Electronic Laboratory Notebooks in the Physical Sciences

Electronic laboratory notebooks (ELNs) are a digital scientific record keeping system. They meet the demands of modern science by creating an organized and secure record keeping environment, that improves collaboration and interdisciplinary work. We will explore a specific case study and examine the landscape of ELNs across the physical sciences.

When: Thursday, 17 May from 12 - 1pm
Where: 200C Warren Hall, 2195 Hearst St (see building access instructions on parent page).
What: Electronic Laboratory Notebooks in the Physical Sciences
Presenting/Facilitating: Kortney Rupp (Chemistry and Chemical Engineering Library)

Prior to the meeting, please review the following:

- Bird, C. L., Willoughby, C., & Frey, J. G. (2013). Laboratory notebooks in the digital era: the role of ELNs in record keeping for chemistry and other sciences. Chemical Society Reviews, 42(20), 8157–8175. (PDF)
- Kanza, S., Willoughby, C., Gibbins, N., Whitby, R., Frey, J. G., Erjavec, J.,Kova, K. (2017). Electronic lab notebooks: can they replace paper? Journal of Cheminformatics, 9(1), 1–15. (PDF)

Additional reading (optional):

Shankar, K. (2004). Recordkeeping in the Production of Scientific Knowledge: An Ethnographic Study. Archival Science, 4(3–4), 367–382. (PDF)

Presenting: Kourtny Rupp, Chemistry Librarian

Attending:

Aaron Culich, Research IT
Amy Neeser, RDM / Library / Research IT
Jenn Stringer, RTL
Josh Quan, Data Lab (Library)
Patrick Schmitz, Research IT
Rick Jaffe, Research IT
Steve Masover, Research IT

(no slides)

Electronic Research Notebooks [no longer Electronic Laboratory Notebooks]

KR background: analytical chemist, library school -- practical understanding of how scientists keep records. In her experience, ERNs were not talked about in undergrad university contexts, in professional (Pharma, etc.) contexts, in graduate school contexts (Purdue). Use in Purdue seemed to happen in part because her lab was run by someone who had worked with Paul Alivasatos at UC Berkeley: migration of practice from California into the midwest. There she used OneNote.

There are lots of ERNs. See http://guides.lib.berkeley.edu/ERN/typesofERNs -- little guidance when comparing ... vendor reps simply promote their own. Cost is a huge consideration for PIs; for this reason, KR tends to recommend OneNote or Evernote to begin with ... not because it's ideal but because it's better than paper.

Problem: when a student comes to her, they want a recommendation of what to use starting immediately -- this presents a dilemma re: what to recommend ... might introduce complexity into a lab's workflow if different people are using different ERNs.

Before suggesting, tries to evaluate the lab environment. And tell 'em it's a pilot. In the environment: what instruments are connected to what computers; which are standalone, which are networked; etc. If there's a lab manager, they're a good candidate to pilot an ERN.

Do not like having a stand-alone conversation about ERNs without discussing a Data Management Plan (DMP) for the lab -- do they have one, what is it, if they don't have one can the ERN discussion be embedded in a larger DMP context.

For a scientist, the record of their scientific work is deeply bound up with their identity. Not easy to suggest/accept proposals for changing how that record is kept.

Vendors want to come in and provide a particular ERN for an entire campus. Doesn't work. Amy relates U Mich med school experience -- they could afford to do this, did, and the solution (LabArchives?) only worked for a fraction of the med school population. KR considers one of her responsibility to be working with vendors to educate them about what their role on campus is or is not.

Aaron: GitHub, Open Science Framework (OSF) -- how does that fit into the ERN landscape?
KR: ERN is where individuals keep their (diverse) stuff. In general, things like GitHub and OSF want to be linked to the scientists' ERNs.

Any given solution may not work for everyone: installs right on one person's laptop, not anothers; or crashes frequently for some users.

Jenn: Might interns from other Library schools (if not our own School of Information) be recruited to assess information organization of different laboratory groups on our campus?
Rick: Could undergraduate students be embedded in labs in a similar way to the way Research IT was bring undergrads into creation of Researcher Profiles?

KR: Key to convey to scientists that simply installing a piece of software isn't the whole solution or the end of the story.

Faculty worry sometimes that ERNs make their research data more vulnerable to intellectual property theft. There's an argument to be made about the altruistic value of sharing research that's recorded digitally ... but not always an easy argument to sell.

KR looking at how ERNs are adopted and used at different institutions (Purdue, UCB), one more financially challenged than the other.

Though there's a lot happening around ERNs, the soundbyte story is that people (generally speaking) are not using them.

KR: One need is an intake form: what is it that a researcher is doing ... lots of questions ... including whether anything he was going to do would be patentable [which requires timestamping and verification of the temporal development of the research]. ERNs in court (re: IP disputes) are not really done yet.

Aaron: Is there a path into ERNs that KR would recommend?
KR: Assessment of lab workflow, instrumentation, etc. first. And whether they have budget to expend on ERNs.
Aaron: Is there any one you like a lot?
KR: LabArchives is pretty good, for chemists and biologists certainly. They're also integrating their tool into curriculum. But ... who is responsible, is it a department, is it a lab, is it the Library, is it the campus?
Jenn: Common good? Thinking of analogy to Learning Management Systems in undergrad education. Is this an area for exploration for supporting a common good solution (or solutions) relevant to both research and teaching.
KR: Vendors are looking for ways in. Perhaps there is negotiation that can take place.

Steve: Is there a set of capabilities that has been articulated, and that is relevant across a range of disciplines?
Amy: Minimum viable product idea...
KR: It's complicated. A lot of different requirements in different domains. Security of data is a cross-cutting concern, but there are few others.
Patrick: Outside life & physical sciences?
KR: Just beginning to get outside those realms.
Jenn: Grant to do some requirements research across domains? That would be interesting.
Josh: Among data scientists, finding that if it's not open source it's not really in the running. JupyterHub.

Patrick: Searchability of digitized data a clear benefit
KR: Transparency to lab manager, PI, etc. Also, information transfer to someone coming into the group to replace a staff person who leaves ... digital record much more legible than handwriting! And more productive not to come up to speed by re-doing from scratch, instead leveraging the experiments / techniques developed by a predecessor.
Patrick: That's a huge productivity boost.
Jenn: Grant opportunity .....
Patrick: Yes ... Sloan, for example, as a funder of science, might be very interested in this kind of inquiry, with that kind of productivity gain.

Aaron/Josh: Carl Boettiger's work.
Steve: Are there others making the kind of use of repositories, notebooks, etc. or is Carl a one-off example?
Aaron: There are some others. Maybe the question is -- how many one-offs? Karthic Ram is another example. Some at Davis.

Patrick: the "what's your exit strategy" question -- relevant here?
KR: Certainly

Aaron: Dream solution?
KR: Need the people, the teams. Scientists, IT people, Librarians...

Rick: What if we turn the research proposal idea on its head, do it as ethnography, watching how particular tools are adopted.
Jenn: Researchers' behavior in relation to their ERNs.