Data Information Literacy Case Study Directory

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Planting the Seeds for Data Literacy: Lessons Learned from a Student Centered Education Program

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Abstract

With researchers facing new requirements and expectations for managing, sharing and curating their data, it is critical that they have the knowledge and skills needed to respond effectively. However, competencies in working with data are often not included as a part of a student's formal education. Students that do acquire proficiencies with data, generally gain their skills in an ad hoc manner on the job and at the point of need (Jahnke & Asher, 2012).

The lack of data education has been identified as a problem that information professionals are potentially well-suited to address (Haendel, et.al., 2012). Research initiatives such as the Data Management Skills Support Initiative (Molloy & Snow, 2012) and the Data Information Literacy Project (Carlson, et.al., 2013) were launched to better understand and respond to the need for data education. Tools and resources are being developed to teach data competencies, such as the New England Collaborative Data Management Curriculum[1]. And many librarians are offering workshops (Eaker, 2014), online training programs[2], or even credit bearing courses (Whitmire, 2013). These and other efforts have helped to define what should be taught and what approaches to use in teaching them.

An underexplored aspect of teaching data literacy is their lasting impact on students. If we seek to foster meaningful change in the cultures and practices surrounding data through data literacy programs then we need to understand how students perceive, process and apply what they are being taught.

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[1] New England Collaborative Data Management Curriculum: http://library.umassmed.edu/necdmc
[2] MANTRA: http://datalib.edina.ac.uk/mantra/

This paper presents a case study about the experiences of ten graduate students from the College of Agriculture at Purdue University who enrolled in our semester long data literacy program. The program was loosely structured to enable students to shape its direction. Instead of providing a static syllabus, we formed weekly lesson plans that were developed as the program progressed. This approach allowed us to create presentations, discussions and exercises that were responsive to student interests and needs. We gained insight into how graduate students navigate their roles as producers of data, the challenges they face and how to make data literacy relevant to them.

The course met weekly in two hour sessions over fifteen weeks. The session topics were:

1. Introduction to the Data Literacy Pilot Program

2. Data Management Planning

3. Data Lifecycle Models

4. Discovery & Acquisition

5. Description & Metadata

6. Data Security & Storage Issues / Description & Metadata (Part 2)

7. Issues in Copyright & Licensing Data

8. Description and Metadata (Part 3) / Mid-semester Check-in

9. Data Sharing / File Naming Conventions

10. Data Management & Documentation

11. Data Visualizations

12. Data Repositories

13. Data Preservation

14. Data Publication and Curation

15. Data Literacy Course Wrap-Up

Ongoing assessment was a critical aspect of the course. Formative assessments used included assignments where students would discuss or present on data topics and "minute papers", brief statements from students describing what they had learned and what was still unclear. Summative assessments included a focus group at the last class session and follow up interviews six months after the program ended to understand what students had retained and incorporated into their data practices. As this was not a credit bearing course we did not assign grades to our students. However, we did provide written feedback on their assignments and made ourselves available to meet with students outside of class time.

We learned a great deal about developing and teaching effective data literacy programs from this experience. Our students responded positively to having the class discussions and assignments centred on their own data. Students are rarely able to devote time to

consider anything more than the immediate purpose of their data. Having a space dedicated to focusing and developing their data helped students to re-examine their roles and responsibilities as budding researchers. As one student stated:

> 'This course really changed the way I think about research. It made me into a better scientist because now I have taken responsibility for my data management. And I've also come to appreciate metadata and organizing your data so that it's in line with the scientific method, so somebody could actually come and repeat your work and understand it. I consider that now to be an essential part of how I see science.'

We found that students appreciated the opportunity to learn more about the data sets generated by their classmates in different fields and readily engaged each other in discussions about specific issues they each faced. There was a limit to this cross disciplinary connection however. The two students who were working with social science based data had a harder time making connections as their data were dissimilar from their peers.

Our students reported an increased awareness of the structures that exist or are being developed to help address data management and curation issues. Although students are tasked with working on data they are not generally exposed to concepts, tools or resources that are available to assist them in their responsibilities. Even when they are aware, they may not have the time to explore them fully or guidance to help them understand how they could be applied to advance their needs specifically. This finding is a good reminder to data curation experts of the need to connect with intended audiences. Graduate students are a ripe target for outreach efforts as they are still in the process of constructing their professional practices and identities.

We observed a wide variation in the receptiveness of student's advisors to the topics and issues that were being addressed in the program. Some advisors were open to students bringing back what they had learned to their colleagues and some of our students even led efforts to reassess current practices within their labs. Other students expressed frustration over how difficult it was to incorporate what they were learning without support, or even to get their advisor to engage in discussions on data. Although they are expected to take ownership of their work, graduate students are still under the authority of their advisor and dependent upon their support. This tension between advisor and graduate student about the treatment and disposition of data is an issue that affects the impact of data literacy programming and must be navigated with care.

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