Connecting Fragmented Support on Campus: Growing Research Data Services Programs Through Collaboration

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Abstract

Research data services are provided by multiple units across and beyond the library, which is why communication and collaboration are paramount to building support for researchers. By exploring how Research Data Services (RDS) programs can function in the fragmented landscape of research support on campuses, we outline the role of collaboration in building programs. In this paper, we discuss building an RDS program by emphasizing three strategies for collaboration: collaborating within the library, collaborating across campus, and collaborating externally with those without direct ties to your organization. The aim of this paper is to offer attainable examples and strategies for building collaborations across campuses for libraries that have small or nascent RDS programs—how to approach and cultivate partnerships, how to set realistic goals, and how to work holistically within the fragmented academy.

Keywords: research data services, external collaborations, cross-campus collaborations, goalsetting, outreach, faculty learning community, institutional support, open practices, affordability

Introduction

In a 2020 Ithaka S+R research report, Jane Radecki and Rebecca Springer examine the structure of research support on academic campuses, finding that "Research data services—support offerings which enable and improve data research—are currently provided in an ad hoc manner by a variety of campus units, including libraries, academic departments and institutes, labs, and IT or research computing units."[1] It is through the lens of the fragmented nature of research support that we explore the role of collaboration in building a Research Data Services (RDS) program on academic campuses. Because of the multiple stakeholders involved in providing effective research data services, collaboration is an integral component of data services, although not without its challenges.

In an OCLC Research report, *Social Interoperability in Research Support: Cross-Campus Partnerships and the University Research Enterprise*, the authors describe the fragmented nature of research support across campuses.[2] Through a series of interviews with stakeholders, the report documents the unique, fiercely independent nature of the

academy, and goes into depth on how to conceptualize research support structures amidst such fragmentation by looking closely at stakeholders and the social interoperability between groups—or, how disparate units begin to work together. The report highlights that "being everything to everyone will not work. Stay focused on what you want to achieve: saying no or limiting scope can strengthen your value as a reliable partner."[3] The authors encourage the library to be confident in the value they bring to the table. By focusing on areas of interest and strength in the library, we demonstrate the power of building bridges across campuses and the vital role libraries play in supporting data-intensive research through such connections.

In this paper, we discuss building an RDS program by emphasizing three strategies for collaboration: collaborating within the library, collaborating across campus, and collaborating externally with those without direct ties to your organization. While we focus on research data specifically, the challenges and forms of collaboration that we identify are widely applicable to libraries' growing involvement in data management at all levels. The inspiration for this paper arose from two presentations[4] that highlighted the ways in which we have successfully leveraged partnerships to expand research data support from within our respective libraries. We work at medium-to-large universities with small and growing data service programs, and the examples presented in this paper are drawn from our experiences and from the literature. The aim of this paper is to offer attainable examples and strategies for building collaborations across campuses that are scalable for libraries that have small or nascent RDS programs.

Defining Research Data Services

There is neither a "universally accepted definition of what counts as a 'research data service,'"[5] nor a consistent method of developing an RDS program on campus generally or from

within a library specifically. All three authors are situated in different areas of their library's organizational chart—with subject liaisons (Atwood), with Scholarly Communication (Condon), and with developers and designers in a Digital Humanities Lab (DeRose)—and each have different areas across campus where strong connections have been established, such as the Office of Research, Information Technology, the Graduate School, the Center for Teaching and Learning, the Center for Research Computing, and departments internal to the library such as Technical Services.

Data services—what they entail and where they are located—vary campus to campus, but at a high level, they consist of supporting students and faculty in their quest to use data effectively in their research and teaching. This support could include helping to identify, digitize, purchase, analyze, or store data from vendors, the internet, or library collections. It could also include consulting with researchers on managing, documenting, or sharing data they have collected or generated. While one unit on campus may be the public face for these services, more often than not, the work is distributed across multiple groups, many of which fall within the library. For the authors, this division falls along technical and disciplinary lines:

1) At Yale, the Digital Humanities Lab serves as the public facing unit for arts and humanities data needs, and the Stata and Data Librarian manage social science and science requests. All work with Collections Development, Technical Services, Preservation, and Library IT behind the scenes to deliver data.
2) At UMass and UNH, the Data Services Librarian serves as the primary coordinator of data services within the library. They support all disciplines. At UMass, there is a close collaboration with the Institutional Repository Librarian to provide the data repository. At UNH, there is a close collaboration

with subject librarians to provide data literacy instruction. At both institutions, there are several centers or units on campus that provide distributed services related to research data—some free, some for a fee or grant-based—but like at many campuses, these services are fragmented.

