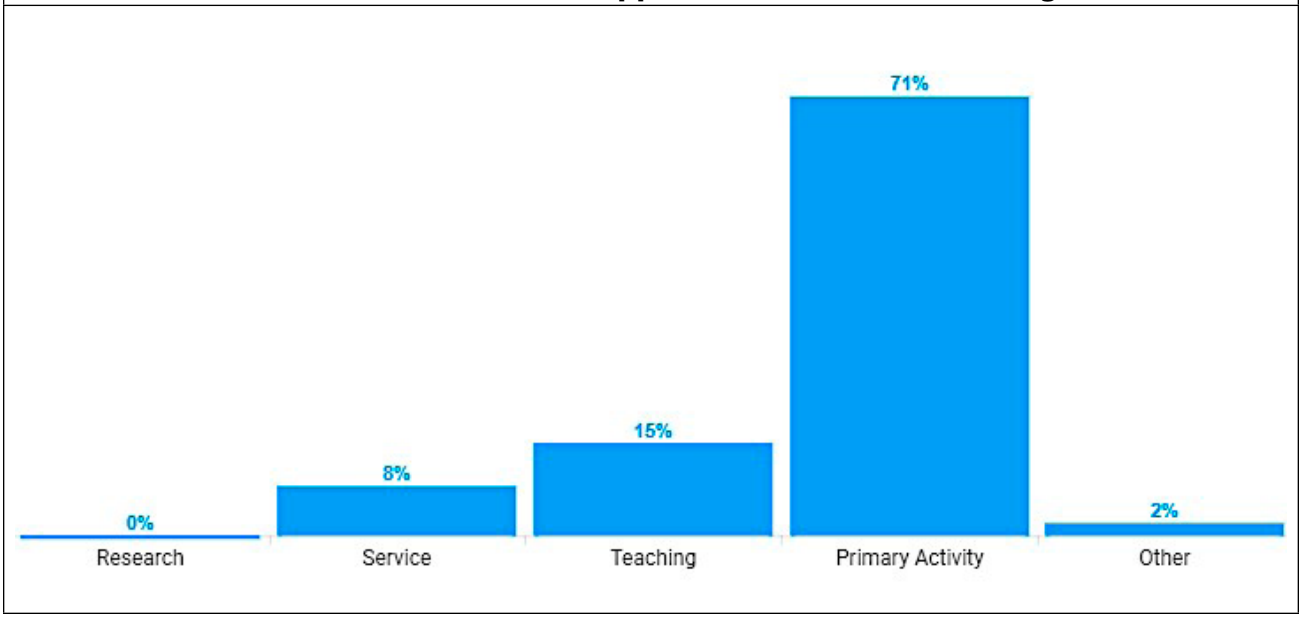
Managers on Tenure Track	*N*=86	%
1	2	2%
2–3	33	38%
4–5	21	25%
6+	30	35%

When asked what their job title was when managing on the tenure track (Q16), 53% of responses were coded as management of some type (branch managers, directors, heads of departments, etc.). When asked what area their primary management responsibilities resided in (Q17), 28 people had supervisory responsibilities in multiple major units. The most frequently mentioned in the coded free text were Acquisitions (9) and Electronic Resources (8). Metadata and Cataloging, Reference and Instruction, and Library Administration were all mentioned in 7 responses.

Tenure Process

When asked if management responsibilities were included in their institution's promotion and tenure application (Q8), 52% of respondents answered yes while 48% answered no. Of those that answered yes, they also indicated what section of the promotion and tenure application included management responsibilities (Q9). Primary activity was overwhelmingly the top

FIGURE 1
Section of the Promotion and Tenure Application that Includes Management *N*=45



choice; twelve respondents chose other. After coding the other responses, the researchers saw that other was chosen to account for differences in vocabulary used in institutions' promotion and tenure documentation, not to account for different categories. The researchers chose to move those responses for ease of analysis. Eight were moved into primary activity, one into teaching, and one into service (see figure 1). Only one respondent answered that management had its own category on the promotion and tenure application.

Sixty percent of respondents indicated that they had a mentor while on the tenure track (Q12). Of that 60%, two-thirds had a mentor who was also a manager (Q13).

When asked about the availability of release time (on-the-clock time in which you are released from your regular duties) for tenure-track librarians (Q10), 87 responses were obtained. Forty-two people answered that release time was available to them while 22 answered that it was not. Of the 23 other responses, all were coded as belonging in the yes category and moved. This amounted to 75% of respondents indicating that release time was available to them. While coded as yes, the free text responses revealed release time policies that were often subjectively or unequally applied and not unilaterally practiced. Variations included release time that must be applied for, release time that only early career tenure-track managers received, and release time that was only available in the first two years. When asked whether they personally took release time (Q11), 63% of respondents said they did take release time while 37% did not. Tenure-track managers were also asked if managers were given additional support or considerations beyond non-managing librarians at their institution (Q14), only two respondents indicated that they did. When asked to explain, monetary supports were the only additional considerations mentioned.

Managerial Responsibilities

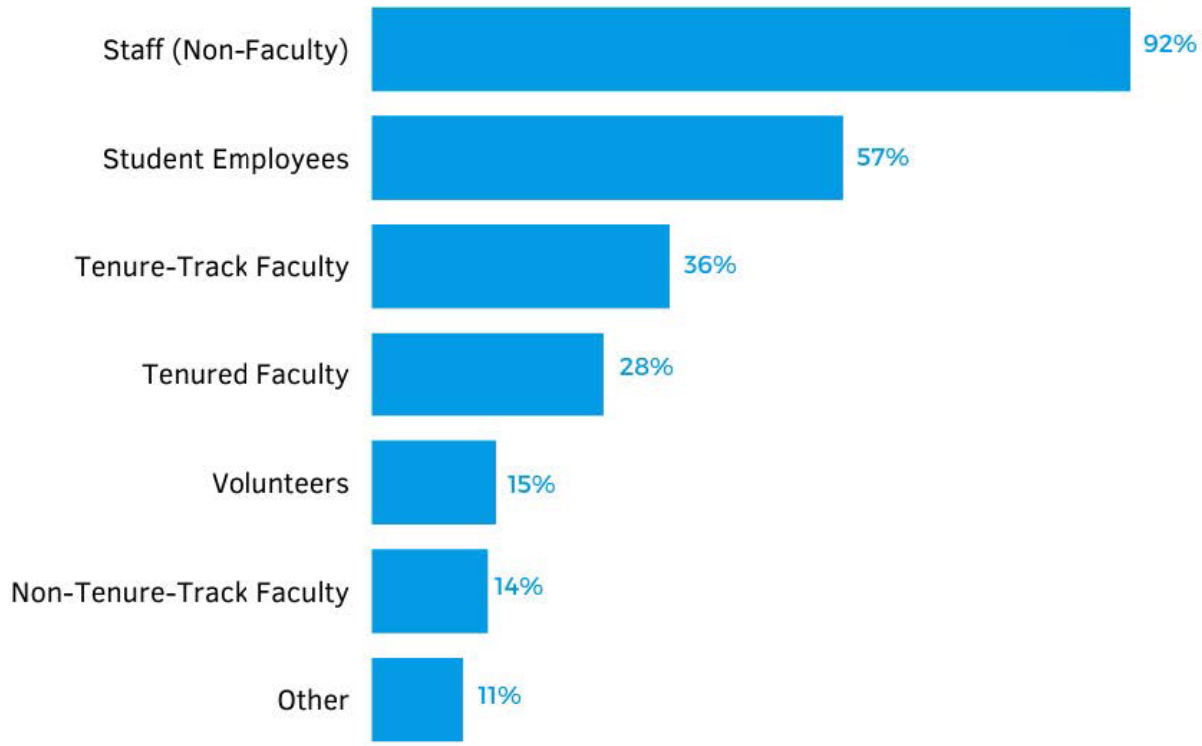
Scope of managerial responsibility can help explain why the experience of managing while on the tenure track may have been advantageous to some and not to others. In order to capture some measure of managerial responsibility, managers were asked how many (Q18, see table 5) and what type of people they supervised while on the tenure track (Q19).

TABLE 5
How Many People Do Tenure-Track Managers Supervise

Number of Reports	*N*=86	%
1–2	12	14%
3–4	20	23%
5–6	21	24%
7–9	16	19%
10+	17	20%

While the number of reports varied greatly across responses with around 20% per category, the type of reports were mostly staff (non-faculty) (92%) with student employees (57%) being the next highest type (see figure 2). Similarly, the coded free text responses mirrored the diversity of the selected responses with clarifications being made between direct and indirect reports and graduate versus undergraduate students. Respondents were able to select more than one option to capture the different types of people one manager may supervise. Only two responses exclusively supervised student employees.

FIGURE 2
Types of People Supervised (*N*=87)



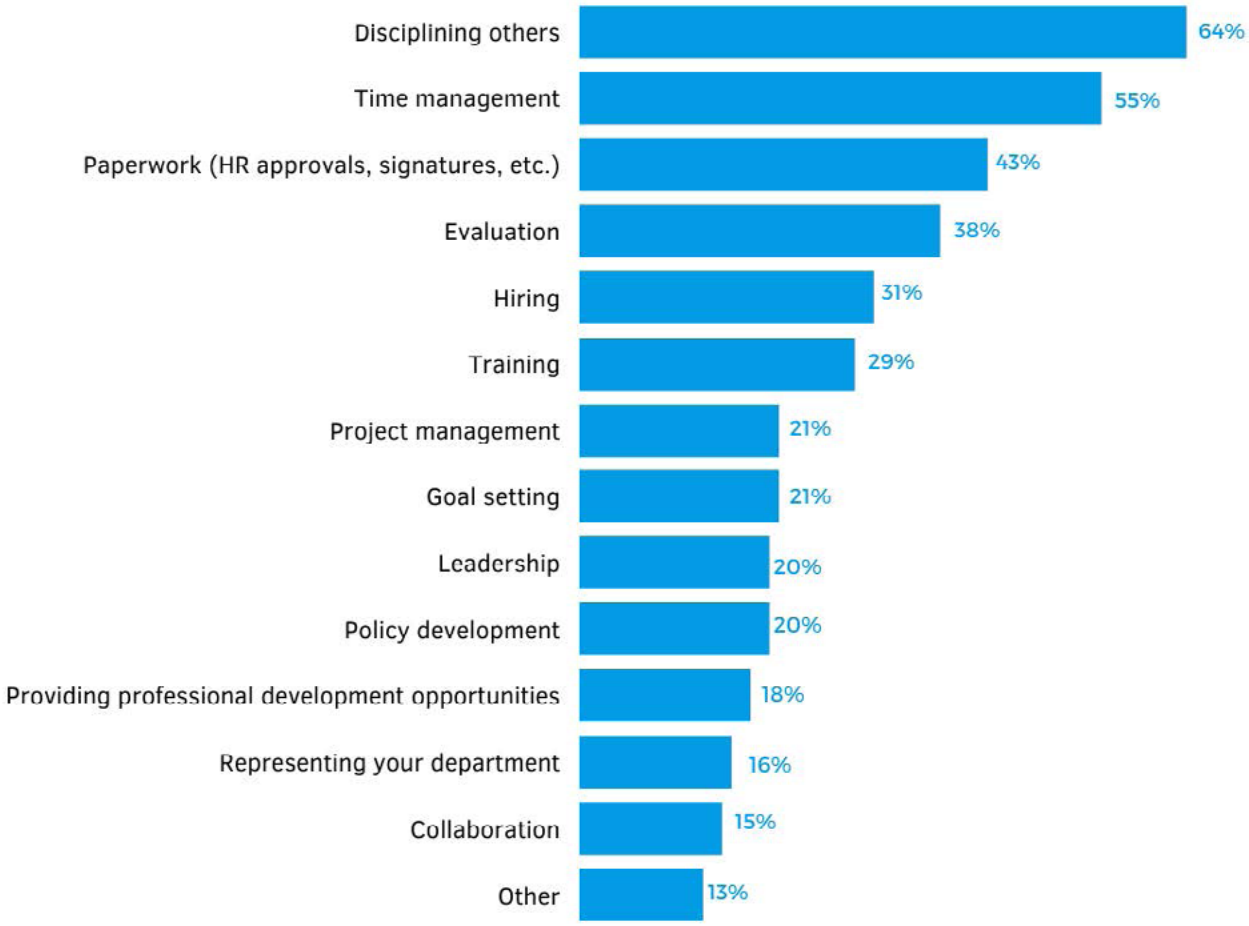
Tenure Process Impact on Managerial Responsibilities

Respondents were given a list of 15 different managerial responsibilities and asked to indicate which were the most challenging for them (Q23). Disciplining others was the top choice followed by time management, paperwork, evaluation, hiring, and training. Thirteen percent of people selected other (see figure 3). Free text responses in the other category varied greatly and showed no clear trends after coding.

When given the same list of 15 different aspects of management and asked which were made more challenging due to their tenure-track responsibilities (Q24), the 68 respondents indicated that time management, disciplining others, evaluations, and HR paperwork were made more challenging. Of the responses that indicated time management was the most challenging aspect of management on the tenure track (59%), 13 free text entries were coded as not having enough time for research or service specifically. Other answers spoke to the competing nature of time for either management or tenure-track work. The pressure on managers on the tenure track to perform well as both managers *and* tenure candidates was prevalent. One respondent stated, "I would rather be a good manager who puts her employees first. But this makes it almost impossible to schedule time for research activities." Respondents also pointed out the inability to plan management in any structured way saying, "When [management] things come up they often must be addressed quickly, so everything else gets pushed" and, "Management requires daily collaboration, conversations."

Disciplining others received 37% of responses but after coding the 21 free text responses, did not specifically address how being on the tenure track made disciplining others more difficult but rather how disciplining others is a difficult responsibility for managers in general. Evaluation received 24% of responses but each response equated to a lack of time or clarity

FIGURE 3
Aspects of Management that are Most Challenging (*N*=80)



in the evaluation process. Finally, paperwork also received 24% of responses but after coding the 10 free text responses, most were not specific to how being on the tenure track made it harder for them to complete paperwork. However, four responses mentioned how paperwork competed for valuable time while on the tenure track.

Finally, respondents were asked if they found their tenure work and requirements advantageous to being a successful manager (Q25). Forty-two percent of people said it was advantageous, and of those, 27 left free text responses. The most coded response was being better at managing others that are also on the tenure track (8). Research was the next most coded element with four respondents discussing how their promotion and tenure expectations required them to stay engaged and up-to-date on trends in their respective areas. An additional five respondents spoke to how their research directly informed their management practice.

Fifty-eight percent of people said that they did not find their tenure work and requirements advantageous to being a successful manager. Of those respondents, 33 left free text responses. In general, respondents saw no benefit to being a manager and being on the tenure track (9). Seven respondents said that it was not advantageous to be on the tenure track because their management work did not earn them any credit toward promotion and tenure. Three responses were coded around the competition between managers and non-managers

on the tenure track. Specifically, "the pressure to manage staff and be expected to publish at the same level as colleagues who didn't manage staff was problematic."

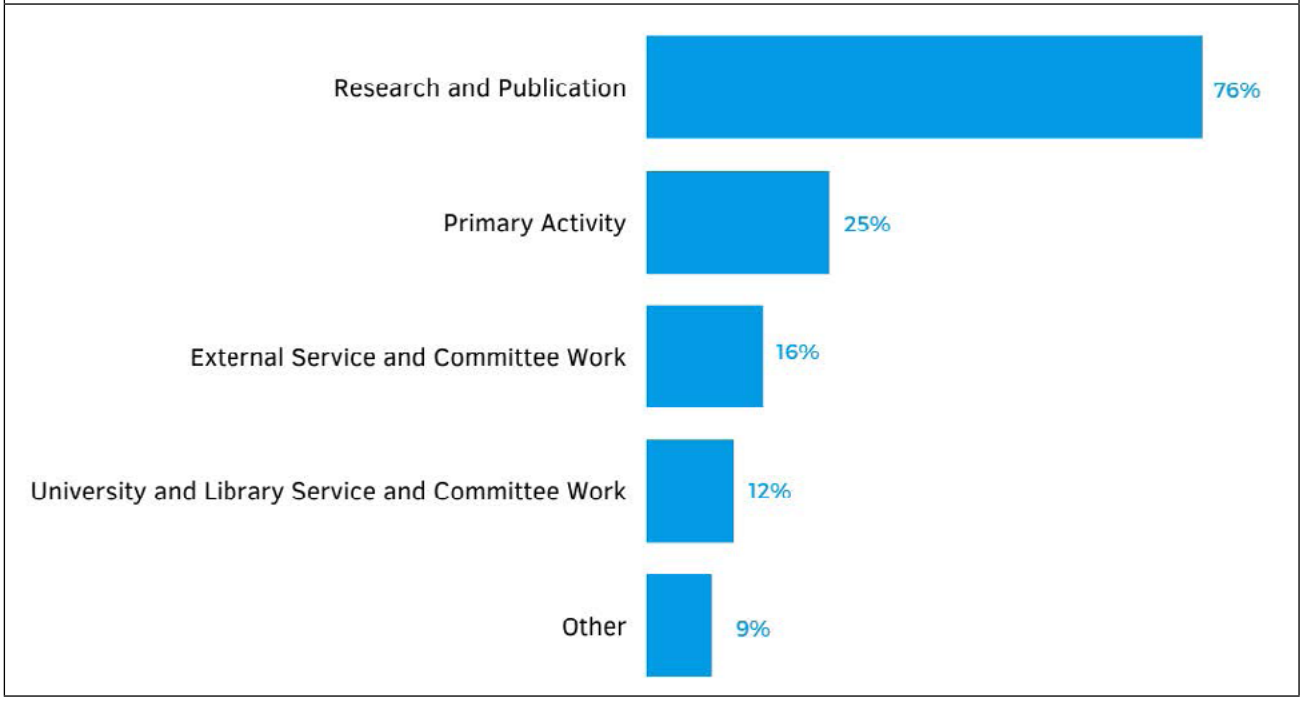
Managerial Responsibilities Impact on the Tenure Process

The researchers were also interested in knowing if the tenure process had an impact on managerial responsibilities. Respondents were given a list of four aspects of the typical tenure process (research and publication, university and library service and committee work, external service and committee work, and primary activity) and asked which aspect they felt was the most challenging (Q20). Over 60% of respondents felt that research and publication was the most challenging aspect of earning tenure.

Respondents were then asked which of the four aspects of earning tenure were made more difficult due to managerial responsibilities (Q21). Around 76% of respondents felt research and publication was made more difficult (see figure 4). Out of the 48 coded responses for research and publication, 41 were coded as lack of time to accomplish both tenure requirements and managerial responsibilities. Primary activity was second with 18 comments. Of those 18 comments, 12 responses dealt with a lack of time but with a particular focus on the dual nature of managing while also being responsible for individual primary assignment work. The researchers felt these comments spoke to how management work is viewed as separate from primary assignment work, which is often more individually focused.

University and library service and committee work, along with external service and committee work, received the remaining responses (28%). The coded text for both areas reiterated a lack of time as the reason for difficulty. Text responses for those selecting other stated that all aspects of earning promotion and tenure were made more challenging due to managerial responsibilities.

FIGURE 4
Aspects of Earning Tenure Made More Difficult Due to Managing (*N*=76)



When asked if respondents felt their management responsibilities were advantageous in being successful on the tenure track (Q22), 37% felt it was, with 28 providing free text responses. Overwhelmingly, respondents indicated that being a manager or having managerial tasks gave them opportunities to help lead initiatives, be a stakeholder in decision making, exposed them to projects, and made it easier for them to demonstrate their impact on library operations and the profession. The researchers interpreted these statements to infer respondents felt their impact as a manager was helpful in demonstrating mastery in primary activity on their promotion and tenure documentation. Surprisingly, two respondents indicated that they found management beneficial because they could delegate tasks to others. Two other responses were coded that, as managers, respondents were given additional insight into the promotion and tenure process by helping/managing other employees who were also going through that same process.

Sixty-three percent felt that their management responsibilities were not advantageous in being successful on the tenure track and 38 provided free text responses. Fifteen responses were coded that management was not included in promotion and tenure or they felt management did not receive the due credit on promotion and tenure documents. Twelve respondents mentioned the amount of time management takes and how it can take away from other aspects of tenure work, with six specifically citing its impact on the ability to do research. Interestingly, three people cited that being a manager and making managerial decisions could make the respondent unpopular with voting members of their promotion and tenure body. All three responses included language that they were purposefully being careful with their decision-making as managers because of this.

Additional Comments

When asked for any additional comments (Q26), 36 responses were obtained. Many echoed prior responses of lack of time, a lack of credit given to management tasks, and the sometimes-political nature of managing others who already have tenure. A new theme that emerged was that the skill set needed to be a good manager is not necessarily the same as the one needed to be a successful tenure-track faculty member. While the overwhelming amount of work without adequate time has been referenced throughout the study, one additional comment highlighted how this can disrupt work/life balance—a topic that many universities are currently grappling with.

Analysis

The researchers ran Pearson chi-squared analyses to determine if relationships existed between categorical variables within the study related to mentoring, presence of management in promotion and tenure documentation, the role and responsibilities of the individual librarian, feelings about the advantages (or disadvantages) of being a tenure-track manager, and what specific areas of management and tenure work were selected as most challenging. A p-value of less than .05 was chosen as a threshold for significance tests. Effect size is provided via Cramer's V, which is utilized in chi-square analyses of contingency tables larger than two columns by two rows. Cramer's V helps demonstrate the strength of an association between variables. While researchers may use different threshold values depending on the discipline, due to the exploratory nature of this study, the researchers chose to use a commonly accepted set of thresholds for general interpretation: less than .20 = negligible association, .20–.29 =

weak association. .30–.49 = moderate association, .50–.69 = strong association, and .70–1 = very strong association.[22]

Institutional demographics (institution type, FTE, and research classification) are not included in the following results as the data was potentially skewed towards those working at large, doctoral-granting institutions with a high research classification. Without an authoritative understanding of what the actual population of tenure-track librarians is, researchers could not know whether this sample might be representative or skewed. The sample was also too small and potentially skewed to analyze data by the type of employee managed by the tenure-track librarian. Most respondents supervised at least some staff, which skewed the data too heavily for meaningful analysis. In both cases, the chi-square analysis did not meet the minimum response count (20% or more) and when Fisher's Exact test was run instead (appropriate for smaller samples), no significance was found.

While the remaining data still comes from a potentially skewed overall sample, the researchers found value in the analysis for information about this particular sample and for future investigation, despite recognizing the potential issues with external validity.

Mentoring

There was a positive, non-significant association with having a mentor and finding tenure and promotion requirements to be advantageous to being a successful manager, $\chi^2(1, N = 74) = 3.624$, $p = 0.057$). If respondents had a mentor but that mentor was not also a manager themselves, there was a non-significant association with disciplining others, $\chi^2(1, N = 52) = 3.525$, $p = 0.06$), and a significant, weak association with paperwork, $\chi^2(1, N = 52) = 4.293$, $p = 0.038$, Cramer's $V = 0.26$, as being aspects of management they find most challenging. This may infer that while having a mentor in general can help tenure-track librarians see value in their work as managers towards earning tenure, there are still areas of responsibility that non-managing mentors do not influence as positively as one might hope.

Promotion and Tenure Documentation

There was a positive, significant association of moderate effect size between management responsibilities not being included in promotion and tenure documentation and respondents selecting that management responsibilities were not advantageous to being successful on the tenure track, $\chi^2(1, N = 82) = 7.365$, $p = 0.007$, Cramer's $V = 0.30$. Perhaps without the opportunity to include their management responsibilities and subsequent impact in formal applications and documentation, managing librarians often see little to no value in managing with regards to earning promotion and tenure.

Management Roles and Responsibilities

When analyzing management roles and responsibilities, there was a significant, moderate association between the number of people supervised and selecting evaluation, χ^2 (4, $N = 86$) = 14.442, $p = 0.006$, Cramer's $V = 0.041$, as an aspect of management they found most challenging. 48% of those supervising 5–6 employees and 59% supervising 10+ employees selected evaluation. This may be unsurprising as annual or more frequent evaluations can take a considerable amount of time per employee. Yet, it is included here as another responsibility that takes a significant amount of time and should be taken into consideration when looking at a manager's workload.

Advantages & Disadvantages of Managing on the Tenure Track

There were two questions on the survey that directly addressed whether participants thought tenure work and requirements were advantageous to being a successful manager and vice versa. There was a positive, significant, and strong association between the two questions, χ^2 (1, N = 73) = 24.0, $p < 0.01$, Cramer's V = 0.574, indicating those who believed managing was advantageous to promotion and tenure success, were also likely to feel that promotion and tenure was advantageous to being a successful manager. The alternative was also true. Those who did not see a benefit in one direction, did not see it in the other. Survey answers discussed previously help illuminate why participants felt this way overall but, this strong association demonstrates the importance of ensuring managers on the tenure track feel positive about both the management and tenure-seeking aspects of their jobs since one can significantly influence the other.

Research and publication was selected as one of the most challenging aspects of earning tenure among those who did not think management was advantageous to earning tenure, and the chi-square test showed significance and a moderate effect size: χ^2(1, N = 82) = 10.686, p = 0.001, Cramer's V = 0.361. Similar findings were shown for those who did not believe tenure work and requirements were advantageous to being a successful manager, although the effect size was weak: χ^2(1, N = 74) = 4.744, p = 0.029, Cramer's V = 0.253. This demonstrates there is a significant association between feeling that one's management and tenure work are not beneficial to each other and struggling with the research and publication requirements of being on the tenure track.

If participants did not feel management was advantageous to being successful on the tenure track, they found collaboration, χ^2(1, N = 82) = 4.139, p = 0.042, Cramer's V = 0.225, project management, χ^2(1, N = 82) = 5.695, p = 0.017, Cramer's V = 0.264, and leadership, χ^2(1, N = 82) = 6.308, p = 0.012, Cramer's V = 0.277, to be some of the most challenging aspects of management—although all these effect sizes indicate weak relationships. Conversely, if participants did not find their tenure work and requirements to be advantageous to being a successful manager, there was a positive association with selecting project management, χ^2(1, N = 74) = 7.245, p = 0.007, Cramer's V = 0.313, and collaboration, χ^2(1, N = 74) = 4.831, p = 0.028, Cramer's V = 0.256, as aspects of management they find most challenging. Both project management and collaboration were chosen at statistically significant rates by those who did not feel that management and tenure work were beneficial to each other, although the effect size was stronger for project management (moderate) than it was for collaboration (weak). These may be areas in which libraries choose to provide additional support and guidance for managing librarians on the tenure track.

Discussion

Too Much Work, Never Enough Time

This exploratory study exposed several themes highlighting the difficulty library managers experience while on the tenure track. A key finding was the lack of time to complete both managerial and tenure-required work and responsibilities. While only two questions included time management specifically as answers (Q23 and Q24), the lack of time to complete all necessary tasks came up repeatedly throughout the free text answers. From the free text answers, it is also clear that managing tenure-track librarians are often asked to perform substantial non-managing primary roles, in addition to supervisory and tenure-required responsibilities.

This seemed to create a sense of being overloaded among respondents. One librarian wrote, "It is incredibly difficult to take time [for research and publication] with the number of meetings I have to attend, including one-on-one meetings with my team, as well as my instruction responsibilities for the 8 departments I serve." Another pointed out that librarians are often, "working managers, meaning that we often do the work of one position plus managing. This makes or breaks your time management skills, which then make or break your ability to meet the tenure requirements." It seems that hiring authorities may be underestimating the amount of additional work managing requires and are creating positions that lead to stress, discontent, and a likelihood of increased future burnout.

Research and Release Time

It should be noted that a lack of time came up most often when discussing the requirements for research and publication. Research and publication was the overwhelming choice for the most difficult aspect of tenure and promotion and profusely for those who also felt that management was not advantageous towards earning tenure or vice versa. Research and publication is often cited as the most difficult aspect for librarians in general[23] and release time is offered as a helpful aid for creating dedicated time to conduct research. However, only 63% of those who had release time available to them utilized it. Some felt they that could not "take that research release time and still be a good manager." Some respondents expressed an expectation by others that since they were managers, they should be in the office 40 hours a week to manage their staff. They felt they could not take release time, regardless of its availability. Heavy managerial loads, subjectivity of release time policies, and other potential barriers to using available release time mirror earlier findings from Vilz and Poremski.[24] From this study, we would recommend those wanting to implement release time for research and publication also be transparent in its policies and application. Libraries should work with managers to ensure they feel they can afford to take release time while still completing other responsibilities.

Lack of Credit and Understanding

Another finding that appeared upon closer analysis was the feeling among tenure-track managers that other librarians and faculty did not understand or appreciate the full scope of their work. One simply stated, "Other tenure-track librarians did not understand the time suck of management." While another elaborated on the differences between the two types of librarians, "…the time that others spent on research and publication efforts, I was spending on management work, project planning, and frankly, just putting together schedules and helping people succeed at their jobs!" This disconnect and frustration was also visible when discussing whether management responsibility counted towards tenure. 48% of librarians stated management roles were not included in tenure and promotion documentation and 63% stated that management responsibilities were not advantageous to earning tenure and promotion. This is in line with many respondents feeling that little credit is given for managing as it applies towards earning tenure and promotion. Responses included that:

- "Management wasn't really credited to my workload and I needed to 'do' as well as manage and lead."
- "It takes a great deal of time and effort to manage people, and not enough credit given for that work."

