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Alisa B Rod, Biru Zhou, Marc-Etienne Rousseau

► **To cite this version:**

Alisa B Rod, Biru Zhou, Marc-Etienne Rousseau. There's no "I" in Research Data Management: Reshaping RDM Services Toward a Collaborative Multi-Stakeholder Model. *Journal of eScience Librarianship*, 2023, 12 (1), 10.7191/jeslib.624 . hal-04001425

HAL Id: hal-04001425

<https://hal.science/hal-04001425>

Submitted on 22 Feb 2023

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There's no "I" in Research Data Management: Reshaping RDM Services Toward a Collaborative Multi-Stakeholder Model

Alisa B. Rod, McGill University, Montreal, Quebec, Canada, alisa.rod@mcgill.ca 
Biru Zhou, McGill University, Montreal, Quebec, Canada, biru.zhou@mcgill.ca 
Marc-Etienne Rousseau, McGill University, Montreal, Quebec, Canada, marc.rousseau@mcgill.ca 

Abstract

Objective: This article examines a reshaped service model for research data management (RDM) founded on centralized and cohesive collaboration between multiple stakeholders at a large research university in Canada. This initiative, along with a newly formed team dedicated to RDM service provision, is a joint effort by the institution's Vice-Principal Research and Innovation (VPRI), Library, IT Services, and Research Ethics units.

Methods: This article presents a single case study methodology. The authors reflect on services such as "query the panel" sessions where researchers across all disciplines bring their questions to representatives from the Library, IT, Research Ethics, and VPRI. This case study also highlights the use of Jira's service desk software as a user management system. The authors also present descriptive statistics representing engagement with this new unit and our services.

Results: Support for RDM requires expertise from multiple domains. With a collaborative approach as a guiding principle and a focus on establishing a small, but agile team comprised of a librarian along with stakeholders from IT and VPRI, it is possible to leverage resources and support for RDM from a broad range of units across an institution.

Received: June 29, 2022 **Accepted:** November 4, 2022 **Published:** February 15, 2023

Competing Interests: The authors declare that they have no competing interests.

Data Availability: The data that support the assessment results reported in this study are openly available in the McGill Dataverse: Rod, Alisa Beth, Biru Zhou, and Marc-Étienne Rousseau. 2022. "Replication Data for: There is no 'I' in Research Data Management: Reshaping RDM Services Toward a Collaborative Multi-Stakeholder Model." [Data set]. Borealis, V1. <https://doi.org/10.5683/SP3/LCTDKZ>.

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Conclusions: At many institutions, RDM services are siloed within the library or an adjacent campus unit. New digital technologies have profoundly transformed academic research across all disciplines, necessitating the evolution of corresponding research data-related services. The authors will conclude by outlining specific lessons learned in reshaping digital research infrastructure-related services at their institution.

Introduction

Over the past 10 years, research data management (RDM) services have been increasingly defined and formalized in tandem with the growth of new policies, norms, and principles regarding the role of research data in scientific reproducibility and transparency. As researchers have collected more and more data and are held increasingly accountable for stewarding their research data for the long-term, academic libraries have typically risen to meet this need as the campus discipline-agnostic service provider with a mandate of organizing and preserving information more broadly (Akers et al. 2014; Cox and Pinfield 2014; Latham 2017; Steeleworthy 2014; Tenopir et al. 2015). In addition, as funders placed pressure on researchers to incorporate internationally recognized RDM practices (e.g., making research data FAIR, etc.), institutions have reacted in different ways (Akers et al. 2014; Briney, Goben, and Zilinski 2015). This article examines a case study of a reshaped service model for research data management (RDM) founded on centralized and cohesive collaboration between multiple stakeholders at McGill University in Canada. This initiative, along with a newly formed team dedicated to RDM service provision, is a joint effort by the institution's Vice-Principal Research and Innovation (VPRI), Library, IT Services, and Research Ethics units.

Literature Review

In general, academic libraries are well-positioned to offer RDM services as librarians may hold many of the roles required to support research data over its lifecycle (Humphrey 2012; Steeleworthy 2014). For example, the management of information and the digital preservation of information for the purposes of broad dissemination and re-use are cornerstone activities of academic libraries. In addition, liaison librarian models provide a discipline-specific network for instructional and consultative support. However, unlike conventional collections, the management of research data often also depends on IT services, shifting funder and institutional policies regarding research and/or enterprise data, and other technical infrastructure, such as advanced research computing (ARC).

