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2022

Creating Capacity for Research Data Services at Regional Universities: A Case Study

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CREATING CAPACITY FOR RESEARCH DATA SERVICES AT REGIONAL UNIVERSITIES
A Case Study

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Understanding the processes of research design and of data collection, organization, storage, preservation, and sharing is critical to the success of any project, regardless of the scope of the research. From research design and conceptualization to the potential sharing of data with other researchers for replicability, as well as preserving data for the benefit of the wider research community, unique challenges, as well as opportunities for research data management (RDM) and research data services (RDS) teams, are presented; these include problems, issues, and concerns regarding how to prepare a data management plan (DMP) and how to manage data collection, analysis, storage, and preservation. In response to these concerns, academic institutions typically have structured RDS for students and faculty through the support of many stakeholders: academic librarians who are familiar with the disciplinary resources and have skills in archives, data curation, and institutional repositories; information technology services staff who provide solutions to infrastructure issues regarding storage and archiving; and other campus research administration entities that deal with the funding, integrity, and administration aspects of the research.[1]

Our research highlights a case study at the University of Nebraska at Omaha (UNO) where the library staff took an engaged and systematic approach of conducting a needs assessment of researchers on campus regarding RDS. Approaching our Center for Faculty Excellence (CFE), we invited our colleagues to participate in a campus-wide survey and in focus groups. Within this chapter, we share our results and discuss findings that helped us structure our RDS in collaboration with other key stakeholders in our campus community. As we spoke with our colleagues at other institutions regarding their experience with RDS, it became evident that the challenges and support needs are different not only across institutions but also across different academic disciplines. Our case study is a context-specific example of how regional academic libraries may approach a systematic needs analysis and implementation of RDS in collaboration with other campus stakeholders. However, with the findings from our survey and focus group sessions, we hope our colleagues at other institutions will gather insight into how we considered the potential elements of planning and implementation of RDS. We highlight our approach as we developed an infrastructure of support identifying and involving key campus stakeholders. Additionally, we developed discipline-specific instructional resources with the Association of College and Research Libraries' Framework for Information Literacy for Higher Education as a guiding document to support the data lifecycle—from research design, data management planning, data collection needs, and approaches to data analysis, as well as storage, sharing, and long-term curation of research data.[2]

INSTITUTIONAL CONTEXT AND RATIONALE FOR THE STUDY

UNO is a Carnegie doctoral research university with six academic colleges. The research landscape of our institution has expanded in the last few years with new programs and certificates being added to both undergraduate and graduate offerings. UNO currently offers over ninety graduate programs at all levels, including masters, doctoral, and specialty programs such as certificates, non-degree options, dual degrees, and educational specialist programs.

Graduate students enrolled in several of our master's degree programs, which include business administration, criminology, emergency management, gerontology, political science, public administration, and sociology, have

thesis requirements for the completion of the program. Faculty colleagues supervising these projects often advise students to utilize existing datasets to examine relevant research questions. These projects minimize the time it takes to complete the programs in terms of submitting applications to the Institutional Review Board (IRB) and collecting original data, yet they provide students an opportunity to understand the nuances of research design—examining prior literature, formulating research questions, finding datasets with key variables, running analysis using appropriate approaches, and discussing their findings. At the doctoral level, our students spend a considerable amount of time crafting their research, which often involves submitting an IRB application, collecting data, and conducting data analysis.

Similarly, some of our undergraduate programs have a component of conducting small-scale research projects either as a senior thesis, a capstone project, or a senior seminar. As we observed an increasing number of questions and research consultations with students regarding research data and analysis, we started gathering resources to support these programs. Both undergraduate and graduate students are encouraged to apply for internal research funding through the Fund for Undergraduate Scholarly Experiences (FUSE), through Graduate Research and Creative Activity (GRACA), or through the Research Development Program. The projects are showcased every year at the Research and Creative Activity Fair hosted by the Office of Research and Creative Activity (ORCA).

