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EScience in Action

Data Management Outreach to Junior Faculty Members: A Case Study

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Abstract

New tenure track faculty members are generally in positions as leaders of a research laboratory or group for the first time. In addition to building up the infrastructure of a research lab (whether space, equipment, funding, or personnel), the new faculty member is also setting the research process and expectations for the first time as well. This article highlights outreach to new faculty members assisting those individuals with developing a data management protocol that effectively supports the laboratory researchers to make quality data available internally to and externally from a research laboratory. Using a self-assessment tool and reflective conversation, junior faculty were offered insight and advice into creating a data management protocol for use in their research laboratory.

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Developing a Brownbag and Workshop

Early career faculty face a transition from being directed in data management practices to being responsible for the data management practices of a research group. The transition to a tenure-track faculty position is addressed by departments through such resources as startup funds, assigned laboratory space, and responsible conduct of research training. Data management is generally not addressed and it is assumed that these faculty will figure it out (which may only be after undue stress and frustration). An intervention in the form of a brownbag and workshop is presented that introduced faculty to potential issues and solutions early in their career in order to facilitate the transition to data management on the part of the junior faculty.

Literature Review

Libraries have focused on understanding the needs of scientific researchers for data management through such projects as the Data Curation Profiles (DCP) (Cragin et al. 2010). Purdue University Libraries have been active in understanding the needs of data producers and users through the Data Curation Profiles (DCP) (Witt et al. 2009) project and the Data Information Literacy (DIL) project (Data Information Literacy 2015). It has become evident that researchers have identified many barriers to good data management practices (DataOne Notebooks 2015). Among the most common of these barriers is time; researchers simply don't feel that they have time for the deliberate practice of data management on an ongoing basis (Jahnke, Asher, and Keralis 2012).

Junior faculty members embark on developing a new research enterprise in the high-risk, high-reward environment of a tenure-track university. While they are generally offered at least some support to build up the infrastructure necessary to carry out research, the actual process of developing a work flow is generally left to a faculty member (Crone 2010). The future success of research and publication activities relies upon the resources and infrastructure that the junior faculty member puts into place. In the process of dealing with resources such as lab space, equipment, and graduate students, developing a data management protocol to successfully share data is an area that may be overlooked.

A new service, a Brownbag and Workshop, was developed to create a specific time in which faculty could think critically about the current data management practices within their research groups. The intervention gave them an opportunity to brainstorm solutions for their self-identified weaknesses with more experienced faculty members.

Development of the Intervention

The author undertook an immersive journey into the concepts of underpinning data information literacy (DIL) (Carlson et al. 2011; Carlson and Johnston 2015) where the target audience of the research were graduate students in the two years prior to the development of this brownbag and workshop. While graduate students are very much in need of data management training, they do not generally set the expectations for data management practices within their research environment. That role generally lies with the faculty member who supervises the graduate students. The faculty members rely on graduate students to carry out extensive research projects, collecting and analyzing a variety of data. However, any issues that arise in

data management impact both the faculty and graduate students and generally the problems and identified solutions for the issues have longer term impact on the faculty members.

In conversation with a faculty member who served as a mentor to a group of junior faculty members in the School of Engineering Education, the topic of data management came up while discussing the citation of conference proceedings appropriately. The faculty mentor volunteered that managing drafts of documents produced by previous semesters' graduate assistants was problematic; and so file naming conventions were discussed as a means to identify required files. The faculty mentor's response was that she wished that she had known and implemented this early in her career.

The faculty mentor suggested that the author present on file naming conventions as well as additional results of the DIL research and then offer a workshop to the junior faculty that assist them in developing and implementing a data management protocol for their laboratory.

This idea was turned into a proposal for a Brownbag and Workshop. Objectives for the Workshop included:

Faculty will:

- Evaluate the current state of their research groups' data management practices.
- Develop a prioritized list of mitigating actions that can be put into place.
- Gain insight into how those actions can be transmitted to a research group.