Thus, some institutions recognized early that facilitating best practices related to RDM requires not just training and support but also infrastructure (Erway 2013; Matusiak and Sposito 2017; Wilson and Jeffreys 2013). For example, in 2011, the University of Oxford was awarded funding to develop an institutional RDM policy with corresponding infrastructure and training services (Wilson and Jeffreys 2013). This effort involved collaborations with experts across a variety of domains including the libraries, IT, other

administrative departments, and academics. In addition, in 2010, following the National Science Foundation (NSF)'s roadmap to phase in requirements for data management plans (DMP) in funding opportunities, Cornell University formed an RDM Service Group (RDMSG) encompassing advisors representing high-level administrative units and stakeholders, including the library, IT services, and their ARC unit. Cornell's RDMSG also incorporates consultant and implementation groups representing campus service providers and librarians (Akers et al. 2014). Akers et al. (2014) provide an overview of seven other US-based case studies regarding collaborative multi-stakeholder RDM service models.

In this way, the technical requirements for ensuring that researchers can adequately store their data, compute on their data, share their data internally and externally, and archive or deposit their data for re-use necessarily involves many individuals and departments across a campus. Indeed, Cox et al. (2019) found in a recent international study that libraries that have led in offering RDM services on their campuses have stagnated due to "skills shortages" and failures in affecting broader institutional transformation. Cox et al. (2019) propose a revision of the conventional RDM maturity model to clearly articulate stages of development and the corresponding required skills or resources. Although this maturity model is intended to be a roadmap for library RDM service development, it also provides a compelling map for the ways that other campus service providers may partner with a library to increase overall capacity. Similarly, Kim (2021) found that research data services more generally are more mature at those institutions where the library relies on multiple campus stakeholders as partners in the provision of holistic support.

For example, Hofelich Mohr, Johnston, and Lindsay (2016) describe their institutions' effort to centrally coordinate RDM services as the RDM "village," which harkens to the idiom "it takes a village," as the mindset required to foster mature RDM practices at both the institutional and researcher levels. In other words, Hofelich Mohr, Johnston, and Lindsay (2016) argue that siloed RDM services within a library may in practice be a disservice to researchers. The University of California at Berkeley (UC Berkeley) incorporated a similar perspective in formalizing a partnership between the library and their research IT unit for the purposes of collaborating on RDM support (Wittenberg and Elings 2017). The goals of the UC Berkeley model were to develop a conventional consultative model but relying on the expertise of information professionals in addition to the technical expertise of research IT staff. In this way, the UC Berkeley model focused specifically on human resource capacity development in RDM.

Thus, there are many examples of collaborative RDM support models, and the implementation of a multi-stakeholder service model is not new. However, there are still areas of gaps and room for experimenting with refining or rethinking existing models. Many of the exemplars for collaborative or multi-stakeholder models rely on an extensive network with embedded oversight and advisory groups. While these models are useful in establishing formal channels for governance and communication, it is less clear how well such models perform at scale and over time. For example, Teperek, Higman, and Kingsley (2018) reflect on two different approaches to implement RDM services at the University of Cambridge and conclude that "democratic"

services built alongside researchers from the ground up, although quite labour and resource intensive, would likely gain more traction in terms of broader implementation among researcher communities than top-down bureaucratic approaches.

In addition, there are few models that account for all perspectives that are key in reducing hurdles for researchers. For example, a recent study by Jackson (2018) finds that research ethics boards (REBs) in the Canadian context, which are functionally equivalent to Institutional Review Boards (IRBs) in the US context, would welcome collaboration on knowledge transfer from the library regarding keeping up to date on cybersecurity or other RDM-related issues. Another recent systematic review of RDM at the organization level by Donner (2022) revealed that RDM is typically viewed from a strategic perspective as a multi-stakeholder endeavour, but legal expertise is often a missing piece.

Another more fundamental shift occurred over the past two years due to the global COVID-19 pandemic. The COVID-19 pandemic had a substantial impact on the ability of many researchers to access physical materials needed for their research, conduct in-person research, and quickly adapt to a changing landscape related to policies regulating how research may be conducted in virtual settings. Although many of the pandemic-related constraints of conducting research virtually may be temporary in nature, there is a growing consensus that the future of academia may retain aspects of this new normal (Cox 2020). Thus, there is a need to reflect on the design and adaptation of RDM services in response to the ongoing and anticipated permanent shifts related to the transition of research activities to virtual and hybrid settings.