- "Most of my work is administrative in nature, but administrative work doesn't really count towards tenure."
- "In all our [promotion & tenure] documentation, there is no mention of management and how that's factored into the review."

Library managers on the tenure track may feel overwhelmed and under-supported when a core aspect of their daily work goes unrecognized in their career's most important documentation. One participant wrote they believed "tenure-track managers should have their own tenure expectations set that acknowledges they are different from tenure-track non-managers." The researchers acknowledge that most tenure-track librarians are required to use the same templates and documentation as more traditional teaching and research faculty from across campus. A simple way to begin recognizing the diverse roles and responsibilities among different tenure-track librarians would be to ensure in-house policies and bylaws clearly outline where in campus documentation librarians can include their unique work, such as management achievements.

The Positives

While many of the findings supported what librarians likely already suspected—that managing while on the tenure track is difficult and time-consuming—there were several positives to highlight. Some librarians felt the act of managing itself provided avenues for research topics, such as why certain strategic decisions were made in a particular field. Helping more managers on the tenure track become aware of and take advantage of this connection may alleviate some of the anxiety around publication and research requirements for earning tenure and promotion. Managing while on the tenure track also provided librarians the opportunity to grow their skills and lead new initiatives and projects, providing good examples of primary work to include on tenure and promotion documentation. As one respondent said, "Management provided me with a new frame for decision-making and strategy development. With management responsibilities also came the authority to implement new innovations, making it easier for me to document my impact on the library's operations and the profession more broadly." Another highlighted the opportunities to build relationships, stating, "You are given a lot more freedom to try new things, be involved in a larger way, help direct the library strategically, and honestly build relationships with almost everyone who will be voting on your tenure including the Dean." While mentoring only showed a marginally significant positive association with believing one's tenure and promotion responsibilities were advantageous to being a success manager, this finding is still promising and should encourage libraries to continue to develop and refine mentoring programs tailored to individual librarian needs, including those in management roles.

Limitations

Potential limitations of the study include the sampling method and unknowns surrounding the population of tenure-track librarians who are also managers. Use of a listserv as a sampling method resulted in participants who self-selected to participate. The use of listservs is potentially problematic since there is no way to know how many people subscribe to each listserv and therefore how widely the survey was distributed or what a reasonable response rate would have been. It is assumed these participants did not provide a representative study of the larger population of tenure-track managing librarians. The participant pool skewed towards those

who are or were on the tenure track and working as managers at larger, doctorate-granting institutions. The timing of the study was also potentially problematic, occurring in the midst of a pandemic—a stressful time for many working in libraries, especially managers. Future research on this and related topics should utilize different, more purposeful sampling methods to garner a more representative participant group. Future research should also consider using existing instruments to permit exploration of some of the related concerns brought up in this study. For example, this study's findings indicate that burnout and occupational stress could be a more frequent experience among tenure-track librarians with management responsibilities than among non-managing peers.

Future Directions

Mentorship

Though the importance of mentorship has been well-researched and documented,[25] only a marginally significant association was found between how tenure-track librarians viewed their tenure and promotion work's impact on management and whether they had a mentor. Having a mentor who was also a manager seemed to have little impact as well, showing only a marginal significance on what librarians felt were the most challenging aspects of management. Because of mentoring's positive impact in other areas of librarianship, a future area of research could focus specifically on the relationship between mentoring and managers on the tenure track and whether there are possibilities to improve it.

Potential for Politics

Something the survey did not directly address was the potentially precarious political position that managers on the tenure track may face. Twenty-four respondents said they managed tenured employees while they themselves were still on the tenure track. In these cases, knowing that someone you supervise will be voting on your tenure and promotion may impact what decisions one makes. As one participant wrote, "…I think it is actually quite tricky since being in management can get political. If my tenured colleagues (including my own bosses) do not agree with a management type decision I make, I have absolutely worried it could impact a future vote on my tenure." As libraries tend to be very hierarchical organizations, this warrants further investigation to determine how great the impact of such political concerns might be on tenure-track managing librarians in terms of successfully earning tenure and in being able to lead their unit effectively.

Time Demands

The overwhelming theme of competing time demands for managing librarians speaks to a need for further study. Future research efforts could look more closely at all the specific tasks and responsibilities of managing tenure-track librarians, along with their corresponding time demands. It would be important to document if what they are experiencing and feeling could lead to a higher rate of occupational stress or job burnout, or potentially have a negative impact on their direct reports or tenure success. Addressing this sense of overload may make it easier for hiring authorities to create positions with a greater chance for success and satisfaction.

Financial Benefits

An aspect of library management not addressed in this study was the financial benefits gained

when taking on managerial responsibilities. Future work could explore the attitudes and common practices surrounding librarians taking on managerial responsibilities to see if increased financial gain is a factor in role expectations, hiring, retention, promotion, and job satisfaction.

Conclusion

This study explored how management responsibilities may impact librarians working toward earning tenure and promotion and vice versa. A salient theme throughout the study was the time required to be both a tenure-track librarian and a manager. While time was a factor even for librarians that felt managing was advantageous while working toward earning promotion and tenure, the idea of splitting time between management duties and tenure-track expectations for managing librarians was especially poignant. For librarians who felt that managing was not advantageous to earning promotion and tenure, the idea of splitting time and lack of credit given for management responsibilities seemed to spoil both experiences equally. While the responses showed that experiences may vary for library managers on the tenure track, certain characteristics of being a tenure-track librarian with management duties were illuminated as making the promotion and tenure process more difficult. These included the unwillingness or inability to take release time for research and the dual jobs many tenure-track managing librarians feel they are carrying when attempting to manage others and complete individual primary work themselves.

Library leaders should be clear about expectations in terms of how much individual primary work each managing librarian is expected to complete and how those expectations relate to their promotion and pursuit of tenure. Due to the high likelihood of burnout or occupational stress managing librarians could be facing, mentoring could also be adjusted to account for the additional stressors managing tenure-track librarians' face when attempting to meet promotion and tenure requirements. Additionally, there should be more awareness in libraries regarding all the job responsibilities of managing tenure-track librarians compared to their non-managing peers. Positively, management responsibilities were viewed by some tenure-track managers as advantageous due to the ability to reframe and apply research projects, be involved in high-level decision making, and build relationships.

Appendix. Library Managers on the Tenure-Track

Welcome to our research study!

We are interested in understanding the experiences of librarians who have a managerial role and are currently on the tenure-track or those who have been on the tenure-track while performing a management role. We are defining management as the supervision, oversight, and evaluation of others. We are interested in learning more about how management responsibilities impact librarians as they work to earn tenure and vice versa, how the tenure process impacts managerial responsibilities. For this study, you will be asked to answer some questions about your experiences. Your responses will be kept completely confidential.

The study should take you around 15–20 minutes to complete. Your participation in this IRB exempt research is voluntary. You have the right to withdraw at any point during the study. The Principal Investigators of this study can be contacted at eboss@unr.edu or tradniecki@unr.edu.

Q1. By clicking the "Yes, I consent" button below, you acknowledge:
Your participation in the study is voluntary. You are at least 18 years of age. You are aware that you may choose to terminate your participation at any time for any reason.

- □ Yes, I consent. Please begin the study.
- □ No, I do not consent. I do not wish to participate in the study.

Skip To: End of Survey If Q27 = No, I do not consent. I do not wish to participate in the study.

Q2. Are you currently on the tenure-track or have you been on the tenure-track at any point in your career as a librarian?

- □ Yes
- □ No

Skip To: End of Survey If Q2 = No

Q3. Do you currently have management responsibilities while on the tenure-track or did you have management responsibilities while on tenure-track? Management responsibilities include but are not limited to supervision, oversight, and evaluation of others.

- □ Yes
- □ No

Skip To: End of Survey If Q3 = No

The following questions are about the institution where are you or were tenure-track.

Q4. Which option below best describes the type of institution you are or were tenure-track at?

- □ 2-Year (Associates) College
- □ 4-year (Baccalaureate) College
- □ Master's College or University
- □ Doctorate-granting University
- □ Other _____

Q5. What is the FTE of the institution at which you are or were working towards tenure at?

- □ 0–5,000
- □ 5,001–10,000
- □ 10,001–20,000
- □ 20,001+

Q6. Is or was the institution classified as R1: Very High Research Activity or R2: High Research Activity per the Carnegie Classification of Institutions of Higher Education?

- □ Yes: R1
- □ Yes: R2
- □ Unsure
- □ No

Q7. Including yourself, how many librarians at the institution do you know of are or were on the tenure-track while serving in manager positions?

- □ 1
- □ 2–3
- □ 4–5
- □ 6+

The following questions are about the tenure process at the institution and how management is reflected in them.

Q8. Are or were management responsibilities reflected or included in your institution's promotion and tenure application? Do librarians with management responsibilities include written documentation, such as management highlights and achievements, of that work in your institution's promotion and tenure application?

- □ Yes
- □ No

Display This Question:

If Q8 = Yes

Q9. Under what section of the promotion and tenure application are management responsibilities included?

- □ Research
- □ Service
- □ Teaching
- □ Primary Activity
- □ Other _____

Q10. Do tenure-track librarians at your institution get release time (on-the-clock time in which you're released from your regular duties) to work on tenure-track related activities, such as research?

- □ Yes
- □ No
- □ Other, please explain _____

Display This Question:
If Q10 = Yes
Or Q10 = Other, please explain

Q11. Do or did you personally take any release time?
□ Yes
□ No

Q12. Do or did you have a mentor while on the tenure-track?
□ Yes
□ No
Display This Question:
If Q12 = Yes

Q13. Is or was your mentor also a manager?
□ Yes
□ No

Q14. Do or did managers on the tenure-track receive additional support or considerations beyond what non-managing librarians receive, such as release time or different evaluation criteria?
□ Yes
□ No
Display This Question:
If Q14 = Yes

Q15. If yes, please explain.
_____

The following questions are about your specific position while on the tenure-track.
Q16. What is or was your job title while on the tenure-track?
_____

Q17. In which area are or were your primary management responsibilities while on the tenure-track?
□ Reference and Instruction
□ Access Services/Circulation
□ Metadata and Cataloging
□ Acquisitions
□ Electronic Resources
□ Special Collections and Archives
□ Library Administration
□ Other—Please describe below _____

Q18. How many people do or did you supervise while on the tenure-track?

- □ 1–2
- □ 3–4
- □ 5–6
- □ 7–9
- □ 10+

Q19. What type of people do or did you supervise while on the tenure-track? (select all that apply)

- □ Staff (non-Faculty)
- □ Tenured Faculty
- □ Tenure-Track Faculty
- □ Non-Tenure-Track Faculty
- □ Student Employees
- □ Volunteers
- □ Other—Please describe below _____

The following questions are related to your personal experience and how management responsibilities may or may not impact your tenure success.

Q20. Which aspects of earning tenure do or did you find most challenging? (select all that apply)

- □ Research & Publication
- □ University and Library Service and Committee Work
- □ External Service and Committee Work
- □ Primary Activity
- □ Other

Q21. Of those listed in the previous question, which do you think were more difficult due to your management responsibilities? Please include why in the box below. (select all that apply)

- □ Research & Publication _____
- □ University and Library Service and Committee Work _____
- □ External Service and Committee Work _____
- □ Primary Activity _____
- □ Other _____

Q22. Do or did you find your management responsibilities to be advantageous in being successful on the tenure-track? Please include why in the box below.

- □ Yes _____
- □ No _____

The following questions are related to your personal experience and how tenure work and expectations may or may not impact your managerial success.

Q23. Which aspects of management do or did you find most challenging? (select all that apply)

- □ Time management
- □ Training
- □ Hiring

- □ Collaboration
- □ Project management
- □ Representing your department
- □ Leadership
- □ Goal setting
- □ Policy development
- □ Disciplining others
- □ Paperwork (HR approvals, signatures, etc.)
- □ Evaluation
- □ Providing professional development opportunities
- □ Other _____

Q24. Of those listed in the previous question, which do you think were made more difficult due to work and requirements necessary to obtain tenure? Please include why in the box below. (select all that apply)

- □ Time management
- □ Training
- □ Hiring
- □ Collaboration
- □ Project management
- □ Representing your department
- □ Leadership
- □ Goal setting
- □ Policy development
- □ Disciplining others
- □ Paperwork (HR approvals, signatures, etc.)
- □ Evaluation
- □ Providing professional development opportunities
- □ Other _____

Q25. Do or did you find your tenure work and requirements to be advantageous to being a successful manager? Please include why in the box below.

- □ Yes _____
- □ No _____

Q26. Is there any additional information on this topic that you would like to share with the researchers?

_____

Q27. If you would like to receive a notification when this research is published and available, please include your email below.

_____

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Relationships between Journal Publication, Citation, and Usage Metrics within a Carnegie R1 University Collection: A Correlation Analysis

William H. Mischo, Mary C. Schlembach, and Elisandro Cabada

This study examines the correlational relationships between local journal authorship, local and external citation counts, full-text downloads, link-resolver clicks, and four global journal impact factor indices within an all-disciplines journal collection of 12,200 titles and six subject subsets at the University of Illinois at Urbana-Champaign (UIUC) Library. While earlier investigations of the relationships between usage (downloads) and citation metrics have been inconclusive, this study shows strong correlations in the all-disciplines set and most subject subsets. The normalized Eigenfactor was the only global impact factor index that correlated highly with local journal metrics. Some of the identified disciplinary variances among the six subject subsets may be explained by the journal publication aspirations of UIUC researchers. The correlations between authorship and local citations in the six specific subject subsets closely match national department or program rankings.

Introduction

There has been a great deal of interest in attempting to determine correlational relationships between various individual journal title metrics within a collection, including local publication, citation, and usage (now download) measures and journal global impact factor measures. Gathering the raw measurement numbers associated with specific journals and establishing relationships between these variables can serve to inform a library's collection development and management decisions, including journal subscription, cancellation, and retention decisions. From a public service and subject liaison perspective, this data can be used to construct a knowledgebase identifying departmental and faculty research concentrations and areas of focus.

The data can also be used to indicate if the collection is adequately supporting the research and instructional needs of faculty and students. It can be used in the generation of a library's core journal list, which can provide an evidence-based listing of journals necessary to meet the instructional and research needs of the library's primary constituents.[1]

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The raw publication, citation, and usage data and correlation measures can assist in developing mechanisms to calculate a journal's overall local composite value and can contribute to providing more data-driven assessments of a library's journal collections. Collecting and correlating authorship, citation, and usage data can also allow patterns of journal use to emerge, resulting in a more accurate picture of journal value than cost-per-use calculations or other value gathering methods. Data gathered in this process can also be used to defend any local administrative tax that could be applied to academic departments or colleges to fund the library.

Libraries are also interested in determining the degree to which any one of the local journal metrics, particularly full-text downloads or local citations, can be used as a proxy for predicting any of the other values. This might allow, for example, predictive statements about publication numbers or citations to be made from usage numbers, or vice versa, and for one measure to serve as a predictive proxy for another measure. If this were uniformly the case, libraries could focus on collecting one or two types of measurements and be certain that the other local metrics would be proportionate.

In the same way, libraries are also interested in determining to what extent the journal global impact factor indices, such as the Institute for Scientific Information (ISI) Journal Citation Reports (JCR) Journal Impact Factor (JIF), (abbreviated as ISI JCR) correlate with local citation, publication, and usage metrics. A high correlation would in theory allow impact factor index values to be used in journal collection decisions or serve as a proxy for the local data variables.

Libraries have local usage data available in the form of the *Counting Online Usage of Networked Electronic Resources* (COUNTER) full-text download usage reports.[2] COUNTER full-text download data is provided by commercial and professional society publishers in the form of spreadsheets for specific journals, giving monthly and yearly download data. Local publication and citation information is commonly available via several tools, among them the *Local Journal Utilization Report* (LJUR) from ISI, Scopus API extracted data, the SciVal PURE current researcher profile information system, the Symplectics Elements platform, and other research management resources.

This paper examines the relationships between specific journal title publication, citation, usage, and impact metrics from 17,934 journals in all disciplines, including 12,200 active titles, gathered from scholarly activities involving researchers at the University of Illinois at Urbana-Champaign, a Carnegie R1 university. The study analyzes and calculates the correlations over five years of local journal authorship numbers; five years of local and external citation counts; two years of full-text downloads, two years of link-resolver data, and the values from four global journal impact factor indices. It also examines correlation pair values for the journals in six subject subset areas: engineering; life sciences; social sciences; chemistry; history and philosophy; and literature. Several of these are monographic focused literatures and were included to present a more comprehensive scholarly communication model.

Literature Review

There is a long and rich literature on journal publication, citation, and usage metrics, particularly in the area of citation analysis, which is defined as the examination of citations from journal articles, dissertations, or other publications to determine trends and patterns of use.[3] Ashman reviewed and categorized 88 studies on citation analysis culled from the library

literature published from 1995 to 2008, categorizing the articles into nine types of literature profiles in the areas of public service, assessment, and collection-related areas.[4] Hoffmann and Doucette reviewed 34 articles on citation analysis methodologies published from 2005 to 2010 and found that the articles typically did not provide enough information to make them adaptable for practical collection management decisions.[5]

Many studies have examined the relationships between citation and usage, in both local and global settings, first with print collections, then later with e-journal collections. Research relating to this topic appears in both the library and informetrics literature.

Surveying the studies on the relationship between citations and usage, McGillivray and Astell note that "these (studies) have not produced a definitive answer."[6] Pastva et al. examined the literature on citation and usage analysis and stated that, "some studies found a significant correlation between citation and usage data, while others found no significant correlation, highlighting the importance of methodology and local citation behaviors."[7]

Several studies have looked at the relationship between usage and citation at the article or paper level and sometimes at both the article and journal title levels. Brody, Harnad, and Carr examined download and citation patterns at the paper level within the ArXiv.org e-print archive and found that the number of times an article was read was related both to the number of times it was cited and the age of the article. The authors also determined that short-term Web usage predicted medium-term citation impact.[8] Kurtz et al. examined citation rates and readership rates with respect to publication date within the NASA Astrophysics Data System and developed a model for the relationship between reads and cites which incorporates obsolescence and derives a citation function that is based on several components of a usage function.[9] In a review of usage and citation studies, Kurtz and Bollen assert that the relationship between usage and citation is complex and state: "with the accurate description of use being so complex, it is perhaps not surprising that the relation between use and citation has not been convincingly established."[10] They describe the difficulty in comparing usage information at the article level with citation histories and show that the interpretation of usage frequency as a function of publication date is quite complex.[11] Schlögl and Gorraiz found that there were differences between downloads and citations in terms of obsolescence characteristics, where the half-life of the articles that are downloaded and the median cited half-life are significantly different. They found that the average cited half-life was 5.6 years and the mean usage half-life was 1.7 years, complicating the correlation relationship.[12]

Many of the studies examining the relationships between citation, usage, publication, and impact factor metrics have been carried out in specific subject disciplines and have typically covered a small subset of a discipline's journals.[13] In addition, several studies have found that the correlation between citation and usage data is dependent on subject discipline.[14]

Several previous studies have examined broader correlations between publication, usage, citation, and impact factor metrics within a library environment. Duy and Vaughan found a significant correlation between electronic journal usage and both LJUR local citation counts and library shelving counts for 112 chemistry and biochemistry journals, but found no significant correlation between the ISI JCR impact factor data and local electronic journal usage.[15] McDonald, using subsets from 1,521 journal titles from the California Institute of Technology Library, found that print journal usage and, later, online journal usage was a valid predictor of local citation rates in journals.[16]

De Groote, Blecic, and Martin examined 2,619 health science journals and found high correlation values between download data, link-resolver data, and local citation rates.[17] They concluded that link-resolver data were a good predictor of usage statistics in this environment. However, Gallagher, Bauer, and Dollar found that the usage data captured by link resolvers represented less than 10% of the total e-journal usage as identified by vendor download data.[18]

Chew et al. collected metrics data from 700 e-journals within 12 disciplinary subject areas at the University of Minnesota and analyzed correlation values.[19] The study found marked disciplinary variation in the resulting correlations and also significant discrepancies between Scopus and ISI Web of Science calculated values. Some of the sample sizes were quite small.

Pastva et al. conducted a citation and usage analysis of over 33,000 articles (from an indeterminate number of journal titles) published between 2007 and 2016 by researchers in the Feinberg College of Medicine at Northwestern University.[20] The correlations they derived between journal title usage and citing data were fairly weak and open to interpretation.

In a study of the University of Houston School of Communication faculty publications, Gao analyzed correlations among citation count, journal impact factor values, and journal usage.[21] The journal sample sizes for the studied factors ranged from 147 journal titles to 108 titles. Gao found significant correlations between journal impact factor values and journal usage but no correlation between citation count and impact factor.

Several studies have been performed in research or vendor settings. In a comprehensive scientific impact analysis, Bollen et al. studied 7,675 journals and compared a number of journal citation and usage measures derived from usage log data from the 2008 Los Alamos Metrics from Scholarly Uses of Resources (MESUR) Project with several external impact factor measures.[22] The authors performed a principal component analysis over a 39x39 factor correlation matrix and found 10 usage-based measures that appear to be stronger indicators of scientific prestige than the ISI JCR and other citation-based impact factor measurement systems. Bollen et al. comments that: "these results should give pause to those who consider the JIF (ISI JCR) the gold standard of scientific impact."[23] An earlier study by Bollen et al. (2005) also questioned the validity of the ISI JCR as a valid assessment of journal impact and suggested that usage-based measures were more accurate on a local level.[24]

Gorraiz, Gumpenberger, and Schlögl looked at the use of citation and download global data from 362 ScienceDirect journals over 10 years covering four subject disciplines: arts and humanities, computer science, economics and finance, and oncology.[25] They found that the disciplines with the highest citation rates are not those with the highest download rates and the proportion of downloaded documents is dramatically higher than the proportion of cited documents. The authors claim that citations are often insufficient to assess the impact of the research output in many disciplines and downloads do not necessarily measure actual usage but must be considered as a complement to the "bibliometric citation-restricted horizon."[26]

Elkins et al. examined the correlation between four journal impact factor indices, including the ISI JCR JIF, Eigenfactor's article influence index, SCImago's journal rank index, and Scopus' trend line index.[27] Paired values for the four all showed strong correlations between the four impact factor indexes.

Moed and Halevi carried out a detailed analysis of the relationship between downloads and citations by examining 62 journals from the Elsevier ScienceDirect repository, finding large differences in the degree of correlation between downloads and citations across various subject fields.[28] They examined the correlations at both the journal and article levels finding

that downloads were a good predictor of citations but that citations were a less valid predictor of downloads.

In addition, tools have been developed for library managers that are designed to aid in evaluating journal collections using journal title metrics. The California Digital Library developed the Weighted Value Algorithm (CDL-WVA) dashboard for collection selectors. Knowlton, Sales, and Merriman found that faculty selection differed significantly with the bibliometric values provided by the CDL-WVA tool.[29] The Canadian Research Knowledge Network (CRKN) also utilized the CDL-WVA assessment tool in examining consortial packages of publisher journals.[30]

Methodology

The UIUC is a Carnegie R1 university with over 34,000 undergraduates, over 17,000 graduate students, and 1,900 tenure-system faculty, offering degrees in over 150 programs. In 2019, UIUC awarded almost 14,000 degrees, including 874 PhDs. The UIUC Library supports this wide variety of instructional and research programs with comprehensive journal subscriptions from all major commercial and professional society publishers. In 2021, the UIUC Library supported 108 subject or central collection funds on a $19.5 million materials budget.

The goal of this study was to examine the relationships between a number of local journal title publication, citation, link resolver clickthroughs, and usage measures within a large research university setting and calculate the correlations of these local metrics with four global impact factor indices. Examining these local journal metrics along with the global impact factor data assists the library to better determine the scholarly activities of UIUC researchers and to accurately characterize journal value measures for collection development and retention purposes. To obtain the local publication and citation data for this analysis and correlation of journal research activity metrics, the University Library purchased the 2017 Local Journal Utilization Report (LJUR) for UIUC from ISI, now owned by Clarivate.

The LJUR data provides summary information on UIUC researcher journal title authorship and citation numbers for the database of journals covered by the ISI platform. The LJUR data covers all academic disciplines and provides local publication and citation data at the journal title level for the journals covered by the extended ISI source list that is comprised of the journals covered by the former Science Citation Index, the Social Sciences Citation Index, and the Arts and Humanities Citation Index. The LJUR database covers the years 1981 through 2017 and includes UIUC publication and citation data from 17,934 journals.

The LJUR data is packaged as a Microsoft Access relational database containing five tables: (1) a journal list of 17,934 titles with columns for standard title abbreviation, ISSN, active or inactive status, and publisher; (2) a source publication table of 8,587 journal titles that UIUC authors have published in from 1981 through 2017 with columns for the total number of articles published and published articles for individual years from 1981 through 2017; (3) several tables of UIUC author local citation numbers for 15,785 journals with total times cited and citations by year; (4) a table of 21,423 journal titles (with 14,140 unique titles) including a title and an ISI subject descriptor; and (5) several tables of 14,338 journal titles showing the number of times outside authors have cited articles written by UIUC authors.

For this study, the data from the LJUR was used as a base to construct a journal title master table within a relational database that contained the 17,934 LJUR journal titles list, including the ISSN and EISSN numbers, the publisher information, and the active/inactive designation.

Several scripts were written that extracted publication and citation information from the other LJUR database tables and added this data as additional columns into the master table. The columns that were added contained the total number of locally authored articles in each journal for a five-year period from 2013 to 2017, the total number of local citations from UIUC authors for each title from 2013 to 2017, and the total of external citations to UIUC authored articles for each journal from 2013 to 2017. There were 12,200 journals in the master table that the LJUR designated as active titles.

In order to better process and add the data for the additional usage, impact factor, and SFX (the Ex Libris local link resolver used by libraries) clickthrough numbers to the table of 17,934 journal records, additional ISSN and EISSN numbers for individual titles were added as columns using data from the Australian Research Council Excellence in Research for Australia (ERA) 2018 Journal List and ISSN/EISSN data from the Scopus source journal list. This provided a more comprehensive list of ISSNs and EISSNs that could be used as linking keys for matching journal titles and extracting download data from COUNTER tables and the impact factor data from the various services.

Subject descriptors were added as a column to the journal title master table to more accurately identify and extract subsets of journal titles by subject disciplines. A script was written to extract the ISI subject descriptors from the appropriate LJUR table which contained subject terms drawn from five research areas described by 251 subject categories in the ISI Web of Science descriptor scheme. To augment these LJUR Web of Science descriptors, subject terms from Scopus were added as a separate column to the journal title master table. Scopus journal titles are classified under four broad subject clusters which are further divided into 27 major subject areas and 300+ minor subject areas. The Scopus subjects were added using ISSN and EISSN numbers as the linking key. The two subject columns were used in SQL statements on the journal title master table to retrieve relevant journals in six disciplinary categories covering engineering, chemistry, social sciences, biosciences, history/philosophy, and literature subsets.

In addition, within the master title list, a column was added for SFX link resolver requests and clickthroughs for the years 2017 and 2018.

Four global impact indices were also used in the analysis. All the impact factor indices use global citation statistics to assign a value to individual journal titles typically calculated by taking the number of cited articles in a journal over a specific period and dividing that number by the number of articles published in that same period. The impact factor indices used in this analysis were: the ISI JCR JIF five-year impact factors from 2018; the SCIMago Journal Rank (SJR) values which use average citations within a subject field, the quality of citing journal, and a page rank algorithm on top of the usual measurement of citations divided by articles; the Eigenfactor scores from 2018 in which citations from highly ranked journals are weighted to generate a higher citation score than those from poorly ranked journals and normalized the journal scores by rescaling the total number of journals in the ISI JCR; and the Elsevier 2018 SNIP (Source Normalized Impact per Paper) values, which weights citations based on the total number of citations in a subject field over three years. All of these additional impact factor values have been added as separate columns in the journal title master entries using ISSN and EISSN numbers as the linking key.

For the usage data, the study utilized the publisher-provided COUNTER full-text download usage reports from 35 commercial and professional publishers and four aggregators—EBSCO, ProQuest, Ovid, and JSTOR. The publisher list includes all the major commercial

publishers, e.g., Elsevier, Wiley, Springer-Nature, and Taylor and Francis, and many professional society publishers. The COUNTER data, in the form of spreadsheets of specific journal monthly and yearly full-text download data, was uploaded as individual tables in a separate companion publisher information relational database. Each publisher table contained COUNTER JR1 full-text usage report statistics from either 2015 or 2018. Over 44,000 journal titles are represented in the 39 COUNTER supplied publisher tables in the 2015 data and over 45,000 titles were in the 2018 data with 31,918 unique journal titles represented over both years. The duplicates are often titles appearing in both the publisher and aggregator tables. From there, scripting programs were written to move the 2015 and 2018 COUNTER downloaded data into an aggregated column for each specific matching journal in the journal title database master table. If a journal title appeared in more than one COUNTER table (for example a publisher and an aggregator), the numbers were added together to obtain a total number of downloads for that journal title. The journal titles were matched in the journal title master table using ISSN and EISSN numbers as linking keys.

There were 10,604 of the 17,934 journals in the LJUR all-disciplines corpus that had COUNTER download numbers available and 9,190 of the 12,300 active journal titles with available download data, so the COUNTER statistics covered a high majority of the journal titles in this study.

All the raw data used in this analysis, in the form of relational database tables with multiple columns, is being made available in the UIUC Library's Illinois Data Bank dataset repository under https://doi.org/10.13012/B2IDB-6810203_V1. In addition, the processing scripts and Pearson correlation code is available at https://doi.org/10.13012/B2IDB-0931140_V1.

