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Using Scenarios in Introductory Research Data Management Workshops for Library Staff

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Abstract

This case study describes the inclusion of a scenario-based group learning activity in introductory research data management workshops for librarians at two Australian universities in 2012-2013. The positive response from attendees at these workshops, and the successful re-use of the scenarios at several other Australian universities in 2014-2015, prompted further investigation into scenario-based learning (SBL) and reflection on how this approach could be better applied in future as part of in-house professional development programs for librarians.

1 Introduction

As awareness of the emerging roles for librarians in research data management support increases, so does the need to provide university library staff with professional development opportunities in this area. Surveys have identified that further work is required to build the knowledge, skills and confidence of librarians if research data management is to become a fully developed part of libraries' research support services (Corrall *et al.*, 2013, p.609; Cox and Pinfield, 2014, p.308).

To meet demand in this area, a number of training programs have been developed for librarians, usually those working in client-facing roles with researchers (often, but not always, called liaison librarians). These programs include:

- Do-It-Yourself Research Data Management Training Kit for Librarians (EDINA and University of Edinburgh Data Library, [n.d.](#))
- Essentials 4 Data Support (Research Data Netherlands, [n.d.](#))
- RDMRose (Information School, University of Sheffield, with the Libraries of the Universities of Leeds, Sheffield and York, 2013), and
- Immersive Informatics (University of Melbourne and UKOLN at the University of Bath, 2015).

These extensive multi-module courses are high quality but require a significant investment of time. Their in-depth nature enables a variety of approaches to learning, including lecture-style content, multimedia (e.g. video interviews with researchers), suggested readings, reflection, quizzes, hands-on activities (e.g. exercises in using specific data analysis software) and scenarios.

Few Australian university libraries have adopted or developed such extensive programs specifically for their staff. Librarians moving into the delivery of research data services are more likely to develop on-the-job skills through project work, and to undertake some form of self-directed learning such as attending Australian National Data Service (ANDS) webinars, reading relevant articles and reports, and networking both in real life and via social networks like Twitter (Simons and Searle, 2014, 10-13). In some organisations a more experienced data specialist may be available to coach and mentor librarians moving into data management support roles (Brown *et al.*, 2015, 229), but this is by no means the norm. In this context, in-house sessions at an introductory level can be very important in bringing librarians together as part of their usual teams with the explicit goal of developing a basic shared understanding about research data management in the context of their institution.

This paper describes the positive response to a learning activity in introductory research data management workshops for librarians at two Australian universities in 2012-13 that made use of scenarios. That positive response and the successful re-use of the scenarios in multiple institutional contexts prompted further investigation into scenario-based learning and an assessment of how this approach could be improved in future training for library staff. Section 2 of this paper describes how the workshops were run and offers some observations about the reception of the scenarios during these workshops. Section 3 outlines some best practice suggestions from SBL proponents from areas in higher education outside of libraries, and assesses the scenarios used at Monash University and Griffith University against these criteria. In Section 4, areas for further work are outlined, including closer collaboration between research data specialists and educational designers in course design and the need for an evaluative approach to ensure that a positive initial response to scenarios translates into greater post-workshop confidence and action in the workplace on the part of attendees.

2 Using scenarios in workshops for librarians

2.1 Monash University

In 2012, two half-day workshops on research data management for library staff were held at Monash University. More than forty staff members attended, the majority being team leaders, contact librarians and learning skills advisors.

The first part of these workshops consisted of a short reflection and discussion around participants' goals, followed by a formal presentation that defined research data, outlined funding agency requirements and discussed trends in scholarly communication such as journal policies, data repositories and the emergence of data journals.

The second section of the workshops was a group exercise involving a scenario introducing a PhD student in one of four areas: Medicine, Business and Economics, Arts, or Science and Engineering (Monash University, 2014). Each scenario provided a name and brief biography for the researcher and described their motivation for undertaking a PhD, the research topic, and aspects of the research process. Attendees were split into four groups roughly corresponding to faculty support teams, with around six to eight people per group. Groups were asked to read over the scenario and to identify at least one technical and one non-technical data management issue that the PhD candidate might face; issues were written down by a group scribe on a large easel pad. After about thirty minutes for discussion, each group summarised their scenario for the other groups, shared their easel pad notes and reported back verbally on the data management concerns they had identified.

2.2 Griffith University

In 2013, three similar workshops were run at Griffith University, with around thirty attendees in total. Griffith's converged Library and Information Technology services model meant that team leaders, discipline librarians and learning advisors were joined by staff from the Library and IT Helpdesk team. At Griffith, groups were smaller (four to six people) but still based on the team structure for academic support.