Several recent studies investigated the changing nature of information behaviours and needs of academic researchers due to the COVID-19 pandemic (Baxter et al. 2021; Decker 2021). One general and unsurprising finding is that researchers relied more heavily on digital library resources and services (Noh 2021). The shift of most non-clinical research to virtual modalities has had a profound impact on researchers across many disciplines, but especially research involving human participants or fieldwork (Gentili and Cristea 2020; Howlett 2021). Howlett (2021, 12-13) reflected on conducting fieldwork virtually during the COVID-19 pandemic and argued that “reaching the field no longer requires entering it in a physical sense,” which represents a major paradigm shift. Relatedly, the reliance on remote videoconferencing technology, such as Zoom, to conduct human participant research virtually has sparked a “methodology revolution” regarding the digital collection of audio-visual data (Su and Ceci 2021, 8). Indeed, Gentili and Cristea (2020) argue that the constraints on human behaviour research due to the COVID-19 pandemic may have far-reaching and long-lasting effects on the organization of research endeavours, including a shift of much human behaviour research to large-scale collaborative efforts vs. siloed projects conducted entirely within a single institution or department.

Demand also increased among researchers for information and services regarding RDM in entirely remote systems (Pauwels et al. 2020). For example, Pauwels et al. (2020, 70) noted that during the initial onset of the

COVID-19 pandemic their librarians received “an exponential number of support requests in information management and research data management.” Another professional reflection article by Cooper et al. (2021) highlighted the specific data needs of researchers at Canadian institutions, including remote access to Statistics Canada data, guidance on RDM and publishing, and data sharing assistance due to a substantial rise in funded empirical research on COVID-19.

The Canadian landscape related to RDM is also unique in that a volunteer-based organization comprised mainly of librarians, the Portage Network, had been providing resources and training in RDM with a national scope since 2015 (Humphrey, Shearer, and Whitehead 2016; Humphrey 2020). In 2021, the New Digital Research Infrastructure Organization (NDRIO) was launched and absorbed the Portage Network. NDRIO, rebranded later that year as the Digital Research Alliance of Canada (the Alliance), is a non-profit organization that has been designated by the Canadian government to channel funding to higher education institutions across the three pillars of digital research infrastructure (DRI), including RDM, research software, and ARC (Winter 2021).

In March 2021, the three main public funding agencies in Canada (the Tri-Agencies) released a harmonized RDM Policy (Government of Canada 2021). Although a draft version of this policy had been available for consultation for quite some time already, the final version differed in substantive ways and outlined how three requirements will be phased in over the next few years. For researchers, the agencies will begin to pilot a data management plan (DMP) requirement for funding opportunities in 2022 with the expectation that more and more funding opportunities will have such a requirement in the next few years. In addition, organizations that can receive and administer Tri-Agency funds must publicly publish an institutional RDM strategy by March 2023. The final requirement, which will not be detailed until after 2023, will be to require data deposit following the completion of funded research projects (with caveats for data for which there is a reasonable justification to restrict access). In this way, the release of the Tri-Agency RDM Policy, in conjunction with the formalization of DRI services at the national level, provided a timely opportunity to capitalize on the recent prominence of RDM in the Canadian context.

Case Study: McGill University’s Digital Research Services Hub

As with most collaborative service models, the creation of Digital Research Services was the result of several years of relationship building between the Library’s Digital Initiatives unit and the office of the Vice-Principal for Research and Innovation (VPRI). All three primary members of the Digital Research Services team started our roles during the pandemic. All three roles, including the RDM Specialist in the library, a Senior Advisor for RDM in VPRI, and the Director of Research Software (jointly reporting to VPRI and IT services), were new, and our mission was to develop RDM services from the ground up. These three positions work jointly alongside with the Director of IT, Development, and Operations of an advanced research computing (ARC) unit.

Starting new jobs entirely remotely required creative and novel approaches to forging relationships and developing a service model. We pursued collaboration as a guiding principle in part due to necessity to navigate the complex web of existing stakeholders and initiatives and in part to develop services that would be relatable to the everyday challenges that users face in confronting RDM-related issues. Instead of pressuring users (e.g., researchers and students) to change their practices, we wanted to embody a perspective that as service providers it is instead our role to help users reach that conclusion. In the following section, we elaborate on each of the three primary service domains that comprise our collaborative multi-stakeholder unit: RDM, research software, and ARC.

McGill Library has been instrumental in providing in-house workshops, online guidance, training materials, and DMP templates for various disciplines. The RDM Specialist also provides consultations on DMP reviews and data deposit/sharing practices for researchers. The RDM Specialist also manages our institutional repository—McGill Dataverse—open to all faculty, students, and staff.