Processing

The correlation processing was set up to examine nine journal metric indicators: the LJUR supplied local authorship, LJUR local citation, LJUR external citation, full-text COUNTER download usage, link resolver clickthrough results, and four global journal impact service indexes. The numeric values for these nine indicators are all stored as columns in the records in the journal title master table. Note that this correlation analysis was carried out at the journal title level and does not include any analysis at the journal article or paper level.

A web interface over the database master journal title table was created with a search function that allowed retrieval by journal title, publisher, and subject and sorting capabilities by each of the journal title metrics. The web site tool serves an administrative and search function. It displays data records on single or groups of journal titles with the journal title metrics and can inform subscription, retention, and cancellation decisions, assist liaison librarians in understanding department and group research fronts, and contribute to the identification of core journal lists.

There were 12,200 designated active journal titles in the list of 17,934 titles from the LJUR database at the time of the analysis. The correlations over the metric data elements were carried out on both the 12,200 active titles and the entire corpus of 17,934 journal titles. There was essentially no difference in the correlation values of the active titles analysis and the values on the entire corpus. Because the study was using a two-year total of download data and five-year totals of local authorship and local citation, it was determined that the 12,200 active journal set would serve as a more accurate base sample for correlation calculations. The correlation analyses were carried out over the complete all-disciplines set of 12,200 journal titles and over six subsets comprised of engineering journals; chemistry journals; social science journals; biosciences journals; history and philosophy journals; and literature journal titles.

A server-side correlation generator script was written that produced a web site dashboard that allowed the authors to select the desired journal title metric indicators from the nine options and select either the all-disciplines journal corpus or one of the six disciplinary subset areas. The correlation generator produces a series of two-way correlations on the selected journal title indicators, producing a maximum of 26 (nine values taken two indicators at a time) pairwise correlation values (or fewer if less of the nine indicator factors are chosen). The correlations can be run over the 17,934 journal title corpus and also the 12,200 active journal title subsets.

The correlation generator calculates Pearson's R values for the two pairwise data points. Pearson's R gives values from –1 to 1 where –1 is a perfect negative correlation; 0 is no correlation; and 1 is a perfect positive correlation. Pearson's is intended to be used in situations where the raw numeric data is available, as in this case. Several previous studies used the Spearman's rho correlation statistic in cases where ranked data, not numeric data, was available. All the Pearson's values in this analysis are significant at the $p < .001$ or lower value.

Global Impact Factor Measures

Table 1 shows the pairwise correlation analysis over the journal title values from the four global impact factor indices, using the 12,200 LJUR 2017 active journal titles as the base. Three of the global impact factor indices journal title values showed a high correlation to each other: the *ISI JCR* and *SNIP* (N=8,121, R= 0.7674); the *ISI JCR* and *SJR* (N=8,136, R=0.877); and the *SNIP* and *SJR* (N=11,669, R=0.7438). While the SNIP, SJR, and the ISI JCR correlate highly with each other, the normalized Eigenfactor stands out as not correlating highly with any of the other three impact factor indices: *ISI JCR* and *Eigenfactor* (N=8,348, R=0.4346); *SNIP* and *Eigenfactor* (N=8,127, R=0.2392); *SJR* and *Eigenfactor* (N=8,142, R=0.398).

TABLE 1
Correlations Between Impact Factor Measures

Impact Factor	SJR	ISI JCR	Eigenfactor
SNIP	N=11,669 R=0.7438	N=8,121 R=0.7674	N=8,127 R=0.2392
SJR		N=8,136 R=0.877	N=8,142 R=0.398
ISI JCR			N=8,384 R=0.426

Table 2 presents the correlations between local publications, citations, and downloads with the three highly correlated global impact factor indices: ISI JCR, SNIP, and SJR. None of the three impact factor indices exhibited a significant R value with the publication, citation, or usage measures for the cohort of journals in the study. This reinforces results obtained in numerous studies that show that the ISI JCR is often not a useful measure for local citation and publication activities and typically cannot serve as a proxy for local scholarly communication measures.[31]

TABLE 2
Correlations Between Impact Factors and Local Publications, Citation and Usage

Impact Factor	Publication	Local Citations	Downloads
SNIP	N=11,676 R=0.0849	N=11,676 R=0.1397	N=8,935 R=0.1915
SJR	N=11,721 R=0.134	N=11,721 R=0.245	N=8,973 R=0.318
ISI JCR	N=8,384 R=0.1122	N=8,384 R=0.2364	N=6,171 R=0.3446

Based on these results, only the normalized Eigenfactor Score values were used in the remaining analysis, along with the five local publication, citation, link resolver, and usage indicators. Chew et al. found that the Eigenfactor and SNIP (but not the ISI JCR) values provided significant correlations in certain disciplines with local publication and citation data.[32] They found local authorship and impact factor values correlated strongest with Eigenfactor but also with SNIP in several disciplines.

Correlations Over the Journal Title Metrics

Table 3 shows the correlation results from the 12,200 active journal titles and journal value indicators for the all-disciplines analysis. Of the 15 pairwise value combinations (six items taken two at a time), only three Pearson R values are below .5 (shown in red text): the pair *SFX clickthroughs* and *outside citations* (N=11,709, R=0.4351); *SFX clickthroughs* and *articles written* (N=11,709, R=0.4941); and *downloads* and *outside citations* (N=9,190, R=0.4959). All other R values are above .5 (shown in blue text) with the next lowest being the pair *downloads* and *articles written* (N=9,190, R=0.5282), *SFX clickthroughs* and *locally cited* (N=11,709, R=0.5863), and *normalized Eigenfactor* and *articles written* (N=8,408, R=0.5937). All the other values are R=.64 or higher.

TABLE 3
Correlation Results from 12,200 active journal titles in all Disciplines and Subjects

	UIUC Author Cited by outside authors	Articles written by UIUC authors	Downloads of articles by UIUC users	SFX Clickthroughs	Normalized Eigenfactor
Locally Cited by UIUC authors	N=12,200 R=0.7613	N=12,200 R=0.7698	N=9,190 R=0.7843	N=11,709 R=0.5863	N=8,408 R=0.7858
UIUC Author Cited by outside authors		N=12,200 R=0.7907	N=9,190 R=0.4959	N=11,709 R=0.4351	N=8,408 R=0.6429
Articles written by UIUC authors			N=9,190 R=0.5282	N=11,709 R=0.4941	N=8,408 R=0.5937
Downloads of articles by UIUC users				N=9,041 R=0.7297	N=6,189 R=0.8165
SFX Clickthroughs					N=8,075 R=0.7295

Tables 4 through 9 show the correlations over the six journal value indicators in each of the six subject discipline journal subsets included in the study. These are biosciences (Table 4), social sciences (Table 5), engineering (Table 6), literature (Table 7), chemistry (Table 8), and history and philosophy (Table 9).

Several of the correlation relationships, both in the all-disciplines set and the subject subsets, bear further examination. The specific disciplinary correlations exhibit some interesting differences with the all-disciplines analysis, particularly in three pairwise relationships: *downloads* and *locally cited*; *articles written* and *locally cited*; and *downloads* and *articles written*.

Downloads and Locally Cited

Numerous studies have shown that the relationship between usage and citation is very complex, particularly at the article or paper level.[33] Issues involving usage and citation obsoles-

TABLE 4
Bioscience Journal Value Indicator Correlations

	UIUC Author Cited by outside authors	Articles written by UIUC authors	Downloads of articles by UIUC users	SFX Clickthroughs	Normalized Eigenfactor
Locally Cited by UIUC authors	N=1,204 R=0.8831	N=1,204 R=0.5401	N=922 R=0.7760	N=1,164 R=0.5554	N=1,162 R=0.7659
UIUC Author Cited by outside authors		N=1,204 R=0.5637	N=922 R=0.7031	N=1,164 R=0.5978	N=1,162 R=0.6591
Articles written by UIUC authors			N=922 R=0.4025	N=1,164 R=0.5713	N=1,162 R=0.3956
Downloads of articles by UIUC users				N=909 R=0.6597	N=902 R=0.8420
SFX Clickthroughs					N=1,128 R=0.5465

TABLE 5
Social Science Journal Value Indicator Correlations

	UIUC Author Cited by outside authors	Articles written by UIUC authors	Downloads of articles by UIUC users	SFX Clickthroughs	Normalized Eigenfactor
Locally Cited by UIUC authors	N=1,123 R=0.6199	N=1,123 R=0.5059	N=938 R=0.5416	N=1,100 R=0.6436	N=201 R=0.6130
UIUC Author Cited by outside authors		N=1,123 R=0.5156	N=938 R=0.5381	N=1,100 R=0.5914	N=201 R=0.5209
Articles written by UIUC authors			N=938 R=0.4605	N=1,100 R=0.5780	N=201 R=0.3595
Downloads of articles by UIUC users				N=931 R=0.7231	N=173 R=0.6414
SFX Clickthroughs					N=196 R=0.7541

cence characteristics, where the half-life of the articles that are downloaded and the median cited half-life are significantly different, play a key role in the relationship between usage and citation.[34] At the article level, the articles appearing at the top of a citation ranking are not necessarily the most frequently downloaded articles, and vice versa.[35] Several researchers have noted that different disciplines have different citation practices and protocols concerning citation behavior. Citation habits differ from one scientific area to another and there are several reasons for both citing an article and for downloading an article.[36] Importantly, it has been established that correlations between downloads and citations are higher when calculated at the journal title level than at the article level.[37]

This study uses journal title level metrics, with two combined years of download data and a combined five years of both local citation and publication authorship data. Within this more simplified approach, in the all-disciplines overarching set, the often-studied correlation between the indicator pair *downloads* and *locally cited* is highly significant at N=9,190, R=0.7843. In the subject discipline analyses, the correlation is also high in the biosciences

TABLE 6
Engineering Journal Value Indicator Correlations

	UIUC Author Cited by outside authors	Articles written by UIUC authors	Downloads of articles by UIUC users	SFX Clickthroughs	Normalized Eigenfactor
Locally Cited by UIUC authors	N=1,065 R=0.8533	N=1,065 R=0.8392	N=817 R=0.7240	N=1,022 R=0.7046	N=1,024 R=0.7401
UIUC Author Cited by outside authors		N=1,065 R=0.8021	N=817 R=0.7170	N=1,022 R=0.6738	N=1,024 R=0.8048
Articles written by UIUC authors			N=817 R=0.6002	N=1,022 R=0.6288	N=1,024 R=0.6272
Downloads of articles by UIUC users				N=802 R=0.8249	N=791 R=0.7767
SFX Clickthroughs					N=985 R=0.7080

TABLE 7
Literature Journal Value Indicator Correlations

	UIUC Author Cited by outside authors	Articles written by UIUC authors	Downloads of articles by UIUC users	SFX Clickthroughs	Normalized Eigenfactor
Locally Cited by UIUC authors	N=366 R=0.8846	N=366 R=0.4173	N=272 R=0.6859	N=354 R=0.5120	N=21 R=0.7530
UIUC Author Cited by outside authors		N=366 R=0.4474	N=272 R=0.7652	N=354 R=0.6136	N=21 R=0.8057
Articles written by UIUC authors			N=272 R=0.5201	N=354 R=0.5204	N=21 R=0.7753
Downloads of articles by UIUC users				N=268 R=0.7438	N=14 R=0.8971
SFX Clickthroughs					N=20 R=0.7659

(N=922, R=0.7760), engineering (N=817, R=0.7240), chemistry (N=575, R=0.8667), and literature (N=272, R=0.6859), but lower in the social sciences subset (N=938, R=0.5416) and the history and philosophy (N=96, R=0.4107) journals subset. Even given the complexity, in this study using two years of download data and five years of local citations at the journal title level, the correlations were high overall and high in most of the six subject subsets.

Vaughan, Tang, and Yang analyzed 150 journals in 69 fields and found higher correlations between downloads and citations in the social sciences and humanities fields than in science, engineering, and medicine fields.[38] In this study, the sciences and engineering fields yielded the highest correlations and the social sciences and humanities (except for literature) were lower.

Within the scholarly communications system, researchers are, for the most part, citing the most relevant and important articles in their field and faculty and students are downloading the most relevant articles for their research and instruction. Moed and Halevi suggested that for downloads and citations, there was a high correlation between the two in specialized fields in

TABLE 8
Chemistry Journal Value Indicator Correlations

	UIUC Author Cited by outside authors	Articles written by UIUC authors	Downloads of articles by UIUC users	SFX Clickthroughs	Normalized Eigenfactor
Locally Cited by UIUC authors	N=747 R=0.8557	N=747 R=0.9291	N=575 R=0.8667	N=722 R=0.7755	N=728 R=0.8207
UIUC Author Cited by outside authors		N=747 R=0.8960	N=575 R=0.8111	N=722 R=0.7922	N=728 R=0.8481
Articles written by UIUC authors			N=575 R=0.8871	N=722 R=0.8592	N=728 R=0.8540
Downloads of articles by UIUC users				N=570 R=0.9039	N=569 R=0.9130
SFX Clickthroughs					N=707 R=0.8370

TABLE 9
History & Philosophy Journal Value Indicator Correlations

	UIUC Author Cited by outside authors	Articles written by UIUC authors	Downloads of articles by UIUC users	SFX Clickthroughs	Normalized Eigenfactor
Locally Cited by UIUC authors	N=160 R=0.4363	N=160 R=0.5213	N=96 R=0.4107	N=155 R=0.5640	N=15 R=0.8030
UIUC Author Cited by outside authors		N=160 R=0.1516	N=96 R=0.1554	N=155 R=0.1762	N=15 R=0.7198
Articles written by UIUC authors			N=96 R=0.7735	N=155 R=0.8462	N=15 R=0.3774
Downloads of articles by UIUC users				N=96 R=0.8702	N=11 R=0.2085
SFX Clickthroughs					N=15 R=0.8331

which the readers tend to be the active researchers but in fields where the reader population is wider and more diverse than the research community, the correlations are lower.[39] That observation is generally supported by the results of this analysis. It is also the case that some less academic articles in more general journals are being downloaded for classroom use and not research.

Articles Written and Locally Cited

While the overarching all-disciplines correlation between the values in the *articles written and locally cited* pair is significantly high at N=12,200 and R=0.7698, there are clear differences in the values derived in the six subject discipline subsets. Looking at Tables 4 through 9, the biosciences journals (N=1,204, R=0.5401) in Table 4, the social sciences journals (N=1,123, R=0.5059) in Table 5, the literature journal subset (N=366, R=0.4173) in Table 7, and the history and philosophy journals (N=160, R=0.5213) in Table 9 are all below the all-disciplines value. The engineering publications subset shown in Table 6 (N=1,065, R=0.8392) and chemistry in Table 8 (N=747, R=0.9291) exhibit higher correlations than the other disciplines.

From the scholarly communications standpoint, the faculty are citing the most important articles in the most prestigious journals in the bibliographies of their research and, at the same time, are trying to have their research published in those most prestigious journals. Research faculty aspire to be published in the same journals that are publishing the most highly cited articles. The all-disciplines correlation between the indicators *articles written* and *locally cited* is very high at R=0.7698 and that shows a significant university-wide ability to publish in the same journals that are being cited. But the correlation varies across the six subsets. Interestingly, the *articles written* and *locally cited* correlations in the six subject discipline subsets examined in this study match very closely with the associated program rankings in the U.S. News and World Report 2022 Graduate School Rankings where the UIUC chemistry program is ranked at #6, engineering is #10 (with computer science at #5), biological sciences is #27, sociology is #49 and social work is #22 (but psychology is #7), English is #20 with literary criticism at #18, and history is ranked #21. In fact, one could argue that perhaps a factor in the determination of the prestige of a department or program could be the strength of the correlation between a faculty group's *articles written* and their *locally cited* indicator pair. This might be incorporated into the suite of algorithms of the ranking services. Looking at the six subset areas in this case, UIUC researchers in some of the higher ranked science and engineering programs look to be better able to publish in the journals that they are citing most frequently.

Downloads and Articles Written

From this study, it appears that downloads are not strongly predictive of local authorship, given the all-disciplines correlation of the indicator pair *downloads* and *articles written* at N=9,190, R=0.5282. In the subject discipline subsets, there are three higher correlation values in the history and philosophy journals (N=96, R=0.7735), chemistry journals (N=575, R=0.8871), and engineering journals (N=817, R=0.6002). The other three subject discipline analyses show lower correlations with biosciences (N=922, R=0.4025) and social science (N=938, R=0.4605) lower, and literature (N=272, R=0.5201) somewhat lower. An examination of the five correlations involving the downloads values shows that the correlations for the pair *downloads* and *articles written* are typically lower in the all-disciplines journals and the subset disciplines than the other correlations involving downloads. These lower relationships may be due to the same issue contributing to the other lower correlations involving the *articles written* measures. They are related to the aspirational aspects of UIUC authorship, where the researchers may not be able to consistently publish, because of low acceptance rates or focus of their research, in the journals that, in this case, contain those articles that faculty and students are downloading to support their research. It is also possible that in the broader or more popular fields, there may be numerous downloads of articles by non-researchers in the field. However, in that case the history and philosophy correlation values would be expected to be low as they were for *downloads* and *locally cited* pair but here, they are in fact the highest in the disciplinary set.

Overall, the highest download numbers and local citation numbers come from many of the prestigious journals where the faculty aspire to publish.

SFX Local Link Resolver

De Groote, Blecic, and Martin defined the term SFTARs (successful full-text article requests) to indicate how many times articles in a journal are retrieved from a local link resolver full-text

link appearing in an abstracting and indexing (A&I) service.[40] Their study of medical journals found significant correlations between local link resolver requests and local citations. In this study, the correlation between *SFX clickthroughs* and *locally cited* pair in the all-disciplines journal set was moderate (N=11,709, R=0.5863). Interestingly, the *SFX clickthroughs* and *locally cited* pair values are highest in the social science journals (N=1,100, R=0.6436), engineering journals (N=1,022, R=0.7046), and chemistry journals (N=722, R=0.7755).

The two highest correlations involving the SFX local link resolver clickthroughs in the all-disciplines journals are *SFX clickthroughs* and *downloads* (N=9,041, R=0.7297) and *SFX clickthroughs* and *normalized Eigenfactor* (N=8,075, R=0.7295). The other values, including the correlations with articles written and local citations were lower.

In the UIUC environment, the use of local link resolver links is reduced by several factors. Some users go directly to a publisher or journal site and bypass any link resolver usage. In addition, some full-text links appear on aggregator sites and in discovery systems offering users direct to full-text links or direct to publisher site links. Direct publisher site links appear in major A&I services such as Scopus, PubMed, or Web of Science and aggregators and discovery systems offer direct full-text links or DOI links to publisher sites, both of which bypass the local link resolver.

It may be that UIUC SFX usage was not uniform across all A&I services and publisher sites and that it was consistently used only in certain subject A&I services and not in others or that users were clicking on the direct to PDF links in some A&I services rather than the SFX links. This has gotten more complicated in the UIUC Library where the discovery service pulls out direct PDF links from EBSCOHOST and ProQuest services. In the current environment, the SFX local link resolver has been replaced by the Alma link resolver.

External Citation Values

The LJUR data provides external citation values for the journal title articles authored by UIUC researchers that are cited by outside researchers. In the all-disciplines set of journals, the correlation for the pair *outside citations* and *locally cited* (N=12,200, R=0.7613) is high and it is significantly high for all the disciplinary subsets except for history and philosophy (N=160, R=0.4363).

The correlations for the *outside citations* and *downloads* pair (N=9,190, R=0.4959) were low in the all-disciplines set but higher in the biosciences, engineering, literature, and chemistry subsets. The correlation for *outside citations* and *SFX clickthroughs* (N=11,709, R=0.4351) was lower in the all-disciplines journals than it was in all the subset journal collections except for history and philosophy.

The correlation value for the *outside citations* and *articles written* pair (N=12,200, R=0.7907) in the overarching all-disciplines collection is significantly high but the *outside citations* and *articles written* pair exhibits the exact same differences in correlation values within the six subject subsets that were present in the *local citations* and *articles written* values.

Overall, the external citation correlations do not appear to contribute to a better understanding of the relationships between publication, citation, and usage metrics. The fact that the *outside citations* and *articles written* pair exhibited the same subject subset differences as the *local citations* and *articles written* pair in the six journal sets again implies that UIUC faculty in some departments or programs are not always writing in the same highly regarded journals that they are citing or that outside researchers are citing.

Normalized Eigenfactor

The normalized Eigenfactor Score values are the only global impact factor measures that exhibit significant correlation values with local publication, citation, and download data. This is particularly true at the all-disciplines level. The *normalized Eigenfactor* and *locally cited* pair (N=8,408, R=0.7858) and *normalized Eigenfactor* and *downloads* pair (N=6,189, R=0.8165) are the highest all-disciplines correlations. Several of the *Eigenfactor* and *articles written* correlations in the subject subsets are low, with the biosciences (N=1,162, R=0.3956), social sciences (N=201, R=0.3595), and history and philosophy (N=15, R=0.3774) subsets exhibiting low pairwise correlation values.

Limitations

The study used publication and citation data from 2013 to 2017 and download data from 2015 and 2018 in order to accommodate the projected half-life and obsolescence issues connected with the complex relationships between usage, citations, and publications. This placed the study in a period before open access became as prevalent as it is currently. The implications of open access full-text downloads and authoring are not known but should be investigated using later years for the study.

The authorship, citation, and download data numbers are all raw numbers and are not log normalized or weighted. There is no weight given to first or last authors listed on the articles and all cited articles are treated the same. It is not clear if weighting would influence the correlations in any way.

The study looked at only six subject subset areas. There is a clear need to examine the metric correlations within additional disciplines—some of the other locally highly ranked subject areas and some of the lesser ranked programs—to see if the conclusions regarding program strength and the relationship between the *articles written* and *locally cited* parameters and several other pairs hold true. It would be possible to automate the process to introduce a script that would present the appropriate SQL commands to derive the subject discipline subsets to calculate the R values and summarize and collect the results.

The COUNTER only publisher full-text download data encompassed 31,918 journal titles but the ISI LJUR coverage extended to 17,934 total journals including 12,200 active journals. The Scopus API journal coverage includes almost 25,000 current journals and would be more extensive than the coverage provided by the LJUR data. Repeating this study using UIUC authored journal articles and processed using the Scopus API would provide more extensive journal title coverage and allow additional journal metric pair correlations to be performed.

Conclusion

The goal of this study was to investigate the correlational relationships between journal title metrics from the UIUC multi-disciplinary research journal collection and over six subject subset journals in biosciences; chemistry; social sciences; history and philosophy; literature; and engineering. The particular metric indicators making up this analysis were local publication and citation data; COUNTER supplied full-text downloads; local link resolver clickthroughs; and four global impact factor index values. This analysis was carried out over a large sample of 12,200 active journals in all subject disciplines with publication and citation data supplied through the ISI LJUR service. Full-text download numbers from COUNTER were available for 9,190 journal titles in the active journal title set.

The exercise of assembling the raw journal title publication, citation, and download values over a collection-scale set of journals was useful in itself. A web interface over the database table was created with a search function that allowed retrieval by journal title, publisher, and subject with sorting capabilities by each of the journal title metrics. The web site tool provides data on individual journal titles which can inform subscription, retention, and cancellation decisions, assist liaison librarians in understanding department and group research concentrations, and could contribute to the generation of core journal lists. The pairwise correlation values over the journal title metrics provide insight into scholarly communication patterns, the relationships between the various journal metrics, and the bibliometric interactions in operation at UIUC. These correlation values can be compared to the values at other R1 university libraries. They can also provide evidence of the ability of one or more of the metrics to be used as a proxy for the others. The process methodology and protocols for this study can serve as a model or blueprint for other academic libraries looking to investigate these relationships in other institutional settings.

An analysis of the four global impact factor indices showed that the ISI JCR, the SNIP, and the SCIMago JCR indices did not exhibit significant positive correlations with the publication, citation, or download indicators. Only the normalized Eigenfactor values showed significant correlation with the local data.

The relationship between local download usage and local citation has been the subject of many previous investigations. Earlier studies have shown that the relationships involving downloads and citations, particularly when they are examined at the article level rather than the journal title level, are quite complex. The data in this study were comprised of two combined years of download data from 2015 and 2018 and a combined five years (from 2013 to 2017) of both local and external citation and publication authorship data. The correlations between the important *downloads* and *locally cited* values were calculated at the journal title level, where it has been shown to be higher than at the article level. The analysis found an overall strong positive correlation between journal usage, in the form of full-text downloads, and locally cited journal titles. In the all-disciplines overarching journal set, the correlation between *downloads* and *locally cited* pair was high (N=9,190, R=0.7843) and the R values were also high (from 0.5416 to 0.8667) in five of the six subject subset journal collections examined in the study. The history and philosophy subset R value was 0.4107. While earlier investigations have proven inconclusive, this study shows strong correlations in the all-disciplines set and most subject subsets between full-text downloads and local citations.

One explanation offered in the literature for the subject discipline differences may lie in the observation that there are higher correlations between the two metrics in specialized fields in which the readers tend to be the active researchers but lower correlations in fields where the reader population is wider and more diverse than the research community. Within the all-disciplines 12,200 active journals, and in most subject disciplines, this study's correlation results do imply that download measurements can predict local citations and vice versa.

Researchers are citing the most important articles in the most prestigious journals in their field. At the same time, they are attempting to publish their research in the most prestigious journals, which are typically the journals that they and other researchers are predominantly citing. Research faculty aspire to be published in the same journals that are publishing the most highly cited articles. The all-disciplines correlation of the *articles written* and *locally cited* is very high at R=0.7698, demonstrating a significant ability of UIUC faculty to publish in the

same journals that they are citing. This study found, however, that, for the six subject journal title subsets that are identified from the overarching collection, the *articles written* and *locally cited* correlation matches very closely with their associated department or program ranking in the U.S. News and World Report 2022 Graduate Schools Rankings. One criterion for ranking a subject department or program might be to calculate the strength of the correlation between the group's *articles written* and *locally cited* journal title metrics. The aspirational publishing aspect may also affect the correlations between the indicators *downloads* and *articles written* where many of the articles are downloaded from highly cited journals where researchers aspire to publish.

The study found that SFX link resolver correlations were high when matched with the *downloads* indicator and the *normalized Eigenfactor* measures. The link resolver correlation values with articles written and local citations were lower. The link resolver and external citation indicators were not regarded as very useful measures for understanding publication, citation, and usage behaviors or activities.

With the addition of journal title subscription information to the metric data assembled in this study, it is fairly easy to calculate a journal composite value using the weighted set of local publication, citation, and download number values to derive a journal composite value which can then be divided by the subscription price to obtain an overall value score. The UIUC Library has produced this assigned value journal table, although there is some difficulty in assigning an individual journal subscription price to journals purchased as part of an overarching "big deal" package.

The study revealed some interesting interactions and relationships between the journal metrics. There are limitations and subtleties with each of the journal title measure correlations. Chew et al. noted that "it is generally conceded that the metrics, when taken in aggregate, provide a more complete picture on journal value and importance."[41] A number of studies show that the various journal metrics need to be applied and combined in a strategic manner in order to obtain meaningful results.[42] De Groote, Blecic, and Martin noted that citation data describes research activity but that vendor, publisher, and link-resolver statistics also reflect educational and clinical usage.[43] Given these complex and interrelated factors and the analysis presented in these study results, it would appear that multiple metrics may need to be employed to make definitive statements about journal publication, citation, and usage relationships and interactions. The study also demonstrated that there are some significant disciplinary differences in the local indicator correlation values across the six subject subsets. It is also clear from the study that a more nuanced profile of user publication, citation, and usage activity than some other measures, such as the commonly quoted cost per use metric, are possible and desirable.

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When There's No Information Literacy Requirement: Curriculum Mapping to Drive Engagement

Monica V. Locker and Jennifer L.A. Whelan

Curriculum mapping provides valuable opportunities for internal reflection and external advocacy in academic libraries. Librarians at a small liberal-arts college developed a curriculum mapping project designed to measure information literacy interventions with students, despite a lack of a standardized set of courses that all students take over the course of their tenure. The project incorporated both quantitative scoring and qualitative reflections by liaison librarians to determine the extent of information literacy-focused engagements with students and allowed librarians to target interventions in a way that was designed to reach as many students as possible during their undergraduate careers.

Introduction

Although assessment in academic libraries has often revolved around baseline data such as headcounts, in recent years the conversation has shifted to focus more on assessments of engagement and impact.[1] These assessments look for evidence of interactions which make a meaningful difference in students' academic careers and that are connected with, rather than incidental to, the curriculum. Ultimately, this means considering the reach of high-quality and/or impactful interactions across the student body and aligning librarians' instructional activities with the learning outcomes and values of the library, institution, and/or profession.

At the College of the Holy Cross, all instruction is already tailored to the goals of each course and incorporates the values and priorities of the libraries and the broader institution. In this context, assessment efforts are primarily focused on the reach and scalability of the instruction program as measured by quantity (and, to some extent, depth) of interactions with students. Since Holy Cross does not require any single course or sequence of courses that librarians can visit, the ultimate goal is to engage with as great a percentage of the student body as possible; therefore, an understanding of the curriculum and opportunities for such engagement is critical. This article describes the authors' undertaking to develop said understanding by means of a mixed-methods curriculum mapping project.