Due to disciplinary differences with respect to research practices at UNO, the research data needs of those on campus are extremely varied. For instance, while the main concern of one research project may be on system processing capacity, for another, it may be on data security. As a result of these varied needs, the UNO Libraries' "Mission and Strategic Plan, 2017–2020" advocated supporting, preserving, and providing "dependable access to a growing collection of digital assets in support of online learning and scholarship."[3]

The need to curate these digital assets goes beyond the institution. UNO is part of the University of Nebraska Consortium of Libraries (UNCL), which also includes the University of Nebraska at Kearney (UNK), the University of Nebraska Medical Center (UNMC), and the University of Nebraska–Lincoln (UNL). Collectively, there is a growing recognition of the need for a community of practice that helps to coordinate campus activities regarding research data services. As discussions on our collective infrastructure develop, we have

explored ways to support the UNO campus within the current budgetary and time constraints.

This data-driven approach to scholarship represents a growing trend within the wider field of academia. For instance, in moving toward "open research"—publicly accessible research outputs produced at every stage of the research lifecycle—the international research community is looking to complement the narrative approach to scholarship represented by open access through an increased emphasis on open data. When structured appropriately, metadata and datasets are more likely to be machine-readable, which enhances their discoverability; this, in turn, leads to fewer information siloes and fewer repeated experiments. While not all research data can and should be made open, making research more findable, accessible, interoperable, and reusable (FAIR) enables individual authors, research units, the university, and the wider research community to advance the speed of knowledge dissemination by building on existing research.[4] Driving this growing focus on research data is the development of technology capable of supporting it and the growing number of research funders mandating that data be open. In their October 2020 policy on data management and sharing, the National Institutes of Health (NIH) establishes "the importance of good data management practices and establishes the expectation for maximizing the appropriate sharing of scientific data generated from NIH-funded or conducted research."[5] In summary, by repositioning data as one of the main assets of academic research, open research quickly becomes both an economic and intellectual imperative.

NEEDS ASSESSMENT

Due to the trends we observed with respect to the increasing needs of our students and faculty, our ongoing support for research data-related questions, and the wider data-related research and scholarship needs in the university, we decided to conduct a formal needs assessment at UNO. Prior to that, we formed a Research Data Services Committee (RDSC), comprised of our digital engagement librarian, digital initiatives archivist, institutional repository coordinator, and social sciences librarian to organize and structure our services at the library. We created a Qualtrics survey identifying some of the critical aspects of research data planning, design, collection, management, storage, shareability, preservation, training, and support needs, along with demographic information such as academic rank and department (see appendix

9.1). In addition, we invited our faculty colleagues for a focus group session to allow for a more informal open-ended discussion.

SURVEY RESULTS

First Impressions

We ran our survey during the summer of 2019. In total, we received sixty-five replies to our survey. Within the survey, we focused on the following key areas: the type of data that was being collected, where people were storing the data, and good research data management practice. Individuals demonstrated knowledge within different areas of research data management, but for various reasons, the whole research data lifecycle did not appear to be the focus of the respondents.

Storage

In order to ensure the longevity and reusability of data, suitable storage facilities are needed to access data over time. It was clear from survey results that this fundamental principle of good research data management needed to be addressed. For instance, 30 percent of applicants stored their data on either their laptop or desktop hard drive. (See survey question 12.) The reliability of these systems is limited as they increase the risk of human error due to backups being manual and access being dependent on an individual. However, while it is the responsibility of the researcher to use the most appropriate data storage facility available to them, creating access to an enhanced data storage infrastructure is the responsibility of the institution or the group with which the researcher is working.

Data Management Plans

Data management plans (DMPs) help to organize data within a project by outlining how data will remain accessible before and after a project's completion. Fundamental questions that need to be addressed in these plans at the beginning of research projects regarding the location of stored data and access rights enable adherence to the ideal research data management lifecycle. However, the successful adoption of these plans is limited by a number of factors. The UNO survey results indicated that the top reason for experiencing

challenges in the creation of DMPs was a lack of guidance from the institution, according to 36 percent of respondents, and a lack of guidance from the funding institution, according to 21 percent of respondents. (See survey question 19.) Researchers need subject-specific knowledge in order to complete a DMP; however, they do not necessarily require an expansion of infrastructure. There are numerous free, online platforms that can be used to facilitate a change toward enhanced DMPs. DMPTool, DMP Online, and the Data Stewardship Wizard are three such examples.[6] As these solutions are available, it would suggest that while the utilization of appropriate storage was a problem of infrastructure, the lack of DMP adoption is an issue of education. Promoting their use is an easy way for the library and its peer institutions to begin advocating for enhanced research data management practices.