To promote campus-wide training in RDM, the Digital Research Services team also developed and launched a self-paced online RDM learning program open for all researchers, students, and staff. This project was co-led by the Senior Advisor for RDM from VP-RI and the RDM Specialist from Library. The initial program contains six modules covering essential RDM topics related to the research data lifecycle with instructional videos, interactive exercises, and knowledge checks in each module.

In addition to RDM, research software is also a distinct and fundamental component of modern research. Our team provides the McGill University research community with support and guidance on the access, use, and development of research software and services. To balance the convenience of using cloud-based software in research and maintaining due diligence regarding cybersecurity for research data, the Director of Research Software in our team also serves as a liaison between IT services (particularly the cybersecurity unit), the institution's central legal department, procurement, and researchers to facilitate the procurement and implementation of software campus-wide.

The Director of Research Software works closely with the Director of IT, Development, and Operations of the ARC unit to help researchers in identifying and accessing appropriate cyberinfrastructure resources, such as supercomputers, storage, and cloud-based products. A group of ARC specialists are also available to provide technical support (e.g., software package installation on the national computing system).

Since 2021, the three team members of the Digital Research Services unit have worked to develop a scalable service model relying on collaboration and coordination with as many relevant campus stakeholders as possible. To launch the service model, the Digital Research Services team members first co-created a website about the new service. Each member of the team is empowered with editing permissions for the site through

our university's content management system (CMS). To manage multiple site contributors, we communicate via a Microsoft Teams chat and coordinate so that only one member is editing the site at any given time. The following section provides further descriptions of the new services developed to improve efficiency and remove barriers for researchers in understanding institutional processes and support regarding RDM.

Co-Creating Outreach and Awareness-Building with Multiple Stakeholders

Even though our service domains are categorized into three areas the questions we receive from researchers are rarely related to a single domain. For example, a seemingly simple question on what software is appropriate for collecting online surveys will require knowledge about cybersecurity related to provincial privacy laws and regulations, types of data storage and analysis options that are compatible with the selected solution, and the use of coding and documentation standards for setting up the survey to ensure the usability of the output data from the software. Recognizing these many challenges in the modern research context, the Digital Research Services unit organizes virtual “query the panel” style drop-in sessions, where experts from the library, IT Services, research ethics boards, and the VPRI are all together in the same virtual space to answer research-related questions directly.

Initially, we advertised the monthly drop-in sessions through a listserv managed by our sponsored research unit and restricted the sessions to 25 attendees. In many cases, a principal investigator (PI) or researcher would ask their entire lab to sign up, which depleted the number of designated spots rapidly. In these cases, we also observed that a group of team members from the same lab often were attending to ask questions relevant to the entire group rather than to individual members of the team. As a response to this observation, our current model is to offer these sessions less frequently (one to two times per semester) but have no cap on attendance. Currently, our primary marketing and outreach channels include the sponsored research listserv, liaison librarians sending communications to departments directly, and several key “high profile” researchers who hold administrative appointments (e.g., an Associate Dean of Medicine) who forwards all of our communications to their faculty lists. The updated model of the drop-in sessions has so far worked well since a lot of attendees have the same questions. Over the course of one year, the Digital Research Services unit hosted a total of ten drop-in sessions corresponding with 296 attendees.

It should be noted that the success of the drop-in sessions is also partly due to fortunate timing. In early 2021, the Tri-Agency RDM Policy was announced. In this way, we were able to benefit from an institutional communication about the Tri-Agency RDM Policy, which was signed jointly between our library dean and our VPRI, explaining the policy and highlighting the Digital Research Services model including a particular emphasis on the drop-in sessions. Another important aspect is that one member of the Digital Research Services, the Director of Research Software, reports jointly to VPRI and IT, which gives them the authority to request relevant IT staff to join the drop-in sessions.

Co-Designing Baseline Institutional RDM Training and Instruction

In an effort to develop scalable and collaborative RDM training, the RDM Specialist from the library and the Senior Advisor for RDM from VPRI collaborated to develop a self-paced online training program, comprised of six modules, focused on institutional RDM-related policies and resources. In particular, the short two- to four-minute videos were developed to address many of the recurring questions that had been asked during the drop-in sessions. Since the program launched in August 2021, there have been 387 participants enrolled. The RDM instructional videos were not only embedded within the broader institutional course management system but are also posted on McGill University's YouTube channel as a resource for the general public. Since the public posting in March 2022, the total views on the playlist have reached 418 within 3 months' time. According to YouTube analytics, 92% of the viewers of these videos are nonsubscribers of the McGill University YouTube channel. Even though we cannot rule out whether these nonsubscribers have an institutional affiliation, we maintain that this descriptive statistic may be a proxy indicator for the public impact of these videos beyond our intended audience within the university.