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Literature Review

Curriculum mapping is a widely accepted strategy both for obtaining an in-depth understanding of the academic curriculum, and for strategizing in other ways about information literacy programming.[2] The library literature reports many different strategic applications of traditional curriculum mapping, at the department[3] and program levels[4] as well as in related contexts such as outreach programming.[5] In addition to informing internal library decision-making, curriculum mapping has been shown to be a useful tool for communicating with faculty; for example, librarians at Berkeley College actively involved faculty in their curriculum mapping process, which included the development of department-specific curriculum maps made available through their website.[6] Additionally, librarians at Texas Tech's Architecture Library turned to curriculum mapping when attempts to introduce information literacy-focused assignments failed, ultimately using their project to demonstrate the need for a scaffolded instruction program in place of one-shot sessions,[7] and Ziegler made a similar case on the basis of a project at the University of West Florida.[8]

The term "curriculum mapping" is widely used to refer to activities which are designed to systematically align, and assess the alignment of, information literacy programs with curricula. However, in the literature, this terminology may be used as a stand-in for a variety of different techniques depending on an institution's current programs, local needs, and resources (administrative or otherwise) available to librarians. One such method is syllabus analysis. When targeting a given program or department, there are many examples of librarians collecting syllabi and analyzing them to determine where library learning goals might fit into courses in an embedded, scaffolded way. Broadly, the literature is split into two types of syllabus analysis. The first type attempts to score or map syllabi based on outside standards, like the Association of College and Research Libraries' (ACRL) Framework or Standards for Information Literacy or the American Association of Colleges and Universities' (AAC&U) Information Literacy VALUE Rubric. Examples of this strategy include Beuoy and Boss's use of a rubric to code syllabi based on the inclusion of elements from the ACRL framework;[9] Boss and Drabinski's survey project that reviewed third- and fourth-year syllabi in a single department using a rubric based on the AAC&U framework, allowing librarians to determine where higher-level information literacy concepts might be introduced to students;[10] and Buchanan et al.'s mapping of learning outcomes found in syllabi in different departments to the Information Literacy Competency Standards for Higher Education established by ACRL.[11] The second syllabus analysis strategy attempts to score or map syllabi based on learning goals and outcomes developed within the institution. Examples of this method include McGowan et al.'s analysis of the types of information literacy assignments included in syllabi;[12] Smith et al.'s scoring of syllabi to determine the "degree of library use," which included assigning materials found in the library as well as LI sessions;[13] and Ziegler's review of syllabi that analyzed use of program learning outcomes already developed by the home library and departments.[14] Both strategies have their advantages. One of the primary benefits to using outside rubrics is that they are already validated. However, they can lack specificity, or address needs that aren't central to a given institution. Internally-created rubrics can achieve specificity and address a program's individual needs, but are time-consuming to produce and validate.

Roadmapping is another technique which can be useful in situations where the current status and/or reach of a program is not fully understood. Roadmapping is mainly a means of gathering information on the layout and progression of curricula and identifying where

information literacy already appears within that progression. Since, as Buchanan et al. aptly note, librarians do not typically have any authority over the curriculum,[15] this process is less about curriculum design and more about identifying the progress that has already been made. The roadmapping technique can serve as a useful exercise for internal reflection and assessment. Detailed engagement with the institution's course requirements may reveal nuances of an academic program or barriers to outreach which were not previously understood.[16] It can also support communication with faculty, allowing librarians to target their specific needs, learning outcomes, and/or language,[17] or to advocate for greater information literacy integration on the basis of specific skills and previous demand for instruction.[18] More substantially, roadmapping can form a baseline for further work on information literacy integration in the curriculum, as at Cornell University.[19] Gessner & Eldermire used a "retrospective teaching map" as a means both to understand their teaching capacity (by inventorying their existing activities) and to identify where information literacy already fit into the academic curriculum.[20] Similarly to Holy Cross, Cornell does not have centralized requirements and allows for a number of paths through the undergraduate degree. Roadmapping, however, enabled librarians to quickly grasp (and reference as-needed) the various major programs, core requirements, history of information literacy instruction, and more, facilitating both effective use of staff resources and higher-level planning for their information literacy program.[21] There is also plenty of evidence in the literature of roadmapping being used as a preliminary step in a more-involved curriculum mapping project, or in conjunction with other techniques such as syllabus analysis.[22]

Strategies such as roadmapping and syllabus analysis are necessarily fairly qualitative, but it can be difficult to accurately assess a program's reach and understand the program as a whole without quantitative information. One means of reporting out quantitative results from such projects is through using scoring techniques. There are numerous examples in the literature of libraries utilizing scoring formulas in conjunction with mapping projects to quantify the degree to which information literacy is present within particular programs, courses, etc. Specifically, scoring has been used to quantify such elements as the strength of a course's candidacy for future information literacy integration[23] or the sophistication of existing information literacy elements.[24] At institutions where librarians have access to student-level data, scoring has also been used to calculate the instructional histories of individual students (i.e., whether they have had previous information literacy instruction), garnering a stronger sense of how students move through the course sequence and which courses might most effectively target the greatest number of students.[25] Broadly, scoring- and rubric-type techniques are a common fixture in the library literature, and the authors have found scoring to be an effective method for understanding assessment data in previous projects. This was the primary basis for the authors' choice of methodology in this project.

Background

The College of the Holy Cross is a Jesuit, undergraduate-only, liberal arts college located in Worcester, Massachusetts (FTE approx. 3,000). The college's current curriculum aims to provide students with maximum flexibility in their learning experiences. Students begin with the required first-year program, Montserrat, which consists of year-long seminars from across the college's disciplinary departments, loosely grouped into themed clusters. Rather than a predetermined course sequence or required entry-level courses, students at the college select

from the full range of the curriculum to fulfill 12 disciplinary requirements, in addition to requirements for the student's selected major(s), minor(s) and/or concentration(s). Each academic program has its own set of requirements, which might consist of a standardized course sequence, a selection of electives from designated categories, and/or a minimum competency level (e.g., in some languages), among other combinations. The end result is that each student's degree path is highly individualized.

Information literacy instruction, meanwhile, has been ad hoc, contingent largely on the rotation of courses and the strength of relationships (and overall communication) between individual faculty and librarians. While liaison librarians for the first-year communities were in place at the program's inception in 2008, a teaching-focused liaison program for the major departments was not established until 2014. Most information literacy instruction at the college has historically been, and is still, driven by faculty request: faculty approach librarians with requests for instruction and librarians tailor a session based on the syllabus, research assignment, and/or specific requests from the instructor. Thus, while librarians can point to strong relationships with specific faculty and may have an anecdotal sense of their level of engagement, the bigger picture is less clear. With no single class that all students are required to take, there is no information literacy module or session that all students are guaranteed to view. All of these factors have limited librarians' ability to accurately assess the extent of their reach or to ensure that all students receive appropriate and equal instruction in information literacy. The Research, Teaching & Learning (RTL) division in the college libraries mainly engages with students via two methods: course-tailored information literacy instruction sessions, and Personal Research Sessions (PRS)—30-minute, individual consultations typically focused around a single assignment or research project and designed both to teach information-seeking/evaluation skills and to provide students with supporting materials for their projects. Given the ad hoc nature of the existing instruction program, it was clear that the Holy Cross Libraries needed to conduct a curriculum mapping project to assess how many students were actually being reached, and to what extent they were being reached (i.e., were students being reached evenly across all programs and departments?).

Methodology

We felt strongly that we wanted to interface with each one of our students at least once in the course of their college careers, but with no shared course across the curriculum and no attendance records for the majority of information literacy sessions, there was no good way to measure progress towards this goal. The purpose of the libraries' curriculum mapping project was therefore not to determine how best to incorporate information literacy skills into the curriculum, but how to scale a customized instruction program to ensure librarians were reaching as many students as possible. In pursuit of this goal, the Libraries' Teaching & Learning Team developed a formula to assign a single score to each course which would allow RTL to succinctly and clearly convey their findings to non-library stakeholders.

Since it would be both logistically impossible and inefficient to interface with every single course at the college, the authors decided that it would be most effective to identify the required course sequences for each major-granting department, positing that each student would have to pass through at least one. These sequences, once identified, would guide our review of the results as well as future engagement efforts. As mentioned previously, each major-granting department at the college has a slightly different approach towards requirements. Thus, as

the first step in our project, liaison librarians were asked to map out the requirements for their areas of responsibility. Liaisons created spreadsheets for their associated major-granting departments, listing specific required courses as well as upper-level requirements (e.g., the English department requires students to take one upper-level course for every major movement within English literature; all of the options for those requirements were listed). As part of this process, liaisons also identified the various course codes associated with requirements in their respective departments.

The Assessment Librarian then aggregated all consultation and information literacy instruction data from Fall 2013 through Spring 2018 and cleaned the data. This process involved requesting information about all courses from the Registrar's Office; assigning a specific course number, section number, and faculty member to each instruction session and personal research session; and indicating the total number of students enrolled in each course that received library engagement. Once this information was entered and standardized, the assessment librarian calculated the engagement score for each course where at least one intervention (i.e., one research appointment or one instruction session) had occurred during this period, whether it was a "required" course or not. The score was designed to consider the number of interventions/interactions in comparison to course enrollment and to weight information literacy sessions more heavily than individual research appointments with students. Since the goal of the project was to increase engagement with students, the Teaching & Learning Team agreed that it made sense to count each interaction with each individual student in the score, which led to the following formula:

$$\boldsymbol{Score} = \frac{(\#\ \boldsymbol{of\ students\ in\ instruction\ sessions}) + (\#\ \boldsymbol{of\ consultations})}{(\#\ \boldsymbol{of\ students\ \ enrolled})} \times \mathbf{100}$$

For example, a course with 16 enrolled students, one information literacy session, and no individual consultations, would receive a score of 100 ($\frac{16+0}{16} \times 100$). The same course, if 3 out of 16 students had also booked individual consultations, would have a score of 118.75 ($\frac{3+16}{16} \times 100$); conversely, if 3 out of 16 students booked consultations but no information literacy session was held, the course would receive a score of 18.7 ($\frac{3+0}{16} \times 100$).

Detailed course data obtained from the Registrar's Office was used to confirm enrollment numbers (which were not always available and/or provided accurately at the time instruction was scheduled) and to differentiate multiple sections of a single course, as well as to provide broader context (i.e., to understand how many courses had had library engagement in a particular area vs. how many courses were offered). RTL's data collection procedures have changed substantially over the years, so, while data exists for AY2013–2014, the data for individual consultations was not granular enough to support robust analysis. As a result, our initial analysis ultimately only considered Fall 2014 through Spring 2018.

Liaisons were provided with the engagement scores for all courses in their areas of responsibility during the time considered. Each liaison was responsible for reviewing their scores, comparing these scores against their list of major requirements/electives, and reflecting on the findings. As part of this process, liaisons generated a written narrative and reflection for each of their departments. While this took additional work and had a more subjective result, this step was important to account for anecdotal information that could contextualize the results. For example, one liaison identified lacking and/or outdated collections as a likely cause of limited engagement in her area; another department had recently restructured

their 100-level course sequence, where the bulk of instruction tended to occur; and in at least one other department, a drop in engagement levels correlated with the departure of certain heavily-engaged faculty from the college. These reflections added nuance to the analysis and helped the authors differentiate permanent from temporary issues, as well as identify barriers that would require more systematic and creative effort to overcome.

Librarians also wanted to incorporate data about the first-year program, Montserrat; however, because Montserrat courses and faculty change on a biannual or in some cases annual basis, it was not possible to definitively compare engagement scores across academic years. For these courses, the Assessment, Teaching & Learning Librarian calculated engagement scores for each individual course and tallied the total number of interventions on a program level, regardless of score; assessment of individual clusters, however, was based on reflection narratives from each individual cluster librarian, similar to those produced for the major departments.

All librarian narratives were reviewed and summarized by the authors as part of the data analysis process. The findings from these narratives were then incorporated into a report on the project, which was submitted to college administrators and used to inform subsequent efforts to improve engagement across academic programs.

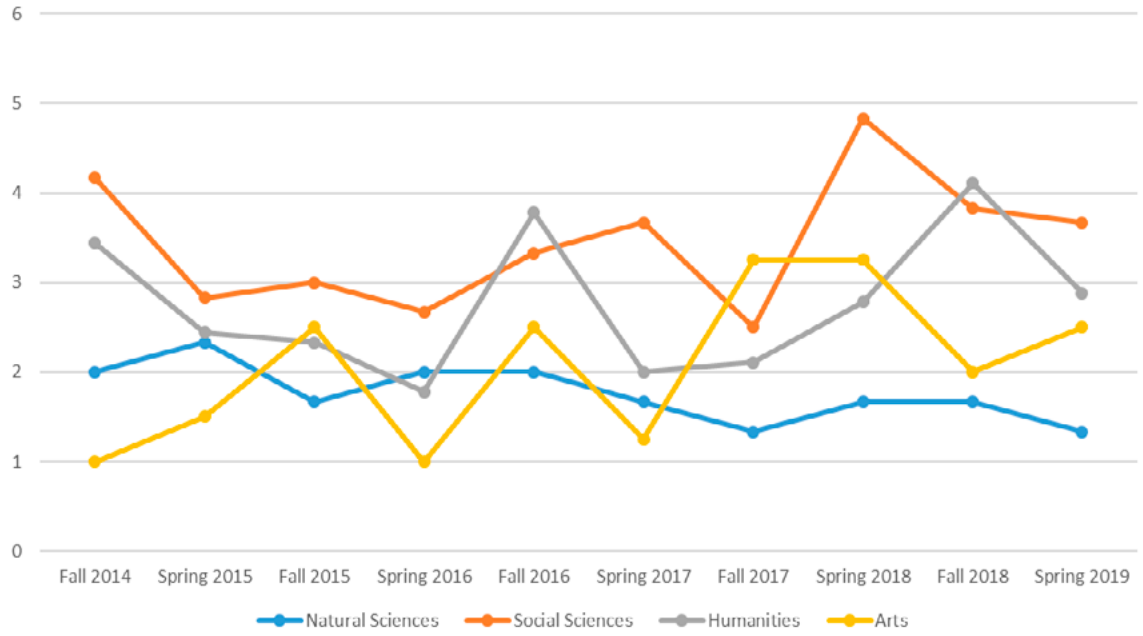
Initial Results

When this curriculum mapping project was initially conceived, the intent was to follow engagement on a course-by-course basis over multiple academic years. Ultimately, this wasn't possible due to multiple factors: changing course offerings and instructors made it impossible to guarantee that instruction would be provided in a particular course during any given year; instructors sometimes scheduled library instruction based on factors other than the curriculum (e.g., needing to travel but not wanting to cancel class); and librarians occasionally switched department affiliations, which altered relationships with faculty members. Instead of following engagement on a course-by-course basis, the results of this project allowed librarians to see how engagement with entire departments fluctuated on a yearly basis and identify departments that needed additional outreach and intervention to ensure that students majoring in those fields received adequate information literacy instruction.

Similarly, while engagement scores were calculated for individual courses in Montserrat, it was not possible to compare scores across years due to the constantly evolving course rotation. Long-term analysis of engagement with the first-year program was based on narratives composed by the librarians liaising with individual clusters within the broader program. Common themes across these narratives included: the strong influence of individual faculty members' preferences and interests (both first-year program cluster directors and individual teaching faculty) on levels of engagement from year to year; the importance of opportunities to engage with faculty at the start of each academic year; the difficulty of advocating for library engagement in courses with little or no research component; the impact of varying qualities of communication between faculty and librarians; and the importance of buy-in and direct support from the director of the first-year program.

Out of the four curricular areas identified (Arts, Humanities, Social Sciences, and Natural Sciences), in most semesters, the Social Sciences were found to have the highest engagement with librarians, followed by Humanities (as figure 1 shows). However, even within high-scoring curricular areas, there were departments with robust engagement and departments with poor

FIGURE 1
Average Interventions per Course per Curricular Area, 2014–2019



engagement. Additionally, the authors discovered department-specific engagement which fell outside the areas scored in this analysis and was thus excluded from the final results. For example, music department faculty frequently assign projects which students complete via more-traditional, drop-in reference transactions; as these transactions fell outside the scope of the Personal Research Session program, they were not reflected in the final scores for that department.

In order to create meaningful visualizations, the authors analyzed the data by charting the number of courses engaged per department and per curriculum area each semester, as well as the mean engagement scores within those courses during each semester. Figure 1 shows the average score per course across all curricular areas. For example, in Fall 2018, the average score for Humanities departments was just over 4, meaning that, on average, courses in the Humanities that had any kind of intervention during the Fall 2018 semester, had an engagement score of 4. For clarity of visualization, courses which had no engagement at all were eliminated from these figures. In the final report, the scoring information was combined with information from the narrative reflections to allow the authors to paint a complete picture of engagement within each academic department.

Due to the wide variation in engagement among departments and across semesters, the combination of these two metrics allowed for more effective evaluation than simply calculating the mean engagement score for all classes running per department per semester. For the purpose of reporting, multiple heat map visualizations were developed, some which showed null scores across semesters (e.g., if a course received library instruction once and then again 3 years later, with no engagement between, that was indicated), and some which did not. This allowed for visualization of weak and strong areas within and across departments and comparison of quantitative scores of required courses produced at the beginning of the project. An example of one of these heatmaps can be seen in Appendix A.

While the final compilation and analysis of data, especially qualitative data, continued throughout 2018, the authors felt that the project's initial results, particularly the maps of

course requirements, suggested some changes that could be made immediately. It was decided that both authors would pilot new engagement strategies during AY2018–2019, with the goal of introducing them across the RTL division should they prove successful. Targeted emails were sent to faculty teaching required courses in the authors' liaison departments. The authors additionally explored opportunities for increased extracurricular engagement, either in conjunction with or in lieu of in-class library instruction.[26] Results from this initial pilot were promising: despite using slightly different strategies, both librarians were successful in increasing engagement with the targeted departments. Plans were made to implement a soft launch of these engagement strategies across RTL in the Spring 2020 semester. Unfortunately, the onset of the COVID-19 pandemic and the college's subsequent transition to remote learning necessitated the cancellation or reconfiguring of many library instruction activities and put this plan on hold for the foreseeable future.

While the AY2018–2019 pilot saw an increase in engagement (the number of total instruction sessions increased by 8.39% over the previous year), a natural consequence of this success was that both librarians saw large increases in their instruction loads. Broadening this approach to the entire RTL division would significantly grow each librarian's workload, so any future attempts to implement these strategies would need to consider scalability. It will also be difficult to ensure that librarians are engaging with every student, unless they are able to teach in every required or possibly-required course. It is likely that librarians will need to consider alternative solutions, perhaps several in combination, to reach the library's goal of 100% student engagement while responsibly and effectively utilizing resources. However, the time-intensive process of identifying each major department's required courses was an important step forward. Spreadsheet maps of major requirements will set the stage for future engagement efforts, including directly communicating with faculty about appropriate courses in which to integrate information literacy, and identifying courses that would specifically benefit from other types of support such as data literacy or visual literacy programming.

Discussion: Challenges & Limitations

Any major assessment project has its challenges, that are multiplied with many parties and complicated factors involved. The current project benefited from the decision to complete the analysis internally, which simplified the process and did not require collaboration with academic departments. However, each participating librarian was very aware of the challenges and limitations of their liaison departments, which affected how each person approached this project. One concern that was unresolved was the uneven distribution of labor in asking each liaison to develop a course list and reflection for each of their academic programs: some liaisons had many more academic programs to assess than others, and some liaisons had fewer but more complex programs for which it was more challenging to construct a list of critical courses. The authors considered the possibility of evenly dividing departments regardless of liaison, but ultimately, a liaison perspective was required to unearth the idiosyncrasies of each program's past and present interactions with the libraries.

In a practical sense, this project was limited by the state of the existing data. Methods for recording instruction and consultation statistics have varied over time as the libraries' programs and needs have changed. All data had to be cleaned and normalized manually before analysis could proceed, leaving room for human error and requiring some data points, in cases where the referenced course was simply unidentifiable, to be excluded from the final analysis

(these were mostly individual consultations). Additionally, existing data collection methods did not account for the length of individual consultations, meaning that scoring could not differentiate between interventions of varying lengths—i.e., a 15-minute instruction session would be scored the same as a 75-minute session, and the same as an entire class coming in for required, individual consultations (15–20 consultations of roughly 30 minutes each). The highlighting of these limitations was, however, an unforeseen benefit of this project: once these issues became apparent, the RTL division was able to take steps to standardize data collection, as well as to more accurately track the actual length of interventions. Future iterations of this analysis will benefit from progressively more consistent and thorough data which will allow for better accuracy. However, incorporating these new data collection methods would also necessitate the development of a more nuanced scoring system to account for the additional factors like session length.

The complicated structure of academic departments at the college also created challenges, if not outright barriers, to accurate evaluation of library engagement data. As mentioned earlier, the track followed by each student is extremely individualized. Many major programs at the college, particularly in the humanities, do not follow a set track and/or offer a complicated set of course requirements, making it difficult to devise meaning from engagement scores. It is difficult to identify or target critical courses in a major program where students are asked to, for example, select one from each of four course categories (as in Religious Studies). Some academic departments, and most interdisciplinary programs such as Environmental Studies, draw heavily upon or at least accept coursework from other departments to fulfill major requirements. This is in addition to departments which themselves encompass multiple course codes. Additionally, the constantly rotating nature of the first-year curriculum made it impossible to quantitatively score or analyze the Montserrat program—evaluation of this program had to be based solely on qualitative assessment.

It is also worth noting that department requirements and course availability have changed over time, making it challenging to compare different years or accurately assess the success of library engagement with critical courses. This could be resolved by consulting previous enrollment data and course catalogs, but this is time-consuming, sometimes imprecise, and optimally requires institutional knowledge of programs which is not always available. While the authors chose not to directly engage academic departments on this project for a number of reasons, direct communication with the departments could be another, more effective means of resolving these issues in future.

Finally, the relationship between the libraries and various academic disciplines varies widely in ways that are sometimes outside the scope of this project. Some departments have a strong culture of library engagement which is reflected in research-heavy assignments (two examples being the History and Political Science departments), while others prefer that students engage with primary texts without secondary research or focus on skill-sets not necessarily supported by typical library engagement (for example, the Philosophy and Studio Art departments). Some programs also choose to engage with the library in other ways. For example, the Music Library, in this assessment, had relatively low engagement scores, but the Music Librarian tends to receive more walk-up extended reference questions than the other libraries—questions of an advanced nature that would likely surface during a research consultation in the main library. However, since the libraries firmly differentiate walk-up questions from pre-scheduled consultation via the PRS program, such questions were not included in this assessment.

Conclusion

The curriculum mapping project undertaken by the Research, Teaching, & Learning division at the Holy Cross Libraries was a mixed-methods project that successfully used both qualitative and quantitative methods to assess the level of engagement that liaison librarians had with students in their major-granting departments. This project revealed that certain areas had much greater engagement than others, but that overall, increasing engagement was a fairly straightforward process. Librarians found the process of mapping out the required courses to be quite valuable and reported that it gave them a better understanding of their departments and a greater ability to interface with students in a meaningful way. Additionally, the process of developing the curriculum map highlighted important considerations about the ways in which the RTL division documents its engagements with academic departments and with individual students, considerations which have already changed the division's data collection procedures. The current project will serve as a foundation for future efforts to embed information literacy instruction into the curriculum in a meaningful way.

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Appendix A. Sample from Heatmap, Humanities Departments, with Required Courses Highlighted

Row Labels	Spring 2019	Fall 2018	Spring 2018	Fall 2017	Spring 2017	Fall 2016	Spring 2016	Fall 2015	Spring 2015	Fall 2014	Average
ASTD											
ASTD 494		100.00									100.00
CHIN											
CHIN 250				100.00	100.00		100.00				100.00
CHIN 260										7.69	7.69
CLAS											
CLAS 263							185.71				185.71
CLAS 299			140.00								140.00
CLAS 199	47.78										47.78
CLAS 160					3.57						3.57
ENGL											
ENGL 366						142.86					142.86
ENGL 409		100.00		150.00		120.00		140.00		100.00	122.00
ENGL 368		115.79									115.79
ENGL 345										112.50	112.50
ENGL 200		105.56									105.56
ENGL 110	80.00	141.67		50.00	260.87	187.50	35.00	8.70	66.67	86.11	101.83
ENGL 393	100.00										100.00
ENGL 243			100.00								100.00
ENGL 369		100.00									100.00
ENGL 372						100.00					100.00
ENGL 387						100.00			83.33		91.67
ENGL 375		68.42									68.42
ENGL 399		11.69	113.04		48.65						57.79
ENGL 130	24.68	45.95		32.76			32.76	163.89	25.58		54.27
ENGL 401	4.00	245.83	6.25	54.55	2.78	88.57			11.76	4.00	52.22
ENGL 407		50.00									50.00
ENGL 199										50.00	50.00
ENGL 122		48.65									48.65
ENGL 121		28.79	19.30	18.42	74.05	42.75	17.70	28.47	48.67	33.33	34.61
ENGL 124					49.12	26.32		1.75			25.73
ENGL 329		11.76					21.43		42.86		25.35
ENGL 314										11.11	11.11
ENGL 337			10.53								10.53
ENGL 336								8.33			8.33
ENGL 230			3.92								3.92
FREN											
FREN 451										6.67	6.67
FREN 301			3.33								3.33
GERM											
GERM 403	160.00										160.00
GERM 406				100.00							100.00
GERM 301										100.00	100.00
GERM 399		100.00									100.00
GERM 304								12.50			12.50
GREK											
GREK 362		150.00									150.00
HIST											
HIST 200	200.00	228.13	133.33	151.35	67.74	222.22		327.27	134.48	75.00	171.06
HIST 422		140.00		225.00		100.00					155.00
HIST 267		108.33									108.33
HIST 305									106.25		106.25
HIST 140					104.17						104.17
HIST 279	102.04										102.04
HIST 317						183.33				17.65	100.49
HIST 284										100.00	100.00
HIST 420		75.00				100.00		33.33		180.00	97.08
HIST 203								155.56		5.00	80.28
HIST 401	10.00	127.59	113.51	105.41	57.14	81.82	59.65	8.70	113.33	59.09	73.62
HIST 199			1.35			108.00					54.68
HIST 399	114.29		10.53			112.50		15.38	11.11		52.76
HIST 226			75.00							23.81	49.40
HIST 322		46.15									46.15
HIST 201		110.87				2.08		5.26			39.41
HIST 239							33.33				33.33

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Notes

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Sexual Harassment on Chat Reference: Prevalence, Impact, and the Role of Organizations

Samantha Kannegiser and Julie Hunter

Over 100 chat providers in academic libraries were surveyed in a premier study measuring experiences of sexual harassment among library workers providing online chat reference. The anonymous survey measured the prevalence and frequency of 11 sexual harassment behaviors across three sexual harassment dimensions: gender harassment, unwanted sexual attention, and sexual coercion. The study also examined chat providers' responses to harassment, the impact of harassment, and the role their organizations played in how they responded. Of our 119 respondents, 61.3% experienced at least one sexual harassment behavior on chat reference within the last 5 years. Responses to harassment were influenced by the existence of organizational policies on how to handle harassment and whether organizations were having open discussions about harassment on chat.

Introduction

Sexual harassment may be most simply defined through a legal lens, via the Equal Employment Opportunity Commission (EEOC) statement which specifies that behaviors including "'sexual harassment' or unwelcome sexual advances, requests for sexual favors, and other verbal or physical harassment of a sexual nature" become illegal when they are "so frequent or severe that it creates a hostile or offensive work environment."[1] Research expands this definition to understand sexual harassment as a psychological construct with negative effects, even when the behaviors do not meet the legal thresholds of frequency or severity to be prohibited.[2] A subset of the sexual harassment literature focuses on third-party sexual harassment, or customer sexual harassment, which recognizes that workers in service positions are harassed by their customers or patrons and are more vulnerable to harassment because of the power imbalance between service providers and customers.[3] The effects of experiencing third-party sexual harassment are similar to the effects of other types of workplace harassment; namely, lower job and health satisfaction and increased psychological stress.[4]

Library workers, like other frontline service workers, have reported experiencing sexual harassment at work by colleagues and supervisors, as well as third-party sexual harassment by patrons.[5] While library work is often done in person, library reference work is increasingly

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supported via online services such as chat reference. There is a dearth of literature on third-party sexual harassment experienced by service workers in an online environment, but online sexual harassment follows the same patterns of in-person harassment.[6] Our study investigates the experiences of sexual harassment of chat providers on library chat reference.

Literature Review

Research into sexual harassment is rooted in the workplace, primarily among co-workers and with a focus on the prevalence, consequences, and antecedents of workplace sexual harassment. Findings on the prevalence of workplace sexual harassment vary depending on study methodology, but overall they show that sexual harassment persists in the workplace and women are more likely to be victims.[7] The negative consequences of sexual harassment, including health, occupational, and psychological outcomes, are consistently reported.[8] Predictably, antecedents of harassment are shown to include organizational characteristics and workplace climate.[9] In the absence of clear organizational policies on sexual harassment, management is more likely to ignore the behavior;[10] and the degree to which an organization tolerates sexual harassment is a reliable predictor of whether sexual harassment occurs in the workplace.[11] This suggests that organizational changes would lessen or eliminate sexual harassment in the workplace.

Third-Party Sexual Harassment

Most studies of sexual harassment focus on sexual harassment among colleagues in the workplace. That being said, there is research on a subset of workplace sexual harassment called third-party sexual harassment, also referred to as customer sexual harassment and patron perpetrated sexual harassment. Seen often in service industries such as retail and hospitality, this harassment is perpetrated by a customer or patron against an employee.