A number of changes were made to the exercise for this new context. Scenarios were modified to reflect the different research priorities at Griffith. A 'quick guide' to topics covered in the institution's research data guidelines was provided, both as an aid for the exercise and to promote the guidelines document as a key resource for library staff and for researchers. After the workshop, in response to participant feedback, a copy of the scenarios with 'expert' commentary was circulated to attendees (Griffith University, 2013).

2.3 Observations

At both universities, the scenario-based activity was very effective in engaging the librarians. The exercise generated lively discussions. Evaluation forms were completed by Monash attendees, and many of these forms rated the scenarios as the most useful part of the workshop. The response from attendees was so positive that the scenarios were shared with the ANDS partners email list and community bulletin board (Searle, 2012).

All groups at both institutions were able to identify multiple data management challenges in areas such as storage, file formats, software and hardware obsolescence, ownership, third party copyright, ethics and dissemination. While only asked to identify one technical and one non-technical issue that might arise, all groups came up with more than this.

The use of scenarios seemed to help librarians make connections between their existing knowledge and skills and those needed for this new area. This applied to both to library-specific topics such as intellectual property and to more general 'common sense' areas such as data storage and backup. Attendees were also observed engaging with scenarios from outside their own areas of subject specialisation: having groups report back on their scenario and findings surfaced similarities and differences between discipline areas.

Discussing scenarios as a group enabled staff in different roles and at different levels to work together. It was also observed at Griffith that some early career information professionals with little practical experience in research support still made valuable contributions to the discussion; their recent studies had covered aspects of digital collections and data management and this enabled them to participate with some theoretical understanding of the issues, even if they had not yet come across these on the job.

2.4 Re-use by other organisations

Both sets of scenarios have been published under open licences to facilitate re-use at other organisations. In 2014 Deakin University used three of the four Griffith scenarios alongside a local example about a collaborative research project. In 2015 LaTrobe University used unmodified Monash scenarios as part of a day-long introduction to research data management. Also in 2015, the Australian National Data Service (ANDS) used Griffith scenarios during workshops at Flinders University and the University of South Australia. Feedback from the organisers of these workshops indicated that attendees continued to respond positively to the scenarios.

3 Scenario-based learning

The scenarios described above were not developed with explicit reference to the large amount of literature about scenario-based learning in academic settings. The data management specialists who created the scenarios and ran the workshops were collaborating with library learning specialists to develop a better research data skills development program for doctoral candidates (Searle and Torres, 2011) but had no formal background in educational design. While concepts of profile building and persona creation for library usability testing and the design of repository and data curation services were similar in some respects (Maness *et al.*, 2008; Lage *et al.*, 2011; Wright *et al.*, 2013), the positive reaction to the use of the scenarios prompted a more in-depth exploration from an educational development perspective.

Scenario-based learning is a kind of situated learning, which emphasises the role of learners as part of a professional community of practice. A scenario can be described as:

"a near-world situation, a descriptive set of circumstances, a critical incident, even a partial life/story narrative. Scenarios usually contain human actors, a storyline or plot (often incomplete), an invitation to solve a problem, demonstrate an acquired skill, explore an issue/concern, and/or to speculate on alternative outcomes". (Errington, 2014)

Proponents of scenario-based learning argue that it is a very effective method of engaging participants and building professional skills. SBL provides a safe space where risks can be taken. It supports team skills and collaboration, and is particularly useful for situations where inquiry is needed and obvious solutions are not always available. Diverse case studies are available in which SBL has been used as part of the professional training of clinicians, emergency response personnel, digital media designers, teachers, mental health nurses, social workers, sociologists and veterinary scientists. In each of these professions, there is a need to interact with clients in the workplace to diagnose problems and determine plans of actions or interventions to address the identified issues, which can be complex.

One such interaction that can be carried out by librarians as part of supporting research data management is an interview or a consultation with a researcher. Many librarians have significant experience conducting reference interviews and research-related consultations, but they can still lack confidence about embarking on this new type of interaction. This type of professional situation is one that SBL should be well-suited to; the developers of RDMRose have argued that learning about research data management should be "exploratory, discursive and reflective, providing a space in which librarians can explore developments as *they relate to their individual/team role...* hands-on practical activities with documents and tools *in real or realistic scenarios* are important" (Cox *et al.*, 2012, my emphasis).