Centralizing the Management of User Requests

As a researcher-facing service, the Digital Research Services team understands the challenges and frustrations researchers face when it comes to looking for appropriate services and resources within a large university's ecosystem. To better triage researcher questions so that they reach the appropriate campus unit and are addressed in a timely manner, we investigated whether the university already licensed a relevant software that could be repurposed for our context. After consulting with our IT unit, we decided to pilot the use of Jira's Service Desk software, which is the backend user management system that is utilized by our IT and human resources units. In July 2021, we launched the Digital Research Services Service Desk as a digital ticketing system using the Jira software that is set up to be the "one-stop shop" for researchers to ask questions related to digital research, especially when researchers do not know where to find the information or which campus unit is responsible (see Figure 1 for a screenshot of the Jira Service Desk dashboard).

The Digital Research Services team's role is to provide advice and guidance, connect researchers to appropriate units, and to promote strong RDM practices by streamlining daily research activities. In line with this goal, the digital ticketing system has provided researchers with a simple and fast way to get answers from a broad range of institutional service and administrative units. We have configured our Service Desk to send the team member assigned to a ticket an initial email at the time of assignment, a reminder if there has been no response to the user within 3 days, and a second reminder to the full Digital Research Services team if the ticket has not been resolved within two weeks. These email reminders, or service level agreements (SLAs), are customizable in this software. The Jira Service Desk platform also enables the Digital Research Services team to track metrics and create analytics based on queries on the full database of received questions, which

<input type="checkbox"/>	T	Key	Status	Summary	Created
<input type="checkbox"/>	High	DRS-228	CLOSED	RE: Approval for NVIVO software	18/Nov/21
<input type="checkbox"/>	High	DRS-51	CLOSED	RE: Data management consultation - McGill open data sharing	11/Aug/21
<input type="checkbox"/>	High	DRS-40	CLOSED	Request for Consultation	04/Aug/21
<input type="checkbox"/>	High	DRS-237	CLOSED	Advice for data management.	02/Dec/21
<input type="checkbox"/>	High	DRS-194	CLOSED	Request re Otter.ai	07/Oct/21
<input type="checkbox"/>	High	DRS-19	CLOSED	Question about sensitive data storage	09/Jul/21
<input type="checkbox"/>	High	DRS-226	CLOSED	Approval for NVIVO software	16/Nov/21

Figure 1: Digital Research Services Jira Service Desk Ticketing System dashboard. This image shows the ticketing queue for tickets assigned to one team member. *Note: this image has been cropped for privacy considerations.*

DRS-157 Return to queue

Qualtrics

Details

Type: Service Request Status: CLOSED [\(View Workflow\)](#)

Priority: Medium

Component/s: McGill Library Resolution: Unresolved

Labels: None

DRS Request category: Research Software

Close Reason: Done

Description

Hello,

I see listed on your FAQs that "Qualtrics is currently in the process of being vetted for research purposes at McGill." I know this has been the case for several months at least. Do we know when Qualtrics is expected to be fully vetted and ready for McGill researchers to use?

Thanks,

SLAs

- 13min ✗ Time to assignment within 1d 6h
- 2d 10h ✓ Time to resolution after a ssignment within 3d 6h
- 1w 3d ✓ Maximum Time to resolu tion after assignment within 1w 4d

People

Assignee: ↖

Alisa Beth Rod, Dr

Figure 2: Digital Research Services Jira Service Desk Example Ticket and Metadata. Red arrows point to the assignee of the ticket, the request category, and the faculty/department of the requester (McGill Library in this case). *Note: this image has been cropped for privacy considerations.*

allows for benchmarking and has provided a foundation for an exploratory evaluation of our services (see Figure 2 for a screenshot of an individual ticket). Over the past year, although we continue to receive a substantial portion of our requests via our own institutional email accounts as we transition to routing all requests through Jira, we also received 188 requests via the Service Desk.

Results: Benchmarking for Assessment of the DRS Service Model

We customized several metadata fields to be able to track the request category (i.e., RDM, research software, ARC, or other), academic affiliation of the user, and the reason for closing the ticket (when applicable). Of the 128 requests where a category was tagged, almost half (about 49%) represented questions directly about RDM (see Figure 3 for a breakdown of total requests by question category).