Situational and organizational factors can determine whether third-party sexual harassment occurs. Like other forms of sexual harassment, an organization's tolerance of customer harassment is a reliable antecedent to whether harassment occurs.[12] A customer or client with some level of power over the employee and a high-pressure service environment can both encourage sexual harassment.[13] The gendering of service work can amplify sexual harassment as it often requires predominantly female staff to "exert maximum efforts to make the time customers spend in the organization pleasant, and to satisfy their needs."[14] Service providers often view caring for customers, clients, or patrons as part of their job responsibilities, making it "difficult for employees to draw a clear line between the type of customer behaviour they would be expected to manage as part of the job and behaviour that was inappropriate, creating ambiguity about how to define, interpret and respond to customer sexual harassment."[15]

Common responses to third-party sexual harassment are reporting to a supervisor, avoidance behaviors, confronting the harasser directly, changing personal behaviors, or seeking support from colleagues.[16] Dismissing incidents of harassment altogether is most common.[17] Because organizational change is not available to them and third-party sexual harassment is so often ignored or silenced in the service sector, victims will employ coping strategies on an individual level.[18] Harassed employees use the interpersonal skills and emotional labor necessary in client-facing service positions to diffuse the harassing encounter and pacify the client or customer.[19] Collective coping is also common. Employees who experience harassment discuss it in an effort to regain power in the situation, reconstructing the harassment

as something that happens throughout the workplace rather than something for which they were personally targeted.[20] Attempting to gain control over the situation, although sometimes illusory, can help prevent some of the negative emotional effects of sexual harassment.[21]

Sexual Harassment in Libraries

Service is often considered the essence of librarianship for librarians; and librarians "will go above and beyond to meet these needs with high-quality services based in the core values of librarianship."[22] Library workers, especially those who interact with patrons as part of their job responsibilities, are susceptible to third-party sexual harassment. Service interactions often require emotional labor, compelling workers to prioritize a patron's emotional needs over their own.[23] This expectation of emotional labor is also found in library professional guidelines such as the Reference & User Services Association "Guidelines for Behavioral Performance of Reference and Information Service Providers."[24] In a close reading of the *Guidelines*, Emmelhainz et al. concluded that the professional guidelines for reference work explicitly require emotional labor of reference librarians, making them solely responsible for creating a "successful" reference interaction by managing their patron's feelings.[25] This prioritization of a patron's emotions over their own makes them vulnerable to receiving third-party sexual harassment, but also constrains their ability to resist or confront that harassment, a situation "further compounded by intersectional aspects of library workers' identity, such as race and class, that make them additionally vulnerable to sexual harassment."[26]

Research into sexual harassment in libraries has not specifically focused on third-party sexual harassment, but rather the overall experiences of library workers in the workplace. Research into this issue began with an often cited, informal 1993 survey in which 78 percent of female librarians reported being sexually harassed while at work.[27] Publications by librarians openly discussing sexual harassment of library workers coincided with the 2017 #MeToo and #TimesUp movements,[28] including an anecdotal survey from *BookRiot* that collected over 250 responses from library workers sharing their stories of harassment in the library.[29] More recently, formal research into academic libraries found that 77.4 percent of survey respondents, of which there were over 600, had experienced sexual harassment in the library.[30] Another 2021 study focused on sexual harassment of library workers at a specific university library and found that 54 percent of workers across 10 campuses experienced or observed sexual harassment at work.[31] These studies primarily analyzed harassment occurring in physical spaces exhibited by both colleagues and patrons.

Online Sexual Harassment in the Workplace

Online sexual harassment, also called cyber sexual harassment, is an often-overlooked form of workplace harassment, but it has harmful effects similar to offline sexual harassment.[32] And much like offline sexual harassment, online sexual harassment takes the form of gender harassment or unwanted sexual attention more frequently than sexual coercion.[33] Barak proposes that there is a higher probability of sexual harassment online due to the situational components of the internet, including online disinhibition, the ability to be anonymous, the ability to easily escape by logging off, and the lack of legal repercussions for cyber sexual harassment.[34]

Cyber sexual harassment of library workers is not well studied. However, anecdotal discussions of handling unruly patrons online suggest tactics like "keeping calm" and "communicating with [patrons]" before "[inviting] them to leave" when the behavior cannot be redirected.[35]

Research Questions

Based on this review of the literature, we developed 4 research questions:

1. What is the prevalence of sexual harassment on chat reference?
2. How do chat providers respond to sexual harassment on chat reference and what influences their decisions?
3. What effects do institutional policies, or lack thereof, have on chat providers who experience sexual harassment?
4. What impact does sexual harassment have on chat providers' attitudes or behaviors when providing chat?

Methods

Sexual harassment has been widely studied over the years with a variety of methods. But the most widely used method is the Sexual Experience Questionnaire (SEQ) developed by Louise Fitzgerald in 1988.[36] This survey instrument is primarily used to study sexual harassment in the workplace. Originally, it asked questions about five dimensions of sexual harassment: gender harassment, seductive behavior, sexual bribery, sexual coercion, and sexual assault.[37] A revised version of the survey reduced this to three dimensions, asking questions about specific sexual harassment behaviors related to gender discrimination, unwanted sexual advances, and sexual coercion. Fitzgerald et al. defined these terms as:

- Gender discrimination: "a broad range of verbal and nonverbal behaviors not aimed at sexual cooperation but that convey insulting, hostile, and degrading attitudes about women;"[38]
- Unwanted sexual advances: "a wide range of verbal and nonverbal behavior that is offensive, unwanted, and unreciprocated;"[39]
- Sexual coercion: "extortion of sexual cooperation."[40]

Other surveys found in the literature focused separately on either sexual harassment occurring broadly online or sexual harassment within libraries.[41]

We used the SEQ and other surveys as inspiration to design a survey instrument (Appendix A) that met the unique needs of the environment we wanted to study, sexual harassment occurring online in library chat reference.. Specifically, our survey asked questions about the types of sexual harassment behaviors experienced in a virtual library environment. We also asked respondents how their chat reference was staffed and how their organizations handled reports of harassment. The survey was primarily quantitative, but we asked two open-ended questions. One asked participants to elaborate on the factors that influenced their responses to harassment. The other asked respondents to discuss how experiences of sexual harassment impacted their work on chat reference.

Our sample consisted of chat providers working in academic libraries who were at least 18 years of age. Because this was a convenience sample recruited via academic listservs, social media, and word of mouth, our results cannot be generalized to the entire population of chat providers in academic libraries. Therefore, we applied a descriptive statistical analysis to all quantitative questions. To analyze our two qualitative questions, we used a thematic analysis, by which we separately labeled text responses to generate a common list of themes and then used the list of themes to individually code the responses. We compared our initial rounds of coding to identify and discuss any discrepancies before finalizing the analysis.

This survey received Institutional Review Board (IRB) approval from Rutgers University and Western Connecticut State University.

Results and Discussion

Demographics

There were 123 respondents to the survey. Of those, 119 usable responses were from academic library workers who completed the online consent form and the survey. Our respondents aligned with the demographics of librarianship, with a majority being White and female between 25 and 54 years of age. Specifically, 86% of respondents were female, 14% male, and less than 1% were non-binary. Our respondents were White (86%), Hispanic (4%), Black or African American (3%), Native American (1%), and Asian Pacific Islander (2%), and 4% declined to answer or identified as Other. We asked participants to identify their general age (18–24, 25–34, 35–44, 45–54, 55–64, 65–74, 75+). Most respondents, 84%, were between the ages of 25–54 with each of these decades representing at 25–30%. Subsequent discussion will focus on the 119 usable responses.

Institutional Characteristics

All respondents worked in academic libraries, with one respondent also working in a public library and another recently retired from an academic library. Most libraries staffed chat with only library employees (81.36%, n=96), .85% (n=1) staffed with a third-party service, and 17.8% (n=21) used a mix of both library employees and a third-party service, explaining that the third-party service or cooperative service covered nights, weekends, and overnight shifts. One respondent did not answer the question. Most organizations, 94.12% (n=112), did not restrict who can access the chat service, while 5% (n=6) restricted access to chat reference to only institutional affiliates. One respondent was unsure of whether restrictions existed.

Participants were most likely to staff chat between 1 and 10 hours a week. Three respondents (2.5%) were not currently staffing chat on a weekly basis, 82 (68.9%) staffed chat between 1 and 10 hours weekly, 20 (16.67%) held between 11 and 20 reference hours weekly, and 14 respondents (11.67%) staffed chat more than 20 hours per week. There was an equitable split between respondents who had 5 years or less experience staffing chat reference and those who had 6 years or more.

Chat reference operators generally did not share personally identifiable information with chat users. The majority of respondents, 79% (n=94) did not make a profile photo of themselves visible to patrons on chat reference. Respondents displayed a variety of names on chat reference, ranging from a full first and last name to completely anonymous (see figure 1). For the 11.76% (n=14) that answered Other, half reported using either the title of the service, the library's name, or listing no display name at all. Other responses included using only initials or using a mix of initials and first or last names (i.e., J. Smith or John S.). One respondent commented that they changed their display name to a stereotypically male name after experiencing harassment.

Prevalence of Sexual Harassment

The majority of respondents, 61 percent (n=73), experienced at least one sexual harassment behavior (figure 2). Interestingly, of these 73 respondents who reported experiencing at least one harassing behavior, only 44 believed that they had been harassed during a chat interaction. Although this aligns with findings from other studies, this disconnect needs further investigation.[42] We received comments implying that some harassment is expected for those working in service positions or within our society. It's possible that not every respondent considers the harassing behaviors to be sexual harassment, despite how it is defined in the literature.

FIGURE 1
Chat Providers' Display Names Listed on Chat Reference

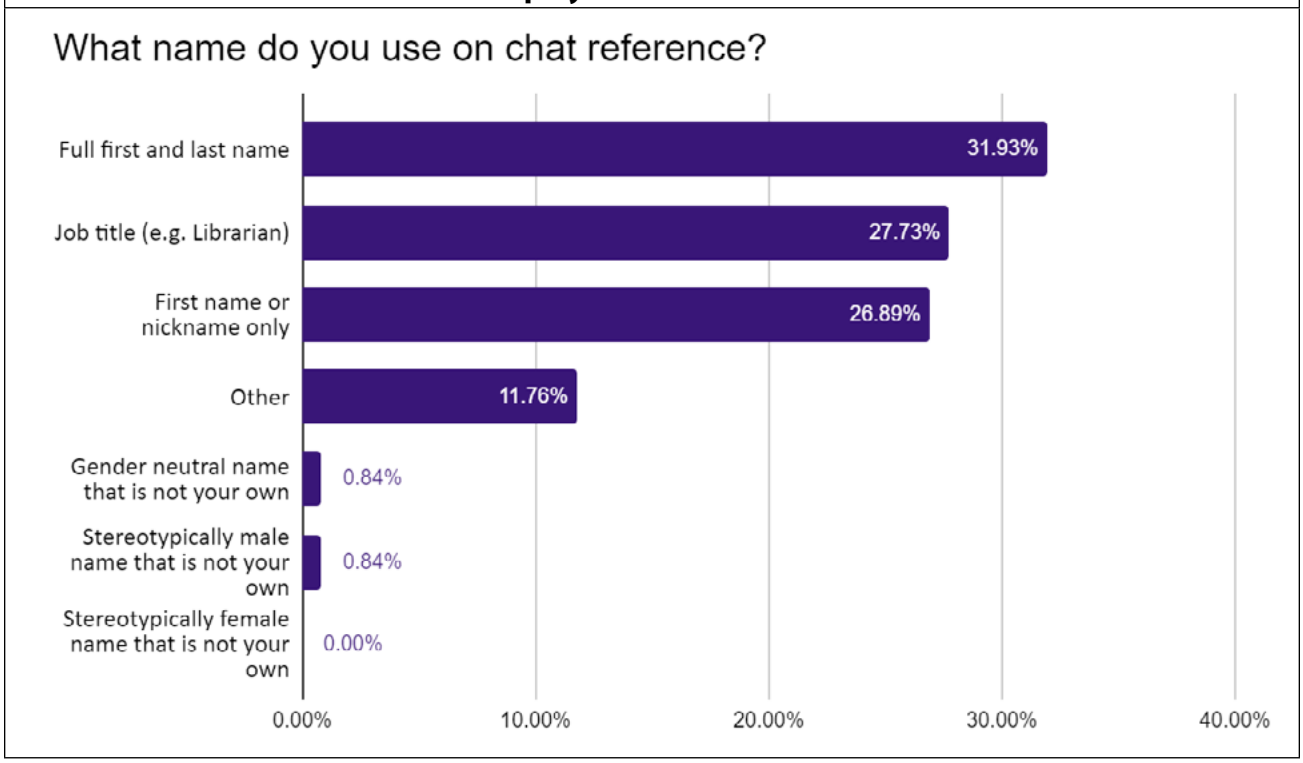
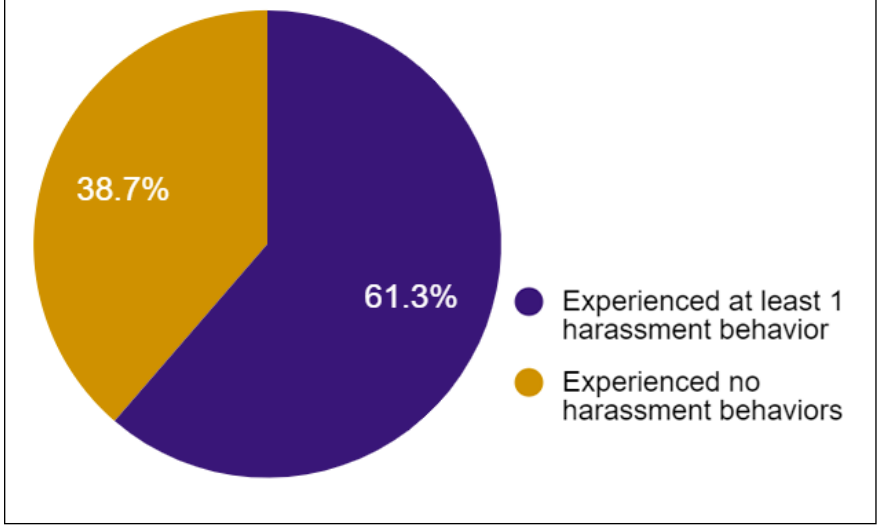


FIGURE 2
Prevalence of Sexual Harassment in Chat Reference (N=119)



Respondents selected the frequency with which they experienced one of the 11 sexual harassment behaviors we asked about in the survey, ranging from 0 times to more than 5 times, over the previous 5 years. Results showed that many of our 119 respondents experienced sexual harassment at least 1–2 times between 2015 and 2020 (table 1).

Consistent with the larger body of sexual harassment research, gender harassment was the most experienced dimension of sexual harassment. While the dimension unwanted sexual attention was less common overall, unwanted seductive behavior and unwanted discussion of personal matters were both behaviors in this dimension that were significantly experienced. Sexual coercion was minimally experienced.

The most common behavior of sexual harassment occurring on chat was unwanted discussion of personal matters. Crude or offensive remarks came in second, closely followed by chat providers feeling they were treated differently due to their perceived gender. Unwanted

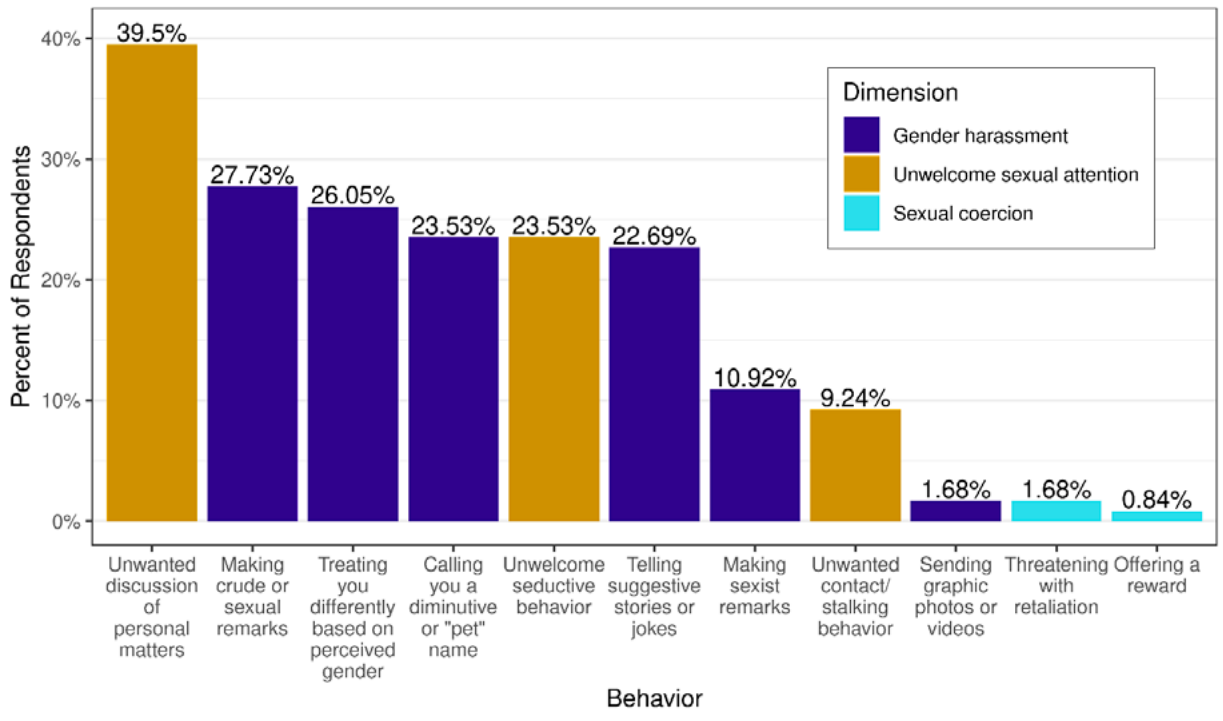
TABLE 1
Frequency and Type of Sexual Harassment Behaviors Experienced from 2015 to 2020 (N=119)

Dimension	Behavior	0x	1–2x	3–5x	>5x
Gender Harassment	Telling suggestive stories or jokes	92	19	6	2
	Sending graphic photos or videos	116	2	0	0
	Making crude or sexual remarks	84	21	7	5
	Making sexist remarks	105	9	2	2
	Treating you differently based on perceived gender	85	16	9	6
	Calling you a diminutive or "pet" name	90	12	10	6
Unwanted Sexual Advances/Attention	Unwelcome seductive behavior	90	21	7	0
	Unwanted contact/stalking behavior	106	10	0	1
	Unwanted discussion of personal matters	71	34	9	4
Sexual Coercion	Offering a reward for sexual cooperation	117	1	0	0
	Threatening with retaliation for lack of sexual cooperation	116	1	1	0

seductive behavior, which includes asking for a date or for personal contact information and being called a diminutive or "pet" name were also commonly experienced behaviors. Figure 3 shows the percentage of affirmative experiences of sexual harassment.

The prevalence of gender harassment confirms what other studies of sexual harassment have concluded—gender harassment is considered less severe than other forms of sexual harassment, such as sexual coercion, but is experienced more frequently.[43] The lessened sever-

FIGURE 3
Prevalence of Experiences of Each Sexual Harassment Behavior, 223 Responses



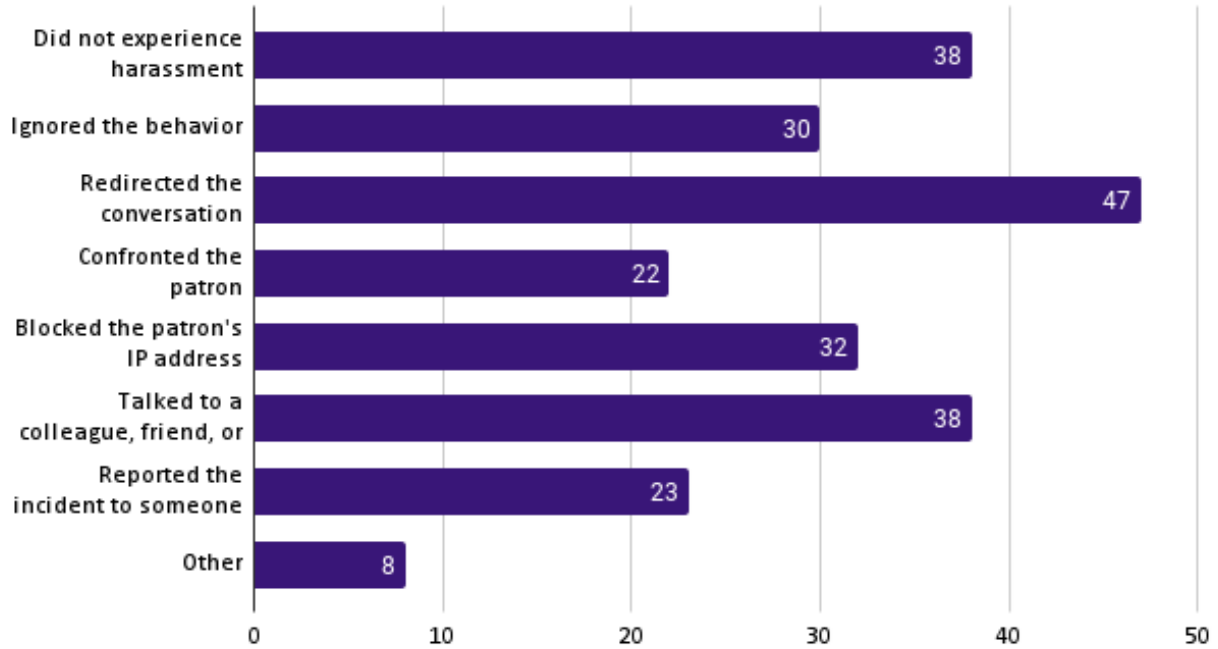
ity does not mean it makes less of an impact on the person being harassed, especially when considering the frequency of the harassment. This is an especially important consideration as libraries are increasingly offering virtual reference services and staffing chat reference services with students.[44]

Gender harassment is the most frequent form of harassment experienced in frontline service work.[45] Librarianship is a service-oriented and largely female profession. Professional expectations of service are often entrenched in gendered ideas of emotional labor, burdening reference providers with the responsibility of not only supplying information but of managing their own and their patron's emotions.[46] The obligation to prioritize a patron's needs over one's own makes chat providers more susceptible to sexual harassment as the patron holds power in the interaction.

Responses to Sexual Harassment

There are many ways that one can respond to sexual harassment, and we found that often chat operators used multiple techniques to handle such a situation, both during and after the occurrence. Our 119 participants shared 238 responses on how they reacted to harassing behavior (figure 4).

FIGURE 4
Responses to Harassment, 238 Responses



Overall, participants responded in more passive ways to harassment. The most common response was to redirect the patron back to the reference interaction. We received many comments from participants about wanting to continue to provide good service even in the face of harassment, and redirection was the primary technique used to do so. This is partially explained by the type of harassment experienced. Respondents frequently mentioned that an inappropriate question or comment was easier to disregard than acknowledge. This is not to say that redirecting an inappropriate conversation is an incorrect response, as often chat

providers are able to subtly correct a patron's behavior and continue providing reference service, but it is worth questioning how the frequency of "less severe" sexual harassment, experienced over a long period of time, leads to feelings of resignation that harassment is a part of library reference work, as some of our survey participants stated.

Ignoring the behavior, blocking the patron's IP address, and talking to a colleague, peer, or friend were also common responses to harassing behavior. The least common responses to harassment were the more direct ones—confronting the patron about their behaviors or reporting the harassment to someone of authority.

We received 60 responses to an open-ended question asking participants to elaborate on the factors that influenced their responses to harassment. Thematic analysis of their explanations uncovered the following themes.

Service Mindset

Chat providers are acutely aware of the service expectations in a reference interaction. A service mindset is encouraged in library professional values and reference service guidelines, and while it is an integral aspect of the profession, it is also a potential explanation for the passive responses to sexual harassment on chat reference.[47] Respondents frequently mentioned their desire to remain professional and provide good service, even when patrons exhibited harmful behaviors.

Giving patrons the benefit of doubt allowed providers to redirect conversations to "[help] them with their academic issue," "maintain a reference interview," and "remain professional since chat transcripts are saved." This pacification of harassing patrons using interpersonal skills and emotional labor in order to perform professional duties is similar to actions taken by service providers in other frontline positions.[48] Respondents consistently performed the emotional labor of considering and managing the harassing patrons' perspectives and needs. When receiving harassing comments, chat providers considered the assumed identity of the patron—potentially "middle or high school students," "a bored kid," or someone who assumed the provider was "not a real person." They made attempts to understand *why* the patron was harassing them in order to continue providing service. Respondents who tried empathizing with harassing patrons mentioned dealing with the behavior "somewhat gently," giving them a "chance to be corrected," and "not making assumptions" about the patron's intentions.

Other times, the desire to continue providing good service was done with a sense of resignation that harassment was expected, and little could be done to avoid it. Societal expectations of harassment were commonly mentioned along with a desire to remain professional and provide service. Harassment online is so "normalized in our culture" that "to ignore it was… best."

We found that respondents ignored harassing behaviors if they believed that direct responses on their part "might cause the patron to react more poorly," or because they were so used to harassment in their lives that something "would need to change societally, systemically…for me to feel less uncomfortable confronting the patron than I do by simply ignoring it."

It should be noted that while sometimes efforts to combat harassment with good service were successful (i.e., patrons allowed themselves to be redirected or understood that their behavior was unwelcome), others had less fortunate experiences with patrons continuing to harass despite attempts to ignore or redirect the behavior. Once this escalation happened, chat providers employed more direct techniques such as blocking IP addresses or directly asking the patron to change their behavior before continuing the interaction.

Role of Colleagues

Relationships with colleagues were a major factor in how chat providers responded to harassment. Respondents reported harassment via official and unofficial channels partly because they desired to protect their colleagues from similar harassment. Other times, respondents relied on colleagues to offer sympathy, advice, and commiseration as a way of handling the aftermath of harassment. Participants mentioned having a "close community of chat staffers" where experiences could be shared since everyone "generally share[d] similar ones." Informing colleagues of harassment was not done to problem solve, but to "commiserate" and warn them "to be on the lookout" so they would not "be shocked if something similar happened to them."

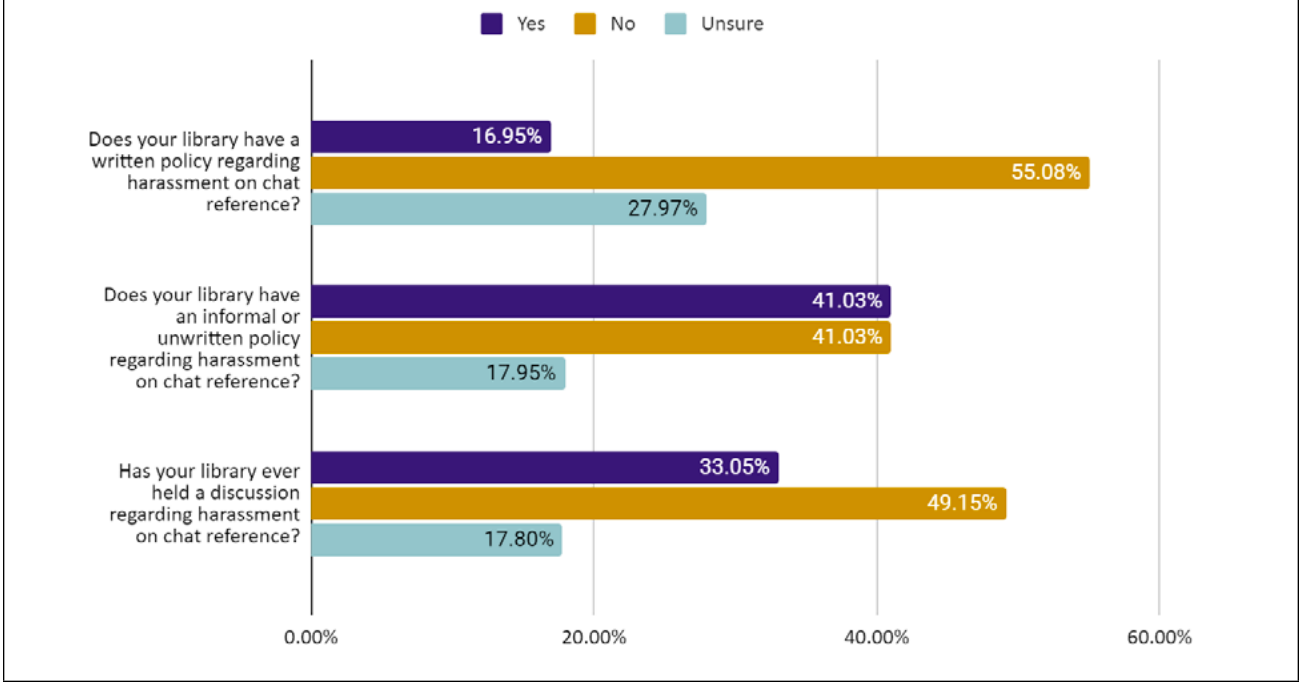
Organizational Impact

In addition to their feelings of professional duty and obligation to their colleagues, respondents' reactions were frequently influenced by their organization's policies, or lack thereof, on sexual harassment. Reflecting on direct confrontation or action, respondents feared repercussions from either the harassing patron or from library administration. Those chat providers, unconfident in their organization's support, who were required to use their real names and/or photos on chat feared that the patron could/would seek them out for further harassment, potentially in person. Many providers were also aware that because chat transcripts are saved and accessible to administration and colleagues, they may be "roped into a formal reporting procedure" or "told off for being aggressive," reinforcing the concept that the customers' needs should be prioritized over their own—under any circumstance.