Based upon these objectives, the liaison designed a two-part workshop. Part 1, otherwise known as the Brownbag, provided the context to the junior faculty for the later conversation. It covered the results of interview analysis performed during the DIL IMLS National Leadership grant (Carlson and Johnston 2015). The slides for this presentation can be downloaded at http://dx.doi.org/10.5703/1288284315525. Specifically, the presentation highlighted that faculty and graduate students have different perspectives on data management.

Graduate students:

- Focus on mechanics over deeper understanding of concepts.
- Learn data management from faculty within the context of an immediate problem and therefore don't necessarily get broad training in the full lifecycle of data management.
- Figure out data management on their own, and figure it out differently from everyone else in the lab unless a protocol is put in place.
- Have a wide spectrum of expertise.
- Frequently suggest and adopt the data analysis tools used in labs which leads to fragmented data management for the professor over time.

The implications for faculty were highlighted in this presentation, with a core message that graduate students will not be equipped with the data management skills that advisors may desire from their students. Given this finding, faculty will then need to provide protocols and training to graduate students in DIL skills in order to improve the smooth function of their own research.

In Part 2, the Workshop, the junior faculty members were asked to identify areas where further data management protocols were needed. The liaison asked the junior faculty members to identify the three aspects of data management that they perceived as areas of highest need. After identifying their top three issues, the author then started the workshop. Each individual picked one issue to address and then the group in turn collectively discussed and brainstormed solutions for those high priority issues.

This session was proposed to the department head of the School of Engineering Education. It was proposed by the author and the faculty mentor who originally discussed the idea and suggested developing an intervention. The idea was accepted by the department head and sponsored by the School of Engineering Education. The entire planning process took about two months: from the original conversation, through the development of the content and assessments, to the actual date of the Brownbag and Workshop.

Key to the success of the entire workshop was the participant group make up. The members of the junior faculty peer group were invited, along with their mentor faculty. The mentor faculty members were still in their early career but had established research programs, and in some cases were already tenured with years of experience troubleshooting data management issues within their research groups.

Resources Developed to Support the Intervention

With the objectives, workshop plan, and target audience established, it was time to assess the available tools and determine which tools would be used. Based on what the author had readily available, it seemed that there was a need for a new tool. The Data Curation Profile (DCP)[1], a tool for capturing a thorough picture of the current state of data management practice within a laboratory with existing data sets, didn't provide evaluation for understanding emerging needs for a research group that hasn't yet begun research. It did provide a very thorough understanding of the issues that may be relevant and necessary for a junior researcher. A data management plan self-assessment[2] also didn't lend itself to assisting a researcher who didn't yet have a clear research plan and infrastructure in place yet, and didn't have specific answers or procedures to follow.

Therefore, the Data Management Strategies Self-Assessment was developed by the author for this workshop using both the existing DCP Toolkit (Carlson, Brandt, and Cragin 2011) and the DIL Toolkit (Andrews et al. 2015) as a jumping off point for the development of the Self-Assessment. The Self-Assessment is unique in that it is significantly condensed and asks about specific actions on the part of junior faculty members. The junior faculty members may then identify that the action has already been taken, needs to be taken, or is a topic of

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[1] http://datacurationprofiles.org

[2] https://purr.purdue.edu/dmp/self-assessment

discussion with their research group. This Self-Assessment tool is available for download at http://dx.doi.org/10.5703/1288284315525.

The assessment was not formally validated prior to use in this workshop. The author hopes that this assessment can be formally validated in future iterations. This assessment served a function for this workshop and also serves as a proof of concept for a diagnostic assessment tool for faculty members. The tool has yet to undergo any substantive revisions but has had a derivative work created from it — the Data Management Strategies Graduate Student Self-Assessment — which can also be downloaded from the case study along with the original assessment.