Accessibility and Preservation

The results of research are strengthened if the data can be verified; however, this is contingent upon the data's preservation and sustained accessibility. Within some projects, this reuse of data might be difficult to achieve, as 29 percent of survey participants did not know how often their data was backed up, and an additional 10 percent never backed up their data at all. (See survey question 13.) Data has the potential to outlive any project, and this crucial resource will be underused if there is no preservation plan in place. Additionally, the transparency and validity of the results could be jeopardized if the data does not remain accessible.

The extent to which data remains reusable and accessible also depends on the stability of the file type and its machine readability. However, less than one-third of the files were in machine-readable formats (.csv, .xml, .txt), suggesting diminished utility for many of the research files being produced at UNO and insufficient knowledge of how to maximize access through the careful selection of file type. (See survey question 8.)

Metadata

Metadata is data about data and helps others understand the methodology employed in a piece of research, which is important for reproducibility purposes. However, 68 percent of our respondents said that they either do not produce metadata or do not know if they produce any metadata, suggesting

a lack of understanding about metadata not only as a term but also regarding its purpose. (See survey question 10.) Research data service providers must address this by using language that is relatable to each discipline. For instance, the All European Academies report "Sustainable and FAIR Data Sharing in the Humanities" notes that the terminology used by those within the humanities to describe their data management activities might differ from those traditionally associated with research data management, such as talking about primary sources instead of datasets.[7] In order to increase data literacy and the curation of metadata, it is therefore recommended to gain subject specialist advice on tailoring support to meet the needs of each discipline.

Culture

Finally, the most popular data management support activity requested by survey respondents at 13 percent was an informational website with data management best practices and links to campus resources and services. (See survey question 24.) This suggests that many campus researchers have only just started to formalize their approach to research data management skill development, and this should inform the provision of services moving forward. However, the successful adoption of these services needs institutional support and for research data management to be incentivized through becoming part of the annual review process and the culture of the university.

EMERGING THEMES

Analyzing Capacity

Following this survey, we conducted a focus group with survey respondents who agreed to be contacted further. Fundamental concerns about the level of planning in research projects were raised and the risk this posed of data loss. These concerns did not relate to the validity and integrity of individual research projects but rather to the standardization of practices between individual researchers both within and external to a project and relating to such issues as the reuse of data. As one focus group member put it, data management is largely being performed by "outliers."

However, this diminished capacity for data interoperability was not just at the hands of the individual but also was visible on a university system level.

The University of Nebraska system's Holland Computing Center (HCC) provides enhanced capabilities for data storage and analysis, but one focus group participant struggled with identifying the flexibility of this infrastructure in its capacity to separate sensitive data from analyzed results that could otherwise be shared more widely. They went on to add that IRB-related data is a "different beast" and requires an enhanced level of security in order to keep it safe.

As our RDS committee develops support for research data management, we have identified that it needs to go beyond having a flexible infrastructure; our efforts must encourage a culture change so that every member of a research team is aware of their data management responsibilities.

Focus Group, Survey, and Our Activities

Increased access to research data, whether internally or externally, increases the speed of innovation. However, this intellectual capital needs to be secured through attention being given to every stage of the research data management lifecycle. Additionally, RDSC is aligning our data science initiatives with wider trends within academia in order for our faculty to remain competitive internationally.

We have learned from our survey and focus group that data literacy is our first priority. This allows us to operate within our current budgetary constraints while also increasing the number of advocates for research data management and infrastructure expansion in the future. By developing an understanding of these issues and encouraging culture change, opportunities for disciplinary advancement and collaboration increase beyond the institution.

