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Teaching Data Management Concepts to Research Administrators

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TEACHING DATA MANAGEMENT CONCEPTS TO RESEARCH ADMINISTRATORS

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This chapter focuses on the creation and evolution of research data management education and training for research administrators at Florida State University (FSU). Beginning with an overview of the history of research data services at FSU Libraries, this chapter describes initial efforts as well as early challenges and opportunities. This includes not only engagement efforts and the development of the initial curriculum but also assessment of the training sessions and changes to the curriculum that were made based on assessment results. The chapter concludes with recommendations for libraries providing data management services that may be interested in growing their learner base beyond faculty and graduate students.

THE EVOLUTION OF RESEARCH DATA SERVICES AT FSU

FSU is an R1 public institution with a total enrollment of about forty-two thousand students, 1,900 faculty, and 2,500 instruction, research, and/or public service staff. FSU Libraries serves this diverse intellectual community with seven libraries across campus and 144 full-time faculty and professional staff.

In April 2014, FSU Libraries hired a data and research librarian who was tasked with initiating new services for research data management and support

for researchers throughout the research lifecycle. That summer, in collaboration with the digital scholarship coordinator, they developed services and programs to help researchers meet the expectations outlined in new federal funder mandates related to the management of scientific research data. Funding agencies responded to these changes—implemented in 2013 by the Office of Science and Technology Policy to provide public access to research data produced through federal funding—by requiring data management plans with applications.¹ The director of FSU's Office of Research Development (part of the Office of Research) researched the practices of academic institutions across the United States to see how they were supporting efforts on the part of researchers to comply with these new mandates. Her assessment revealed the responsive efforts and successes of academic libraries to create educational programs and consultation services around research data management. As a result, the libraries received several requests to provide training for faculty and staff on research data management best practices and requests for assistance with writing data management plans.

To meet increasing demand for these services, FSU Libraries spent the summer of 2014 acquiring necessary skills and researching how the organization could meet researcher data management needs while expending minimal time and resources. This approach was necessary because of the limited capacity of the data and research librarian, who was also charged with developing social sciences data reference services and serving as a subject librarian for several social sciences disciplines, and of the digital scholarship coordinator, who managed a department with a broad portfolio and had limited time to contribute to these early efforts. Despite these time limitations, they were still able to develop an introductory workshop on best practices in research data management geared toward graduate students as well as a training session on creating data management plans that meet federal funding mandates. The best practices workshop was developed in response to requests from The Graduate School and general inquiries received by various librarians. The training session was specifically developed in response to requests from the Office of Research Development and was hosted by them as part of their Sponsored Research Administration training series.

By 2015, FSU Libraries was regularly conducting data management plan consultations with researchers applying for grants with agencies such as the National Science Foundation (NSF), the National Institutes of Health (NIH), and the Department of Energy (DOE). By 2017, this team had conducted over

sixty data management plan consultations for specific grant applications. This success was primarily driven by “word of mouth” referrals in addition to focused outreach efforts around research data management services.² During that time, data services in the libraries expanded to focus on data management competencies for graduate students. Data librarians regularly provided training and instruction sessions related to data management best practices as well as strategies for effective data management.

Recognition of the FSU Libraries’ early research data management efforts culminated in being invited by the Office of Research to advise on and eventually draft Florida State University’s Research Data Management Policy.³ The scholarly communication librarian, as well as the data and research librarian, consulted existing data management policies and consulted their professional network to draft a university policy. Intended to facilitate the enforcement of federal policies, the policy makes clear the responsibilities of the university and researcher to remain compliant throughout the research data lifecycle. Detailed sections on data collection, retention, security, publication, and access were written in a way that empowered researchers to be effective stewards of their data and contributors to public access research.