The derivative work was created by Şenay Purzer, one of the faculty mentors who participated in the workshop. She wanted a tool to use within her research group as a foundation for discussions around data management practices. She asked permission to create the derivative assessment and then shared the resulting work back to the author as part of the case study.

The Brownbag and Workshop

An email invitation was sent to the mailing list for the junior faculty peer group and their mentors along with an email from the school head. Two faculty mentors attended along with four junior faculty members. The Brownbag was carried out according to plan. Thirty-five minutes were spent setting the context. The actual administration of the self-assessment took approximately 25 minutes. The remaining two hours of the Workshop were then spent with faculty members identifying their top three issues and the group brainstorming solutions. Issues identified ranged from technical solutions used for project management, to ways to tag files for easier identification and retrieval, to file structures or naming conventions that would facilitate keeping track of document submissions from other research group members.

Revealingly, the most enthusiastic participants in the session were the mentors. They were identifying problems that arose in setting up data management protocols for their laboratories; and they were able to speak powerfully and practically regarding pitfalls to avoid, techniques or tools to adopt, and effective research group management policies. We spent time talking about "hitting the reset button" by developing robust research data management protocols for new research projects. It appeared to be a relief to mentors that they did not "have to" go back to old data sets and fix them before implementing new and better policies for projects in the future.

Another interesting topic that arose was the influence that graduate students had on the selection of technology within a research laboratory. Faculty members frequently relied upon graduate students to select software and educational tools. Individual graduate students then became experts on specific tools, but when they left, the tool no longer had an advocate, and incoming graduate students then selected other tools. Faculty members had a number of different file formats to manage and specific file formats correlated with former students. The discussion revolved around empowering students while still maintaining control over the output of the research group.

Participants were extremely positive in their feedback on the Workshop. They appreciated the time to think constructively about an issue that doesn't often arise on the priority list for a

faculty member. They appreciated a venue in which they could learn from their peers.

One year after the Brownbag and Workshop, the author asked several participants if they had any reflections on the Workshop. During the intervening time, one participant had created a derivative work based upon the assessment tool to use in her research group, so the author took that as a specific indication of lasting impact from the Brownbag. Additional informal feed back included faculty members requiring students to start producing data management plans as part of their dissertation proposals; they felt that they had much better understandings of what to do with NSF data management plan requirements. Expectations for data management are now explicit in one research group. One participant also felt that the Brownbag "did a great job making a topic that could be full of shame something that we could actually do something about!"

Observations and Opportunities

This service answered a need that the junior faculty members had, but didn't articulate. Similarly, it provided an opportunity for interaction between new faculty members and their mentors around the topics of data information literacy and data management. It provided a structure by which junior faculty can prioritize skills to build and implement as they hire graduate students and develop research partnerships.

The author would like to offer this Brownbag and Workshop to all departments that have new faculty each year. This has proven challenging thus far because it requires the buy in of department chairs and then finding mentor groups. However, this continues to be an area of work that is being pursued. This content is transferable to any department. It is discipline agnostic in that it is simply relaying the experience of faculty and graduate students with more experience to less-experienced faculty in an endeavor to create a time and place to critically think about the creation of data protocols that will work for each individual professor and research group.

Additionally, the author would like to reach out to post-doctorate researchers. This group seems very likely candidates for this content, particularly if they are in the final year of their position and are seeking tenure-track faculty positions. The author has met with one post doc individually to go over this content, but it doesn't work as well as in the small group environment. The use of more experienced mentors really creates a richer discussion that adds much more to the experience. Therefore, seeking to put together a program specifically for post docs in our R1 university is also a goal for the coming academic year.

Overall, this content is very flexible and could prove to be a conversation starter with groups of faculty as a whole. One possible area of future development may be to specifically target departments that are anticipating large numbers of future faculty hires to provide preemptive planning and support for the new faculty hires as they arrive. At the very least, the author may then be identified as a resource for the new faculty by the department and may have an easier time setting up future brownbags and workshops.

Acknowledgement

Disclosure

The author reports no conflict of interest.

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