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## The Journal of Academic Librarianship

journal homepage: [www.elsevier.com/locate/jacalib](http://www.elsevier.com/locate/jacalib)Situating Expertise in Practice: Domain-Based Data Management Training for Liaison Librarians<sup>☆</sup>Jamie Wittenberg<sup>a,\*</sup>, Anna Sackmann<sup>b</sup>, Rick Jaffe<sup>c</sup><sup>a</sup> Indiana University Libraries, Indiana University Bloomington, 1320 East Tenth Street, Bloomington, IN, 47405, United States<sup>b</sup> Kresge Engineering Library, 110 Bechtel Engineering Center, University of California, Berkeley, 94720, United States<sup>c</sup> Research IT, Earl Warren Hall, 2195 Hearst Ave, Berkeley, CA 94720, United States

## A B S T R A C T

The research data management team at the University of California, Berkeley implemented a domain-based Librarian Training Program in order to upskill liaison librarians in research data management principles and create a community of practice among librarians providing research data support. The training program partnered with representatives from each subject division of the Library to integrate content from relevant disciplines. The training model emphasized scaffolding and concrete deliverables, teaching specific tools and concepts, and creating learning objects useful for instruction and outreach. Employing a situated, learning-based, pedagogical model, the program was more successful than previous attempts at library-wide research data management training at Berkeley. This analysis details the program management, curricular design, instruction, and outcomes that made the Library Training Program successful.

## Introduction

Librarians in liaison and domain-centric roles often have opportunities to connect researchers with important information but are not always well-positioned to provide the consultation services necessary for emerging topics such as research data management (RDM). Given funders' increasing requirements for data management plans, data sharing, and reproducible research, librarians recognize a growing need to improve awareness and advocacy for RDM (Antell, Foote, & Turner, 2014; Carlson & Stowell-Bracke, 2013; Johnston, Carlson et al., 2017; Johnston, Olendorf et al., 2017; Latham, 2017). At the University of California, Berkeley, an eighteen-month initiative to train subject librarians in research data management addressed the discrepancy between job requirements and librarian skill sets. The Librarian Training Team designed a domain-specific curriculum and outreach program to prepare librarians for the provision of research data management consultation and referral support. This training program grew from early Berkeley data management efforts to offer generalized training to early adopters selected from each domain. However, general research data management training was unpopular and insufficient to prepare early adopters to train their departments (Wittenberg & Elings, 2017). Domain-based research data management training, in conjunction with administrative buy-in, is more effective in engaging librarians,

delivering relevant content, and creating a community of practice.

## Literature review

*The role of librarians in support of research data management*

In the library literature, a number of studies report on the importance of academic librarians providing data management support services and examine the methods in which librarians can best prepare to fill this new role. In March 2007, the NSF published a report suggesting that “university-based research libraries and research librarians are positioned to make significant contributions” in developing support for data curation, analysis, archiving, and the creation of digital libraries that index research outputs (Cyber Infrastructure Council, 2007). The conversations addressing librarians' role in data support continued in November 2008, during which attendees of the Research Data Management (RDM) Forum identified four key data roles for librarians called into the data support role: data manager, data creator, data librarian, and data scientist (Pryor & Donnelly, 2009). The data librarian's core skills include (among others) knowledge in data preservation, data appraisal and retention, and standards development.

Following the NSF report and the RDM forum, others examined how library organizations can and should adjust to this call for greater

<sup>☆</sup> This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

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<https://doi.org/10.1016/j.jacalib.2018.04.004>

Received 6 October 2017; Received in revised form 10 April 2018; Accepted 16 April 2018  
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support in research data services. Delserone conducted a science assessment at the University of Minnesota (UM) and asked researchers in the sciences about the types of help they seek from the library. Their responses fit into three categories: data organization and manipulation; data storage, security, and sharing; and data stewardship. UM developed the Research Cyberinfrastructure Alliance (RCA) to further examine how the role of libraries and librarians could best support researchers in these three categories. The RCA recommended that the library provide support in multiple areas of data services, including: data stewardship, instruction, data management policy, and data repository certification (Delserone, 2008). Jaguszewski and Williams discovered a similar trajectory of library services when they interviewed administrators at five libraries of the Association of Research Libraries (ARL). Libraries are shifting their focus to “what users do (research, teaching, and learning) rather than on what librarians do (collections, reference, library instruction)” (Jaguszewski & Williams, 2013, p. 4). This shift in focus surfaced a number of areas that librarians needed to support, like data management and preservation plans. Librarians responded to these recommendations through a variety of training programs designed to upskill librarians in research data management topics.