As demand for data management services continued to grow, the FSU Libraries’ strategically expanded their capacity to meet these needs while continuing to explore areas for future growth. By 2017, the data and research librarian, director for digital scholarship, director of STEM libraries, and scholarly communication librarian were all contributing to research data management efforts, and data management services were a more visible part of the FSU Libraries’ portfolio on campus. Additionally, the FSU Libraries’ capacity to offer data management services expanded in 2016 when the data and research librarian moved to the STEM Libraries department to focus on the development of STEM research data management services. The data and research librarian’s role was changed to that of STEM data and research librarian, and a new faculty member was hired to fill the new role of social sciences research and data librarian.

TEACHING DATA MANAGEMENT CONCEPTS TO RESEARCH ADMINISTRATORS

In 2016 and shortly after the implementation of FSU’s Research Data Management Policy, the FSU Sponsored Research Administration (SRA)—the Office

of Research's unit responsible for pre- and post-award functions for publicly funded awards—reached out to the libraries regarding teaching in their SRA Certificate Series. Now named the eSPEAR (Electronic Sponsored Projects Education and Resources) Certificate Series, this educational certificate program was designed to “ensure that FSU research administrators have the foundational knowledge they need to provide the highest quality of support possible to FSU researchers.”⁴ In addition to their core courses on proposal development, setting up awards, internal controls and audits, project management, and others, there is a slate of advanced courses focused on research involving humans and animals, conflicts of interest, intellectual property, and business practices. SRA was interested in adding training opportunities for departmental grants officers and administrators on open access, data management, and grants compliance to this advanced course list. Increasingly, grants officers and managers were assigned to projects requiring data management and security plans for applications, accompanied with expectations for long-term compliance to ensure the plans were being executed correctly. Until this group of administrators was identified to us, most of our services had focused on researchers and their role in grants compliance—unintentionally creating a blind spot for us. Therefore, we were fortunate and grateful to be invited by the SRA to participate in their training series. We adapted our traditional data management curriculum to align with the tasks and role of this group, and we were put on the schedule starting in 2017.

As mentioned above, data management curricula developed through academic libraries were initially developed to meet the needs of research faculty, and to a lesser extent, that of graduate students.⁵ Researchers are primarily responsible for ensuring public access to their research data, which is why initial and continuing data management education targets these two groups. Furthermore, early data management education efforts were largely an extension of information literacy sessions traditionally taught by academic libraries. Over time, we have seen an impressive amount of innovation and imagination in the data management curricula developed and used in academic libraries. Still, most approaches follow a similar formula: What it is, why it's important, how to do it, and when to start. In our experience, this has certainly worked for the stakeholder groups who traditionally participate in our data management training. The role of academic libraries in providing research data management education continues to be shaped by this emphasis on the researchers' side as they were the most affected by these funder

mandates. However, the corollary is that these mandates also fundamentally changed the grants compliance process. For example, the submission of all required administrative documentation, such as performance, financial, and research reports, would previously facilitate a successful grant close-out. With the introduction of more robust funding mandates, the protocols for data management, storage, security, preservation, and sharing must also be considered, including what is surely the additional time and effort it takes to ensure compliance in the long term.⁶

Initially, we focused on introducing and describing the policy changes that have brought data management into the compliance conversation across the research community. We structured the first session, originally titled SRA 20: Open Access, Data Management, and Grants Compliance, in two parts. The first section focused on the Office of Science and Technology Policy memo and included a discussion of data management plan requirements for funding agencies that traditionally provide grant funding to FSU researchers.⁷ The second section focused on open access publishing and on how to make research data and publications publicly available to comply with funding agency and FSU policy.

The first part of the workshop was designed to provide an overview of research data management concepts and compliance requirements. Foundational definitions for data and research data management, along with examples of obvious and less obvious types of research data and file formats, were provided. We discussed reasons why researchers should manage their data, including the fact that funder mandates now require that the results of government-funded research disseminated through publications and digital data be made accessible to the public. This led naturally into an overview of specific federal funding agency guidance. We shared data management plan requirements from agencies such as the National Science Foundation (NSF), National Institutes of Health (NIH), Department of Energy (DOE), and the National Oceanographic and Atmospheric Administration (NOAA). Participants noted the similarities among the sections for data management plans and were able to articulate the core expectations for researchers in managing, storing, securing, preserving, and sharing their data.

