

Advancing research data management in the social sciences: implementing instruction for education graduate students into a doctoral curriculum

Short Title: Adding data management to education curriculum

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Abstract: Research data management (RDM) skills are vital yet often untaught in graduate programs, especially in the social sciences. In this article, the authors present a case study of how a Research Data Librarian and an Education Librarian partnered to provide targeted RDM instruction for a previously unconsidered student group: education doctoral students. They discuss the design, development, and implementation of this focused RDM support. Assessment data from a workshop and in-class sessions is presented and contextualized. From this information, the authors offer practical suggestions that other social science librarians can use to create similar workshops at their institutions.

Keywords: research data management, data literacy, education students, graduate students, outreach

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Introduction

As Frugoli, Etgen and Kuhar (2010) stated, “all empirical researchers are data managers to some degree” (556). Learning how to effectively and efficiently tackle this role is an essential skill for all scholars but it has particular value for emerging or novice researchers. The graduate educational experience presents an opportunity where academic librarians, subject area faculty, and doctoral students can work together to build these components into graduate students’ research practices.

While these partnerships may be well-established in the science, technology, engineering, and mathematics (STEM) disciplines (Eaker 2014, 3; Frugoli, Etgen, and Kuhar 2010, 754; Piorun, Kafel, and Leger-Hornby 2012, 47), data management has become an increasingly important component of social sciences scholarship as well (Borgman 2008, 29). In the digital age, scholars in these disciplines collect, analyze, and share large quantities of research data in new and diverse ways. Doctoral students in these disciplines need support and instruction in building their research data management (RDM) practices as well; due to the nature of their data sources -- which may be quantitative or qualitative -- social sciences graduate students may have different needs, motivations, or issues than their peers in the STEM fields. However, the literature on how academic librarians can effectively reach this group with RDM instruction is limited.

In this article, the authors present a case study of how they worked to incorporate RDM instruction into one university’s education doctoral curriculum. They begin by exploring the concepts of research data management, including how it connects with the Association of College and Research Libraries’ (ACRL) *Framework for Information*

Literacy for Higher Education, and library-based instruction for education students; from there, they identify the factors and characteristics at their university that impacted both their intra-library collaboration and the partnership with their institution's School of Education and Human Services (SEHS). They then present the design, development, deployment, and assessment of this targeted RDM instruction, including the process of gaining discipline faculty buy-in. Finally, they share directions for future research and lessons learned, which offer concrete steps for implementing this type of instruction into other social science graduate programs.

Literature Review

Research Data Management

Data are “anything you perform analysis on” (Briney 2015, 6). This definition allows for a broad swath of research materials to be considered data. For example, in education research, a researcher analyzing teaching methods could have data that includes lesson plans, class assignments, observation notes, and video recordings. Due to proliferation of digital data and analysis techniques, researchers need to implement RDM practices in order to effectively store, organize, and preserve their data. Data management is “the compilation of many small practices that make your data easier to find, easier to understand, less likely to be lost, and more likely to be usable during a project or ten years later” (Briney 2015, 7). Data management practices include, but are not limited to, “data management planning, documenting data, creating metadata about data, organizing data, improving analysis procedures, securing sensitive data properly, having adequate storage and backups, taking care of data after a project, sharing data

effectively, and finding data for reuse in a new project” (Briney 2015, 7). Depending on researchers’ data, the implementation of these practices may vary widely.

Throughout graduate school, students develop and refine their research processes and workflows. Inserting RDM instruction into their studies can help to influence these practices, hopefully leading to the implementation of good data management strategies (Carlson and Stowell-Bracke 2013, 360). As Frugoli, Etgen, and Kuhar (2010) state, “it is easier to learn to do something right from the beginning than to unlearn bad habits and replace them with better ones” (756). However, faculty often critique graduate students’ lack of RDM skills, while admitting their own lack of knowledge in this area (Carlson, Fosmire, Miller and Sapp Nelson 2011, 644). This situation creates, as Carlson et al. (2011, 644) call it, an ignorance loop in learning RDM skills. In a survey of biomedical researchers, Federer, Lu, and Joubert (2016, 54) found that 77% of respondents had never received formal RDM training. In a survey of education faculty, Hollister and Schroeder (2015, 105-6) report that only 23% of respondents had benefited from library support in data management while 66% of respondents thought that receiving library support in this area would help their research productivity. Without formal training in RDM, graduate students learn RDM skills independently, ad hoc, and at the point of need (Carlson et al. 2011, 646; Carlson and Stowell-Bracke 2013, 356; Carlson, Sapp Nelson, Johnston and Koshoffer 2015, 15; Johnston and Jeffryes 2013, n.p.), resulting in each student acquiring a different sub-set of skills which may not be considered best practices.