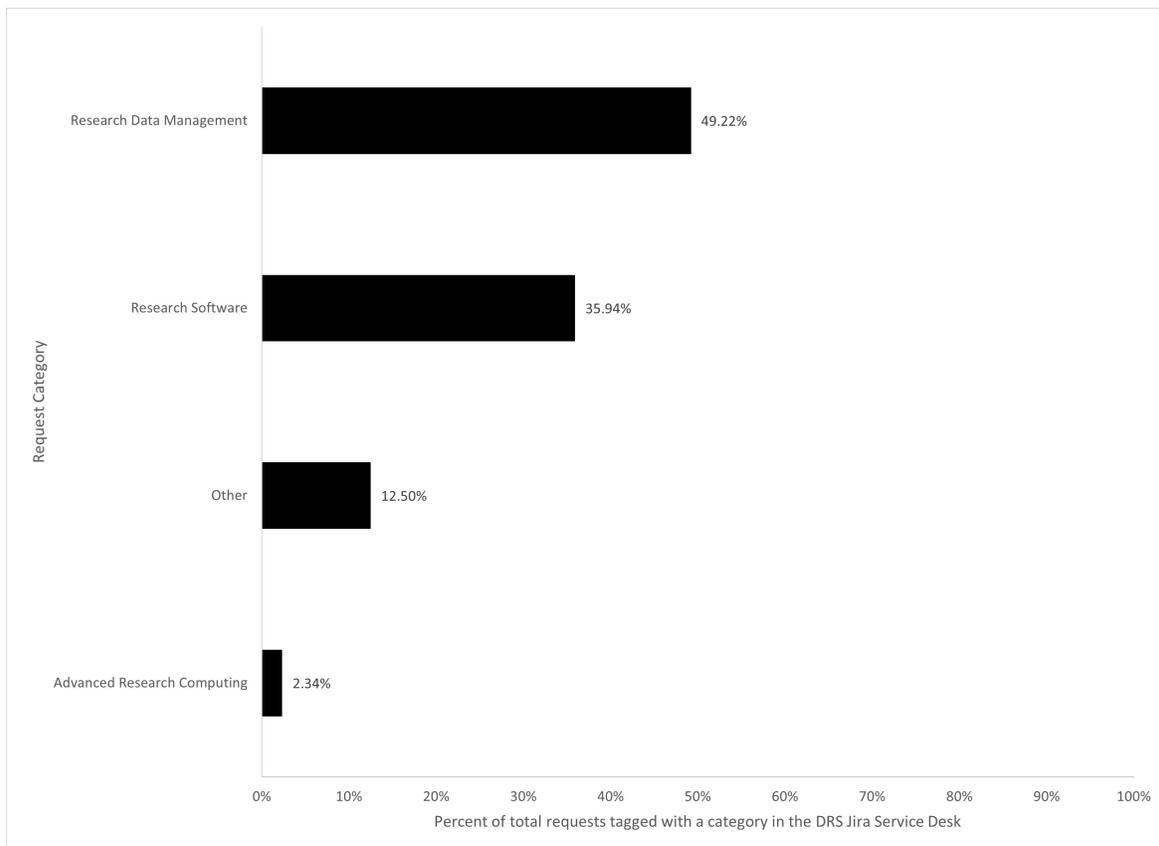


Figure 3: Percent of total requests to Digital Research Services by category, 2021-2022.

Of the 116 requests where departmental affiliation was captured, about half (47%) represented faculty members affiliated with a medical or health science discipline (see Figure 4 for a full breakdown of requests by users' faculty and departmental affiliation).