Effects of Institutional Policies

Fifty-five percent of respondents (n=65) reported their organizations did not have a formal,

FIGURE 5
Organizational Policies and Communication (n=118)

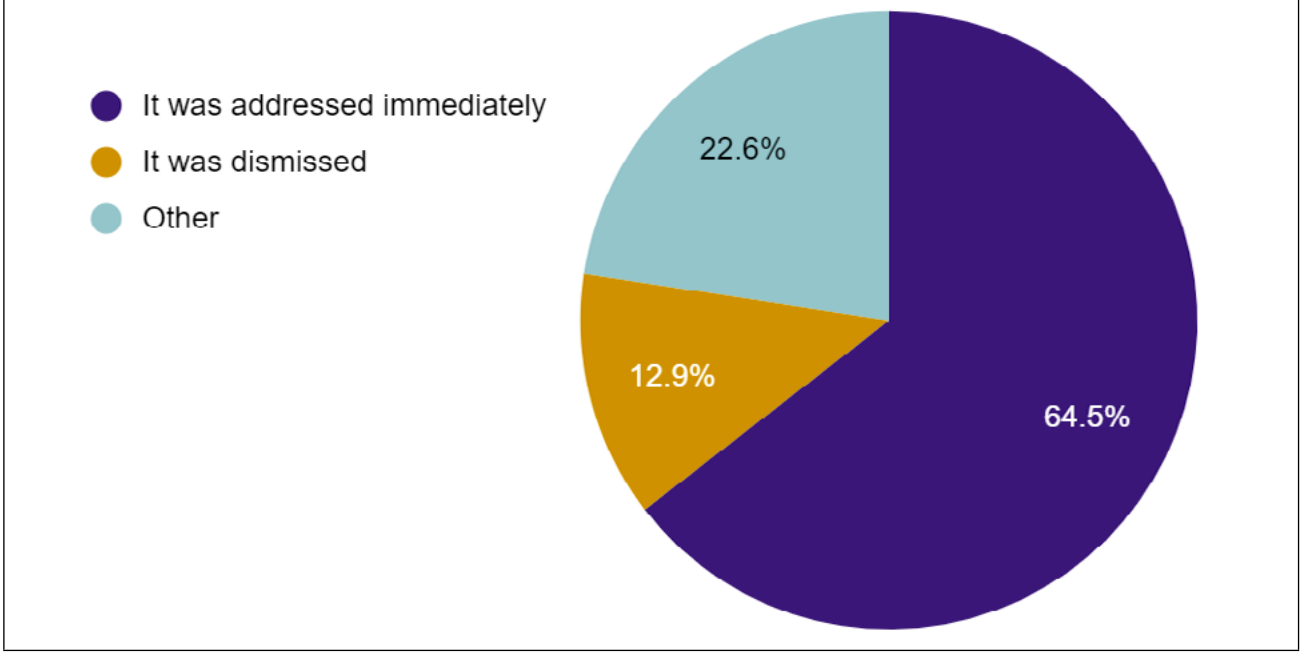


written policy for handling harassment, and many respondents (n=58) reported that their libraries had never discussed harassment on chat (figure 5). Although it was more common to have an informal policy for dealing with harassing patrons on chat, over 77% of respondents were clear on whom to report harassment on chat.

Nearly 28% (n=33) of 118 respondents reported sexual harassment on chat to someone in authority. Interestingly, two of the 33 respondents answered that they *had* reported chat harassment to someone in authority, but they did *not* experience any of the sexual harassment behaviors we had asked about in the survey. We do not have a definitive explanation for that discrepancy, but it is possible the respondents either reported harassment they witnessed another chat provider experiencing or they reported sexual harassment behaviors that we did not include in our study.

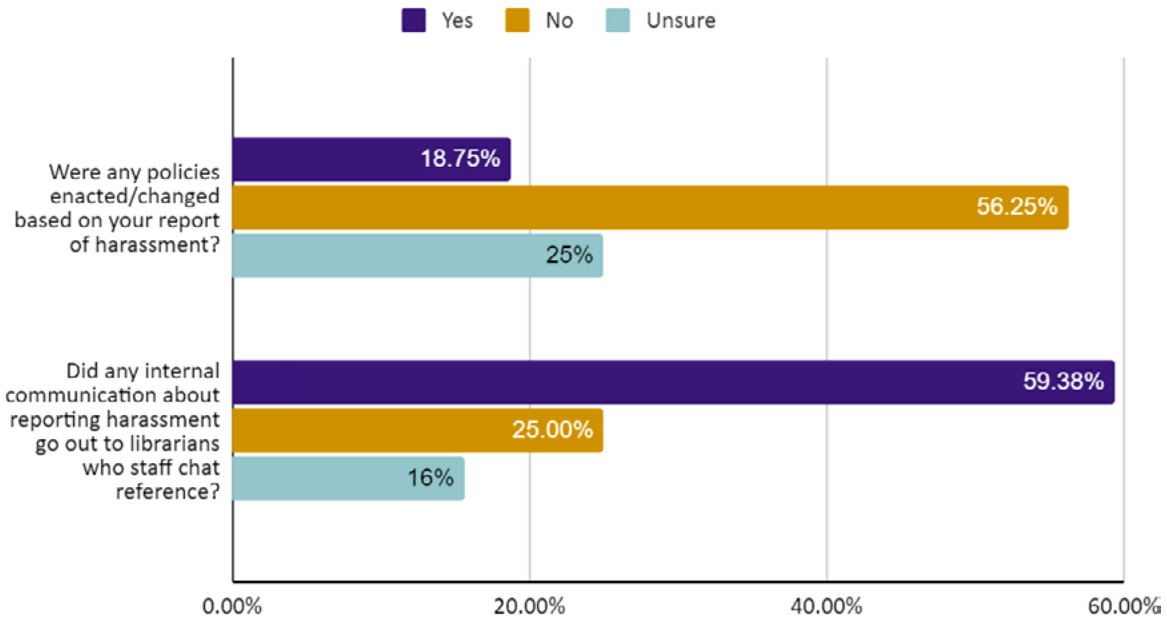
Of the 33 respondents that reported harassment to someone in authority, 31 responded with how that report was received. Reports were addressed immediately in 64.52% of cases (figure 6).

FIGURE 6
How Was Your Report Received? (n=31)



For those that elaborated on answering "other," the common theme was that although their report was acknowledged or addressed, there was little the respondents expected to be done. When police or campus security were called, employees were vaguely advised to take "safety precautions." In other cases, supervisors listened to complaints but ultimately dismissed the harassing behaviors as "to be expected." Some comments alluded to blocking the patron's IP address as a way of handling the harassment. In one instance, the chat providers drafted their own policy for handling chat harassment after initial reports were dismissed by supervisors. Acknowledging that harassment can happen in chat reference and teaching techniques for handling it in the moment, as well as steps to take after it has happened, could better prepare those who will be staffing chat reference.

FIGURE 7
Organizational Responses to Reports of Harassment (n=32)



Other organizational responses to reports of harassment were to change policies or send out internal communications (figure 7). Communicating with employees that harassment had occurred was the most common response.

Organizational policies and communication about sexual harassment, specifically on chat reference, greatly determined how providers reacted to harassment and whether they reported it. In open-ended responses, participants expressed that having a clear reporting structure, instructions for how to handle harassment, and supervisors who discussed harassment on chat were all factors in whether they reported harassment when it happened. Participants who had a positive reporting experience elaborated that their organizations held meetings, encouraged discussion among employees, developed and hosted training on handling harassment, implemented generic identifiers for all those staffing chat as a protective measure, and developed policies and/or canned messages in direct response to harassing behavior. Some respondents mentioned feeling empowered to employ different techniques when harassed, such as closing a chat or telling a patron to stop, because options had been discussed prior to experiencing the harassment. For those who were able to reflect on providing chat reference at different organizations, jobs with admin support or positions at institutions that had a culture of respect seemed to ease chat providers' concerns about potentially experiencing sexual harassment in virtual reference. In other words, even if they had experienced sexual harassment in a prior position, moving to an institution that supported staff and encouraged respectful behavior allowed providers to feel comfortable staffing chat once again.

Impact of Harassment on Chat Providers

Of the 73 respondents who experienced sexual harassment on chat, 78% (n=57) reported that it did not make them hesitant to staff chat reference. However, experiencing harassment did have an impact on how they provided chat reference. Forty-one participants responded to

an open-ended question asking how sexual harassment on chat reference had impacted them and their work. Their comments centered around behavioral changes and practical techniques for avoiding and handling sexual harassment.

Harassment commonly impacted chat providers emotions while staffing chat. Respondents repeatedly mentioned feeling "wary," "anxious," "shaken up," "cautious," "always on guard," "skeptical," "guarded," and "reluctant" during chat interactions. Although we only asked how harassment impacted the providers themselves, respondents often followed up with concerns for how their new wariness of chat patrons may affect patron experience with the library. This desire to provide good service in chat reference, despite harassment, was apparent throughout the comments.

> *"I try not to let these experiences impact reference, though. I want to be helpful, empathetic, and understanding."*
>
> *"My first job…I experienced harassment somewhat frequently…I…haven't experienced any harassment [at my current job]. It makes me much quicker to be friendly/warm towards patrons on chat when I'm not worried that such a tone will be taken as welcoming harassment."*
>
> *"I would imagine this has a negative effect on some patrons who are new to the library… as I am hesitant and distracted by my concerns about possibly being harassed."*
>
> *"I might be a little less 'warm' or 'chatty' in how I greet and interact with a person…but I always try to stay professional."*

After having experienced sexual harassment, providers were more likely to employ more direct actions to avoid or stop subsequent attempts. Most commonly, respondents commented that they would simply end chats and block patrons who exhibited unruly behavior. They experienced "less hesitation about ending a chat with a user who is harassing," have "block[ed] IP addresses…several times," are "more quick to stifle an unruly or inappropriate patron," and will "shut down chat immediately if [they] feel questions asked are inappropriate." Other providers mentioned using the tools available in the chat platform to disguise their identities as a protective measure. This included changing display names on chat to a job title, such as "librarian," or to a male-sounding or gender-neutral name, and/ or removing any identifying profile photos. In line with this, some respondents were hesitant to give their name or email within the chat unless they could confirm the identity of the patron.

There was an overall sense in the survey responses that the level of sexual harassment experienced on chat differed from in-person experiences because of the disconnect that technology provides. The perceived level and frequency of harassment was a factor in how chat providers reported being impacted by harassment. That being said, harassment did impact chat providers. Once providers experienced harassment, they were plagued with feelings of wariness in future chat interactions. A major concern among respondents was that this wariness also impacted the level of service they were providing to patrons. Consistently, providers mentioned the desire to remain professional and provide good service, regardless of how their patron is behaving.

Limitations

This exploratory study has several limitations. In recruiting participants, we were clear that this survey asked about experiences of sexual harassment and included contact information for support services for participants. While this was an intentional choice meant to protect participants who might be uncomfortable taking a survey about sexual harassment, it could have also led to a self-selecting population of survey participants who experienced sexual harassment. Additionally, we recruited participants via academic listservs and did not employ random sampling, and so our results cannot be generalized to the broader population of library workers. Lastly, the demographic makeup of our respondents was largely white and female, and while this is representative of the demographics of the profession, this study does not account for the myriad ways in which intersecting identities, such as race and sexuality, compound experiences of harassment.

Conclusion

We found that chat reference providers are experiencing sexual harassment on chat, primarily in the dimensions of gender harassment and unwanted sexual attention. Participants were more likely to respond to harassment passively by redirecting a conversation, seeking support from colleagues, or ignoring the behavior altogether. Responses to harassment were influenced by three factors: a service mindset—in which chat providers desired to provide quality reference service despite harassment; relationships with colleagues—to protect or support them; and organizational support—whether their organization had held discussions or training about harassment on chat or if harassment was believed to be tolerated.

Chat providers were not hesitant to staff chat reference after experiencing harassment. But the experiences did have an emotional impact, making them more wary and anxious in future interactions as well as more likely to respond directly to harassment in subsequent experiences.

Most organizations did not have explicit policies or conversations about harassment on chat reference, but responded to reports of harassment informally, often with internal communication. Formal policies or documentation for responding to sexual harassment on chat reference are lacking, but chat providers appreciated both formal and informal communication around the issue.

Sexual harassment on chat reference may be less frequent than harassment experienced in person, but it is no less important to acknowledge. Addressing harassment in virtual spaces is particularly relevant now as libraries pivoted to online services in response to the COVID-19 pandemic. Chat providers, like all workers, deserve safe working environments with explicit and enforceable policies in place. Sexual harassment policies should specify the inclusion of virtual working environments, especially those where employees are interacting with patrons. Clear guidelines for reporting sexual harassment behaviors perpetrated by patrons in an online environment are necessary and should include expectations of how reports will be handled. Additionally, there is a need for training of chat providers on how harassment occurs online, how it can differ from in-person harassment, and specific strategies that the provider may use in the moment. Our respondents outlined a spectrum of responses from the proactive and service-oriented, such as using an alias and redirecting a conversation, to the more direct and safety-focused, such as blocking an IP address. Depending on the level of harassment experienced and comfort level of the employee, these and other methods are

useful tools for navigating online harassment. Above all, creating and reinforcing an environment that protects and supports employees who have experienced harassment is essential.

Acknowledgments

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Appendix A

Q1 What is your gender?

- ○ Male
- ○ Female
- ○ Non-binary
- ○ Prefer to self-describe
- ○ Prefer not to say

Q2 What is your age?

- ○ 18–24
- ○ 25–34
- ○ 35–44
- ○ 45–54
- ○ 55–64
- ○ 65–74
- ○ 75 years or older

Q3 What is your race?

- □ White
- □ Hispanic or Latino
- □ Black or African American
- □ Native American or American Indian
- □ Asian / Pacific Islander
- □ Prefer not to say
- □ Other:

Q4 At what type of library do you work?

- ○ Public Library
- ○ Academic Library
- ○ Other

Q5 How is your library's chat reference service staffed?

- ○ By your library's employees
- ○ By a third-party service
- ○ Other

Q6 Who can access your library's chat reference service?

- ○ Only those affiliated with the institution or community
- ○ There are no restrictions on who can access the service
- ○ Unknown
- ○ Other

Q7 On average, how many hours a week do you personally staff chat reference?

- ○ 0
- ○ 1–5
- ○ 6–10
- ○ 11–20
- ○ More than 20

Q8 How many years of experience do you have staffing chat reference?

- ○ Less than 1
- ○ 1–5
- ○ 6–10
- ○ More than 10

Q9 Do you believe you have experienced harassment on chat reference?

- ○ Yes
- ○ No
- ○ Unsure

Q10 Do you feel you have ever been treated differently on chat reference due to your perceived gender? (e.g. favored, ignored, or slighted)

- ○ Yes
- ○ No
- ○ Unsure

Q11 Within the last 5 years, how often have you experienced the following harassing behaviors from patrons on chat reference?

	0 times	1–2 times	3–5 times	More than 5 times
Telling suggestive stories or jokes	○	○	○	○
Sending graphic photos or videos	○	○	○	○
Making crude or sexual remarks	○	○	○	○
Making sexist remarks (e.g. Is there a man I could talk to about this?)	○	○	○	○
Treating you differently due to your perceived gender (e.g. favored, ignored, or slighted)	○	○	○	○
Called you a diminutive or "pet" name (e.g. sweetheart)	○	○	○	○
Unwelcome seductive behavior (e.g. asking to meet in person or on a date)	○	○	○	○
Unwanted contact/stalking behaviors (e.g. Patron you chatted with then came to the physical library looking for you or found you on social media and made contact)	○	○	○	○
Unwanted discussion of personal matters (e.g. a patron telling you about their personal life or asking you about yours)	○	○	○	○
Offering a reward for sexual cooperation	○	○	○	○
Threatening with retaliation for lack of sexual cooperation	○	○	○	○

Q12 If you experienced any of the harassing behaviors described in the previous question, how did you respond to the behaviors? Check all that apply.

- □ I have not experienced any of the harassment behaviors described.
- □ Ignored the behavior
- □ Redirected the conversation
- □ Confronted the person/asked them to stop
- □ Blocked the patron's IP address
- □ Talked to a colleague, peer, or friend about the experience
- □ Reported the incident to someone in authority
- □ Other:

Q13 What factors influenced your decision to respond how you did?

Q14 Is a photo of you visible to patrons on chat reference?

- ○ Yes
- ○ No
- ○ Unsure

Q15 What name do you use on chat reference?

- ○ Full first and last name
- ○ First name or nickname only
- ○ Gender neutral name that is not your own
- ○ Stereotypically male name that is not your own
- ○ Stereotypically female name that is not your own
- ○ Job title (e.g. Librarian or Reference Librarian)
- ○ Other

Q16 Does your library have the ability to block IP addresses of patrons on chat?

- ○ Yes
- ○ No
- ○ Unsure

Q17 Have you used the block function or reported a patron to someone who could use the block function?

- ○ Yes
- ○ No

Q18 Does your library have a written policy regarding harassment on chat reference?

- ○ Yes
- ○ No
- ○ Unsure

Q19 Does your library have an informal or unwritten policy regarding harassment on chat reference?

- ○ Yes
- ○ No
- ○ Unsure

Q20 Has your library ever held a discussion regarding harassment on chat reference?

- O Yes
- O No
- O Unsure

Q21 Does your library provide canned messages to send to patrons behaving inappropriately on chat?

- O Yes
- O No
- O Unsure

Q22 Is it clear to whom you would report an incidence of harassment on chat reference?

- O Yes
- O No

Q23 Have you ever reported harassment on chat reference to someone in authority?

- O Yes
- O No

Q24 How was your report received?

- O It was addressed immediately
- O It was dismissed
- O Other:

Q25 Were any policies enacted/changed based on your report of harassment?

- O Yes
- O No
- O Unsure

Q26 Did any internal communication about reporting harassment go out to librarians who staff chat reference?

- O Yes
- O No
- O Unsure

Q27 If you have experienced any of the harassment behaviors described above, did the experience make you hesitant to staff chat reference?

- O Yes
- O No
- O I did not experience any harassment behaviors.

Q28 Has the experience had an impact on how you provide chat reference? If yes, please explain:

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Characteristics of United States Academic Libraries in 2020 and Regional Changes from 1996 to 2020

Samantha Godbey and Starr Hoffman

This paper provides a snapshot of United States academic libraries in 2020 and explores longitudinal trends in staffing and expenditures for 1996 to 2020. The authors merged and analyzed academic library data from the National Center for Education Statistics from over 4,000 postsecondary institutions. Characteristics are explored by region and maps are provided. Total inflation-adjusted library expenditures have increased steadily for all regions from 1996 to 2020, including in the two major expenditure categories of staffing and collections. In the Northeast and West, averages are markedly higher in staffing and total expenditures than the other two regions.

Introduction

Beginning in 1966, the National Center for Education Statistics (NCES) began collecting data on library collections, services, and expenditures for all academic libraries in the United States via the Academic Libraries Survey (ALS). Despite the long history of this data collection, analysis of this data has proved challenging for researchers, especially over time. A prior study by the same authors[1] explored ALS data from 1996 to 2016. This paper expands on that study by providing regional comparisons that add nuance to previous benchmarking data and by extending the longitudinal analysis to include 2018 and 2020. We also include an examination of 2020 data in order to provide a recent snapshot of United States academic libraries.

Literature Review

The ALS is part of the mandatory annual reporting requirements for all degree-granting Title IV institutions in the United States, and this data is available at no cost from NCES as a subset of IPEDS (the Integrated Postsecondary Education Data System). We selected this data for study due to the survey's national scope, high response rate, and availability without cost. Two additional surveys are frequently used in similar studies of academic library characteristics: the Association of Research Libraries' (ARL) ARL Statistics Survey[2] and the Association of College and Research Libraries' (ACRL) Academic Library Trends and Statistics Survey.[3] Collected since 1908, ARL Statistics provides useful data for member institutions[4] and can

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be suggestive of broader trends or "valuable insights into the profession as a whole,"[5] but ultimately this data comes from only approximately 125 institutions. The content of ACRL's Academic Library Trends and Statistics Survey is more closely aligned with the ALS, currently consisting of the required questions from the IPEDS Academic Libraries Component as well as a section on library trends, which changes each year. The number of reporting institutions is generally high, for example, 1,672 libraries or 52.1% of U.S. libraries completed the 2020 survey;[6] however, this is lower than the federally mandated ALS. Users previously paid for access to the full survey results by purchasing a single paperback edition for approximately $600. Now the full survey is only available by subscribing to the ACRL Benchmark tool, which currently costs anywhere from $99 for a one-month individual subscription to $400 for a one-year library subscription. Independent published research using this dataset is limited. For example, Fagan used ACRL Survey results to investigate predictors such as library instruction for full-text article requests,[7] while Mezick combined data from ACRL, ARL, and IPEDS to explore the relationship between library expenditures and library staffing numbers with student retention rates.[8]

Despite including the highest number of institutions compared to the alternatives and being freely available for download on the NCES website, longitudinal analysis of ALS data is challenging due to changes in survey questions and renaming of variables over time. Numerous studies have explored a single year of ALS data[9] and, less frequently, two years.[10] In fact, one of these papers that included a historical comparison was an official NCES report.[11] For example, Crawford[12] used 2010 ALS data for over 1,300 institutions to explore the relationship between library characteristics and student outcomes and found a correlation between library expenses per full-time equivalent (FTE) student and graduation and retention rates. Others have taken a regional approach to a single year of IPEDS data. Teske et al.[13] explored academic library statistics as potential predictors for first-year retention and six-year graduation rate specifically for libraries within the Southern Regional Education Board interstate region, while Crawford[14] looked at relationships between institutional and library variables for Pennsylvania colleges and universities.

Some researchers have examined three or more years of ALS data in order to identify trends or significant changes in academic libraries;[15] however, aside from our previous study,[16] the most recent of these studies is now ten years old. These studies nonetheless provide examples of the richness of this data and potential for longitudinal examination. Regazzi analyzed data on library expenditures, staffing, and usage from 1998, 2004, and 2008, noting an increase in other professional staff over this time period, especially among doctoral research institutions,[17] later confirming these results after the addition of 2010 data.[18] In Budd's examination of statistics on staffing and library transactions over 4 years of IPEDS data between 1998 and 2008,[19] the author noted a decline in library staffing over this period, but patrons nonetheless continued to visit libraries, pushing back against broader concerns about digital access to library materials reducing the importance of libraries. Lu provided the most comprehensive look at trends in United States academic libraries for the decade from 1994–2004, examining changes in library services and library resources over this time period.[20] Lu noted a positive trend in numbers of professional library staff and in library expenditures in multiple categories, including salaries and wages expenditures. While useful at its time, the data analyzed in this study is now nearly twenty years old.

In our previous study, we examined staffing and expenditure trends from 1996 to 2016 by Carnegie classification and institution size. Results indicated that the numbers of students per librarian increased over time in each Carnegie and size category, with baccalaureate institutions having the lowest student-librarian ratios. Additionally, average inflation-adjusted staffing expenditures remained steady for master's, baccalaureate and associate's institutions, and inflation-adjusted staffing expenditures declined across each size category. With the current paper, we provide an updated look at the state of U.S. academic libraries and examine trends among regional groupings of libraries. Our aim is to provide a benchmark reference; providing this data stratified by region as well as by Carnegie classification and institutional size should provide additional insight for academic library leaders looking for peer comparisons, particularly with respect to staffing and budgets. We provide commentary throughout as related to previously identified trends for the twenty years ending in 2016.

Method

We merged publicly available data from academic libraries at postsecondary institutions in the United States from 1996 to 2020 to create a single dataset that allows for the exploration of trends over time. Data is collected annually and maintained by NCES as part of federally mandated reporting for all United States higher education institutions. In particular, we merged and cleaned data from the ALS, which includes questions on library staffing, expenditures, collections, and services, and additional IPEDS surveys on student enrollment, faculty staffing, and institutional characteristics. Part of the complexity of analyzing this data for multiple years comes from changes over time with the administration of the ALS. It has also moved around within NCES, from being administered as a separate survey to being incorporated into the Integrated Postsecondary Education Data System (IPEDS) at different times since the 1960s.[21] Currently, the questions about academic libraries exist as the Academic Libraries component in IPEDS. For the purposes of this paper, we refer to the various iterations of the survey during the time period studied as the Academic Libraries Survey or ALS.

The data for every second year from 1996 to 2020 was downloaded as separate files for the various components, cleaned and merged using R, and imported into Tableau for analysis and data visualization. Variables on institutional characteristics, including Carnegie classification, zip code, and student enrollment, come from the IPEDS Human Resources, Fall Enrollment, and Institutional Characteristics. The current full consolidated dataset includes 81 variables with 51,699 observations.[22]

The data has been filtered for the current study to limit it to Title IV-eligible (i.e., federal financial aid), degree-granting postsecondary institutions reporting 10,000 USD or more in overall library expenditures. Private, for-profit institutions were excluded (n = 1,861), as were institutions outside of the regions noted below, i.e., from outlying areas and U.S. service schools (n = 130). The number of institutions varies from year to year, and this number consists of different institutions at different points as institutions fail to report or experience changes in library and institutional characteristics. The refined dataset examined here includes data across all years for 2,555 unique institutions and overall includes 4,104 unique institutions across the 50 states and District of Columbia.

Each year, data is submitted the following winter for the previous academic year ending on June 30. For example, the 2020 data included here is for the 2019–2020 academic year, providing a snapshot as of the end of June 2020.

Institutional characteristics examined here include region, control, Carnegie classification, urban-rural classification, and institution size, as well library-specific data on numbers of librarians and expenditures. Each of these are self-reported by institutions completing the relevant survey. For *region,* designations are described in more detail below. *Carnegie classification* refers to the 2000 edition of Carnegie classifications (Carnegie, 2001); values from 1996, 1998, and 2000 were converted to the comparable Carnegie 2000 classification. For *institution size*, institutions were assigned to five size categories based on total FTE fall student enrollment. All expenditures are adjusted to their equivalent in 2020 USD using values from the United States Consumer Price Index.[23] The variable *urban-rural classification* consists of four possible values (rural, suburb, town, and city) and is assigned by NCES based on a combination of population size and proximity to populated areas.[24] For the longitudinal data, it is important to note the variation in specific reporting institutions in different years.

For the current examination, we have assigned institutions to one of four regions based on their location (Central, Northeast, Southeast, and West). Within IPEDS, institutions are assigned to one of ten regions; we excluded U.S. service academies and other U.S. jurisdictions, and further combined the remaining IPEDS regions into four larger regions of comparable size for the purposes of comparison in this study. The Central region consists of Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Missouri, Nebraska, North Dakota, Ohio, South Dakota, and Wisconsin. The Northeast region consists of Connecticut, Delaware, the District of Columbia, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, and Vermont. The Southeast region consists of Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia. The West region consists of Alaska, Arizona, California, Colorado, Hawaii, Idaho, Montana, Nevada, New Mexico, Oklahoma, Oregon, Texas, Utah, Washington, and Wyoming.

Results and Discussion

Characteristics of U.S. Academic Libraries and Institutions with Academic Libraries in 2020

Regional characteristics of U.S. academic libraries in 2020 are provided in detail in table 1 and represented in map form in figures 1 through 5. While the four regions are similar in total numbers of academic libraries (Central=553, Northeast=517, Southeast=587, West=550, table 1), the map in figure 1 indicates that academic institutions are, unsurprisingly, much more spread out in the western part of the country. Comparisons between regions can also be seen in figures 6 through 9, which include results for each region as a percentage. For Carnegie classification, for example, the Central region has a total of 553 academic libraries, of which 36.9% are at associate's colleges (figure 6). The Southeast and West have higher concentrations of associate's colleges with academic libraries than the other regions, with 42.8% and 53.8% associate's colleges as compared to the Central (36.9%) and Northeast (30.4%). The West is an outlier in percentage of libraries at bachelor's colleges in only 11.1% of the region's institutions, whereas all other regions have approximately a quarter. Instead, the West has the largest number and percentage of libraries at associate colleges of any region. While all regions are similar in that they have the lowest percent share going to doctoral/research institutions, the Northeast and West regions have distinctly higher percentages (Northeast=13.7%, West=12.4%) compared to the Central (10.7%) and Southeast (9.4%) regions.

Regions also show differences in institutional control; the Southeast and West have more public institutions (Southeast=64.6%, West=76.4%), while Central (56.4% public) and Northeast (46.6% public) are more evenly split (figure 7). The stereotype of everything being larger out West is upheld as far as institutional size; the West has the lowest percentage of libraries in the smallest size category among all regions. Just 36% are at institutions with fewer than 2,500 students, compared to 46.4% of Northeast institutions, 51.9% of Central, and 54.5% of Southeast. The West also has the highest concentration of academic libraries in the two largest institution size categories, with 12.2% between 10,000 and 19,999 student FTE, and 9.5% at or above 20,000 student FTE (figure 8).