#### *Types of trainings for librarians*

In the years following the Jaguszewski and Williams study, librarians have worked to find the proper mode of Research Data Management training through a combination of online, hybrid, and in-person trainings. Research Data MANTRA (Management Training), developed at the University of Edinburgh in 2011, was created as an online curriculum to teach researchers and librarians about research data management through use cases, scenarios, and best practices (Rice, 2014). This distance learning model was designed to support individual learners located remotely from the instructors and from one another. Initially, the creators of MANTRA were funded to create discipline specific materials. However, a needs assessment found that specific topics, such as confidential data, spanned multiple disciplines. Currently in its fourth iteration, the program is now linked to a certificate-granting Coursera MOOC designed for both librarians and researchers (Tibbo & Jones, 2015). MANTRA enables learners to work through data management training at a self-guided pace, and its open license has allowed others to build upon the training for their own local purposes. The training remains broad and, although highly accessible, does not provide the customized training incorporating local research culture that some librarians require.

Shortly after the development of MANTRA, a hybrid training model emerged that specifically focused on librarians (De Smaele, Verbakel, & Potters, 2013). Librarians from the three Dutch Universities of Technology (3TU) developed Data Intelligence 4 Librarians, a mix of online and in-person intensive instruction. The model, which combined group meetings, online study, and homework assignments, reflected the collaborative environment of the modern scientific community. The course consisted of seven days of training (four days of face-to-face training) and covered 4 interdisciplinary modules: data management; technical skills; acquisition and advice; and actual topics (de Smaele et al., 2013). Participants in Data Intelligence 4 Librarians responded positively to homework and the resulting discussion; however, participants wanted real-world use cases contributed by librarians employed in an RDM role and researchers addressing how data are managed and how these behaviors might differentiate based on discipline. Similar responses were found when planning for and assessing other general training programs for librarians (Bresnahan & Johnson, 2013; Cox, Verbaan, & Sen, 2014; Wittenberg & Elings, 2017).

In-person trainings have taken a number of forms. RDMRose, which originated in the UK, took a slightly different approach in their training for liaison librarians. The course content consisted of half-day sessions completed as self-directed learning exercises. This format enabled

hands-on activities, such as researcher interviews. Participants found that the group discussions enabled them to see multiple perspectives of RDM; however, librarians desired greater inclusion of local institutional context, which may aid in translating the theoretical to concrete examples (Cox et al., 2014). Byatt et al. (2013) also held an intensive, in-person workshop around data management informed by survey results. This workshop for librarians focused on knowledge of research data management, making effective referrals, and end of lifecycle research data management. The training combined a general introduction which was intentionally kept interdisciplinary in order to allow best practices to be transferred between disciplines. Future changes for Byatt et al. (2013), include widening the scope of trainees to draw in a diverse set of expertise. Both of these in-person trainings highlight the difficult balance of providing discipline and institutional specific RDM knowledge from multiple areas with greater diversity of opinion.

Three additional in-person trainings have taken on a discipline-based and researcher-centric approach by integrating data workflows into the learning process. Bresnahan and Johnson (2013) conducted a needs assessment of librarians at University of Colorado Boulder supporting research data management and found that librarians desired practical, hands-on training and expressed concern regarding the disciplinary differences required to work with researchers across the university. As a result of this needs assessment, a day long workshop called *DataDay!* was developed and implemented for subject librarians at the university. The workshop included hands-on exercises and discussions through which participants worked with real datasets (Johnson & Bresnahan, 2015). Lyon created a 3-unit Research Data Services course at the University of Pittsburgh iSchool in which practitioners participated alongside graduate students. This exposed MLIS students to the practitioner perspective while providing practitioners with graduate level coursework and content. The course facilitated collaboration with faculty and researchers in four health and physical science laboratories to give participants a sense of daily research workflows (Lyon, 2016). Finally, librarians at the University of Pittsburgh adapted pieces of Lyon's work to develop a new research data management training for subject librarians that enabled a deep dive into subject areas while addressing research data competencies like data sources, metadata schemas, and data archives (Mattern, Brenner, & Lyon, 2016). While this deep dive was successful in developing disciplinary based knowledge of RDM, the authors found a need for greater peer-feedback among librarians in order to develop a stronger community of practice.

#### *Situated learning and communities of practice*

The literature shows that, when faced with the challenge of learning the skills and expertise needed to support a burgeoning new field, librarians have requested training that conveys real-world experience, prepares them to recognize disciplinary variation, and equips them with an understanding of both the broad perspectives and the local institutional context. However, the success of their efforts is equally dependent on the process by which they develop these new capabilities.

Lave and Wenger (1991) construction of situated learning places value on learning through a process of participation with communities of practices. Situated learning increases the effectiveness of learning new abilities and tools within a specific academic culture and discipline (Farrell & Badke, 2015). The concept of situated learning has been applied to information literacy as a way of knowing an information landscape within a specific context (Lloyd, 2007). The concept of communities of practice has evolved from Lave and Wenger (1991) initial definition of ‘a system of relationships between people, activities, and the world; developing with time, and in relation to other tangential and overlapping communities of practice’ to a nuanced, deliberate group consisting of three elements: domain (a specific area of expertise that members share), community (a set of people who engage with one another), and practice (ways of dealing with problems typical of a domain) (De Cagna, 2001).

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