Following Springer and Radecki, and in line with our experiences, we define research data support broadly as "support offerings which enable and improve data research,"[6] including "any concrete, programmatic offering intended to support researchers (including faculty, postdoctoral researchers, and…students) in working with data."[7] This inclusive definition underlines that data services touch—to varying degrees—multiple units across and beyond the library, which is why communication and collaboration are paramount to building support for researchers.

Literature Review

Over the past ten years, there has been an increase in academic libraries providing new forms of support for research data, leading to the development of infrastructure in areas related to digital humanities, data repositories, data curation, and data management planning. In fact, data curation was noted as one of the top ten trends in 2012 by the Association for College & Research Libraries.[8] Further, a 2019 study from the Association of American University (AAU)—an association of 66 of North America's leading research universities—found that of the 60 university libraries surveyed, "Data services are almost ubiquitous in AAU libraries with 93% of the population offering services for research data management."[9] However, it has been noted that universities that are less research intensive, such as smaller and private colleges and universities, are underrepresented in the published literature[10] and "may have more limited or more specialist requirements and would not aim to

achieve the same levels of service development."[11]

Providing research support on campuses is a collaborative enterprise that includes partnerships beyond the library. A 2011 baseline assessment survey conducted by the DataOne project looked at 221 libraries and found that more than one third of respondents collaborated or planned to collaborate with units outside the library on research data support.[12] In a smaller, follow-up survey in 2014 that consisted of 128 libraries, that percentage remained somewhat stable, although subsetting the data showed that larger universities—those with more students, more faculty, and more external funding—had a higher rate of collaboration than smaller institutions.[13] In a 2017 study of the Association of European Research Libraries (LIBER) academic member libraries, 91% (n=86) of respondents collaborated with other units on campus to provide research data support.[14] In all of these studies, collaboration on services with groups outside of one's home institution was less common, though evidence suggests that might be changing.[15]

Collaboration addresses difficulties inherent to supporting research data at the same time that it introduces its own challenges. Obstacles to establishing data services include financial limitations and inadequate staffing,[16] lack of skills and confidence,[17] grappling with the impostor phenomenon,[18] and lack of awareness among researchers.[19] Partnerships with other units across campus can alleviate some of these obstacles by sharing responsibility, valuing domains of expertise, and bringing together unique skill sets. But collaborating in this way means communicating across domains—each with their own vocabulary, priorities, and perspective of "data"—and across siloed campus organizational structures.[20]

When establishing data services, we face disciplinary barriers. McGovern identifies this as an

opportunity for *radical collaboration*: "The concept of radical collaboration means coming together across disparate, but engaged, domains in ways that are often unfamiliar or possibly uncomfortable to member organizations and individuals in order to identify and solve problems together, to achieve more together than we could separately."[21] McGovern explains that "radical collaboration adopts the concept of radical candor to the desire and need to work together productively and collectively."[22] It is an opportunity to work towards shared understanding—for example, "data management" is interpreted differently by different domains, so it becomes critical to come to a shared understanding of terms.

Laura Saunders and Sean Corning offer a framework for collaboration that accounts for how libraries can strengthen their partnerships across campus.[23] They work to improve the definition of "collaboration" within Library and Information Science – that collaboration is much more robust than cooperation, and that the two terms are often conflated. They explain that cooperation, while often described as "collaboration," is more limited in scope—partners come into the library because a location was offered, for example, but there are no interactions beyond offering the physical space. Meanwhile, collaboration means that the ability of each partner is somehow increased. Saunders and Corning note that all relationships do not need to be at the collaborative level—there are benefits to having relationships across a spectrum of engagements. Relationships can be fluid. It will depend on the needs of our partners and the projects we embark upon.

