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Data Strategies

THE RESEARCH SAYS...

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February 10, 2014

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RESEARCH BACKGROUND

DATA INFORMATION LITERACY

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DATA INFORMATION LITERACY

PRELIMINARY INVESTIGATION

- Institute of Museum and Library Services funded grant.
- Lead by Jake Carlson at Purdue University.
- 4 Institutions
- 5 projects: data management practices in
  - Landscape Architecture
  - Hydrology
  - Civil Engineering
  - Computer Science and Engineering
  - Natural Resources
- 8 faculty members and their graduate students were interviewed.
- Interventions focused on the data information literacy skills of graduate students were prepared
  - Embedded Instruction; Laboratory intervention, discussion, online course modules, and credit courses
  - (*Data Information Literacy: Librarians, data, and the education of a new generation of researchers*, 2014)

DATA COMPETENCIES

WHAT SHOULD DATA MANAGERS KNOW?

Knowledge and Skills for the 21st

Century

- **Discovery and Acquisition**
- **Ethics and Attribution**
- **Metadata and Data Description**
- **Cultures of Practice**
- **Data Management and Organization**
- **Data Curation and Reuse**
- **Data Quality and Documentation**
- **Data Processing and Analysis**
- **Data Visualization and Reuse**
- **Databases and Data Formats**
- **Data Conversion and Interoperability**
- **Data Preservation**

(Carlson, Fosmire, Miller, & Nelson, 2011)

Overall Findings

- Overall, the competencies were seen as important for students to develop.

- Overall, students were seen as lacking in these competencies.

- Assumption that students have or should have acquired these competencies earlier.

- Lack of formal training for students in working with data.

- Learning is largely self-directed and through "trial and error."

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FACULTY PERCEPTIONS

PRACTICE AND PEDAGOGY

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OVERALL FINDINGS

BASED ON INTERVIEW DATA

- Education / training from advisor tends to occur at the point of need and is framed in the context of the immediate issue.

- Students tended to focus on data mechanics over deeper concepts.

- Faculty were often unsure of best practices or how to approach these competencies themselves.

- Lack of formal policies in the lab.

"Well, yeah. I do think that more of a formalized structure, rather than just like, "Oh, just sort of watch what your predecessors have done," would be useful. I think now I'm kind of repeating these things again and again. I'm not even sure I know how to do this as a sort of a formal training program. Even the way you list it, it's like "Curation and Preservation." Just to even put a name on it, and say, "This is what we're doing, and this is what you need to make sure you're doing."… And this is why you do it. Because data may have value beyond the original purpose." – Natural Resources Faculty

FINDINGS

FACULTY SELF REPORTED OBSERVATIONS

- Both Faculty and Grad Students are left to figure out data management for themselves
  - Everyone figures it out differently, including within research groups
- Faculty feel burdened by data management because it takes up time that could otherwise be spent doing "actual research"
- There is a wide spectrum of level of expertise in managing data.
- Faculty are frustrated by high turnover rates within research groups that exacerbate data management problems.
- Faculty recognize that data management plans are required now but feel unsure about what constitutes a good plan.

RECURRENT TRENDS

COMMONALITIES ACROSS FACULTY MEMBERS

- The successful handover of data between research personnel is threatened by timing, documentation, and file management.
- In engineering disciplines, there are few disciplinary norms when it comes to data management and this makes it more difficult to manage and share data.
- The dominant pedagogy for data management is "go figure it out" or "Sink or Swim".
- Tools for data management are frequently selected at the suggestion of graduate students.

"That is the way we work, I mean we like our students to be mostly self-sufficient. We like them to learn things on their own, not because we don't like to teach them, but because we believe that the pain and suffering method is a good way to teach them. Okay, so one way it breaks down is time. The other way it breaks down, that I can think of, is if there are many pitfalls. Many ways for a student to think they have done it right, when in fact, they have done it wrong. So false positives. If the technique has a lot of false positives, then the pain and suffering technique is at least not as straightforward as the other technique….. I guess the false positive issue is worse because…when a student reports it's done, if the advisor doesn't have a good way of knowing if it's done correctly, then it is harder to catch, and so it may be a much more costly mistake later." – Computer Science Faculty

THE BOTTOM LINE

THE MAJOR HOLDUPS

- Data loss
- Sharing in the lab or research group
- Sharing externally
- Meet funding mandates
- Future verification
- Don't necessarily want to learn everything themselves

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STUDENT REALITIES

FIGURING IT OUT AS THEY GO ALONG

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THE ISSUES IN A NUTSHELL

FOR GRAD STUDENTS

- Internalized research timeline
  - Transitioning from project due in two weeks to research life of years or decades
- Very focused on mechanics and tools, instead of logic behind why process is completed.
- Use previous students' documentation and are aware of pitfalls of poor documentation. However, they are also time constrained and so frequently produce poor documentation themselves.

"With the idea that…because, for many students, before you go to graduate school, even when they are in school, they do course projects. It's every week, every two weeks. So they have the mentality: I'm going to work on this for two weeks, and I'm done." Electrical and Computer Engineering Faculty

"No, I don't think they understand the full range from…you know, chronologically or the functionality. They basically follow directions, and I don't think they look at it beyond that. I have to take responsibility for a lot of that because I don't really spend much time talking about it." Civil Engineering Faculty

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SELF ASSESSMENT TOOL

MY CURRENT DATA STRATEGIES

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SELF ASSESSMENT TOOL

FIGURING OUT PRIORITIES

Complete the tool as indicated. It is possible to have one or more checks for each competency listed.

As you go through mentally rank the items as Not a Priority, Low Priority, Medium Priority, High Priority, or Essential. Your goal is to identify 1-3 competencies that would make an immediate positive impact for your research team if you solve them.

You may also wish to think about the competencies in terms of levels of concern: Not at all concerned, slightly concerned, somewhat concerned, moderately concerned, or extremely concerned.

Mark your top priorities in an identifiable way.

OPTIONAL 5 MINUTE FREAK OUT

REFERENCES

Data Information Literacy: Librarians, data, and the education of a new generation of researchers. (2014). (J. Carlson & L. R. Johnston Eds.). West Lafayette, IN: Purdue University Press.

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QUESTIONS?

REQUESTS FOR CONSULTATION

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