UNCL Listening Sessions

After we conducted our survey and focus group session, a similar effort was made by our consortium UNCL to assess the research data services needs of the faculty on all campuses. We saw these listening sessions as another opportunity to talk to faculty colleagues on other campuses of the university system. From these talks, we gathered that the desire to learn about the infrastructure for finding, sharing, and curating data is certainly present, but faculty seemed less familiar with the RDM process in general. However, some faculty noted that they were more aware of trends surrounding RDM from what can be referred to as their personal academic network as opposed to

the resources available on campus—highlighting the need to promote RDS on not just our colleges but all our campuses. Faculty colleagues seemingly receive a selective dissemination of information on campus efforts regarding RDS. Despite sincere efforts from librarians, some departments seem to rely primarily on their own academic networks. Yet some faculty also noted that the metrics for data sharing are beginning to factor into discussions among reappointment, promotion, and tenure committees.

Infrastructure support for housing big datasets that other platforms are not equipped to handle was one of the concerns that we heard in these sessions, particularly among STEM faculty. Faculty, in particular, noted the need for front-end data visualization tools as well as formalized training for data visualization. The reemergence of the themes we identified in our campus surveys highlights that faculty are aware of disciplinary differences, infrastructure and communication gaps, and the need for interdisciplinary and transdisciplinary collaboration.

COLLABORATION WITH OTHER CAMPUS UNITS

Acknowledging that the success of our library's RDS initiative depends on bringing together key stakeholders that represent our campus research community and provide professional services with an interest in RDM, we identified the following campus units to collaborate with and learn about our faculty needs related to RDM.

Social Science Research Commons (SSRC)

SSRC is an interdisciplinary initiative of the social sciences to promote academic partnership and collaboration by offering a network of support for students and faculty as they work to master critical research tools and methodologies. SSRC offers open lab hours in which students and faculty can consult with sociology faculty, the social sciences librarian, and graduate assistants on questions regarding SPSS, survey design, and research question development. Methodological workshops on topics such as Qualtrics, social network analysis, and working with big data are routinely offered.

The goal of the commons is to organically develop a network of research methods and statistics experts both to support student research and to develop interdisciplinary connections among faculty. This network spans various

disciplines including the social sciences, humanities, and natural sciences. In addition, the commons provide a meeting space for classes and research groups.

Social Science Methodology & Methods (SSM&M) Faculty Leadership Forum

Through the campus Faculty Leadership Forum (FLF), workshops on qualitative, quantitative, and mixed-methods research methodologies are routinely offered by our faculty as well as colleagues from other institutions. These workshops are posted on faculty listservs, library newsletters, and other campus faculty resources.

Consortium for the Advancement of Research Methods and Analysis (CARMA)

This interdisciplinary center hosts lectures from nationally renowned faculty on qualitative, quantitative, and mixed methods data collection and analysis approaches. Students and faculty have access to an extensive online video archive where they can learn more about current research and statistical methods, as well as data analysis, through institutional membership.

All these venues provided us with invaluable insight on our faculty's research data needs as we attended the UNCL listening sessions; held regular, open consultation hours at SSRC; and attended some of the methodology and analysis workshops with our faculty colleagues offered through the FLF and CARMA.

IMPLEMENTATION

We have started addressing the results of our campus-wide survey primarily through the creation of resources designed to aid faculty, students, and staff with data literacy, data management planning, and data storage to help them start thinking early on in a research project about their short- and long-term data needs. The first of these resources we developed was a research guide.[8] The guide intends to serve a few goals for our work. The first is to simply help make the campus aware that the library is a partner in their research data management and planning and that expert staff exists to help with their needs and questions as they arise. The guide also provides the campus community

the resources to generate data management plans. A variety of questions and resources are intended to help data users consider the research lifecycle of their data and become familiar with the DMP tools.

The research guide also serves as a starting point for library subject specialists who work with departments beyond the librarian's own liaison areas. The guide points to specific data types, open data repositories for specific disciplines, data lifecycles, and related resources that can aid subject specialists in recommending discipline-specific repositories or procedures. Likewise, we also presented our survey findings to the library staff as part of a professional development series the library runs internally. The presentation distilled the results of our survey, giving subject specialists' insight into specific departments and disciplines that are particularly concerned with research data. We remain in constant communication with subject liaisons as new resources, tools, questions, and initiatives come our way.