 Some authors have found value in framing research data management as a "wicked problem." The term "wicked problems" was coined in 1973 by H.W.J Rittel and M.M. Webber to characterize complex and unique societal issues with no clear solution and no criteria for know-

ing if a solution has been found, an oft-cited example being climate change.[24] For research data management, "complex technical issues (such as how to build a data repository or which metadata standards are suitable) are tangled up with organisational, political and economic issues."[25] The multiple stakeholders, varying definitions of the problem, lack of a clear single solution, and complex nature of data render it a wicked problem.[26] The focus on collaboration for research data services is significant in this context because "wicked problems are so complex that solutions will always have to come from the group not just one individual."[27]

RDS programs are still an emerging service point in libraries, but research and scholarly discourse in this area are growing. Some researchers have described how they have established programs in data services, including: how a data services program was initiated,[28] or how data-related partnerships were established.[29] Other work outlining maturity models for data services has also been conducted,[30] as has the development of frameworks for skills necessary to provide data services.[31] There have also been case studies and accounts of the successful and challenging collaborations that were undertaken during the development of data services.[32] Morgan, Duffield, and Walkley Hall describe the experience of three Australian University Libraries, noting that "While each library has developed its own approach to best suit local requirements each has learnt that collaboration and integration with university-wide systems is key to the services offered."[33] Contributions to the literature also include practical guidance on strategizing and leveraging partnerships as a key mechanism for developing data services.[34]

This article builds on the groundwork of previous research by demonstrating how we have expanded research data services in our libraries through integration with other units across our campuses. It contributes to practice by provid-

ing a synthesis of strategies on how to begin establishing collaborations. Given the complexity and increasing range and volume of data needs on campuses, active collaboration rather than passive cooperation is required. By exploring how RDS programs can function in the fragmented landscape of research support on campuses and with the concept of wicked problems in mind, we outline the role of collaboration in building programs. Informed by Saunders and Corning's framework for collaboration and McGovern's notion of radical collaboration, we highlight opportunities for small or nascent programs and address how to approach and cultivate partnerships, set realistic goals, and work holistically within the fragmented academy.

Piecing Together Data Services Through Collaboration

Research data support is a campus-wide and ever-increasing need, driven by funder requirements, open science, and technology-enabled research opportunities. However, such support is complicated by inherent differences in the disciplinary needs, data types, and research agendas. Collaboration within and outside of the library is vital to supporting this need long-term, as it brings together expertise and resources while acknowledging that sustainable, scalable data support cannot fall to one person—or one team. How these varied needs are addressed depends on a number of variables: campus size, library size, organizational structures, Library administration support, existing staff expertise, and budgets for new staff or resources.

While developing partnerships and embarking on collaborative projects can help grow library data services, it can also contribute to scope creep and overextending staff and resources. To minimize that risk, collaborate with Library administration to clearly define what data services means for your library—be mindful of the library's strategic priorities and what services you are in a position to support and to what level

given current staffing. Align and standardize this messaging throughout the library's communication channels for both external and internal audiences to promote a shared vision and understanding of what services are within scope—and are outside of it. When taking on projects, incorporating formal project management tools, such as Memoranda of Understanding and intake forms,[35] can help set expectations for all involved by providing a clear demarcation of the work to be completed; they also foreground the anticipated time commitments (be sure to buffer in additional time to account for surprise obstacles or delays). Library administration, middle management, and supervisors can help establish boundaries for managing scope creep. They can also contribute to relationship-building with external partners and set a tone in the library that values collaboration. Without support of the library administration, projects and partnerships for building RDS programs are less likely to succeed in the long-term because they are more likely to struggle with employee burnout, turnover, and sustainability challenges.

Employee turnover can have significant impacts on constructing a sustainable RDS program. Building relationships, establishing data services (especially if you are sharing infrastructure or other costs outside the library), and effecting change on the culture of a campus take time. When stakeholders, champions, or collaborators leave and services have not been fully integrated into workloads, it can feel like you have to start over again. But collaborations can also help mitigate impacts due to employee turnover by evidencing the need for certain services, creating some redundancy of responsibilities, and setting the foundation of a shared vision.

Below, we present reconfigurable models for building a data support program through collaboration based on our experiences at three different institutions. Throughout this section, we keep in mind that the complexity of providing

data support for researchers requires us to candidly navigate the complexity of collaborative relationships and realistically set boundaries based on Library resources and expertise.

Collaborating Within the Library

Collaborations within the library can contribute to a unified voice on campus. In larger organizations, it can be difficult to know what each individual member of the library is focusing on, and as such, you can lose out on serendipitous connections. In smaller organizations, workload constraints can limit interactions outside of one's daily responsibilities. Communicating with your library colleagues about what you do, how you support researchers, and in what ways you can collaborate could help establish connections that distribute support. It is impossible for everyone to know everything. We talk a lot about having champions across campus, but it is also important to have a few champions within the library as well to help bring more folks into the fold and more eyes (and possibly hands) to the services. For emerging services or those outside of traditional library support, fostering a group of internal champions can be key to the success of the program. Internal library collaboration can take many forms from integrating workflows and co-creating services to training for skill development.

