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Implementing a graduate-level data information literacy curriculum at Oregon State University | Approach, outcomes and lessons learned

Teaching Objective

Enable graduate students to acquire foundational knowledge and skills in selected data information literacy (DIL) core competencies[1,2] that would support long-term habits in planning, management, preservation and sharing of research data

Approach

Use outcomes-centered course design[3] to develop effective teaching strategies[4] for DIL core competencies

Course Characteristics

Description | Careful examination of all aspects of research data management best practices; open to students of all disciplines. This 2-credit course was designed to incorporate substantial active learning approaches; lecture was punctuated by individual and group activities. Significant student participation was expected. The midterm exam was an abbreviated Data Curation Profile[5], and the final exam was a data management plan. See poster supplementary materials for course syllabus (detailed course description, assignments, grading methods, weekly schedule and readings), lesson plans and evaluation content[6].

Demographics | 11 students, including three faculty members. The disciplinary range of the students was broad: six students from the College of Public Health and Human Sciences, two from the College of Forestry, and one each from the Colleges of Veterinary Medicine, Science, and Agriculture. Student degree paths ranged from non-thesis master's to Ph.D., with some of the students having a very well defined research project already planned and others much less so.

Assessment | Students were anonymously surveyed (Qualtrics) twice during the course: once at half-way through, and again during the final week of classes. I asked targeted questions about how well sessions prepared them to meet specific learning outcomes, and requested written feedback on what they liked most and least about the course. I also asked what they thought would be the single most significant improvement to the course thus far.

What Students Liked

File-naming and folder organization strategies
"....was very practical and useful."

Best practices for data storage, backup and security, including local resources
"I would have liked to have more [on this]."

Hearing examples and case studies from real-life
"I liked hearing about other people's data, their woes, and successes."

Hands-on activities in class and in the computer lab
"I liked the active laboratory sections."
"The class activities are useful and keep me engaged in class."

Metadata, lesson and hands-on activities
"[I liked learning about] metadata issues, because they're what I struggle with the most."

Guest speakers
"I liked having the guest speakers share about their area of expertise."

Where I Can Improve

Communicating purpose and expected outcomes of the Data Curation Profile
"I'm still not quite sure I understand what they are for and about."

Reducing redundancy between lectures, perhaps by explaining important concepts in different ways.
"All seemed valuable, though some parts are redundant."

Be more cognizant of student knowledge and experience levels
"This is all new information to me and many others."

Balancing needs of students from disparate disciplines
"Have two separate classes for social and natural sciences."
"...not particularly applicable to my field of research."

Add *more* hands-on activities in class and in the computer lab
"I personally enjoyed the hands-on elements the most."

Incorporate more case studies
"Doing case studies with various datasets could be helpful. ...this would allow us to see how others archive their data and ways to improve our own management techniques"

How Will I Change the Course Next Year?

Connect students & content to the "real world" | Not surprisingly, the students most enjoyed aspects of the course that involved the "real world". This included hands-on activities in class, opportunities to learn about software tools and resources in the computer lab, examining case studies in data management success and failure, and having guest lecturers visit the class. I need to incorporate more real-world cases into lecture content. One student suggested that I use a real research project as a case study that we follow across topics throughout the course. Great idea!

More hands-on time with metadata | Students were eager to learn about metadata, both in terms of theoretical concepts and the tools and methods for creating it. We had a computer lab period devoted to metadata tools (Colectica and DataUP; taught by our Metadata Librarian), but the students wanted more. Metadata format and creation are very discipline-specific; this is one area where I was less successful in meeting the learning needs of my discipline-diverse students. Next year, I'll add another computer lab to give the students more time and experience with the tools, and design an assignment that will clarify the creation process and products.

Use the data management plan as framework | The goal of the course is to give students knowledge and skills in data management that apply directly to their research workflow. Their final assignment, a data management plan (DMP), was the culmination of the class and was intended to provide them with a guiding document for the remainder of their graduate research. While I verbally related course content to the DMP throughout the course, they did not create it until the end. A better approach may be to have them create sections of the DMP as we go. This would better facilitate the self-reflective process of applying largely discipline-agnostic course content to their highly individual research.

Have a "data day" | This is another student suggestion that I really like. They said, "I think having a day in which we bring in our data set (if possible) and be able to incorporate some of the concepts we talked about in class with management, naming, security, etc." I am considering whether to have a class session devoted to this, or if I should book weekly "office hours" in a library computer lab to give students this kind of opportunity.

Split the course? | There were a few suggestions to offer [at least] two versions of this course, one each for humanities/social sciences and natural/applied sciences. This makes sense on many levels, but involves doubling my teaching workload. It's not clear that this is realistic at this time, but I am open to the idea.

More active learning | While I did employ several active learning approaches throughout the term, I recognize that I can make improvements in this area to get students more engaged.

References

1. Carlson, Jacob, Michael Fosmire, C. C. Miller, and Megan Sapp Nelson. "Determining Data Information Literacy Needs: A Study of Students and Research Faculty." Portal: Libraries and the Academy 11, no. 2 (2011): 629–657. doi:10.1353/pla.2011.0022.
2. Carlson, Jake, Lisa Johnston, Brian Westra, and Mason Nichols. "Developing an Approach for Data Management Education: A Report from the Data Information Literacy Project." International Journal of Digital Curation 8, no. 1 (June 14, 2013): 204–217. doi:10.2218/ijdc.v8i1.254.
3. Nilson, Linda B. Teaching at Its Best : A Research-Based Resource for College Instructors. 3rd ed. Hoboken: Wiley, 2010.
4. Whitmire, A.L., "Pedagogy for data management: Instructional design strategies for teaching research data management to graduate students." Poster, Data Information Literacy Symposium, Sept 2013. http://hdl.handle.net/1957/42703.
5. Witt, M., Carlson, J., Brandt, S., & Cragin, M. (2009) Constructing Data Curation Profiles. International Journal of Digital Curation, 4(3), 93–103.
6. Whitmire, A.L., "Implementing a graduate-level data information literacy curriculum at Oregon State University: approach, outcomes and lessons learned." Poster and supplementary materials, University of Massachusetts & New England Area Librarian e-Science Symposium, April 2014. http://hdl.handle.net/1957/47005.

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Innovation | Heart | Ideas

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