Interestingly there is little mention of scenario-based learning within the literature related to academic library practices. A small number of articles promote the use by librarians of problem-based learning (PBL, which intersects with, though is not the same as, scenario-based learning) in the context of information literacy and research skills (Cook and Walsh, 2012; Hines and Hines, 2012; Mi, 2011; Wenger, 2014). One recent study has also investigated differences in library usage by students in courses with SBL and PBL approaches to curriculum design (Chen *et al.*, 2011). However, the use of scenarios in contexts where librarians are themselves the adult learners remains largely unexplored.

The following sections outline best practice suggestions from practitioners of SBL in other areas in higher education, and discuss the scenarios used at Monash and Griffith against these criteria.

3.1 Identifying the skill that needs to be addressed

Prior to developing a scenario-based learning activity, several steps should be undertaken. It is necessary to identify the key competencies that practitioners need: "what are those things [they] should be good at... What should they be able to do, almost automatically?" Key events need to be identified and broken down into component steps that a competent practitioner would take to work through the events. Learning outcomes should be developed, ideally around demonstrable behaviours that relate to the key competencies (Naidu, 2010, 44-45).

The scenarios used at Monash and Griffith were developed with little thought given to pre-identifying the specific competencies that attendees might need and how the scenarios would address these. Librarians were asked to identify potential challenges on the assumption that the information provided in the scenario was reasonably complete and correct. The learning activity did not therefore address the skills needed to consult with a researcher, if the primary purpose of the interaction was seen to be advocacy about the benefits of data management or the promotion of institutional services for storing, managing and disseminating data. This would require a higher level of understanding about the broader environment (e.g. institutional infrastructure, funding agency requirements, journal policies), as well as specific verbal communication skills in persuasion and

negotiation.

On the other hand, if the purpose of the consultation was perceived as a needs assessment or gap analysis, followed (perhaps at some later point) by the provision of information that might meet some of those needs, different skills would be required: the focus might then be on good listening skills, note-taking skills, and the ability to ask open questions. Given that many librarians are introverts and that open interviewing techniques are the basis of reference inquiry work, it may be that a data consultation with these goals would be less of a stretch for many experienced liaison librarians.

Whether the scenarios developed for the training at Monash and Griffith were effective depends on the expected outcomes of data consultations with researchers, which were not clear at the time of the training. This suggests that organisations asking their librarians to consult with researchers about data management need clear goals for those conversations, so that trainers can determine what skills are needed and the level that librarians should be aiming for to get a good result.

3.2 Choosing the right type of scenario

Once the required skills are identified, trainers need to assess what type of scenario would best develop those skills. The "judicious choice of scenario type and allied strategies" (Errington, 2010, 20) is needed to achieve good learning outcomes:

"Each kind of scenario can potentially make a specific contribution... Discernment involves identifying appropriate scenario types, the kind of learning intentions they facilitate, their delivery characteristics and their specific professional advantages... There is much potential in using various combinations of approaches". (60-61)

There are three main kinds of scenarios:

- *Problem-based scenarios* help students integrate theoretical understandings with practical knowledge and involve decision making or critical analysis. Learners can apply what they know about similar circumstances, but will have to fill gaps in the available information, make decisions and provide justification for them.
- *Issues-based scenarios* explore concerns that underpin the area of study or practice by asking students to explore different (sometimes competing) viewpoints in order to build a better understanding of how vested interests can influence decision making. These scenarios can be useful when attitudes, beliefs and values are important factors.
- *Speculative-based scenarios* require students to gather evidence about current practice and use this to consider factors that might influence their discipline or profession in future.

Using this taxonomy, the scenarios used at Monash and Griffith can be categorised as very basic problem-based scenarios, with a focus on critical analysis. Depending on the skills that librarians need in a particular institutional context, alternative or supplementary approaches could be taken.

For example, if librarians are expected to take an advocacy role, an issues-based activity might be useful since providing factual information about research data management will often not be enough to counter the attitudes, beliefs and values of various stakeholders. An example of scenario-based learning that might address this competency is the use in ANDS workshops of a mock interview with a researcher who is concerned about data sharing, where the goal for the librarian is to change the researcher's negative attitude to data sharing to a more positive one. Some ANDS workshops have also included exercises asking participants to think about research data management from the perspective of different stakeholders in the organisation, such as the Vice-Chancellor, the Research Office, IT Services or the Library.