In the literature, much RDM education focuses on offering discipline agnostic workshops for graduate students. While these workshops provided a general

introduction to RDM, attendees indicated that they wanted to see examples, resources, and tools that were tailored to their disciplines (Adamick, Reznik-Zellen, and Sheridan 2012, 186; Johnston and Jeffryes 2014, 433; Whitmire 2015, 9). For RDM education within a single discipline, these workshops have focused on STEM disciplines (Carlson and Stowell-Bracke 2013, 343; Eaker 2014, 4; Frugoli, Etgen, and Kuhar 2010, 754; Piorun, Kafel, and Leger-Hornby 2012, 46). Additionally, while many RDM best practices are relevant across the disciplines, how to apply those best practices can vary widely from discipline to discipline (Frugoli, Etgen, and Kuhar 2010, 756), thus further making a case for tailored RDM instruction.

The social science disciplines warrant tailored RDM instruction for a variety of reasons. Like the sciences, the social sciences also heavily rely on data in order to conduct research. But social scientists often utilize a mix of quantitative and qualitative data. RDM skills are equally important for qualitative research as for quantitative research (Corti and Van den Eynden 2015, 546). Social scientists often re-use data collected by others, a key difference from most scientific research (Borgman 2008, 31). Additionally, many social scientists work directly with human subjects and therefore need to develop and implement research procedures that protect their subjects' privacy and confidentiality. In the field of education research, the discussion of data management has centered on utilizing different digital tools for data analysis and theories for interpreting data (Savin-Baden and Tombs 2017, 167-193), whereas RDM instruction focuses on implementing best practices into research workflows.

Research Data Management and Academic Libraries

In order to ameliorate this ignorance loop, some academic librarians have begun offering formal education opportunities in RDM as part of research data initiatives within their library. Librarians are uniquely suited to teach RDM to students and faculty because they have the expertise and training to store, organize, and preserve information (Brandt 2007, 365; Carlson et al. 2011, 631; Cox, Verbaan, and Sen 2012, n.p.; Federer, Lu, and Joubert 2016, 52; Johnston and Jeffryes 2013, n.p.). According to ACRL Research Planning and Review Committee's 2012 Top Ten Trends in Academic Libraries, librarians "have a vital role to play in helping their research communities design and implement a plan for data description, efficient storage, management, and reuse" (312). This potential outreach area, then, represents a focus profession-wide.

Moreover, this kind of targeted instructional area offers academic librarians a way to consider how to address the information literacy frames in the *Framework for Information Literacy for Higher Education* (ACRL 2016). Understanding research data, and how to manage this information they both collect and create, is essential for students as they process their "greater role and responsibility in creating new knowledge, in understanding the contours and the changing dynamics of the world of information, and in using information, **data**, and scholarship ethically" (ACRL 2016, Introduction, emphasis added). In particular, RDM instruction can help students to understand several frames from the perspective of student as content creator. Building RDM knowledge and practices can help learners acknowledge the contextual and constructed nature of authority, because they can see first-hand how "information resources reflect their creators' expertise and credibility" (ACRL 2016, Authority is

Constructed and Contextual). Moreover, when students learn about RDM in their discipline, they also see first-hand that information creation is a process, and that they have a role to play in this process. Understanding both the authority that grounds research data and the creation process can also help students to consider the value of information, especially in different formats. For example, what value do raw data have to different researchers, and how can this value be demonstrated? RDM also provides a point of entry to think about scholarship as a conversation in new ways, because it prompts students to consider what existing data they may want to engage with, or to consider how their data may be re-used by other researchers in the future.

Library Instruction in Education Disciplines

Within the social sciences, though, education students have unique research needs. At a basic level, these learners need to develop their own skills in searching, finding, using, and evaluating information as well as the critical thinking protocols to understand complex ideas of authority, information value, scholarly conversations, and information creation as process. Furthermore, education students must be equipped to address both hands-on skills and higher-order thinking to P-12 students (Duke and Ward 2009). These dual needs present a more complicated and nuanced picture that academic librarians need to consider as they reach both education students and faculty.

