CHAPTER 6: Launching a Collaborative Research Data Management Services Program at Rowan University

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CHAPTER 6

Launching a Collaborative Research Data Management Services Program at Rowan University

Shilpa Rele and Benjamin Saracco

This case study describes the process of implementing a research data management (RDM) services program at Rowan University (Rowan). Rowan has seen rapid expansion in terms of enrollments, undergraduate and graduate programs, and research activity over the last decade and has grown from a state college into Rowan University. It is a unique academic institution in that it is one of only two in the United States with both allopathic and osteopathic medical schools. The acquisition of the Rowan School of Osteopathic Medicine and the establishment of the Cooper Medical School of Rowan University were significant factors in the university’s research-intensive Carnegie classification R3 in 2017 and R2 classification in 2018. In late 2021, Rowan announced it will establish a new School of Veterinary Medicine, the first of its kind in the state of New Jersey. Additionally, university leadership is currently working on a path to achieve R1 Carnegie Classification (research intensive) as a
primary strategic goal in the coming years and is looking to achieve $45 million in externally sponsored research by the end of fiscal year 2022 (Figure 6.1). Research data management (RDM) solutions that will increase both the research quality and create higher-quality external grant funding applications will be key to achieving that important goal.

With the tremendous increases in enrollment, research, external funding, faculty, and additional campuses, the Rowan University Libraries (RUL) has faced a proportional increase in demand for digital research project collaborations (e.g., Watershed Project, Jean and Ric Edelman Fossil Park Digital Collection) and new research support services from the university community (e.g., developing workshops on writing effective data management plans, ORCID, providing journal selection reports, etc.). As background, Rowan University Libraries comprises Campbell Library, which is the main library located on the main campus in Glassboro, NJ, the Cooper Medical School of Rowan University Library located in Camden, NJ, and the Rowan School of Osteopathic Medicine located in Stratford, NJ. The libraries employ 82 staff employees and approximately 32 student employees. Our vision is to provide “Information empowerment through innovative technology and exceptional service” (Rowan University Libraries [RUL], 2018).

In response to the previously mentioned developments, RUL and the Division of University Research (DUR) took the opportunity to work collaboratively to conduct an environmental scan of the landscape of the current research data management practices and needs in order to determine future services, training, and infrastructure that may be required to support the research data lifecycle at Rowan. The survey method, results, and interventions implemented in response to the findings have been summarized using Koufogiannakis and Brettle’s evidence-based library and information practice (EBLIP) theoretical framework’s process elements: articulate, assemble, assess, agree, and adapt (Koufogiannakis & Brettle, 2016).

Figure 6.1
Growth of sponsored research funding at Rowan University from 2010 through 2018. Total patents awarded in this time period was 25.
Announcing Our Institutional Needs

With the tremendous growth of the university and the impending expansion of sponsored research, RUL identified an opportunity to expand support research services and become relevant to the faculty community with regard to research data management. To determine how and where research data management needs may exist at the university, we asked the question: What are the most immediate research data management needs that faculty require assistance with and what services can the university offer to address these needs?

Assembling the Evidence

Professional Knowledge

Representatives from the Rowan University Libraries (authors Shilpa Rele, scholarly communication and data curation faculty librarian, and Benjamin Saracco, research and digital services faculty librarian, Cooper Medical School of Rowan University) and the Division of University Research (Stephen Robishaw, manager, Office of Proposal Development) participated in the Digital Library Federation’s e-Research Network Program (DLF eRN) from May to October 2018. DLF eRN was a six-month program that brought together teams from research-supporting libraries to strengthen and advance their organizational data services and digital scholarship roles. It provided an opportunity to learn about collaborative RDM efforts undertaken at other academic institutions, current best practices as they relate to various stages of the RDM lifecycle, and opened up a network of professionals engaged in this area of service at other institutions.