Providing campus-wide data support requires coordination across multiple units within a library, both front- and back-facing. For example, as libraries increasingly license data and toolkits for text mining research, such as Gale's Digital Scholar and ProQuest's TDM Studio, traditional cataloging systems and processes need to be updated. Promoting data resources is one challenge; providing access is another. Researchers often learn about and request the available data from front-facing colleagues (for example, subject liaisons or digital humanities lab staff) or via the library catalog. However, fulfilling those requests, entails internal collaboration with back-of-the-house colleagues, from Collection Development and E-Resources (for initial purchases and cataloging) to Library IT (for storing the data). Even designated labs or centers for data research need to work in conjunction with other units in the library (e.g., Collection Development) and non-library partners (e.g., Information Technology) to acquire licensed data or software. And the work does not end at acquisition. The data or software then has to be made discoverable (by Technical Services) and available to researchers (by Library staff), who might also require training in how to use it for particular goals (by Library staff or external partners). Figure 1 presents a brief case study about adding datasets in the library catalog.

Figure 1. Case - Datasets in the Library Catalog

Collaborators: Collection Development, Data Librarian, Digital Humanities Lab, Digital Preservation, E-Resources (Technical Services), Subject Liaisons

Example: In order to review and improve the discoverability of licensed datasets, Yale Library convened an internal, cross-unit task force to discuss cataloging practices—what criteria to document (e.g., file type, date range), and how to indicate access (datasets aren't open or immediately available in the same way that books are—researchers might have to sign a data use agreement first or have a particular affiliation on campus). An additional cross-unit group established a new workflow for acquiring, verifying, cataloging, and delivering the datasets, with different groups taking the lead at each stage. Funding requests for datasets go through Collection Development and subject liaisons. After a dataset is received, the Digital Humanities Lab and Data Librarian provide data verification,

as well as a README file with information for cataloging. A team in E-Resources uses that file to create the library record for the dataset, making it discoverable in the catalog, and Digital Preservation ingests (when the license permits) the dataset into Yale's digital preservation system. The Digital Humanities Lab and Data Librarian then provide access to the dataset when a patron request is received.

Outcomes: Researchers can discover on their own what datasets Yale Library has licensed for text and data mining. Likewise, subject librarians meeting with researchers can pull up the catalog and identify in real time datasets that might be helpful. A group in E-Resources also successfully applied for "data set" (and related terms) to be an authorized Library of Congress form/genre heading to improve the discoverability of such resources nationwide.[36]

Co-teaching between data professionals and subject librarians is a way to bring disciplinary expertise to data literacy instruction. Subject librarians build communication channels with department faculty and students. Collaborating with subject librarians and using their existing networks to promote data services and, where appropriate, combine data literacy instruction with information literacy, is a great way to tailor training to meet disciplinary needs. This collaboration can also be a mechanism for training subject librarians who might likewise be called on to provide data support to researchers from their disciplines, such as reviewing data management plans, becoming familiar with data analysis tools, or consulting on locating repositories for finding or sharing data.

Data repository development is also an area that involves collaboration within and outside of the library. In some cases, establishing a data repository entails working with repository staff and metadata experts in the library and building on existing repository services. Existing repository services may include digital archives, digital collections, or institutional repositories, and therefore require collaboration and alignment with, for example, Scholarly Communications, Archives and Special Collections, Digital Scholarship, Digital Publishing, or Metadata services. For system administration and technical support in larger libraries, Library IT may be responsible for managing the open-source repository platform. Development would entail working with Library IT to configure the specific needs of a data repository. In other cases, the data repository may be a partnership between the library and central IT, moving collaboration on software development outside of the library to units across campus.

Collaborating Across Campus

Breaking down barriers between units on campus begins with reaching out, establishing connections, and being candid and (potentially) uncomfortable. Interacting with areas across campus that have differing goals and values is both challenging and rewarding. Taking the time to understand the needs on your campus, as well as the time to come to a shared understanding and terminology, will benefit your partnerships in the long term.[37] One way to advance cross-campus alignment is to establish a data governance committee. This recommendation is present in the AAU APLU's "Accelerating Public Access to Research Data" report,[38] and both Atwood and Condon are members in their campus's governance groups. These committees can broaden the reach of data services by ensuring that initiatives are distributed among many interested parties and by building data service into the fabric of research and teaching on campus. Additionally, using the committee as a

foundation for promoting the impacts and logistics of collaborations helps to make a case for the continued partnerships being a consideration in hiring new positions or after employee turnover. While these committees can languish from employee turnover, the intention is that they provide the new person stepping into a role with background context that could help them continue where their predecessor left off.