The second part of the workshop focused on finding open access publishing options and open data repositories—institutional, national, and subject-specific—to help researchers complete the data-sharing requirements in their data management plans. Researchers are accustomed to a closed, copyright

culture in academic publishing, so providing a detailed open-access sharing plan for publications and data posed a challenge when these funder mandates originally took effect. To make this part of grant applications successful, grants officers found themselves needing to know more about open access. Research on open access carried out in response to these new funder mandates had found a reluctance among researchers to share their data (for fear of being scooped or breaching confidentiality) or to share their publications (for fear of losing the prestige of publishing in highly ranked, non-open access journals). While research administrators and grants officers are not expected to train researchers on the benefits of open access, they are faced with managing researchers' concerns and ensuring compliance with funder mandates. To this end, we also discussed Creative Commons licensing, directories for open access publishing, and data repositories. Overall, this part of the workshop was aimed at helping research administrators and grants officers navigate the open access ecosystem and feel more comfortable suggesting possible places for researchers to make their research data available to the public.

The second session, originally titled SRA 24: Best Practices in Research Data Management and Data Documentation, built on the first session by focusing on essential data management and documentation practices throughout the research data lifecycle. We began with a brief overview of topics covered in the first session such as definitions for data and research data management, why it is necessary to manage data, and common data management issues. This prepared attendees for an overview of the role of data documentation, file management, and data storage and backup in the research data management process and a deeper discussion of the overall research data lifecycle. One of the most relatable ways to discuss data documentation is file naming best practices—how to properly name a file and its subsequent versions and to develop a project hierarchy to organize data for a research project, lab group, or department. In the presentation, we provided examples of appropriate types of data documentation and metadata such as README files, codebooks, and data dictionaries. This was followed up with an activity for file naming and organization best practices where each participant identified a file on their computers that did not conform to the best practices we described and then renamed the file to better reflect those practices. (A more thorough description of this activity is provided later in the chapter.) We concluded this second session with a discussion about data storage and best practices for backing up research data.

Overall, the format of these sessions worked well, and we received positive evaluations from participants. At the conclusion of several sessions in 2018 and 2019, participants were asked to provide feedback via a paper evaluation form. This feedback was then shared with the instructors and used to further refine the sessions. Over four sessions, thirty-eight evaluation forms were completed. Overall, workshop participants appreciated the presenters sharing their expertise and knowledge of data management in a clear and concise manner. Several participants also enjoyed the group activities and how they tied to the material presented in each session. A few noted the helpfulness of pre-workshop handouts, including the slides for the session and any worksheets. On the other hand, several attendees noted the lack of relevance that data management had to their normal job responsibilities. Some suggested that the incorporation of more specific examples would be helpful in making the connection between data management and their current roles. Suggestions included mock exercises dealing with specific work scenarios or examples of principal investigators not following public access policies and the possible consequences. This feedback was incredibly valuable and encouraged us to rethink our approach to making the tenets of data management more relatable to their work. Overall, we were pleased to note that the vast majority of attendees would recommend our sessions to their colleagues.

As demonstrated in the feedback presented above, there are both opportunities and challenges in developing data management training for grants compliance officers and research administrators. For many attendees, this is often the first time they are learning about data management. As they are participating from the perspective of administrators, they may or may not have the extensive research training and experience that a faculty member may have. Much of the terminology that is common vernacular in libraries and in research in general (e.g., metadata, data documentation, data management, data repositories) may not be familiar to this audience. Thus, we realized that we needed to clearly define key terminology and provide relatable examples. Another challenge was demonstrating the relevance of data management to their work as research administrators. While research administrators are often assisting faculty throughout the research lifecycle and data management process, they are not managing any data themselves and are not usually intimately involved in day-to-day research projects. For example, at first, we struggled to adapt our language from “when you start working with your data” to “when your researcher starts working with their data.” Although this might seem like a

small semantic quibble, speaking appropriately to their role as administrators established rapport with participants and helped them apply these concepts more easily to their responsibilities. However, although these challenges exist, there has been ample opportunity for us to communicate to grants officers and research administrators the importance of data management in their work and for the researchers they support. These training sessions were also designed to create a sense of both the specific and the broadly applicable data management needs across campus. In this way, administrators can emphasize the importance of good data stewardship to the researchers or departments they work with, which also provides the library with an opportunity to develop connections with the university community.