Research Evidence

Evidence from past and emerging research on the establishment of RDM services at higher education institutions has shown that “interorganizational collaboration enables more efficient use of resources and expertise” (Kim & Syn, 2021, p. 453). A recent systematic review of the literature on research data management practices and services found that a lack of interorganizational collaboration between the library and other supporting departments, such as information technology and research divisions, was frequently cited as being a major barrier to the successful implementation of RDM services (Ashiq, Usmani, & Naeem, 2020). Some of the authors’ assigned curriculum from the DLF eRN further solidified the importance of forming institutional partnerships with clear collaborative roles and responsibilities. One specific mantra the authors learned from the DLF eRN’s curriculum is that effective “data management services cannot exist in a vacuum” (Henderson, 2016, p. 121).

Local Evidence

The authors’ participation in the DLF eRN program gave them the guidance and knowledge needed to develop strategies and documentation to guide the implementation of a local RDM program at Rowan. One of the tangible outputs of this program was the
The development of an online survey. This survey was designed to conduct an environmental scan to assess current research practices at the university as well as highlight areas where faculty and researchers may need services and instruction to better manage their research outputs and processes in a more efficient manner.

The authors identified 350 faculty and researchers from all three Rowan campuses to participate in the survey. The specific inclusion criteria the authors used for selecting the population that would receive the survey included those who currently had submitted grant applications to external funding agencies and those with publications in the last five years (2013–2018) as identified via an affiliation search in the Scopus abstract and citation database. Rowan’s Office of Proposal Development supplied us with a list of grantees during this period.

The survey consisted of twenty-three questions and was approved by the Rowan Institutional Review Board. The research survey question design was informed by a previous survey instrument used at one of the author’s former institutions. A full list of survey questions is available in Appendix 6B. No personally identifiable information was collected from the survey participants. Survey questions collected information related to demographics: practices surrounding privacy and confidentiality of data, short- and long-term data storage/preservation, data accessibility needs, methods of sharing data, types of file formats generated, and inquired about information and future services needed to assist with effective management of the RDM lifecycle. In fall 2018, the authors disseminated the survey to the 350 faculty/researchers we identified from across Rowan’s campuses directly to the invited survey participant’s institutional email addresses.

Assessing Our Findings

The authors found the survey findings to be the most critical of all the evidence collected. For this reason, this section focuses on that evidence only.

The survey received 113 responses (a 32% response rate). Two additional respondents indicated that they did not wish to participate in the survey by clicking “no” to opt out. Of these responses, the majority, 74.3% self-identified as “faculty” while 17.4% identified as “clinical faculty” (Figure 6.2). As background, “clinical faculty” at Rowan are primarily practicing physicians at Cooper University Hospital who also teach, assess, and/or mentor students at Rowan’s allopathic medical school. Clinical faculty also routinely serve as research collaborators with medical students and residents in collaborative research teams at the medical school’s partner academic health system, Cooper University Healthcare. Faculty are primarily tenure-track faculty at all other academic programs across Rowan.

When examining the survey responses by associated school or college, the authors learned that ~50% of the responses came from respondents from Rowan’s allopathic and osteopathic medical schools (Figure 6.3). This was followed by respondents from the College of Science and Math at ~27% and Henry M. Rowan College of Engineering and Rohrer College of Business each with ~7%. These results demonstrate clear evidence of a majority STEM-associated pool of survey respondents. One possible reason for this STEM-heavy representation in our survey respondents is that the majority of research conducted and external funding received by Rowan has been in STEM-related fields.
**Figure 6.2**
What is your position? (n=113)

- Rowan School of Osteopathic Medicine: 4.60%
- College of Science and Mathematics: 26.60%
- College of Education: 2.80%
- College of Humanities and Social Sciences: 2.80%
- Cooper Medical School of Rowan University: 45.90%
- Henry M. Rowan College of Engineering: 7.30%
- Other: 2.80%
- Rohrer College of Business: 7.30%

**Figure 6.3**
What school or college do you belong to? (n=113)
Survey results were not surprising and are similar to those recorded by environmental scans of research data management audits conducted by other academic libraries (Whitmire, Boock, & Sutton, 2015). Faculty specifically demonstrated the highest need for uniform assistance with and access to research data storage solutions, meeting external funder requirements of public access to research and scholarship, writing effective data management plans, assistance with metadata for research objects and tools for sharing research data, and better support and training services for RDM in general. See Figures 6.4 and 6.5 for additional survey results.