The ACRL recognizes library instruction's importance to preservice (i.e., uncredentialed teachers-in-training) and in-service (i.e., credentialed) teachers; as such, its Education and Behavioral Sciences Section (EBSS) developed the *Information Literacy Standards for Teacher Education* (ACRL EBSS 2011) in 2011 and is working to

revise them in 2017 (ACRL 2017, n.p.). These standards were developed in light of the ACRL (2000) *Information Literacy Competency Standards for Higher Education* and are intended to “guide teacher education faculty and instruction librarians in developing information literacy instruction for teacher education students” (1). Moreover, they serve to “enable the evaluation and assessment of such instruction and curricula through benchmarking outcomes” (ACRL EBSS 2011, 1). While the scholarly literature on library instruction focuses on preservice educators (see, for instance, Bhavnagri and Bielat 2005, 127; Crouse and Kasbohm 2005, 49; Emmons, Keefe, Moore, Sanchez, Mals and Neely 2009, 140; Kovalik, Jensen, Schloman and Tipton 2010, 146; Witt and Dickinson 2004, 75) these studies offer a foundation of how education faculty and librarians can develop instructional partnerships to effectively reach a specific population of education students.

Library scholars who have examined in-service teacher education may provide more useful insights. These students are generally in graduate programs, and they may be in-service teachers or working in another area of education (e.g. P-12 administration, higher education administration, counseling). Research on these librarian-teacher educator partnerships or librarians’ outreach work to education graduate students has highlighted that many of these students are returning to school after a long absence and may need additional support or guidance (Blummer, Watulak and Kenton 2013, 125; Kumar, Ochoa and Edwards 2012, 92; McMillen, Garcia and Bolin 2010, 429). Moreover, these students may not consistently be on campus, either due to work or personal responsibilities or because they are not full-time students (McMillen, Garcia and Bolin 2010, 429). Understanding how these in-service educators approach both

their own educational process and their research needs is key (Kumar, Ochoa and Edwards 2012, 95), in part because research may be new to them. But most importantly, librarians' work with these education students -- whether as a result of face-to-face (Blummer, Watulak and Kenton 2013, 125; McMillen, Garcia and Bolin 2010, 430) or online interactions (Kumar, Ochoa and Edwards 2012, 95) -- can help to design instruction that impact their beliefs and practices. Considering the prior literature on how to best address education graduate students' needs and challenges provides key takeaways for designing and implementing RDM instruction.

Research Data Management Instruction Sessions

Target Student Population

Oakland University (OU) is a mid-sized university located in suburban Detroit with a total student population of just over 20,000 (Oakland University Office of Institutional Research and Assessment [OIRA] 2016, n.p.). Its School of Education and Human Services (SEHS) offers undergraduate, graduate, and continuing education (non-degree granting) programs; as of fall 2016, this campus unit had a total enrollment of 2,094 students. Of this sub-population, 1,031 were graduate students in masters, graduate certificate, or doctoral programs (Oakland University OIRA 2016, n.p.). Within SEHS, there are four doctoral programs in Educational Leadership, Reading Education, Counseling, and Early Childhood Education. In fall 2016, these programs had a total enrollment of 130 doctoral students (Oakland University OIRA 2016, n.p.). As with many other education graduate programs, SEHS graduate students -- and especially those in the doctoral programs -- are mid-career professionals. They have returned to pursue

further higher education after a period of absence and most continue to work full-time or part-time while completing their doctoral work. Because these four programs are relatively small, doctoral students are able to have considerable interaction with their program faculty and academic librarians.

Establishing a Partnership with SEHS

This partnership developed as an outgrowth of OU's Education Librarian's desire to further develop her targeted support to SEHS doctoral students and faculty. She herself is a doctoral candidate in the SEHS Educational Leadership program, and so she has first-hand knowledge of course scope, research data requirements, and students' needs in managing data throughout their educational experiences. Based on her high level of connectedness with this particular program, she approached OU's Research Data Librarian about targeting RDM support services for this group of students. In their conversations, this duo of librarians agreed that outreach to Ph.D. students in the social sciences represented a new way to conceptualize research data support.