The NCES assigns each institution one of four geographical classifications: rural, suburban, town, or city, as noted above. Across all regions, institutions with academic libraries are more prevalent in cities (figure 9). The Northeast has a higher concentration in suburbs

TABLE 1
Characteristics of Regional Groupings, 2020

	Central	Northeast	Southeast	West	Row Totals
# of Academic Libraries	553	517	587	550	2207
Carnegie Classification					
Associate's Colleges	204	157	251	296	908
Bachelor's Colleges	148	127	156	61	492
Master's	142	162	125	125	554
Doctoral / Research	59	71	55	68	253
Control					
Private, nonprofit	241	276	208	130	855
Public	312	241	379	420	1352
Institution Size					
<2,500	287	240	320	199	1046
2,500–4,999	130	118	113	127	488
5K–9,999	74	97	79	105	355
10K–19,999	39	42	41	67	189
>20,000	23	20	34	52	129
Urbanity					
city	205	205	247	278	935
rural	65	47	90	45	247
suburb	108	190	92	116	506
town	175	75	158	111	519

Note: Central consists of IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, WI; Northeast consists of CT, DE, DC, ME, MD, MA, NH, NJ, NY, PA, RI, VT; Southeast consists of AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, WV; West consists of AK, AZ, CA, CO, HI, ID, MT, NV, NM, OK, OR, TX, UT, WA, WY.

(36.8%), in fact, nearly as many as in its cities (39.7%), whereas Central and Southeast academic libraries tend to be found in cities or towns. Among regions, the West has the highest percentage in cities (50.5%), and the amount in suburbs (21.1%) and towns (20.2%) are quite similar. Figure 4 helps show this concentration in cities. For example, the numerous academic libraries clustered along the I-35 corridor in Texas that includes the cities Dallas, Ft. Worth, Waco, Austin, and San Antonio are visible running northeast to south. This map is also a useful visual representation of the suburb grouping of institutions in the Northeast.

Values for each of the considered academic library characteristics are provided in table 2. There are distinct regional differences among academic libraries. In 2020, the Southeast has the most academic libraries compared to the other regions but has the lowest average number of librarians (8.2, the same as Central), and the smallest average expenditures across all categories (total expenditures = $2.78 million; staffing = $1.16 million; collections = $1.09 million). The Central region is similar but slightly higher with total expenditures of $2.87 million on average, staffing expenditures of $1.19 million, and collections expenditures of $1.15 million. Conversely, as noted above, although the Northeast has the fewest libraries, it has the highest average number of librarians (12.3), and the highest average expenditures across all categories (total expenditures = $4.59 million; staffing = $1.94 million; collections = $1.73 million). The West follows the Northeast in both average numbers of librarians (11.4) and expenditures (total expenditures = $3.93 million; staffing = $1.76 million; collections = $1.37 million). These differences between regions can in part be explained by the differing distribution of institutional types, such as greater numbers of Carnegie doctoral/research institutions in the Northeast and West.

Trends Over Time for U.S. Academic Libraries, 1996–2020

For each of the following variables, data are provided as line charts to explore trends in the data (figures 10 through 13), in addition to the 2020 data in table 2.

Number of Librarians

Average numbers of librarians from 1998 to 2020 by region are provided in figure 10. As noted in the authors' earlier article on this data, the data source for number of librarians shifted in 2012 from being reported by libraries themselves in the ALS to being centrally reported to

TABLE 2
Characteristics of U.S. Academic Libraries by Region, 2020

	Central	Northeast	Southeast	West
# of Academic Libraries	553	517	587	550
Average # of Librarians	8.2	12.3	8.2	11.4
Average Expenditures				
Staffing Expenditures	$1.19M	$1.94M	$1.16M	$1.76M
Collections Expenditures	$1.15M	$1.73M	$1.09M	$1.37M
Total Library Expenditures	$2.87M	$4.59M	$2.78M	$3.93M

Note: Central consists of IL, IN, IA, KS, MI, MN, MO, NE, ND, OH, SD, WI; Northeast consists of CT, DE, DC, ME, MD, MA, NH, NJ, NY, PA, RI, VT; Southeast consists of AL, AR, FL, GA, KY, LA, MS, NC, SC, TN, VA, WV; West consists of AK, AZ, CA, CO, HI, ID, MT, NV, NM, OK, OR, TX, UT, WA, WY.

IPEDS by institutions' central human resources (HR) offices. Shifts from 2010 to 2012 should therefore be viewed cautiously. Only the Northeast region declined in number of librarians when the data reporting changed (from 12.6 in 2010 to 12.3 in 2012), while all other regions increased. However, this may not be an accurate representation of library staffing. For example, if there are units at an institution that did not previously report to the ALS but that include professionals who could be classified by central HR as providing related library or services, there would be an increase in "librarians" between 2010 and 2012 without any actual changes in staffing. Additionally, in the HR survey, institutions with fewer than 15 total staff do not separate the number of librarians from other archivists, curators, or museum workers.

The limitations of this data mean that it is not possible to compare the exact values for 1998 (the first year this number was collected) and 2020. The Central region, for example, has the same number of total librarians in 2020 as there was in 1998, but the reporting method has differed; it is better to look at the trend lines, particularly since 2012, to get a sense of changes. Prior to 2010, there was fairly steady but slow growth in librarians through 2008, then a slight decline for all regions in 2010, presumably following the 2008 recession. From 2012 onward, it is less consistent. The Southeast and Central follow a similar trajectory, with a slight increase in 2014 and declines from 2016–2020. The Northeast has fluctuated, ending at the same number in 2012 and 2020. The West was fairly steady over time but shows a slight increase from 2012 to 2020.

In the previous study, we observed a decrease in average number of librarians per institution across all Carnegie and size categories from 2012 to 2016. This trend continued into 2020 for the Central and Southwest regions, but differed for the Northeast and West, the two regions with higher concentrations of doctoral institutions. Institutions in the West have slightly increased in librarians since 2016 and the Northeast is overall higher but inconsistent in numbers of librarians in this time period.

Library Expenditures

In contrast to library staffing numbers, expenditures data is consistent in its reporting across all years from 1996 to 2020. For all expenditures data, values have been adjusted for inflation to 2020 dollars. Our previous study focused exclusively on staffing expenditures by Carnegie classification and institution size through 2016. When grouped by region, total library expenditures between 1996 and 2020 (figure 11) have increased across all regions. This increase across all regions is also noticeable across the two major expenditure categories of staffing (figure 12) and collections (figure 13). Overall, the Central region has experienced the smallest change over time in total library expenditures in this 24-year period. All regions were at least slightly down in total, staffing, and collections expenditures from 2018 to 2020. Within this time period, total expenditures decreased in all regions from 2010 to 2012, but then increased again from 2012 to 2014. Since 2014, total expenditures in the Central, Northeast, and Southeast regions have decreased, with the sharpest decline in the Central region. In contrast, the West has on average increased since 2014 in total library expenditures.

The decrease in total expenditures from 2010 to 2012 seems primarily driven by decreases in staffing expenditures across all regions. In figures 12 and 13, we see that in 2012, collections expenditures remained flat for the Southeast, and decreased by $.1M in the other three regions, while there was a drop in staffing expenditures. During this period, 2010 to 2012, the average number of librarians fell slightly for all regions except the Southeast, which rose slightly from

9.0 to 9.1 FTE.[25] The average number of total library staff also decreased from 2010 to 2012, and had been decreasing since 2008 for all regions, although this does not completely explain the specific staffing expenditure decrease from 2010 to 2012.[26]

In contrast, the increase in total expenditures from 2012 to 2014 appears to be driven by both staffing and collections increases, with a steeper increase in collections expenditures. All regions increased overall from 1996 to 2020 in collections expenditures, increasing almost every year until 2014, at which point the trajectory for all regions shifts to being flat or decreasing slightly, with the steepest decline in the Central region from 2014 to 2020 (figure 13).

For all three figures, the Northeast and West regions are the highest trend lines. The fact that Northeast and West have the highest concentration of doctoral/research institutions helps explain why their expenditures are so much higher than the other regions for total and staffing. Staffing is a large portion of total library budgets in general. In our previous study we noted that staffing expenditures by Carnegie grouping were on average anywhere from 40% to 70% of total expenditures in a particular year, with associate's institutions consistently devoting a higher percentage of their total expenditures to staffing and doctoral/research institutions spending a lower percentage on staffing and more on collections.[27] Although doctoral institutions spend a lower percentage of their total budgets on staffing, nonetheless their staffing expenditures are higher in total since they have higher staffing numbers. Given the higher concentration of doctoral institutions in the Northeast and West, higher overall expenditures make sense. Research institution expectations around collections and staffing contribute to higher expenditures in those categories for these regions.

Collections expenditures, which also increased across time for all regions, show more similarities across regions in their trajectories (figure 13). The Northeast and West are still highest, again perhaps due to the high number of research institutions, which tend to have larger collections budgets. The trend lines are mostly parallel for collections, with all regions exhibiting similar growth but on a different scale. For example, immediately following the 2008 recession, from 2008 to 2012, trend lines are flatter for all regions. These parallel trajectories across regions are logical, given that changes in collections expenditures are largely determined by increases in pricing that affect all institutions such as industry-wide increases in subscription costs.

The inflation-adjusted values discussed here provide insight into academic libraries' actual experiences. When not adjusted for inflation, the trend lines for all types of expenditures are much steeper, with almost completely consistent year-over-year increases in total, staffing, and collections expenditures. Budgets have increased substantially in dollar amounts since 1996, but this provides an incomplete representation of the resources academic libraries have available to them. As an example, ever-increasing collections costs, especially for academic journals, have outpaced inflation and have been of significant concern to academic libraries for decades.[28] Despite increases in budgets from year to year, inflation-adjusted values provide a more accurate indication of libraries' purchasing power over time.

Conclusion

The NCES data on academic libraries is a helpful tool for benchmarking library staffing and expenditures compared to peers, either by region as presented here, or by Carnegie classification as presented in our previous article. It is also useful as an overview of the current state and potential future direction of academic libraries regarding the key areas of staffing

and expenditures. Viewing this data over time can provide additional insight and stronger conclusions than can be observed in a single year's data snapshot. While NCES data for the most recent year is easier to use with some of the newer IPEDS data tools, viewing data over time and by distinct groups such as region remains challenging. The authors have made the dataset used in this study available for use[29] by anyone for further studies, or for creating custom peer institution comparisons.

Data limitations include those mentioned previously with regard to changes in reporting over time. Additionally, the authors noted the highly dispersed nature of this data in their previous article, which remains true for the additional years examined here. It is important to note that the population is large (n = 2,207 in the year 2020) and composed of highly varied institutions in terms of size and other characteristics. The exact institutions included vary across years as well, as not all institutions report every year. Averages are provided here to account for these variations within each year's data, but individual institutions may observe that these averages do not align with the data they have reported for their own academic libraries.

In this article, we have provided a snapshot of characteristics of academic libraries in 2020 and noted several key trends over time:

1. Total library expenditures, even when adjusted for inflation, have increased overall for all regions from 1996 to 2020. This increase is also clear in the two major expenditure categories of staffing and collections. All regions except for the West have decreased in total library expenditures since 2014.
2. In the Northeast and West regions, where larger numbers of academic libraries are at doctoral/research institutions, there are higher numbers of librarians and expenditures across all categories as compared to the other two regions. The averages are markedly higher in staffing and total expenditures than the other two regions.
3. Data on the average number of librarians by region indicates slow but steady growth in numbers of academic librarians from 1998 to 2008. Since 2012, the Northeast and West regions have remained steady in numbers of librarians, while the Central and Southwest regions have declined.
4. Trend lines in collections expenditures show parallel trajectories across regions from 1998 to 2020, likely due to changes in pricing that affect all institutions.

The intention of this article was to provide an indication of trends among U.S. academic libraries as of 2020, not a completely thorough examination of the data. Future research might explore additional aspects of this plentiful dataset, for example, breaking down the data into more detail by exploring institutional characteristics within regions (e.g., by Carnegie classification, control, etc.) to gain further insight into the regional trends observed here. Further study with an expanded dataset could also explore changes in libraries in the years following the COVID-19 pandemic. The 2020 data included in this article covers the period ending in June 2020, so academic library staffing and budgets were not yet significantly affected by the pandemic. A future study would benefit from examining 2022 and even 2024 data to explore longer term impacts of the pandemic on staffing and budgets.

FIGURE 1
Geographic Distribution of 2020 Academic Libraries

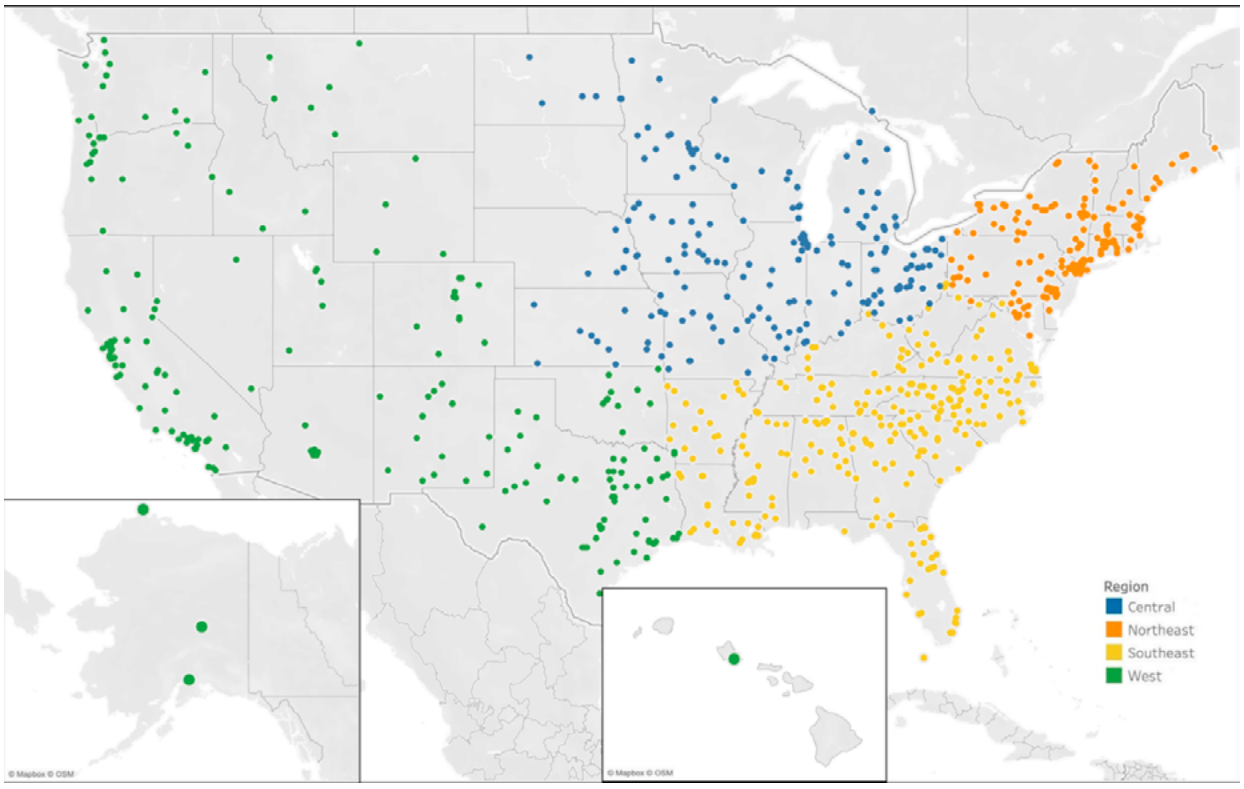


FIGURE 2
Carnegie Classification of 2020 Academic Libraries

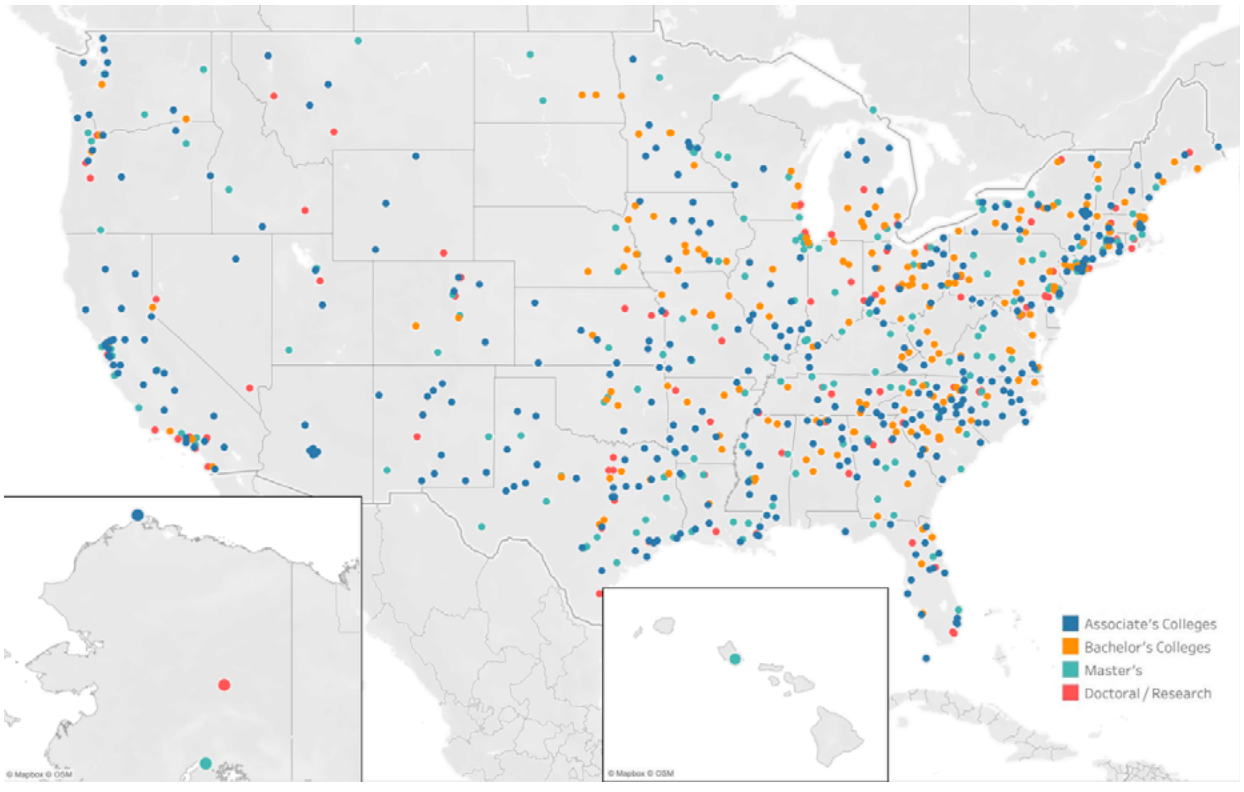


FIGURE 3
Control of 2020 Academic Libraries

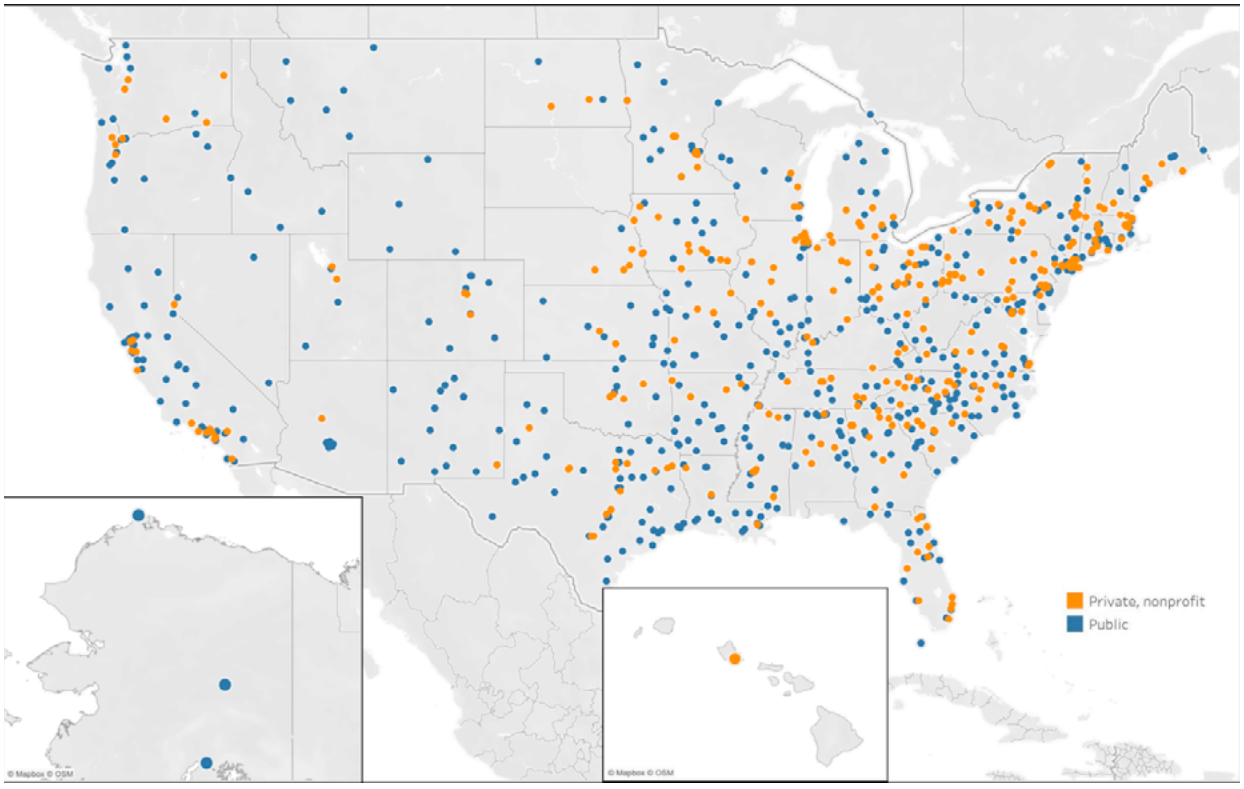
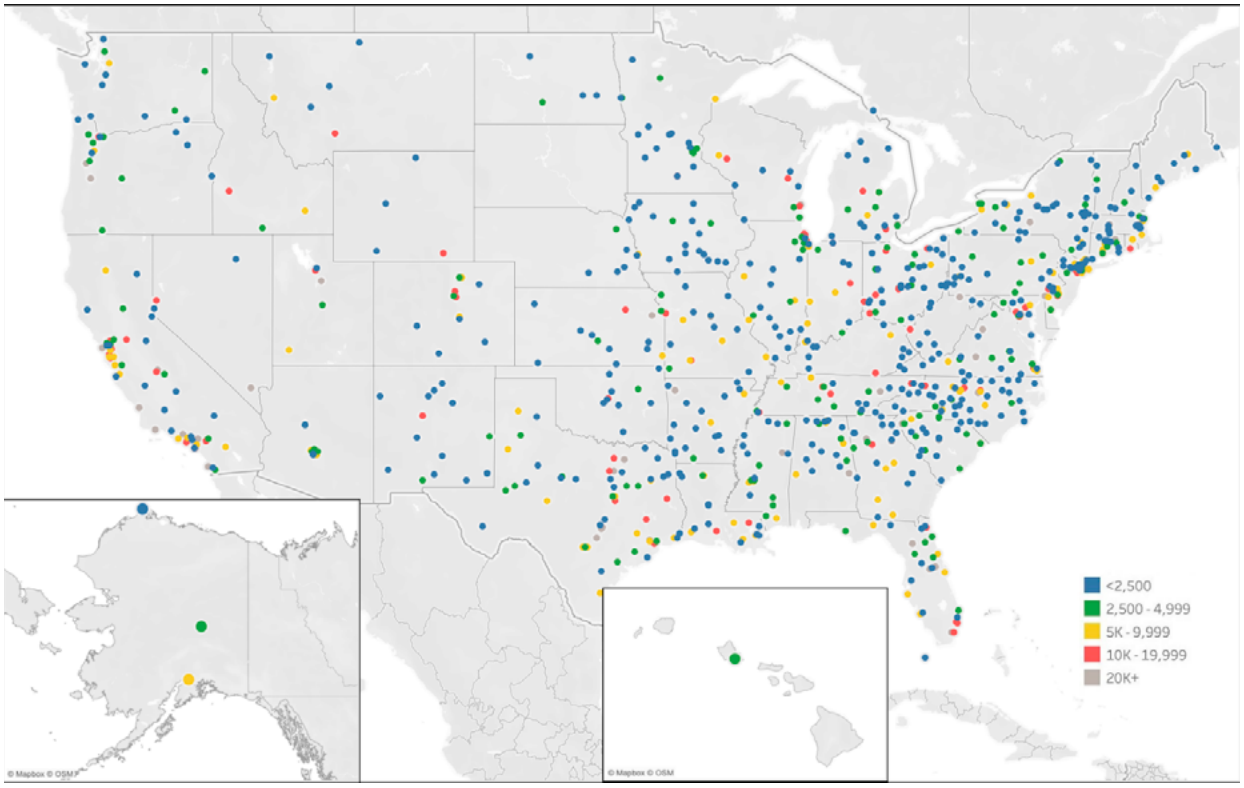


FIGURE 4
Institution Size of 2020 Academic Libraries



Note. Includes institutions reporting ≥ 1.0 FTE Student.