**Figure 6.4**
Do you encounter any data management problems when collaborating on a research project? (n=113)

**Figure 6.5**
Thinking about priorities for allocating university resources, please indicate any other services that you believe should be a high priority for Rowan University. (n=113)
The survey results demonstrate that these services and solutions are needed across Rowan regardless of campus or medical school affiliation. These survey results confirmed the existence of the RDM needs and provided the authors with evidence that they took to university administration and research-related university councils and committees in order to summarize the RDM needs of the faculty and gather support for the establishment of a new RDM program at the university.

In addition to the short-answer responses the authors collected from the survey, further statistical analysis was also performed in SPSS software using Pearson’s chi-squared testing. With the assistance of a clinical faculty member and biostatistician, the authors conducted chi-squared testing on responses made by two sets of subpopulations from the respondents: clinical faculty versus non-clinical faculty and respondents from one of Rowan’s two medical schools versus respondents not associated with the medical schools. Resulting P-values of less than or equal to 0.05 were chosen as achieving a level of significance. These two subpopulations were selected for additional statistical analysis because the authors theorized that health science and biomedical researchers may have different research practices and research data management needs when compared to researchers from other disciplines. The authors also wanted to take advantage of this opportunity to further analyze this unique population of respondents as Rowan is one of only two universities in the United States with both allopathic and osteopathic medical schools. Therefore, the information produced from surveying this unique population had the potential to produce novel findings.

When the statistical analysis was completed comparing responses from these subpopulations using chi-squared testing the majority of responses did not produce results with a P value lower than or equal to .05 and were deemed statistically insignificant. There were several questions that did have statistically significant results, however.

Survey responses from clinical faculty comparing their frequency of engagement with external collaborators between clinical and non-clinical faculty at Rowan University were significantly higher than that of non-clinical faculty. Based on our professional knowledge, possible explanations include:

- Clinical faculty at Rowan routinely work across health systems and the local university and therefore have a greater chance of working with external collaborators.
- Clinical faculty at Rowan frequently work across multiple information technology systems and electronic medical record systems between their varying academic and healthcare affiliations. They also do not have uniform access to data storage technology options offered across institutions. This disparity in technology resources could result in clinical faculty self-reporting more external collaborations due to lack of uniform access to information technology systems.
- The non-clinical faculty possibly pursue more individual research projects because they have access to more internal Rowan funding opportunities and are incentivized through the tenure and reconstructing process to produce more single, first-author works.

Survey responses from a question comparing the frequency of barriers in finding shared research data storage between medical school and non-medical school respondents
at Rowan University varied significantly. The authors theorize some explanations for this significantly different response:

- It is possible that medical school-associated respondents have better access to shared storage because they are also more likely to collaborate with external researchers whose institutions may have institutional data storage solutions available to their researchers.
- It is possible that medical school-associated respondents may have additional data storage options available to them through their academic medical center affiliations that non-medical school respondents do not.

### Agreeing on Goals and Actions

Based on our survey findings, the authors of the survey worked together to identify several activities and next steps for the university to engage in to develop a truly collaborative research data management program. The recommendations were provided to various university administrators and broken down into tiered levels of service with some initiatives and services that were to be addressed in the immediate future and some that would need longer discussions and preparation to put support in place for instruction and infrastructure related to RDM.