This section is organized into three sections based on broadly defined areas on campus and includes a brief statement of the goals of each area and examples of how we have collaborated to build research data support. One theme across each of these areas is the benefit of tailoring your message to the particular group. It can be beneficial to approach these areas by leveraging their own self-interest, so understanding the goals and pressures of each unit can help you bridge connections. Note that each campus may have a different name for a particular area, but the goals should be similar, and each campus may have additional centers or institutes that participate in initiatives aligned with RDS.

Research and Engagement

The Office of Research and Engagement (other names include but are not limited to "Research Office" or "Office of Research, Economic Engagement, and Outreach") is largely responsible for how a campus conducts research—from proposal generation to award close-out. Example sub-units include Research Administration, Research Development, Compliance, Institutional Review Board (IRB), Institutional Animal Care and Use Committee (IACUC), Responsible Conduct of Research, and Sponsored Programs.

A highly collaborative unit, the goals of your Research and Engagement Office will revolve around the research enterprise, including risk assessment and mitigation. When interacting with these groups, research data support can provide a way to reinforce the messages of the IRB, Compliance, and Responsible Conduct of Research. Not only does reproducible research training cover many of these challenges, but RDS interacts with researchers at different points in the research lifecycle and therefore is able to provide guidance to researchers on complying with university policies and with other regulations. When approaching colleagues in Research and Engagement, it is important to keep the frame of risk mitigation in mind—you may need to work on language to mollify their concerns. There are several areas of alignment between the research office and the library where collaboration provides value-added support. Figure 2 presents a brief case study about bringing RDS to Responsible Conduct of Research training.

Figure 2. Case - Responsible Conduct of Research and Good Data Practices

Collaborators: Research Data Services Librarian and the Research Office

Example: Thousands of research organizations across the world have outsourced their Responsible Conduct of Research (RCR) training with the CITI Program for their research ethics and compliance training.[39] However, if your organization still offers in-house research integrity training, there is a natural alliance between Research Data Services programs and RCR—a library representative can offer to teach or co-teach in areas such as responsible data sharing, data stewardship, or digital scholarship. Further, a message coming from both the Library and Responsible Conduct of Research program shows a multi-unit commitment to good data practices. At UNH, the data services librarian partners

closely with the Responsible Conduct of Research and Scholarly Activity Committee and is regularly invited to co-present at both university and professional development training events.

Outcomes: This collaboration establishes broader campus awareness and messaging around the relationship between responsible data practices and research integrity.

Research data specialists can offer expertise by sitting on a research integrity committee, such as the Institutional Review Board for the Protection of Human Subjects in Research (IRB) or Institutional Animal Care & Use Committee (IACUC), which can reinforce the importance of RDS in the organization and function as an opportunity for researcher education. With IACUC, for example, re-collecting data that was either lost or collected poorly comes at a high cost—it requires more animals. This outcome is neither in the organization's nor the researcher's best interest; RDS can leverage good data practices and in turn, reduce unnecessary collection or re-collection of data. On the IRB, data specialists can provide expertise around secure data handling and responsible data sharing practices.

Providing guidance on writing funding proposals now also requires guidance on writing Data Management Plans (DMP). Libraries can help encourage the use of grant funds to cover data management costs and train Research Development professionals on the basics of writing a good DMP or provide a DMP review service while leveraging existing tools like the DMP-Tool. There are opportunities here to help establish an organization's commitment to data stewardship, as well, including through requiring DMPs for internal funding, streamlined workflows, and policy and guideline development. For example, at UMass a partnership with the Director of Research Development, the Office of Research Engagement, and other stakeholders resulted in a Research Data Management Strategic Plan for the campus that provides a strategy for improving campus data management practices and planning.

Academic and Faculty Affairs

Academic and Faculty Affairs relates to the excellence of the academic mission of a university, including recruitment, retention, and training of faculty. These offices may be housed in the Office of the Provost, Graduate School, individual Colleges, or stand alone. Generally, units in these offices can benefit from guidance on trends in data stewardship and new ways of working with data, education on data management, and leadership around emerging data needs.

Offices of Academic and Faculty Affairs may have an explicit commitment to student success and the recruitment and retention of diverse faculty, and people working in these offices interface regularly with deans, department heads, chairs, and other senior leadership. There may also be a budget, so tailoring a message to Academic and Faculty Affairs with a funding slant—for example, that good data management can improve academic output and reduce risk related to failing an audit—could be opportunities for entering a conversation with administrators in this group. The range of activities in these offices can bridge academic and research spheres and means that areas of potential collaboration are quite broad—from collaborating with individual faculty to offices of faculty development.