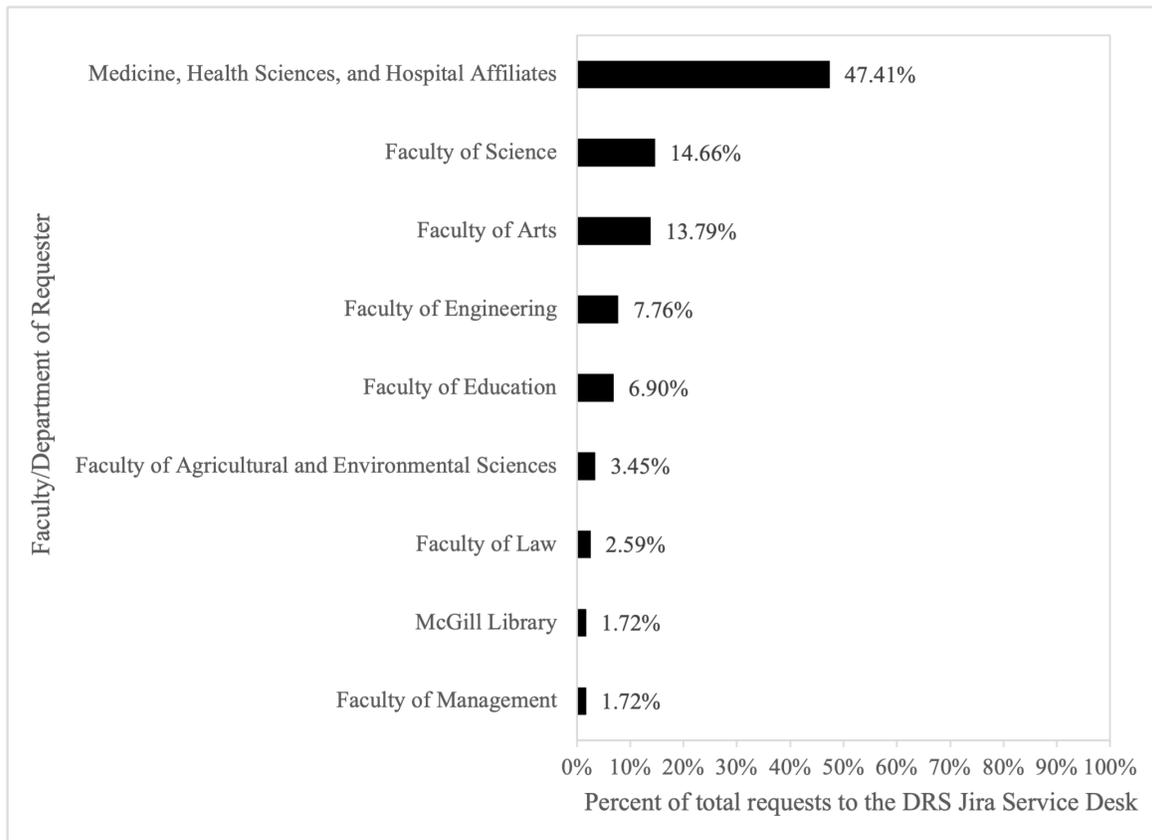


Figure 4: Percent of total requests to Digital Research Services Jira Service Desk by Faculty or Departmental Affiliation, 2021-2022. *Note: medical and health science faculties and departments have been aggregated.*

We also have a field that allows us to generate our own metadata labels or tags for a ticket (e.g., “grant,” “cloud services,” “transcription software,” etc.). Of the 58 requests for which a team-member generated label was tagged, the largest proportion (33%) represented “cloud services.” This was an expected major issue for researchers since at the beginning of the pandemic McGill University’s IT unit adopted a new institutional cloud software-related regulation. Many of the remaining labels were each used for a single ticket, which indicates that the utility of generating our own metadata tags may not add much value as metrics for evaluating this service.

Discussion

Although we are still determining what information to collect for the purposes of longitudinal evaluation of our services, tracking basic statistics such as attendance and enabling custom metadata in Jira has provided adequate information for exploratory analyses. In aggregating the number of requests to Digital Research Services by faculty and department, we were able to confirm that requests from users with medical and

health sciences affiliations far outpace requests from users across other disciplines. This finding supports an internal exercise, the RDM Maturity Assessment Model in Canada (MAMIC), that we conducted to review the maturity of our DRI-related services at McGill University (Fry et al. 2021). The MAMIC incorporates a rubric to rate services such as IT infrastructure, researcher support, and budgeting and finance related to RDM offerings at an institution. The results of our MAMIC exercise highlighted issues that are ubiquitous across Canadian institutions, including a lack of infrastructure for the long-term deposit or archiving of sensitive data such as data derived from clinical settings and patients. Altogether, the level of support required by medical and health sciences users indicates an opportunity for Digital Research Services in further strengthening relationships with research hospitals and institutes.

Regarding the category of support, although most questions from users were related to RDM, a large proportion (about 36%) were about research software. For researchers, the distinction between RDM and other activities or needs related to the active management of a research project during its lifecycle is opaque. Support for RDM requires expertise from multiple domains related to digital research infrastructure (Donner 2022). With a collaborative approach as our guiding principle and a focus on establishing a small, but agile, team, it is vital for Digital Research Services to connect and leverage resources and support from existing units within the university. Therefore, when we initially launched the Digital Research Services unit, we proactively reached out to multiple service and administrative units (e.g., IT, sponsored research, Research Ethics Boards, procurement, legal, etc.) within the university to build relationships and formalize communication channels.