**Tier one recommendations include:**

- Updating library LibGuides (e.g., creating more instructional content on the University’s Institutional Repository, RDM University storage options, links to outside resources such as external data repositories and DMPTool)
- Offering workshops and consultations (e.g., Writing Effective Data Management Plans, ORCID, Introduction to Open Access Publishing, one-on-one DMP faculty consultations)
- Reviewing and updating policies with RDM-related information (e.g., Updating the university’s data governance policy)

**Tier two recommendations include:**

- Making open tools available and providing support for incorporating them into the research process (e.g., ORCID, DMPTool, Institutional Repository)
- Offering robust and sustainable technology and infrastructure options to store, preserve and provide access to research data (e.g., Code42, Amazon Web Services)
- Strategically advocating for additional services and resources in the budget process (e.g., gaining approval for an institutional Open Science Framework membership, bringing on a new digital asset management software for digital humanities project data [Alma D])

**Tier three or the long-term recommendations include:**

- Strategically planning for additional collaborative staffing in the three units represented in the RDM Working Group
- Offering assistance with data curation
- Developing a repository of example/aspirational Rowan Data Management Plans (DMPs) for each federal agency
• Utilizing the internal seed funding program as a component of a comprehensive grant simulation program with key components including the drafting, editing, and review of DMPs

These recommendations were further refined and transformed into a Research Data Management Working Group (RDM WG) Road Map working document; an excerpt is available for review in Appendix 6A.

As for the immediate next steps, the authors reached out to a critical institutional partner, the Division of Information Resources & Technology (Rowan’s IT division), which led to the establishment of the RDM WG. The RDM WG comprises senior representatives from each of these units. This group is charged with reviewing, recommending, and implementing policies, services, and infrastructure as they relate to supporting the research data lifecycle at Rowan. The goal of this group is to assist with creating and implementing data management plans, applying best practices for managing data, and finding data management services at any stage of the research process (Rele, 2021).

Using the evidence gathered from the survey results, this WG has been implementing services and resources to better meet the research data management needs of the Rowan community. The authors conducted training workshops for using the DMPTool, implementing ORCID into the RDM lifecycle, and best practices for writing effective DMPs. This group’s discussions have also resulted in campus-wide conversations about implementing cloud storage service for research data storage. Additional software and services such as Open Science Framework institutional membership and new software for the collection and analysis of qualitative research data are currently under review.

**Adapting Our Plan**

**Additional Stakeholders**

While the authors successfully identified faculty needs related to research data management, one limitation of this study (as is similar to other previous such studies conducted) was that it was not disseminated to graduate students or lab technicians who may be more directly responsible for generating research data and managing the research project lifecycle (Goben & Griffin, 2019). Their needs may be different from those of researchers themselves. Another limitation of the survey is that its results reflect the needs of mostly STEM faculty and not necessarily the needs of humanities and social science faculty, who may also have other research data management needs.

**Assessment Plans**

It is important to note that there have been many recent personnel changes and departures of several members of the Research Data Management Working Group (RDM WG). Despite this turnover in staffing, the new group members will hopefully take up the roadmap and continue to implement many of its recommendations moving forward. It will be important for future group members to periodically assess goals and objectives laid out in the roadmap document and update it as the RDM environment changes at
the University in its quest to achieve an R1 Carnegie classification for research activity. A follow-up survey using many of the same questions used in the authors’ original survey could provide interesting findings that could reveal if interventions used from the roadmap have been effective in achieving the RDM WG’s goals, particularly for the various populations covered in this chapter.

**Reflecting on Lessons Learned**

Our RDM WG has learned several valuable lessons from this project.

**Communicate Clearly**

Communication is key to managing effective collaboration. The RDM WG meets on a regular schedule to discuss issues and implement next steps for tasks at hand. It maintains detailed meeting notes and links to documents (e.g., policies) that need review and approval.

**Develop a Roadmap**

Having a roadmap has helped identify key priorities and personnel and adhere to timelines to the best of our ability. Appendix 6A details the first roadmap object. A full copy of the map is available in the external supplement file hosted at Fighare. The example set forth by our working group of functioning systematically and collaboratively will be useful to those looking to start RDM services at their institutions.