FIGURE 5
Urbanization of 2020 Academic Libraries

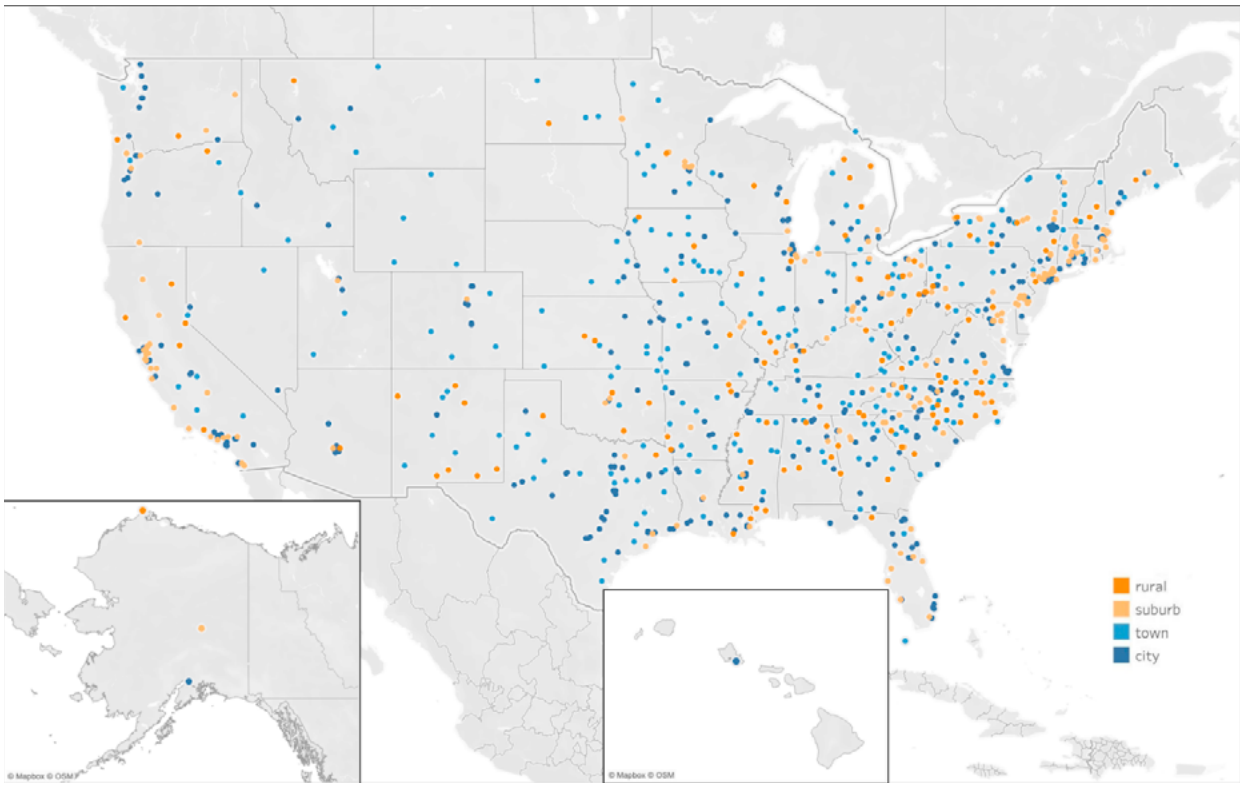


FIGURE 6
Carnegie Classification of 2020 Academic Libraries by Region

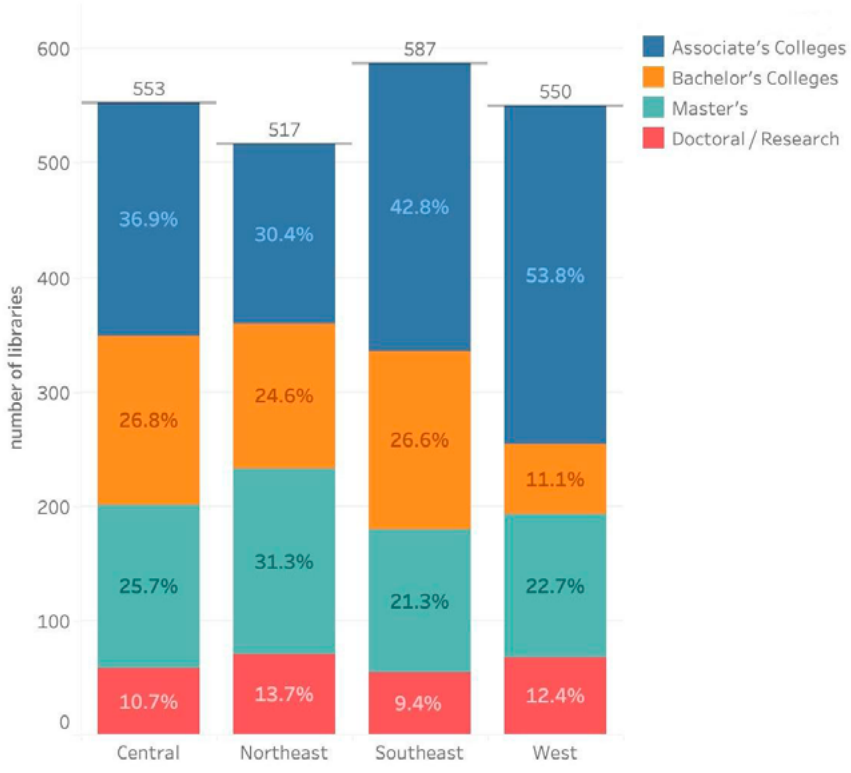


FIGURE 7
Control of 2020 Academic Libraries, by Region

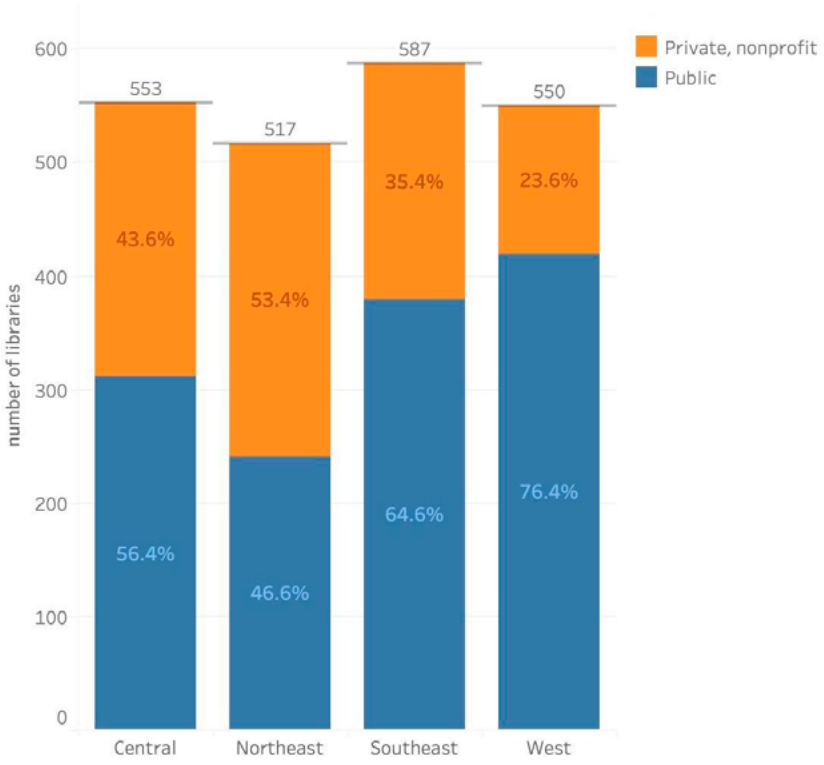
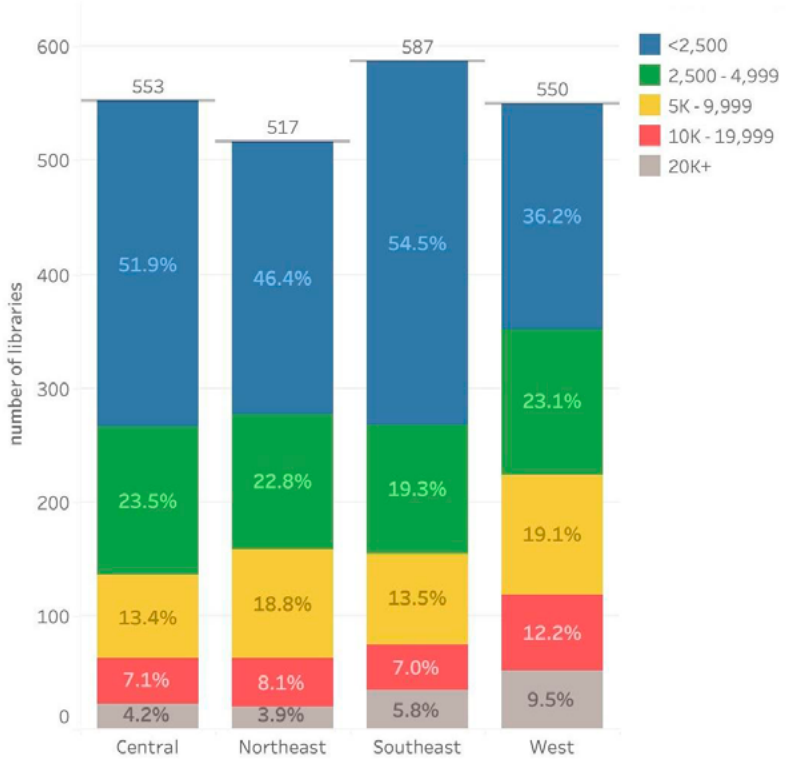


FIGURE 8
Institution Size of 2020 Academic Libraries by Region



Note. Includes institutions reporting ≥ 1.0 FTE Student.

FIGURE 9
Urbanization of 2020 Academic Libraries by Region

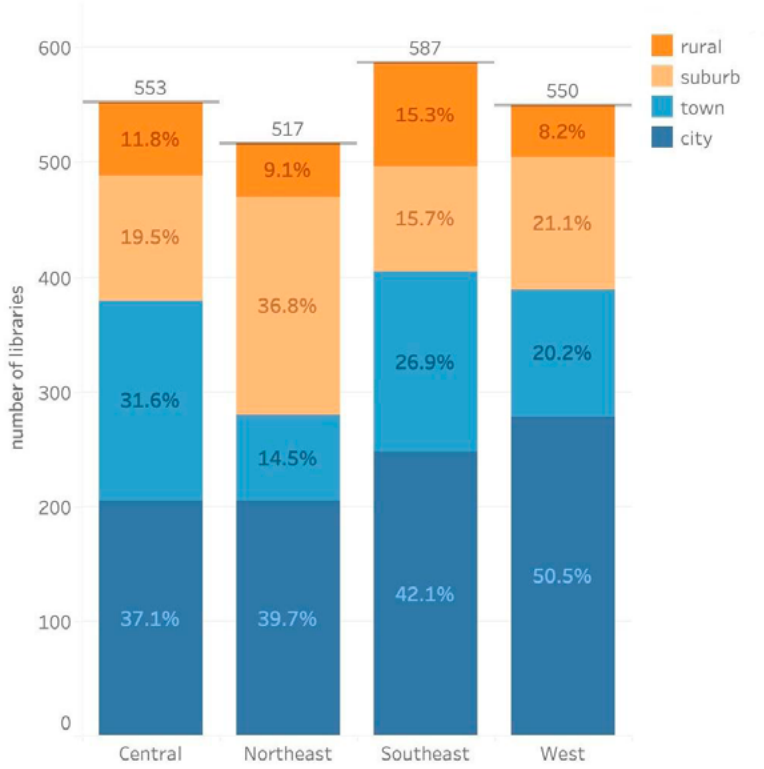
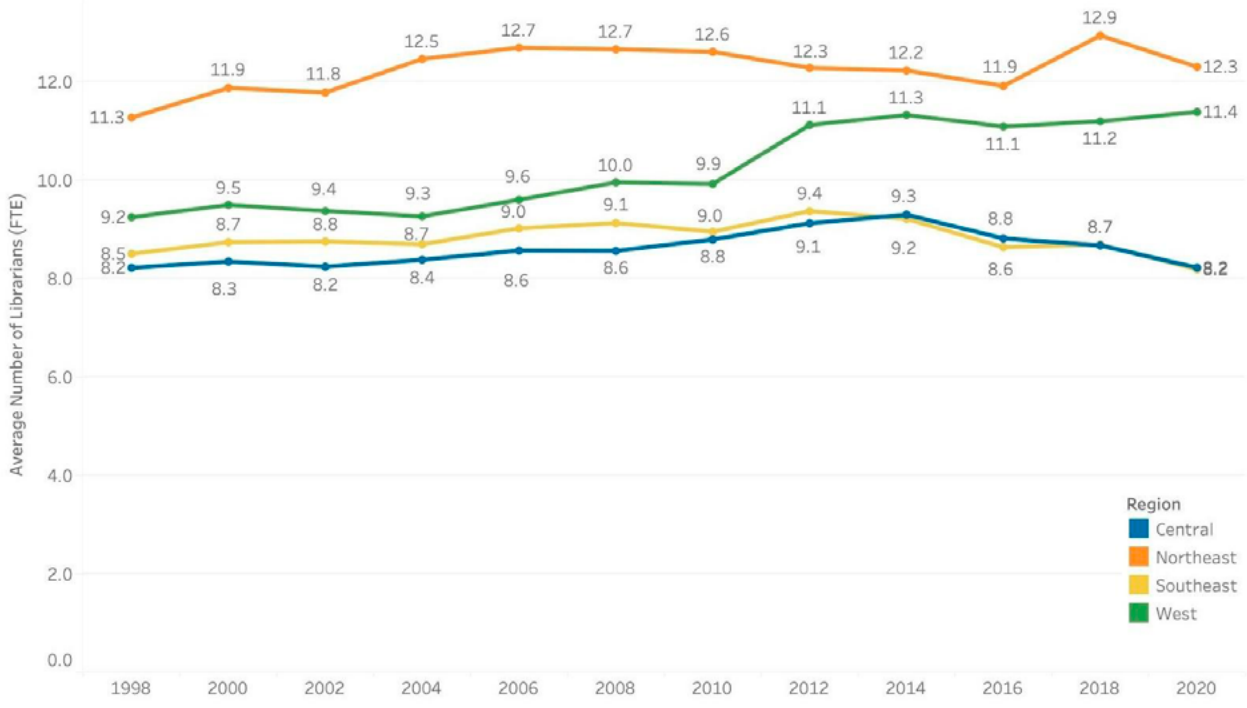
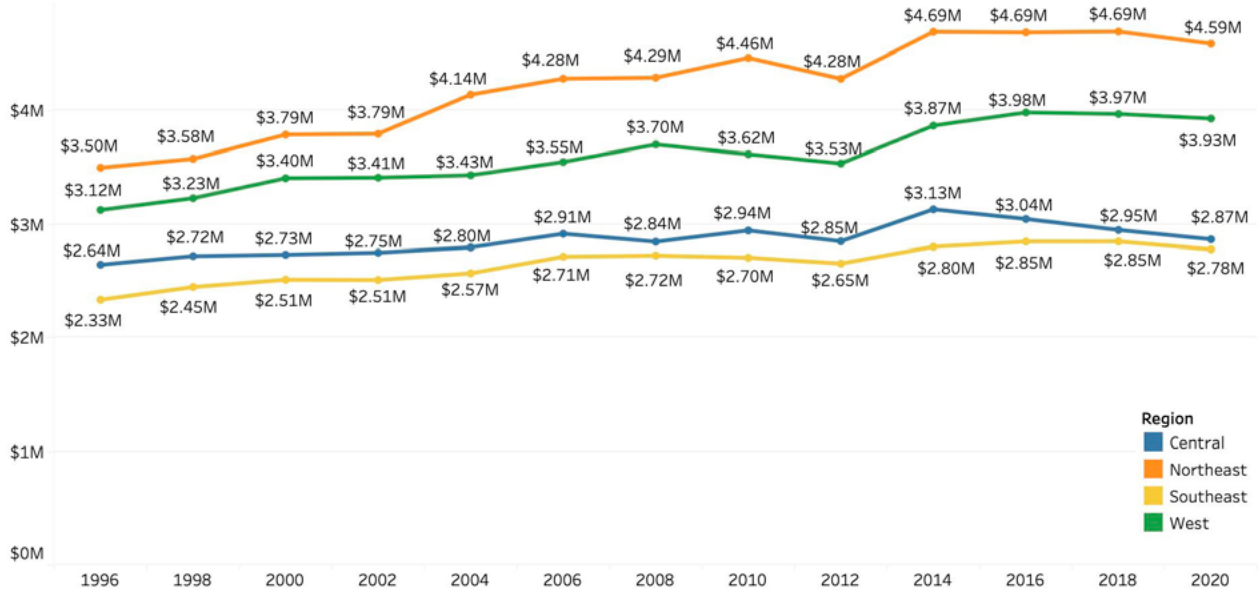


FIGURE 10
Average Number of Librarians (FTE) per Institution Over Time, by Region



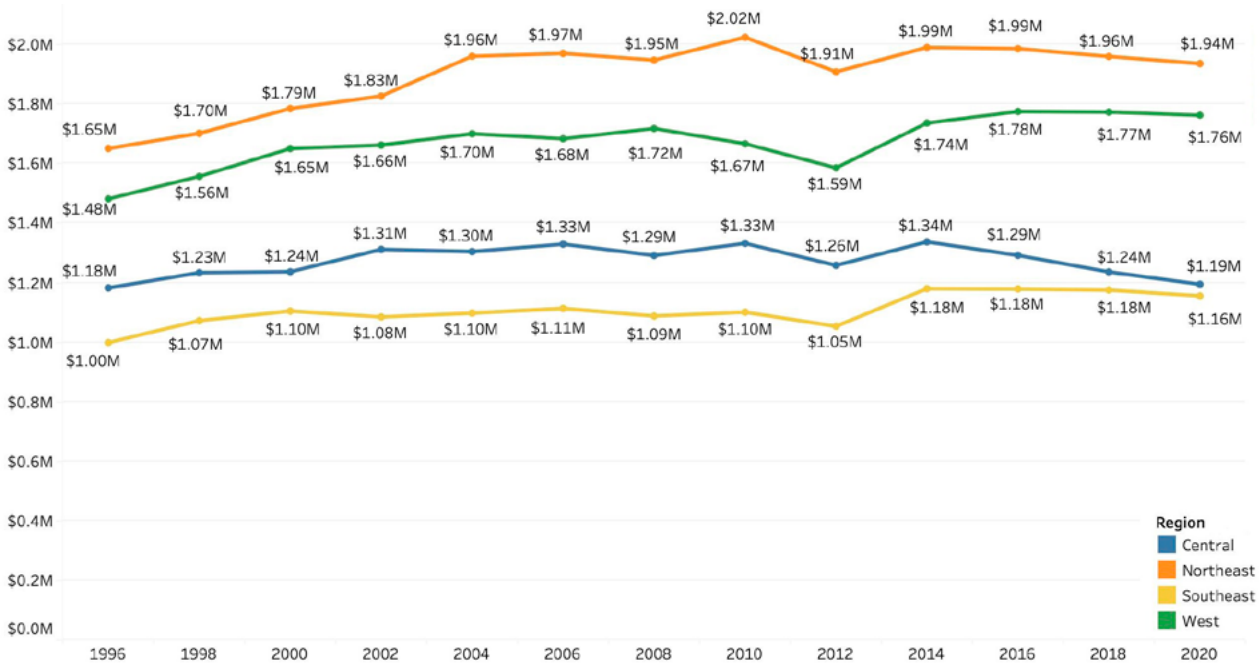
Note. Includes institutions reporting ≥ 1.0 FTE librarian. Data source for number of librarians: Academic Libraries Survey, 1998–2010; IPEDS Human Resources survey, 2012–2020.

FIGURE 11
Inflation-adjusted Average Total Library Expenditures per Institution Over Time, by Region



Note. All expenditures are converted to their equivalent value in the year 2020.

FIGURE 12
Inflation-adjusted Average Library Staffing Expenditures per Institution, by Region



Note. Staffing expenditures refers to salaries/wages, excluding fringe benefits. Includes libraries reporting library staffing expenditures ≥ 1.00 USD. All expenditures are converted to their equivalent value in the year 2020.

FIGURE 13
Inflation-adjusted Average Library Collections Expenditures per Institution, by Region

Note. Includes libraries reporting library collections expenditures ≥ 1.00 USD. All expenditures are converted to their equivalent value in the year 2020.

Notes

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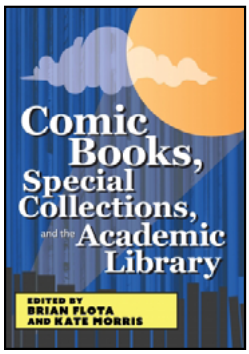
Comic Books, Special Collections, and the Academic Library. Brian Flota and Kate Morris, eds. Chicago, IL: Association of College and Research Libraries, a division of the American Library Association, 2023. 305p. Softcover, $82.00 ($73.80 ALA members) (ISBN: 978-0-8389-3950-5).



As comic books and their associated media continue to dominate popular culture, many libraries are exploring the idea of collecting them or thinking of new ways to use the comic books they have as aids to instruction and research and to draw more students into the library. The editors of this new work have collected essays covering many different aspects of the comics in the library question. In 20 chapters over 4 sections, the reader learns why a library should collect comics material, what to do with it once it arrives, and how to use it in library instruction and as a research tool.

The wide variety of comic publication formats and subjects can be daunting when deciding what to collect. Often, a library's collection begins with a donation from an individual collector. Other criteria, such as local authors and artists or a particular subject or style of publication, can help focus an institution's collecting efforts. In Part 1 of *Comic Books, Special Collections, and the Academic Library* many of these issues are discussed. The special requirements of digital comics are covered in one chapter, and another discusses Native American, First Nations, and Indigenous graphic novels and how they are used by students in various classroom settings. Another chapter examines the conflict between the established Comics Code and the Nixon administration's desire to get its anti-drug message into as many media outlets as possible. The challenges and importance of collecting local comics in Australia is discussed in another chapter.

Part 2 looks at the particular challenges of housing and cataloging comic books in an academic setting. Many were not intended to last and were printed with cheap ink on cheap paper. Different storage solutions such as acid-free slipcovers and storage boxes (similar to what individual comic collectors might use) are discussed. Cataloging presents several challenges. Most comic books were published in serial form, but many different writers and artists might work on specific issues. Titles and even publishers might change over the course of a comic's life. Long established series might have associated one-off issues. Some libraries have adapted MARC records to catalog their collections, while others use finding aids, usually in a spreadsheet format, as a quick and economical way to make a collection accessible to readers and researchers. Of special interest is the Dark Horse collection at Portland State University. The publisher, located in Oregon and founded by alumni of PSU, made the decision to donate copies of everything they publish to PSU. There is a circulating collection as well as archived copies of their output.

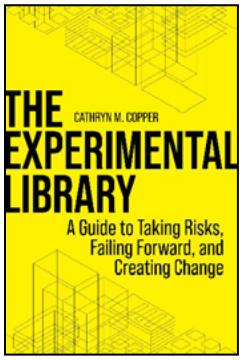
Instruction and outreach are the focus of Part 3. Working with an instructor, special collections librarians can pull materials on a specific topic or from a particular era, allowing the students to see different perspectives and interpretations of events. One chapter discusses an exhibition of editorial cartoons that COVID forced online. Librarians were able to add pop-up explanatory notes to the scanned cartoons that were arranged by topic. In another case, Silver

Age (c1956–1972) superhero comics were compared to other, lesser-known genres from the period, such as war, western, and romance comics. Students could compare artistic styles and editorial decisions in different types of stories, and the worldview on display in the comics could be compared to other media of the era.

In Part 4, chapters discuss specific collections and types of comics. One discusses the challenges particular to crowdfunded comics, especially regarding budgets. Another looks at LGBTQ graphic memoirs in relation to other biographical sources from members of this community. A third examines propaganda comics from Maoist China, establishing a link to earlier forms of information distribution, such as early modern European broadsheets and religious tracts. Students are able to compare tales such as the life of Confucius through the lens of the party line of the Chinese government. Another looks at comics published by the Catholic Church to compete with the popular secular comics of the time.

Comic Books, Special Collections, and the Academic Library will be a valuable resource for any librarian whose institution is beginning to collect comics and to any librarian with an underused collection looking for inspiration. The popularity of comic books and their related movies and television shows provides an excellent avenue for introducing students to larger topics in history, storytelling, and social issues in a number of disciplines. The breadth of topics covered across the chapters of this work means that almost any reader will find some applicable ideas for collecting, organizing, and using comic book collections in an academic setting. —*Dan Forrest, Western Kentucky University*

Cathryn M. Cooper. *The Experimental Library: A Guide to Taking Risks, Failing Forward, and Creating Change.* Chicago, IL: ALA Editions, 2023. 184p. Paper, $59.99 (ISBN: 978-0-8389-3965-9).



The Experimental Library: A Guide to Taking Risks, Falling Forward, and Creating Change by Cathryn M. Copper is a short, handy guide for anyone looking to bring about a different way to solve problems and implement change in their library. The book is divided into three short sections: "A Culture of Experimentation," "The IDEAA Anti-Method," and "Mapping Experimentation to Your Organization." Summarizing successful corporate businesses that reinvented or transformed themselves provides the foundation that libraries could follow. The meat of the book, however, is in Part 2, where Copper explains the steps in the experimentation "anti-method" and how it is relevant to libraries. Moving libraries away from being risk-adverse and towards embracing exploration into new operational procedures or innovative programming is a major theme of the whole book. Experiments do not have to take a lot of money or space in order to be implemented—all they need is to be well thought out. This book takes inspiration from the tech sector and startups, highlighting companies like Apple and Google as experimentation models to emulate. Libraries can imitate the environment of a startup organization by encouraging small experiments and reconsidering what it means to fail. This book is ideal for someone in a leadership position who is looking to bring about changes, both large and small, to their organization. At a slim 184 pages, this book is easy to read as part of a professional-development group or for everyone in leadership to consider.

Copper has worked in both public and academic libraries and has provided examples of experimentation from her past experiences as well as samples from other libraries. The provided illustrations are equally split between academic and public library situations. Any

reader will be able to appreciate the proffered case studies and use them as a starting point for thinking about their own future experiments. Copper is not only well-versed testing in libraries, but she is also sympathetic to the potential struggles library employees might face when trying to create change. The author reminds readers that libraries are stereotypically risk-adverse institutions. The best way to create change is to start small; however, the second-best path is to be a manager or in high-level administration with the authority to institute change from the top down.

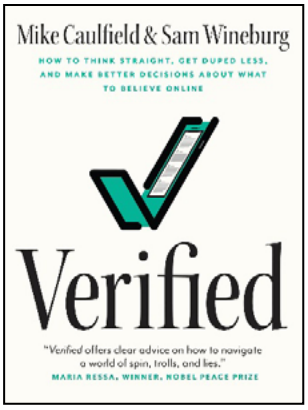
While Copper's main argument is "the beauty of experimentation is that anyone can do it regardless of budget" (ix) many readers may feel like they lack the authority to propose a new policy, event, or idea. This book is best for people in a formal or informal leadership role who can institute the necessary cultural changes, regardless of the available budget. While the author intends the text to be helpful for anyone in a risk-adverse industry, because the title has "library" and is published by ALA, very few readers outside the field of librarianship are likely to encounter it. On the other hand, many of Copper's models of companies as successful innovators are found in the tech industry. As a result, more examples of libraries doing well instead of highlighting famous technology and start-up organizations would have been appreciated. Copper knows that library culture is unlikely to transform into Silicon Valley culture, so giving the intended readers more insight into what is going on in their own field is, similarly, more likely to be applicable.

The most interesting parts of the book are found in Chapter 4 when the author discusses determining what the real question is instead of what the problem is and evaluating/connecting the results of experimentation back to the library as discussed in the last three chapters: "Fail Forward," "Reskilling the Information Professional," and "The Experimentation Roadmap." These are the most widely impactful chapters that can alter how people think about the issues they face in their workplace and determine what "success" looks like. These chapters would help someone identify the issue, not just solve the symptom, and then prove the worth of a program, service, or resource. These final chapters are perhaps the most widely relevant because, as the saying goes, "what is measured can be managed." Although aspects of DEIA are not explicitly discussed, an attitude of experimentation could be used to try bringing in more diverse policies, collections, and programming. For this reason, readers outside of a strong leadership role might be interested in reading or encouraging a library-wide read of this text.

Embracing risk and learning from failure are two tenets libraries could put to good use. Ultimately, *The Experimental Library* has value for anyone in libraries interested in making changes and guiding their institution in new directions. Copper is a knowledgeable author prepared with case studies which make this book relevant to practitioners and idea-creators alike. Although people in leadership positions are best positioned to act on what is recommended in the book, any reader or organization can benefit from the information included. I would recommend this title to any public or academic library interested in trying something different or experimenting with their programs. —*Clarissa Ihssen, American University*

Mike Caulfield and Sam Wineberg. *Verified : How to Think Straight, Get Duped Less, and Make Better Decisions About What to Believe Online*. Chicago, IL: The University of Chicago Press, 2023. 266p. Paper, $14 (ISBN: 978-0-226-82206-8).

Acclaimed economist, political scientist, and computer scientist, Herbert Simon, is quoted by authors Mike Caulfield and Sam Wineberg in the conclusion of *Verified : How to Think Straight,*



Get Duped Less, and Make Better Decisions About What to Believe Online and perfectly encapsulates the problem addressed by the book. Simon observed that, "a wealth of information creates a poverty of attention" (212). Accordingly, Caulfield and Wineberg suggest not always focusing on what to pay attention *to*, but instead, how to "critically ignore" low-quality information in an effort to save time and mental energy in an online world overloaded with information. Written with humor and abundant in real-world examples, *Verified* expands upon Caulfield's popular SIFT approach to evaluating information online and includes tips on identifying common dirty tricks used by purveyors of disinformation and misinformation, strategies for recovering lost context, a primer on peer review and scholarly communication, and an overview on how advertisements insidiously disguise themselves as real news.

Verified begins by introducing SIFT, Caulfield's updated approach to evaluating information online, introduced in 2017 and now popular with academics and other researchers. SIFT directs internet searchers to Stop, Investigate the source, Find other coverage, and Trace claims to the original context. This approach is practical, intuitive, and effective, but it takes practice to make it second nature. Caulfield, a research scientist and affiliate instructor at the University of Washington Information School's Center for an Informed Public, and Wineberg, professor emeritus and head of Stanford History Education Group, establish their credibility early, citing studies that evaluate the effectiveness of SIFT and lateral reading. The practice of using the web to evaluate the web has struck a chord with researchers and has been supplanting older methods centered around examining the source itself.

Chapters on Google and Wikipedia discuss the strengths and weaknesses of each tool and advise on how to use both safely. The scholarly conversation around these two ubiquitous and enduring cornerstones of the internet has fostered much debate. Google and other search engines are generally accepted as imperfect tools that require some knowledge of how they work in order to use them effectively. Caulfield and Wineberg integrate insights into click restraint, source types, and establishing search result expectations along with analyses of some of Google's more recent innovations (e.g., featured snippets) and algorithmic behaviors. The chapter on Wikipedia highlights some of the developments that have allowed the site to evolve from a teacher's worst enemy to a primary trusted source of information for Google, Siri, and many health care providers. The authors applaud Wikipedia's utility when performing quick fact checks, verifying the trustworthiness of sources, and identifying major figures, issues, and points of contention on a given topic.

The book concludes with a postscript regarding the recent public release of ChatGPT and, while the authors recognize that they barely had time to get their comments in by their deadline, they include insights that will likely prove valuable in the coming years as artificial intelligence and large language models (LLMs) continue to influence the way we write and what we read. They warn us that one of the last hard-to-fake signals of authority, writing style, is in danger of being cheapened by tools like ChatGPT, and they recommend putting more stock in a source's online reputation. On a more optimistic note, LLMs may make lateral reading easier by providing quick access to more information and filling the gaps between longer, dense sources and short snippets with little context. The timely postscript ends with a warning: LLMs don't know things, they only remix and repeat what people have said about

them online. Before anyone uses text written by an LLM, they should verify all facts and claims, a process that may take longer than the actual composing and writing.

Verified is reinforced by several devices that help make it a useful reference. Plentiful screenshots illustrate red flags on questionable websites and provide context for discussions of things to look for in search result pages. Each chapter ends with a bulleted list of takeaways which, even isolated from the text, serve as useful reminders of things to be mindful of online. The conversational tone of the writing, while persuasive and efficient, describes techniques that may be considered common sense, and it sometimes lacks the textual weight and simplicity of a checklist or the novelty of an entirely unique approach. *Verified* counters this vulnerability by consistently building upon previous lessons and examples to drive its points home. For example, in a chapter about being mindful of one's emotional reaction to a piece of information, the reader is asked to recall a story in a previous chapter about the outrage surrounding the "suitcases of ballots" that appeared in Fulton County after the poll workers left for the night. Getting to the truth of a matter about which the entire population has a voice, including certain voices aiming to create outrage, is messy business. One of *Verified*'s greatest strengths is navigating the mess with its constructivist approach, linking everything together and building from previous learning.

Caulfield and Wineberg hope that readers of *Verified* will take these lessons and strategies and use them to counter the mass of mis- and disinformation online. Instead of withdrawing from the often-toxic environments of social media, they encourage readers armed with proper verification skills to read, verify, and share high quality information. For the most part, they make it look relatively easy while acknowledging the massive infrastructure designed to bend or disregard the truth. To the novice researcher, *Verified* serves as a sympathetic and accessible guide to those who feel overwhelmed by the volume and complexity of the modern information machine. For researchers, academics, librarians, and students who are already SIFT adherents, the book provides context and examples in spades, which help explain why the approach makes sense. —*Stephen Michaels, University of North Georgia*