Although we attempted to anticipate demand from researchers and implement scalable service offerings, we also developed additional resources in a more reactionary fashion. For example, we decided to develop a comprehensive FAQ page on the Digital Research Services website as a resource to point to in the drop-in sessions that provides an overview of all relevant information and resources on data storage, data sharing, data archiving, research software, and ARC. However, since most of these services are provided by or paid for by IT and managed by different portfolio managers within IT, it was imperative that we strengthened our relationship and communication with instrumental IT staff members. For context, McGill University's IT Services unit's mission is not to serve research, but to serve the enterprise needs of the institution broadly. Thus, until the launch of Digital Research Services, there was not a direct or meaningful way for researchers and IT staff to engage in a sustained and ongoing dialogue. The Network and Communications Services Director within IT was instrumental in introducing the Digital Research Services team to relevant IT portfolio managers, which in turn provided the appropriate channels for maintaining current information for our FAQ page. We have also invited several key IT portfolio managers to participate in the drop-in sessions as IT representatives where they have been able to, for the first time, receive direct "face-to-face" feedback from researchers outside of the context of one-off requests to IT for case-specific assistance.

The collaborative approach between Digital Research Services and the IT portfolio managers in this example demonstrates that better coordination between service units is not only beneficial for researchers but is also an effective way for relevant research support units to gather direct feedback on their service offerings. In addition, the importance of the Digital Research Services unit's organizational structure as team-based (e.g., a cross-functional team) cannot be overstated. The success of connecting with IT portfolio managers in part was due to our initial efforts in reaching out to IT services at the formation of Digital Research Services via our team member, the Director of Research Software, who is co-appointed by IT and VPRI, and in part due to portfolio managers' own eagerness to help and collaborate on top of their current workload.

Beyond the strengthening of relationships between IT and other research support units, another added benefit of the drop-in sessions has been the opportunity for knowledge transfer between the experts from various research support units, which in the past have operated more in silos and without awareness of how to interpret policies across functions. For example, it emerged during the drop-in sessions that IT's interpretation of a privacy or legal restriction relating to human participant data often differed slightly, but significantly, from the interpretation of the representative from the research ethics board. In this way, these drop-in sessions provide a forum for debate and conversation among experts who had previously no mutual avenue for collaboration. These drop-in sessions also allowed each representative expert to stay updated on the operations and perspectives of other research support units.

Conclusions

Going forward, a robust and continual assessment plan will be required to ensure our services align with the rapidly evolving needs of researchers and funder requirements. In addition, just as the Digital Research Services team was developed to remove silos and assist researchers in navigating the increasingly complex digital research ecosystem, there is also an opportunity to collaborate with other institutions that are currently piloting similar innovative service models in developing best practices for benchmarking impact. For example, just prior to the pandemic, North Carolina State University (NCSU) launched a Research Facilitation Services (RFS) unit as a pilot, which reflects a similar collaboration between their library, IT unit, and their Office of Research and Innovation (Ruediger 2022). A future project could involve an in-depth comparison of these emerging cohesive cross-functional RDM support models with the aim of supporting roundtables or the collaborative development of assessment best practices.

In general, due to the rapid shifts in public health measures during the COVID-19 pandemic with limited on-site access (Cox 2020), many researchers were struggling to move their research activities to remote modalities. In addition, the publication of the Tri-Agency RDM Policy created an imperative to increase awareness of RDM best practices among researchers. Raising awareness of current available standard offerings at the university, such as collaborative tools, remote data storage options, and downloadable

institutionally managed licensed software, was an urgent task for Digital Research Services to connect researchers to relevant resources. Depending on the internal organizational structure and culture in different universities, it would not be a surprise to find that some administrative or service units are not empathetic towards research because these units simply do not have a research-related mandate. For RDM librarians and professionals, directing outreach efforts not only towards researchers but also towards service units that are relevant to the research data lifecycle may become a necessity (Smith et al. 2021). Overall, the meteoric shift toward virtual research practices and needs caused by the COVID-19 pandemic presents a unique opportunity to rethink the human and contextual aspects of RDM service provision.

Acknowledgements

The content of this article is based on the Lightning Talk presentation at RDAP Summit 2022, available from Open Science Framework: <https://osf.io/cbvga>.

Data Availability

The data that support the assessment results reported in this study are openly available in the McGill Dataverse:

Rod, Alisa Beth, Biru Zhou, and Marc-Étienne Rousseau. 2022. "Replication Data for: There is no 'I' in Research Data Management: Reshaping RDM Services Toward a Collaborative Multi-Stakeholder Model." [Data set]. Borealis, V1. <https://doi.org/10.5683/SP3/LCTDKZ>.

Competing Interests

The authors declare that they have no competing interests.

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