**Focus on Flexibility**

The COVID-19 pandemic demonstrated the need for flexibility and respect for honoring varying work schedules and demands on working group members’ time. This has also meant placing two proposed projects on hold due to the unavailability of resources to support their implementation and being realistic in all that our working group could achieve since the onset of the pandemic without putting undue burden on its members.
# APPENDIX 6A
RESEARCH DATA MANAGEMENT WORKING GROUP ROAD MAP EXCERPT

<table>
<thead>
<tr>
<th>Goals/ Objectives</th>
<th>Implementation Timeline</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Goal—To develop effective and collaborative RDM program on campus</strong></td>
<td><strong>Year 1</strong> (2018–2019)</td>
</tr>
<tr>
<td>Objective 1. Understand RDM landscape at Rowan</td>
<td></td>
</tr>
<tr>
<td>Librarians and Division of Research staff</td>
<td></td>
</tr>
<tr>
<td>Measure 2. Adequate participation in survey from each college/campus</td>
<td>Action 2. Review DMPs in external grant-funded applications (spring 2019).</td>
</tr>
<tr>
<td>Forthcoming: librarian team members will coordinate with the Division of Research about their strategic plan.</td>
<td>Action 3. Share results with IRT (spring/summer 2019).</td>
</tr>
<tr>
<td></td>
<td>Action 4. Reach out to external institutions to share results and discuss possible benchmarks for success.</td>
</tr>
</tbody>
</table>
APPENDIX 6B
FULL SURVEY INSTRUMENT

General Information about Researcher

1. What is your position?
   ☐ Faculty
   ☐ Clinical faculty
   ☐ Researcher
   ☐ Other. Please specify____________________

2. What School or College do you belong to?
   ☐ College of Humanities and Social Sciences
   ☐ Henry M. Rowan College of Engineering
   ☐ College of Science and Mathematics
   ☐ School of Earth and Environment
   ☐ Rohrer College of Business
   ☐ College of Communication and Creative Arts
   ☐ College of Performing Arts
   ☐ College of Education
   ☐ Rowan School of Osteopathic Medicine
   ☐ Cooper Medical School Rowan University
   ☐ Other. Please specify____________________

3. Which of the following best describes your primary areas of research? Select all that apply.
   ☐ Education
   ☐ Engineering/Computer Science
   ☐ Health Sciences or Biomedical Sciences
   ☐ Life Sciences
   ☐ Physical Sciences
   ☐ Social Sciences
   ☐ Humanities
   ☐ Performing Arts
   ☐ Earth and Environment
   ☐ Interdisciplinary. Please specify____________________
   ☐ Other. Please specify____________________

Information about the Research Data

4. Do you work with sensitive or confidential data (such as Personally Identifiable Information (PII)), Protected Health Information (PHI/HIPAA), or other types of sensitive information?
   ☐ Yes
   ☐ No
   ☐ I don’t know

5. How do you currently protect your data? Select all that apply.
   ☐ Data are password protected
☐ Data are de-identified
☐ Only my research team members have access to the data
☐ Data are encrypted
☐ Data are destroyed after use
☐ My data is off network
☐ I do not protect my data
☐ Other

6. What file types do you generate or use in the course of your research? Select all that apply.
☐ Text (e.g., .txt, .pdf, or .doc files)
☐ Raw text data (e.g., .csv, .dat)
☐ Tabular or relational data (e.g., spreadsheets and/or databases)
☐ Image data (e.g., .jpg, .tiff, .bmp, .gif, .png, .ps, .psd, .svg files)
☐ Audio data (e.g., .mp3 files)
☐ Video data (e.g., .mp4, .wmv, or .avi files)
☐ XML (Extensible Markup Language) data (e.g., .xml)
☐ Geospatial data (e.g., .shp, .gdb, ArcGIS, GeoDA, Google Shape Files, .geotiff files)
☐ Proprietary data file format (e.g., SPSS, Matlab, etc.). Please specify __________________________
☐ Other, please specify __________________________