From the intra-library partnership, the Education Librarian identified several starting points for RDM outreach in the SEHS doctoral programs. Based on her own experience, she and the Research Data Librarian decided that they would pilot their work within the Educational Leadership department; with this group, the Education Librarian could provide very specific guidance and direction. She identified two spots where they could integrate RDM within the Educational Leadership doctoral curriculum. In addition, she and the Research Data Librarian recognized that students farther along in the process would also need RDM support. To address these needs, they offered

freestanding workshops for students anywhere in the Ph.D. process on the basics of RDM. They strategically scheduled these sessions at times when doctoral students or candidates would already be on campus.

Designing the Instruction Sessions

Recognizing that RDM is an entirely new topic for most education researchers, most of the sessions were entitled 'Data Management 101' as a way of informing the faculty and graduate students that no prior RDM experience was needed. RDM covers a wide variety of topics and covering all of these topics in a single session with novice researchers was neither feasible nor practical. Selected topics were chosen due to their direct applicability to these doctoral students' dissertation research. For example, securely storing data was a vital topic to cover because most students will be collecting and analyzing human subjects data and are required by institutional review boards (IRB) to securely store this data in order to protect the privacy and confidentiality of their study participants. Due to the length of the session (one hour), only four topics were chosen:

- Introduction to RDM and its importance in the research lifecycle
- Finding and reusing existing data
- Documenting and organizing data
- Storing data safely and securely

For each of the four topics, the students were provided with practical tips, resources, and tools tailored to education research¹. For example, in the fourth section

¹ A copy of the presentation slides is archived in OU's institutional repository (<https://our.oakland.edu/handle/10323/4522>).

of the presentation focused on storing data safely and securely, different storage options were presented, including which options can and cannot be used for human subjects data. A suggested storage plan was given as a starting point for the students to tailor to their specific needs. Additionally, in all sections, generic resources and tools were presented as well as those available only at OU (such as OakShare, OU's secure file storage server).

Delivering Instruction Sessions

To target education doctoral students at different phases of their research process, these librarians embedded RDM instruction into two doctoral classes and offered two standalone workshops. In the fall of 2016, the Research Data and Education Librarians presented 'Data Management 101' in ED 732 (now classified as ED 9010). Four doctoral students and one faculty member participated in this session. This course focused on qualitative research methodology, and its relatively small enrollment is typical for this doctoral program. As such, the librarians were able to provide targeted and focused support to these learners as they explored key RDM topics for the first time.

During the winter of 2017, they then offered two standalone workshops to all SEHS doctoral students. These sessions covered the same information addressed in the in-class presentation, but looked at RDM practices through a less specific lens (i.e., not a single class assignment). These sessions were scheduled at times when education Ph.D. students were already on campus (e.g. after a doctoral support group meeting or before classes started on a weekday evening). Three doctoral students attended the first workshop, which was offered after the monthly doctoral support

meeting; no students attended the second workshop held on a weeknight before evening classes.

Finally, in the spring of 2017, the Research Data and Education Librarians offered another in-class session on intermediate data management practices. This session was embedded in ED 903 (now classified as ED 9100), which is designed for students at the end of their coursework as they approach their independent research work. The content in this class addresses students' qualifying exams (which may include pilot testing research studies), developing a dissertation proposal (which again may include pilot testing), working through the IRB process, collecting and analyzing data, writing the dissertation, and defending the dissertation. While several students had taken ED 732 in the previous fall and worked through the Data Management 101 session, not all students had had this RDM instruction. In this in-class instruction, then, the Research Data and Education Librarians worked to build foundational concepts of the Data Management 101 session, while also providing information on more advanced considerations for those students who had already considered some facets of RDM in their own practices. Six students and one faculty participated in this in-class presentation.

Post-Instruction Survey Results

From the workshop and in-class sessions, there were 11 responses to the post-instruction survey. Overall, the feedback was overwhelmingly positive. On scale of 0-10 (0 = extremely useless, 10 = extremely useful), students, on average, ranked the sessions with a score of 8.75 ($n = 8$). On this instrument, participants ranked their prior knowledge of, change in knowledge of, and how they believed their practices would

change with respect to several data management practices covered by the librarians. As the Research Data and Education Librarian made sense of these data, they specifically examined education doctoral students' beliefs about data organization, an introductory data management principle (see Figures 1-3). Understanding where these students' saw their existing knowledge and could identify opportunities for growth in this area was a stepping stone for further developing these targeted instructional offerings and creating more advanced data management offerings for education students. In most of the survey responses, students expressed little or some knowledge of data organization practices (see Figure 1). After instruction, though, most respondents noted a significant change in their knowledge of this RDM topic (see Figure 2). And finally, all participants who completed the survey said that their data organization practices would change, but the degree to which their practices may change varied (see Figure 3).