The research guide also provides specific resources for R, Python, SPSS, and Microsoft Excel. The library staff includes experts on R and SPSS, but we also identified Python and Excel needs among various units across the campus including public administration, bioinformatics, and data science programs. The computer language-specific material includes a range of hyperlinks to tutorials, readings, documentation, and language libraries designed for data analysis, visualization, and reusability. Given staff and time constraints on computer language expertise, we can only offer specific help on certain languages, but we also want to try to capture the range of possible interests and needs on the campus in the research guide.

In addition to the research guide, we have also developed new instruction material and workshops for teaching data literacy or for working with specific computer languages. A variety of new workshops on data visualization, data analysis and tidying, R basics, clustering and classifying with R, and other related topics have begun to illustrate to the campus the library's commitment to research data. The workshops have been among the best-attended across all our current offerings, attracting between twenty-five and forty attendees to each session. Adding to this are two R initiatives: a six-session, six-week boot camp series intended to teach R from the very basics to doing complex data visualization; and a new campus-based R user group designed to bring R users together and in conversation with one another. In effect, this means that not only is the library creating and sharing resources for the campus but also engaging in culture-building across units.

In developing our workshops and providing research instruction to our students at SSRC during walk-in research consultations, we have utilized the ACRL Framework as a guide to our instructional efforts. The framework's interconnected core threshold concepts helped us see connections to the individual competencies and behavioral dispositions that we envision our students developing as they move on the continuum from novice to expert researchers—navigating discipline-specific data resources, identifying a body of literature that helps them synthesize the theoretical and methodological approaches to data collection associated with their topic, acknowledging the assumptions and limitations of prior research designs, and finding a significant gap to propose their own research.[9] The understanding by design aspect of the framework allowed us to create and implement small, incremental, and manageable steps into our broader information literacy instruction efforts that acknowledge the need for scaffolding of these data literacy concepts throughout the course of the academic programs.[10]

Through these early initiatives, we have begun addressing campus needs on data literacy and planning, but we are also looking forward to mid- and long-term concerns that will allow us not only to meet current needs but also to anticipate necessary staffing, infrastructure, and expertise levels going forward. Given the growing emphasis on our campus on data analytics, informatics, and data science programs, we expect an ever-increasing need for data storage and preservation. Successfully executing preservation plans will likely require campus-wide and system-wide partnerships that can allow us to pool resources for infrastructure and expertise. These strategic partnerships within the system are essential not only for our ability to meet our longer-term goals but also to aid the other Nebraska campuses in their own research data services.

As our study illustrates, the current scope of support for RDS at our institution is broad and relies on resources from various campus stakeholders. Disciplinary differences regarding levels of support needed, variety of areas of support, and the diverse venues for us to incorporate our support for faculty and students' research data needs make it difficult to effectively evaluate the impact of our services and their bearing on student learning. Given the increase in the number of data-intensive graduate programs, our faculty colleagues acknowledge the need for RDS, and we plan to be actively engaged in these discussions moving forward. With our case study as an example of an RDS initiative at a regional campus of a state university, we hope that our

colleagues will find useful and practical insights in enhancing their library's role and presence in developing and supporting RDS at their institutions.

Further Readings

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SURVEY QUESTIONS

1. What is your school or college?

2. What is your department?

3. What is your position? Check all that apply.
   - Faculty/Assistant
   - Faculty/Associate
   - Faculty/Full Professor
   - Adjunct/Instructor
   - Graduate Assistant
   - Researcher
   - Other _____

4. How many years have you been at UNO?
   - 1-4 years
   - 5-9 years
   - 10-14 years
   - More than 15 years

5. Do you engage in data management for your research projects? Please choose all that apply. If you select "Other," please provide a brief description.
   - Collection of data
   - Cleaning of data
   - Analysis of data
   - Storage of data
   - Sharing of data
   - Disposal of data
   - Archiving of data
   - Other _____