A speculative-based approach could give participants a greater chance to explore what research data management means in the broader context of the library profession and its future. For example, participants could be asked to consider the implications for their library services if research data became a reportable research output alongside more traditional publications such as journal articles, or to consider what services would be needed if there was a rapid expansion in the number of journals requiring data deposit as part of the manuscript submission process.

3.3 Aiming for authenticity

Scenarios can take the form of caricatures; these "exaggerate and accentuate problems or solutions... usually through the use of satire or polemic" (Adam, 2010, 180). An effective example of this for research data management is 'My Data Management Plan – a satire' (Brown, 2010), which is included in the Do-It-Yourself Research Data Management Training Kit for Librarians from the University of Edinburgh. However, practitioners of SBL generally emphasise the need for authenticity and most learning developers aim for more detailed and realistic stories such as the copyright scenarios included in the UK Data Archive's training resources (Corti *et al.*, 2011).

Authentic scenarios should "match the real-world tasks of professionals in practice as nearly as possible. Learning rises to the level of authenticity when it asks students to work actively with abstract concepts, facts, and formulae inside a realistic—and highly social—context" (Lombardi, 2007). Developing authentic data management scenarios for librarians therefore requires a good understanding of the research process, of common data management challenges, and of researcher motivations and 'pain points'.

The initial set of scenarios developed at Monash University mined the experiences of library staff who were dealing with real-life

issues that had emerged through a number of channels of communication with researchers. As noted earlier, the developers of the scenarios were informed by work on personas in service design, which emphasised the use of "data collected from actual or potential users. One of the most common ways of collecting data is to interview many users and find shared design needs among them" (Lage *et al.*, 2011, 919). Fifty data interviews conducted by librarians as part of the ANDS-funded Monash Research Data Collections Project (Todd *et al.*, 2011) were an important source of qualitative information; potentially sensitive details of research topics and practices could be protected by aggregating the information to create fictional scenarios rather than real-life case studies.

In addition to project interviews, staff had received ad hoc inquiries by email, phone and during personal consultations, and also had insights gained through the delivery in 2009-2011 of seminars attended by more than 150 PhD candidates. Attendees at these seminars came from a wide range of disciplines and had to describe their research topic and the kinds of data that would be used or generated as part of these workshop. The introductions and methods sections of completed theses in different disciplines also provided a useful source of information that could be fed into the development of the scenarios.

As a result of these real-life experiences handling complex and often open-ended queries from researchers, the scenarios highlighted the use of third party data, which was far more common than expected, and collaborative research situations in which intellectual property issues could arise:

Louise also wants to access the policy documents of government agencies and health service providers (including hospitals) in Queensland and in other jurisdictions in Australia and overseas. She thinks she will do some kind of content analysis on these, probably also using NVivo, for which Griffith has a site licence. Some agencies freely provide these documents on their websites, while other agencies have internal documents that are not readily available to the general public, which she may have to approach the organisations for directly.

Paul is one of four PhD students using this project as the means of completing their PhD. They have the same supervisor, who is the Primary Chief Investigator on the ARC Linkage Project that the PhD students are all part of. Paul will be working with samples of various kinds, which will undergo different treatments in the lab. Each student in the lab will be treating the same samples differently and they will need to be able to compare results with each other.

The scenarios also emphasised the frequency with which a single study adopted more than one method of data capture and analysis: a quantitative survey followed up with qualitative interviews; content analysis of documentation supplemented with interviews with industry representative; or measurements from clinical tests combined with data from patient questionnaires:

Lachlan will end up with hundreds, if not thousands, of images of archival documents, programs, posters, and photographs. He also plans to interview present and past performers, administrators and Board members of a number of musical theatre companies, and to document a number of performances using a digital video camera.

At both Monash and Griffith, the scenarios included details about the PhD candidates' motivations and specific goals around dissemination of their research:

Louise is a new PhD student in the Institute of Health. Her topic relates to policy interventions to prevent the outbreak of infectious diseases like bird flu. She is interested in this topic because of her work as a policy analyst with Queensland Health and her background in volunteering in developing countries. She sees completing the PhD as a good way to further her policy career as well as her interests in social development.

When he finishes, Paul thinks he will seek a post-doc in another institution, and try to further his work using the data that he has derived during his PhD, perhaps applying his findings to another area of manufacturing.