A common strategy when working with members of campus is to find your champions and

influencers[40]—and data work is no different. Your champions can come from any discipline and can be of any faculty rank—new faculty may be hoping to build their network on campus; tenured faculty may be more willing to explore something new that they felt uncomfortable pursuing before they had the security of tenure. Conversations are a great way to build a foundation—word-of-mouth is a powerful tool. Data-related committees are another opportunity for the library to find champions, provide guidance, and demonstrate leadership. For example, data librarians at UMass, UNH, and Yale serve on, and lead, campus-wide groups tasked with data governance. This is also an area for change leadership—committees can help shape the policies and culture of a campus.

Most campuses have offices or institutes that focus on supporting faculty development in research and teaching. Partnering with these offices can connect principal investigators (PI) and instructors with those in the library who have experience teaching with data and data literacy in mind. Many of these offices run workshop series in excellence in teaching or promotion and tenure. For example, at UMass, a program called *I'm a PI, now what?* organized by the Office of Faculty Development is geared towards new PIs, and the Libraries folded in a data management component. This event was an opportunity to demonstrate the library's role in data management at a point of need—when faculty are just figuring out how to establish their grant-funded work on campus.

Working with graduate students is a critical component of an RDS program that aims to foster good data practices and educate new researchers. For example, through partnership with the Graduate School for the Arts and Sciences, Yale Library offers a Digital Humanities Teaching Fellows program, which provides an opportunity for graduate students to learn digital humanities methods and apply them to their teaching assignments. The Graduate School for

the Arts and Sciences funds the teaching appointments, while the Digital Humanities Lab provides dedicated staff support. This program, which includes library-led technical and pedagogical training for the fellows, has broad benefits, from integrating computational methods into the undergraduate curriculum to providing graduate students (and when applicable, their faculty co-instructor) with data-related training that they can incorporate into their teaching and research. Through this program, departments and the Graduate School have come to identify the Library as a key partner in data literacy and instruction.

Information Technology

Responsible for much of the technology on campus, Information Technology (IT) plays a significant role in how scholars conduct their research. They have a variety of aims, which may range from the general management of computer hardware, software, and operating systems to infrastructure, regulatory compliance, human resources and payroll, and robust security for campus assets, both hardware and data. There may be a unit within or adjacent to IT that focuses on research computing specifically. Libraries and IT approach data services from different perspectives, with IT possessing a technology-centric approach that focuses on storage, cybersecurity, maintenance, tools, and compute power.

To collaborate effectively, IT and Library Data Services need to do the work on finding shared definitions and desired outcomes—for example, the aim of a repository maybe different; Libraries might use a repository to openly disseminate the products of research, whereas IT may be wary of this mentality initially because their repositories might include human resources-related personal information. Getting on the radar of the Chief Information Officer or head of research computing can, at the very least, offer some weight to the message and importance of

research data services. Once a shared understanding is established, there are many opportunities for partnerships and shared goals. At UNH, it was the partnership between the Library and the Research Computing Center that established the foundation and direction of an RDS program on campus.

While High Performance Computing (HPC) is certainly not a standard offering on all campuses, for those campuses where HPC is available, there exist opportunities to collaborate. For example, at UMass, the Libraries established a partnership with the campus representative to the Massachusetts Green High Performance Computing Center to help provide a way to share extremely large datasets that are not able to be ingested by the Libraries' data repository platform. Additionally, as more scholars look to leverage the gains offered by high performance computing methods across all disciplines, a campus connection to available high performance computing resources—even at small liberal arts colleges—could be of benefit.

Collaborating with External Partners

Collaborating with external partners can help build capacity for individual RDS programs and foster a community of practice. It also broadens perspectives, as your external partners come with their own viewpoints, pain points, and successes. Although studies suggest that collaborations external to one's institution are becoming more common, in the United States, larger institutions are currently more likely than smaller institutions to establish these relationships.[41]

Many of the collaborations with external partners that we read about are large, multi-institution, grant-funded projects, which can feel less attainable for those who work in smaller institutions or in under-resourced RDS programs. Projects such as the Data Curation Network,[42] Make Data Count project,[43] or the recently awarded

Completing the Life Cycle: Developing Evidence-Based Models of Research Data Sharing[44] are important for developing infrastructure, standards, and the field in general. While these *are* attainable, they are large commitments that must be supported and prioritized by one's institution and one's role—not everyone works in a position that can support these kinds of initiatives. Fortunately, there are other, low-barrier ways to collaborate externally and build one's network.