6. Have you ever submitted a formal data management plan or protocol?
    - Yes
    - No
    - Unsure
    - Other _____

7. Which of the following best describe the types of data you have produced
   or anticipate producing as part of your research? If you are unsure,
   please select "Other" and provide a brief description of your data. [Please
   choose all that apply.]
    - Non-digital text (e.g., handwritten notes, paper laboratory notebooks)
    - Artistic products
    - Audio recordings
    - Computer code
    - Crowdsourcing data
    - Curriculum materials
    - Databases
    - Digital gene sequences or similar renditions of biological/organic/
      inorganic samples or specimens
    - Experimental data
    - Field notes
    - Interview transcripts
    - Patient records
    - Samples or specimens
    - Software
    - Spatial or geographic data
    - Spreadsheets
    - Surveys
    - Video recordings
    - I don't produce any data.
    - Other _____

8. Which of the following formats best describe your digital research data? Examples of specific file extensions are included. [Please choose all that apply.]

   ○ Audio (.aif, .iff, .mp3, .wav)
   ○ Computer-aided design/CAD (.dwg, .dxf, .pln)
   ○ Data (.csv, .dat)
   ○ Data—Statistical/SAS, SPSS (.sav, .sdp, .spv)
   ○ Data—XML (.xml)
   ○ Database (.db, .mdb, .pdb, .sql)
   ○ Geographic Information Systems/GIS (.gpx, .kml)
   ○ Image (.bmp, .gif, .png, .ps, .psd, .svg, .tif)
   ○ Scanned document (.pdf)
   ○ Spreadsheets (.wks, .xls)
   ○ Text (.doc, .docx, .log, .rtf, .txt)
   ○ Video (.avi, .mov, .mp4)
   ○ Web (.html, .xhtml)
   ○ Don't know
   ○ Other_____

9. "Metadata" refers to descriptive information or documentation about data. Have you produced, or do you anticipate producing, metadata for your project? If you select "Yes," please describe the nature of the metadata.

   ○ Yes _____
   ○ No
   ○ Don't know

10. Indicate the approximate amount of data the project is typically expected to generate.

   ○ 1GB (gigabyte) or less
   ○ More than 1 GB but less than 100 GB
   ○ More than 100 GB but less than 500 GB
   ○ More than 500 GB but less than 1 TB (terabyte)
   ○ More than 1 TB but less than 100 TB
   ○ More than 100 TB but less than 1 PB (petabyte)
   ○ More than 1 PB
   ○ Don't know
   ○ Other _____

11. Indicate where the data is currently stored. [Please choose all that apply.]
    - Hard drive of the instrument that generated the data
    - Desktop hard drive
    - Laptop hard drive
    - External hard drive
    - Department server
    - Institutional server
    - Institutional network
    - Cloud (internet-based) storage (e.g., Dropbox, box.com, Google Drive)
    - CD/DVD
    - USB flash drives
    - Don't know
    - Other _____

12. Indicate how often backups are made for the data associated with your projects.
    - Hourly
    - Daily
    - Weekly
    - Monthly
    - Annually
    - Never
    - Don't know
    - Other _____

13. Identify how long you plan on keeping the data associated with your project.
    - Less than 1 year
    - 1 to 5 years
    - 5 to 10 years
    - More than 10 years
    - Indefinitely
    - Don't know

14. Have you used a discipline/domain-specific repository or archive such as ICPSR (Inter-university Consortium for Political and Social Research)? If you select "Yes," please indicate the name of the repository.

    ○ Yes _____

    ○ No

15. Which funding resources are available to you or your department, center, lab, or research group to support long-term data storage (more than five years) and preservation?

    ○ External funds
    ○ University funds
    ○ Professional development funds
    ○ I/We have not received funds for long-term data storage and preservation.
    ○ Other _____

16. Identify who is responsible for managing the data associated with your projects. [Please choose all that apply.]

    ○ Self
    ○ Other faculty working on project
    ○ Undergraduate students working on project
    ○ Other designated person working on project
    ○ IT staff within your school or research center
    ○ External project partners
    ○ Third-party data center
    ○ No one
    ○ Don't know
    ○ Other _____

17. Data Management Plan (DMP) is a document that creates a framework for the management of data both during and after a project's completion. Did you receive guidance on your data management plan? If yes, please indicate from where. [Please choose all that apply.]