In developing these sessions, we adapted our established data management curricula to address these needs and challenges. This is most easily demonstrated through the activities and group discussions that were planned for the sessions. One discussion in SRA 20 centered around examples that were reported in the news and academic journals around research integrity and reproducibility.⁸ In related sessions with faculty and graduate students, these examples are often only touched on briefly as an introduction to the Holdren memo and funding agency guidance policies.⁹ However, we felt that expanding on these stories for the SRA sessions and framing them through a broader, institutional perspective would allow grants officers and administrators to connect data management with concepts of research integrity, compliance, and grant funding with which they may be more acquainted.

Another activity in SRA 24 focused on file naming and organization best practices. Each participant found a file on their computers that did not conform to the best practices we described. Then they renamed the file to better reflect those practices. Attendees then formed pairs and shared their answers with one another, followed by a large group discussion. In sessions with faculty and graduate students, the participants are asked to find a file relating to their research project (e.g., a data file, publication draft, etc.) and revise the file name. This is intended to encourage them to establish best practices throughout their project. However, since grants administrators do not likely have files related to a research project, they are encouraged to find an example of a file, documentation, or procedure they may have produced through the course of their professional duties. The large group discussion then focused on implementing these file-naming practices and data management best practices more broadly in their own departmental and project workflows.

VISIONING THE FUTURE AND RECOMMENDATIONS

Our early efforts to bring the tenets of data management to the FSU community laid the foundation for identifying and working with various user groups. The invitation to participate in the SRA Certificate Series was, therefore, a natural extension of our services. As of this writing, we have collaborated with the SRA for nearly four years. Based on our experiences and on course evaluations, the two-part course format used in recent years effectively covers the broader applications of data management and how to ensure compliance throughout the data lifecycle. We plan to continue making adjustments to these courses each semester and are open to developing courses tailored to the subject- or project-specific needs of research administrators. To meet the long-term needs of complying with ever-changing research data sharing mandates, we have also discussed extending support services beyond training. Through consultations or providing training in other formats, such as tutorials or Canvas modules, the libraries may be better able to meet the needs of individual grant officers and project managers.

Our goals for data management programming have been shaped by these positive experiences with SRA. We anticipate expanding data management training and services to additional members of the FSU community outside the typical user groups of faculty and graduate students. For example:

- With the substantial growth of undergraduate research programs at Florida State University and many other universities, undergraduate students are working with and producing data much sooner than those in graduate school.
- Academic and career advisors introduce students to learning pathways intended to make students more marketable. Data management skills could easily translate to meet the contemporary expectations of employers. Also, these advisors are likely to share grant and funding opportunities with students and may be interested to know about funder mandates and data management plan requirements.
- Research scientists, postdoctoral fellows, and teaching affiliates are not necessarily considered faculty or students, and this ambiguity sometimes leads to their unintentional exclusion from campus services. However, their contributions to research across campus—at research centers, departments, and labs—are essential to FSU's

success as an R1 university. Expanding our services to this population is a top priority for us moving forward.

In conclusion, we hope that other teams dedicated to data management training and services find these examples to be useful for their own institutions. Through the experiences detailed in this chapter, we have found that the following are vital for establishing collaborations with “non-traditional” learning communities:

- Leverage existing relationships on campus.
- Think critically about ways to adapt data management training to meet the needs of various groups.
- Assess educational materials and content delivery for data management training to refine and improve over time.

As the conversation around research data management and data sharing continues to evolve, it is critical that academic libraries continue to evolve and expand their pedagogical focus to meet the needs of all campus stakeholders who play a role in the research lifecycle. Doing so will position academic libraries as a key driver of research data management education well into the future.

Notes

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