Working with regional, national, or international organizations is a way to identify external partners and build your network of peers. While we often consider our work with professional organizations as service, it can also be a mechanism for collaboration and professional development. For example, the New England Chapter of the Association of College & Research Libraries (ACRL-NEC) has a Research Data Services Interest Group that organizes several roundtable discussions as a means for both professional development and building a community of practice among regional library data professionals. At the international level, the Research Data Alliance (RDA) provides a mechanism to participate in a variety of working groups and interest groups that co-create "technical and social infrastructure solutions...that enable data sharing, exchange, and interoperability." [45] There are a number of other regional, national, and international associations and events that offer opportunities for networking and professional development such as the Midwest Data Librarian Symposium (MDLS), Southeast Data Librarian Symposium (SDLS), Research Data Access and Preservation (RDAP) Association, the Medical Library Association's Data Caucus, and the International Association of Social Science Information Services & Technology (IASSIST).

One way to collaborate with external partners is to take advantage of consortia memberships or existing connections between universities. Clem-

ent, et al. detail how they approached collaborative instruction in small liberal arts colleges by leveraging the relationship among the Northwest Five Consortium institutions.[46] Through an initial grant-funded project, they created a data curation workshop that brought together small research teams from each school. While not without its challenges, the workshop was successful in achieving many of its high-level goals, in particular a community of practice among the participating librarians. Figure 3 presents a case study that provides an overview of the New England Software Carpentry Library Consortium (NESCLiC)[47], a regional, cost-sharing collaboration.

Figure 3. Case - The New England Software Carpentry Library Consortium (NESCLiC)

Collaborators: Library professionals and the Carpentries

Example: The New England Software Carpentry Library Consortium (NESCLiC) is a regional network of library professionals that developed a consortia model to share membership expenses for the Carpentries, an international organization that consists of Software Carpentry, Library Carpentry, and Data Carpentry. The Carpentries teaches "foundational coding," offering two-day educational workshops and train-the-trainer programs. Every year, members of NESCLiC are eligible to send library staff from their campus to the Carpentries' instructor training and certification program. Atwood and DeRose went through the program together, along with several library colleagues from other member institutions. DeRose and fellow certified Yale Library colleagues have taught the Carpentries curriculum—which includes introductory programming and data management workshops—in sessions open to subject liaisons, Technical Services librarians, and campus-wide participants.

Outcomes: In addition to receiving pedagogical training, participants also gained access to a local (as well as a global) community for discussing data-related challenges and solutions. Along with being a professional development opportunity for individual library staff, campuses also benefit from the workshops those staff are then qualified to teach to students, faculty, and fellow staff.

Additionally, informal external connections are a viable way to build your community. Reaching out to local experts or like-minded colleagues can help establish new connections. For example, librarians from more established RDS programs can work with science librarians at local, small liberal arts colleges or community colleges to provide joint workshops that are open to students and faculty from across these institutions. By sharing the load, we are able to leverage one another's expertise. Further, we bring different objectives to our work: a small liberal arts college that works exclusively with undergraduate students and a large university with a solid contingent of graduate students have different experiences in working with students and bringing them into data-related discussions. Like other partnerships, partnering informally with colleagues can be subject to the whims of an organization, and it is more likely to be based on particular individuals in a role, which can be an issue if there is staff turnover. Regardless, the viewpoints of our colleagues, even if only briefly obtained, can be invaluable.

Strategies for Collaborating

Above we outlined examples of collaborations to illustrate potential opportunities that can be adapted for growing RDS programs. Strategic and sustainable services are built on collaboration—or rather, radical collaboration—between various units on campus. "A primary objective of radical collaboration is to be inclusive—to gather around a shared interest, responsibility, or problem, all of the skills, good practice, and resources, including human."[48] While some collaborations can happen organically, successful "collaboration is a complex process that takes a substantial amount of planning and effort" to help participants overcome barriers, understand roles and contributions, and produce mutually beneficial outcomes.[49]

Based on our individual experiences, we provide the following strategies for collaboration for building robust, sustainable, and user-centered RDS programs that safeguard against person-dependent services. As with much of data services, your experience will depend on your individual organizational culture. We listed the suggestions below in order of internal-facing to external-facing work.