    ○ Funding agency website
    ○ Webinar
    ○ Campus resources

- ○ Colleague within department
- ○ Colleague at UNO
- ○ Colleague at another institution
- ○ UNO sponsored projects administration
- ○ IT support staff
- ○ Librarian
- ○ Data management planning template (Word document)
- ○ DMPTool or other data management planning software
- ○ Google
- ○ No guidance
- ○ No data management plan created
- ○ Unsure
- ○ Other _____

18. Did you experience any of the following challenges in preparation of your data management plan? [Please choose all that apply.]

- ○ Lack of guidance from funding agency
- ○ Lack of guidance from institution
- ○ Lack of access to infrastructure for data storage
- ○ Lack of infrastructure for data accessibility
- ○ Lack of infrastructure for data preservation

19. For each of the following statements, rank/rate your response using the 5-point scale (1-very undesirable to 5-very desirable)

- ○ Sharing my research data is:
- ○ Preserving my research data long-term is:
- ○ Reproducibility of research is:

20. In your opinion, should data sharing be incorporated into annual evaluations of faculty performance? If you select "Yes," please describe if it would be through the internal sharing of data or the external sharing of data.

- ○ Yes _____
- ○ No
- ○ Don't know
- ○ Other _____

21. How often do professional journals in which you publish your research require that authors submit the data necessary to replicate or validate the results?

   ○ Always
   ○ Most of the time
   ○ Sometimes
   ○ Rarely
   ○ Never
   ○ I don't submit papers to professional journals

22. How important do you think it is for UNO to spend resources on providing the following services? [N/A, not at all important, not very important, somewhat important, very important.]

   ○ Provision of advanced computing options (e.g., distributed network, or cluster computing, supercomputer-class machines)
   ○ Provision of statistical and other data analysis support
   ○ Short-term data storage (five years or less)
   ○ Long-term data storage and preservation (more than five years)
   ○ Acquiring unique identifiers for data sets (e.g., DOI, ARK)
   ○ Data security support
   ○ Guidance on depositing data into discipline/domain-specific data repository or archive
   ○ Guidance on how to use appropriate metadata standards
   ○ Guidance on writing data management plans
   ○ Guidance on intellectual property issues with my data
   ○ Guidance on privacy/confidentiality with my data
   ○ Other _____

23. Would you be interested in any of the following data management support activities? Please select at most five answers.

   ○ Assistance meeting data sharing and/or data management requirements of funding resources
   ○ Informational website with data management best practices and links to campus resources and services
   ○ Data management plan consultation (i.e., individualized assistance)

(continued)

- Data management plan templates and tools (i.e., do-it-yourself resources)
- Data management plan workshops
- Provision of an institutional data repository
- Help identifying repositories for data submission
- Assistance in selecting data to preserve for the long term
- Tools for sharing research data
- Data storage and preservation services
- Producing metadata for your research data
- Compliance with policies, legal requirements, and ethical standards
- Assistance finding and accessing secondary data sources
- Data set purchasing
- Information about citing data resources
- None of the above
- Other _____

24. Is there any additional information you would like to provide on data management planning or research data support at UNO?

25. Would you be interested in participating in a focus group in the future? This focus group would help the Research Data Services Committee at UNO Libraries further assess the research data needs of faculty. If "yes/maybe," please fill out the form below.

FOCUS GROUP QUESTIONS

Introductory question: Across the university, many departments are producing their own research data and/or have a need to acquire data. How do you engage in the management of your data?

> *Follow-up question:* What are your priorities when it comes to your research data? How do you plan for the collection and storage of your data?

> *Follow-up question:* Do you follow a formal data management plan? "Please provide more detail on that."

How do you envision providing infrastructure to aid in research data management?

> *Follow-up question:* What form would this take?

> *Follow-up question:* How would this help satisfy the various file formats you produce?

> *Follow-up question:* Who do you think should take responsibility for the research data?

Where and how do you store your data?

> *Follow-up question:* Is this a long-term solution?

> *Follow-up question:* How do you secure your data? Or: Do you have a method for keeping your data secure and/or preserved?

We've focused a lot here on the production of your own research data. Have you had a need for finding data but were unsure where to locate it?

> *Follow-up question:* What sort of strategies/platforms/repositories have you used?

What would you like your liaison librarians to help you with regarding research data?