As the final question on the survey, participants were asked to share any final thoughts or comments about the session. One participant noted that, "This was an excellent presentation at the perfect time in our course. I need to start good habits from the beginning in relation to managing data." Another indicated that, "I learned a ton!!!! Very useful information! CRUCIAL knowledge for PhD students!!!" And finally, a student who had attended a previous session indicated that:

Some of this information was already known to me - so that is why I have marked some of these as minimally changing my practice. However, I feel that I am better informed for having had more than one exposure to the information as I have gone through the program and my research has changed. I now have a

better idea what systems will possibly work for me and where to go to make sure I don't lose data completely in the event of idiocy (lol) or natural disaster.

These comments highlight the benefits students with different background knowledge or experiences saw in this type of instruction. They expressed appreciation that RDM instruction was linked to their coursework as well as being exposed to RDM instruction multiple times in order for these concepts to 'sink in.'

Next Steps & Future Directions

As these librarians consider how to further advance RDM instruction for OU's SEHS doctoral students, there are several constructive paths forward. First, they will continue to offer Data Management 101 and Intermediate Data Management sessions embedded in the qualitative research methods and "preparation to dissertation" courses in the Educational Leadership department. These situated instructional interactions offered the most effective opportunities to highlight how RDM connected to Educational Leadership doctoral students' practices. Working with education faculty ensures that the RDM instruction connects to students' needs and experiences; it also guarantees that this kind of learning is part of doctoral students' program experiences. Furthermore, RDM in class sessions offers students the opportunity to see their instructors engaged with the topic. This faculty participation can both provide back-door training for this group and encourage students to put techniques into practice as they research. Also, the Research Data and Education Librarians have identified ways to spread this instruction to the three other SEHS Ph.D. programs. Beginning in the fall of 2017, Data Management 101 sessions will be offered in the qualitative research course designed

for both Early Childhood and Counseling Ph.D. students; they will also provide this content in an orientation session for new Reading and Language Arts Ph.D. students.

In addition to continuing to offer RDM instruction embedded within the curriculum, the Research Data and Education Librarians are also embarking on longitudinal investigation to determine how this instruction affects students RDM practices. This research represents a unique effort to consider RDM at the graduate level in the social sciences and across time. Via semi-structured interviews, they will interview two groups of recent education Ph.D. graduates: 1) students who did not receive RDM instruction (control group) and 2) students who did receive RDM instruction (sample group). Interviews with the control group have already begun and interviews with the sample group are expected to begin winter of 2018. By comparing and contrasting themes that arise in interviewing these two groups, these librarians hope to provide qualitative evidence of the effectiveness of their RDM teaching practices. Also, these results may help to understand how RDM practices differ between doctoral students who ultimately pursue careers as P-12 administrators versus careers as faculty.

Lessons Learned & Conclusions

From these experiences, the authors have identified several practical lessons learned that others may use to design and implement RDM instruction into social sciences graduate curricula. These key takeaways consider logistical, content, and motivational considerations. By considering these three pieces as they create RDM outreach or instruction, other academic librarians can more effectively build disciplinary relationships around research data and affect graduate students' practices.

Logistical Considerations

- *Partner with a colleague:* Working with a colleague can make starting new instruction less intimidating. In this case study, the Research Data and Education Librarians utilized their respective knowledge of RDM and the education doctoral program to design, develop, and implement this instruction.
- *Use one-shot sessions to directly connect with curriculum:* Previous studies have shown that library instruction can effectively connect with students at targeted, curricular points of need (ACRL 2012, n.p.). In this situation, RDM instruction should be added to the curriculum when doctoral students are beginning to gather and analyze data (either for their dissertation or a class assignment). These RDM topics are new for faculty too so they had many questions!
- *When designing instruction, consider target students' unique needs and attributes:* At OU, most doctoral education students are busy, full-time professionals without much free time for extra workshops. Providing in-class instruction is the most practical way of providing RDM instruction. If considering workshops outside of class time, try 'piggy backing' on established events as a way to encourage attendance. For example, one of the standalone workshops in this case study occurred after a doctoral support group meeting so that students could easily attend the RDM workshop after attending this group. In contrast, the other workshop – which was not connected to another event – had no attendees.
- *Consider existing interpersonal connections:* Utilize existing personal relationships within the department or program to start instruction. If you do not know the program or curriculum well, use the course catalog to find the doctoral

research methods course. As with all new instruction, conduct a pilot before doing a full-scale program. Post-session assessment will provide feedback to help refine instruction methods and materials.