7. Approximately how much digital research data are you currently storing?
☐ < = 99 Gigabyte (GB)
☐ 100 – 499 GB
☐ 500 – 999 GB
☐ > = 1 Terabyte (TB)
☐ > 25TB
☐ I don't know

Research Funding and Data Management Plans
8. Have you received funding in the last 5 years from any external funding agency (e.g., government/private foundation)?
☐ Yes
☐ No

9. Have you been required to include a Data Management Plan (DMP) in your funding application? (A DMP is a formal plan that outlines how you will store, archive, preserve, secure, and share your research data during and after the research project is completed, and who will take responsibility for these actions.)
☐ Yes
☐ No
☐ I don't know

10. Do any of the journals you publish in require you to submit research data in
addition to a manuscript?
☐ Yes
☐ No
☐ I don’t know

Data Storage and Preservation
11. What is your current method of data storage or backup during the project?
Select all that apply:
☐ Personal desktops or laptops
☐ External hard drives/CDs/DVDs
☐ Departmental server
☐ Online/cloud storage (e.g., Dropbox/Google Drive/Amazon Cloud)
☐ Written notes or printed materials
☐ Campus storage option (please specify) _______________
☐ Other (please specify) _______________
12. What are your data storage and preservation needs post-project?
☐ Please specify _______________
13. How long do you need to store data post-project?
☐ Please specify _______________
14. Thinking of your most recent project, what is the minimum length of time you need to store your research data?
☐ < 1 year
☐ 1 – 5 years
☐ 6 – 10 years
☐ > 10 years
☐ I don’t know

Data Management and Data Sharing
15. How do you conduct your research? Select all that apply:
☐ Individually
☐ In a team at one of Rowan University’s campuses
☐ Collaborating with members at other Institutions such as colleges, universities, research institute, or University hospital
16. If you are collaborating with other institutions, which institution manages and stores the data?
☐ Rowan University
☐ Collaborating institution
☐ Both
☐ Other (please specify) _______________
17. Do you encounter any data management problems when collaborating on a research project? Select all that apply:
☐ Finding suitable shared storage space
☐ Lack of file naming conventions make it difficult to identify files
☐ Lack of version control has caused confusion
☐ Legal issues
☐ PI relocating/changing institutions
☐ Other (please specify) _______________

18. How do you share your data with people outside your research group? Select all that apply:
☐ Email
☐ Project website
☐ Department website
☐ University website
☐ Data repository or databank
☐ Cloud service, such as Dropbox or Google Drive
☐ Supplementary information included with journal article
☐ Other (please specify) _______________
☐ I don’t share the data / I can’t share the data

19. What reasons might prevent you from sharing data with people outside your research group? Select all that apply:
☐ Data contains personal/sensitive information
☐ Might not get credit
☐ Data misinterpretation or misuse
☐ Too much time or effort
☐ Data requires secure or restricted access
☐ Data is of little value to others
☐ Commercialization or patent concerns
☐ Not licensed to share data
☐ Other (please specify) _______________

20. If you currently deposit some or all of your data in a data repository or databank, which one do you use? Examples include ICPSR, National Center for Biotechnology Information/NCBI, etc. Please specify.

University Support and Services

21. Thinking about priorities for allocating University resources, please indicate the importance of these services to you for either your active or stored research data.

<table>
<thead>
<tr>
<th>Information about best practices developing a data management plan (both short term &amp; long term)</th>
<th>Very unimportant</th>
<th>Unimportant</th>
<th>Neither important nor unimportant</th>
<th>Important</th>
<th>Very important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assistance meeting data sharing or storage requirements (e.g., funding agencies, IRB)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Thinking about priorities for allocating university resources, please indicate any other services that you believe should be a high priority for Rowan University.

Any additional comments?

Thank you for your time!

If you would like to talk to us further about research data management needs, please contact us.

**Acknowledgment**

The authors would like to thank Dr. Krystal Hunter of the Cooper Medical School of Rowan University for her expertise in data analysis and the assistance she provided us in conducting some of the statistical analyses featured in this chapter.

**References**