Start where you are.

- Focus on where you and your campus are at this moment. Data services is not a race; build through iteration. Seeking perfection will lead to little or no progress. Instead, foster a comfort with failure and small wins. Create user journey maps to identify how researchers might currently engage with the library to meet their data needs.
- Set realistic goals and milestones. One technique is to follow the SMART principles. Create goals that are (S)pecific, (M)easurable, (A)chievable, (R)elevant, and (T)ime-bound. Develop a roadmap of where you want your program to be but lay out small, achievable steps to get there.

Assess your offerings, staffing, and infrastructure—and any gaps you wish to fill.

- Develop a baseline. An assessment of what you offer—from staff to infrastructure—can provide you with a baseline from which to work. This plan can be as brief or as thorough as you deem necessary.
- Identify gaps. Gaps in your services may be filled by partners on campus—do some research to identify potential partners, and how you might approach them. Talk with researchers at all levels to identify their top data needs that are not being addressed on campus.

Piece together your program.

- Pull together a network of collaborators who can contribute to research data support offerings. This network building can be done formally or informally and will depend on your relationships across and outside of your campus.
- Create a map. Drawing a map that demonstrates your current network and other potential partners on campus can help you see where you can make connections.
- Get to know structure and bureaucracy. Part of establishing any program in data services will rely on leaning on those outside of the libraries. Tapping into other units will require an understanding of bureaucracy, pain points, and incentives for those groups. This is a slow but worthwhile process.

Build your network of collaborators.

- Pull in colleagues who have an interest in data. Develop your relationship with generosity in mind. Look to colleagues in the library, on your campus, and in the profession more widely.
- Co-teach. There are multiple opportunities to co-teach with colleagues across campus.

Collaborate to teach a new tool, offer an information session (data literacy, general introduction to services), or train-the-trainers.

- Co-learn. Learning together offers a different way to boost skills and build community. Running a learning group or journal club are two ways of facilitating learning together. Host an informal working group to learn a new tool or programming language—inviting students and faculty to join the working group provides a way to support their learning (by providing a venue and community) while library staff acquire new skill sets that will enable them to increase the research data support offerings in the future.
- Be patient—timing is essential. Sometimes we have to wait for the right person to enter (or exit) a role.

Cultivate shared understanding.

- Build something others can see themselves in. Using inclusive language and forming groups that pull in colleagues from all disciplines are two techniques to help you be inclusive from the beginning.
- Develop shared definitions. A form of community building, establishing shared definitions that cut across disciplinary jargon can help reduce ambiguity and assumptions, and bring disparate disciplines together.
- Report on what you are doing so others can build from your examples.
- Talk with your peers. We have a lot to learn from one another!

Reflection

In this article, we discussed the necessity of building collaborative endeavors in the development of library-led research data support services. We presented several examples of our collaborative efforts and strategies for collaborating that illustrate varying degrees of partnerships and progress towards radical collaboration.

While this article does not outline exactly how to build a program, it does provide several ideas—based on our own successes and challenges at medium-to-large sized universities—for building sustainable data services. Our aim is to provide others with relatable and adaptable models for collaboration, and to inspire other individuals and groups to share their successes and struggles establishing research data support through collaboration. To support RDS programs of all sizes and levels of maturity, it is valuable to continue to add to this conversation, creating a corpus of the many entry points into data services. While our aim is to present ideas for collaboration that are accessible to all-sized universities who are developing RDS programs, readers will know best the landscape at their institution and which opportunities are attainable or scalable based on their resources.

What is not necessarily clear is the amount of time that went into building our relationships across campus. In some cases, relationships needed to be built over a period of years. Sometimes the excellent reputation of the library preceded us, and at other times, it was our own reputation, or the reputation built up by our colleagues across campus, which helped us establish and maintain a connection. We cannot underestimate the importance of all our bridges. Relationships—and fruitful collaborations—take time, and understanding the landscape of your campus will help you establish connections. Highly decentralized campuses, like our universities, require a great deal of time to establish connections, but they also offer many opportunities for collaboration once those connections are made. The challenge can be finding the right person at the right time and maintaining that connection.

Building community is a way for a campus to leverage expertise and distribute accountability. Research data support is, in part, about helping scholars and administrators treat their research data as the asset it is, rather than as a liability.

As is true with any wicked problem, when data support rests with one individual, risks increase and progress is hindered. Redundancy is a key to a campus's success in data services—just as we recommend all important efforts (and data) have multiple backups, so, too, should those who are doing the work of data services!

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