Content Considerations

- *Focus on practice, rather than theory:* Doctoral students are busy and are interested in practical tips, resources, and tools that they can utilize immediately rather than theory. Center RDM support on what they can implement now or in the near future.
- *Accommodate students' varying comfort with technology:* As mid-career professionals coming from a wide variety of educational settings (P-12, higher education, etc.), doctoral students at OU have varying levels of comfort with technology. If possible, try to offer high-tech and low-tech options for RDM best practices. For example, using a file naming convention for organizing files works equally as well for digital and physical files.
- *Discuss RDM in terms of digital and physical data:* Often data are only thought of as digital files. But data can also be physical (paper surveys, paper research notes, physical artifacts, etc.). For those of the low-tech end of the spectrum, they may be collecting and analyzing a lot of physical data. It is important to discuss the similarities and differences between RDM for physical versus digital data. An example of a similarity is the practice of creating backups for important digital files and physical documents.
- *Provide concrete steps for protecting human subjects data:* As educators, doctoral students are keenly aware of the need to protect their human subjects'

privacy and confidentiality. Doing so is also a requirement for IRB approval.

When planning instruction, look for guidance through your university's Information Technology department or Research Office on the available tools and resources that students can use to protect their human subjects data.

- *Suggest a flexible RDM plan of action:* Many students will not have been exposed to RDM topics previously. Therefore, some students may feel very overwhelmed about putting RDM practices into place. Providing students with a flexible RDM plan of action can be a good way to ameliorate these feelings. This plan of action should provide a suggested order for implementing RDM practices. It will provide students with practical starting point that allows them to tailor it to their unique needs. A flexible plan of action reinforces the notion that RDM is not a set of rules but rather a set of best practices (Frugoli, Etgen and Kuhar 2010, 754).

Motivational Considerations

- *Provide direct connections between implementing RDM practices and students' dissertations:* Often RDM education is framed around complying with federal funding agency mandates. But many education doctoral students, including those at OU, are not working on projects that are funded by these agencies. However, implementing RDM practices will help doctoral students with their dissertation research. For example, having robust documentation about their data analysis procedures will help them as they write the Methods section of their dissertation. During each presentation, the practical aspects of RDM were highlighted (i.e. putting this practice into place will help save you time and headaches later!)

- *Acknowledge students' career aspirations when designing instruction:* Many OU doctoral education students are pursuing this terminal degree as a means of career advancement rather than starting a research career as faculty members. Therefore, their motivations (or lack thereof) for implementing RDM practices will be different than for students who plan to continue academic research after defending their dissertations.
- *Unique nature of graduate education students may influence instruction:* OU education doctoral students are mid-career professional, often with significant obligations outside of their doctoral work. Consequently, they often take longer to complete their doctoral degrees. According to OU's Office of Graduate Education (n.d.), 46% of SEHS doctoral students complete their degrees in between six and eight years and 17% of students complete theirs in nine or more years. Framing RDM instruction around the idea that implementing RDM practices will make it much easier to return to their dissertation research after an absence can be a powerful catalyst for these students. Also, emphasizing that "any little bit you do to improve your data management helps" (Briney 2015, 8) is important.

Conclusions

In Oakland University's Educational Leadership doctoral program, two librarians partnered with disciplinary faculty to successfully bring RDM instruction to a population of researchers who are not the traditional targets for this type of instruction. Based on the positive reception by both the doctoral students and faculty, the authors plan to continue and expand this instruction. As they address different departments' needs in

OU's SEHS, they will continue to research how this instruction affected doctoral students' RDM attitudes and practices.

While this ongoing development and research will help to advance both the library-education liaison relationship and RDM instruction at OU, this case study also highlights how cross-library and cross-university collaborations can be leveraged to support graduate students in new ways. Other academic librarians may find fertile ground in partnering with social sciences master's and doctoral programs around issues of RDM, open access, scholarly communications, or other evolving research topics. These kinds of relationships further build the library's role in graduate research while also equipping the next generation of scholars to consider, apply, and advocate for these key information concepts.

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