Lachlan is an aspiring writer and would eventually like to publish a social and pictorial history of musical theatre for a general, rather than academic, audience. If he cannot find a publisher prepared to publish this as a book, he might try to get the information out via a website or via his blog, which he also plans to use to promote the project while he is doing it. He has also been approached by the ABC to produce a radio documentary, and plans to use snippets from his interviews as part of this 1-hour show. He thinks the interviews might constitute an interesting oral history collection in their own right and wonders whether the National Library or State Library of Queensland or some other institution may be interested in having these at the end of the project.

The scenarios also included the following hint: "You may want to start your discussion by thinking about what the student wants to do with their research at the end of the project and working your way back from there." This approach flipped the more common approach to training around a lifecycle, which lends itself to a chronological approach. Starting at the end and working back enabled the librarians to see the data management issues implicit in the scenarios as barriers to the students' achievements of their career goals and to the ongoing impact of their research rather than as purely technical or information management problems.

Creating authentic scenarios also meant that some aspects of data management that are important to librarians (e.g. metadata standards) were not included, because they would be unlikely to be raised by researchers themselves as part of the 'story' of their

research.

3.4 Embracing ambiguity

Building a greater tolerance for ambiguity would almost certainly help librarians with research data management, which has been described as an arena where simple solutions are not available; rather, it is a "wicked problem" and "social mess" where everyone has a different perspective, "all sorts of political, cultural and economic constraints" are in place, and there are many ways to intervene and an unclear understanding of the effect of our actions (Cox, 2014). SBL practitioners argue that complex scenarios discourage students from thinking that there are "correct" answers to problems that are changing all the time and encourage them to focus on the journey rather than the destination. Most professionals, they argue, need to be tolerant of ambiguity and able to respond more flexibly to changing circumstances.

However SBL practitioners also note that while incompleteness can be motivating for some students, ambiguity makes others extremely uncomfortable: "this shift to self-directed learning can be difficult: our students still occasionally ask for more lectures and didactic sessions, and for clear answers rather than guidance on how to find out for themselves" (Henderson, 2010, 74).

Both at Monash and at Griffith, groups of library staff asked whether 'the answers' would be provided. At Griffith a second set of the scenarios was provided with some commentary after the workshop was completed; this commentary focused on linking parts of the scenarios with relevant sections from the University's research data management guidelines.

At the time of the workshops, I interpreted this reaction as indicating that the participating librarians did not quite trust their own judgments and needed someone they saw as an 'expert' to let them know whether they were 'right' or 'wrong'. This was disappointing, as the request seemed to go against the good work that had been done by participants in unpicking complex situations during the activity. A different perspective may be that "feedback on your solution, your problem-solving process, and your rationale makes all the difference between an effective and an ineffective learning experience" (Clark and Mayer, 2012, 103). Decisions can be consciously made about when and how often to provide feedback and what to focus on. At an introductory level, providing generalised feedback after the session (not during) that tied the problem solving process to a critical institutional document (rather than assessing particular groups' responses as more or less 'correct') was probably appropriate.

4 Conclusion and future directions

Librarians want professional development opportunities that explicitly address their changing roles in support of research data management and that provide them with the information and tools they need to take action. Feedback from participants in the Immersive Informatics pilot at the University of Melbourne suggested that "the emphasis on theory detracted from the (more valuable) practical examples and case studies... The value of a broad overview of content was acknowledged but it was at the institution level of example and practice where most participants gained value from the course" (Shadbolt *et al.*, 2014, 320). At Griffith University, when asked to identify their primary goal for the introductory workshops, half of the attendees wanted to know what research data management meant for them as individuals in changing roles (Searle, 2014).

Understanding data lifecycles, funding agency requirements and changes in the global scholarly communication ecosystem is important for librarians; however, that knowledge must be supplemented with preparation for one or more discrete workplace tasks that individuals are expected to take on and that should make a demonstrable difference to research practices in their institutions. Scenario-based learning can offer librarians an opportunity to build individual and team understandings of research data management, and to develop empathy for researchers through a focus on what really motivates them (as opposed to what a funder or institution requires of them). In a real-life situation, the librarian is likely to be alone, to be in the researcher's workspace (which may be unfamiliar) and to be bombarded with information that can be unstructured, incomplete, and full of new terminology and concepts. By contrast, a scenario can be designed to highlight some aspects while minimising others, and can enable library staff to explore a complex set of challenges with colleagues in a 'safe' space.

There is a great deal of further work that could be done in this space. Compared to the sophisticated strategies advocated in the literature, the scenarios described in this paper are very simplistic. There is room to develop the problem-based approach further to encompass more reflection and discussion about actions librarians could take to assist researchers with the problems that were identified. To address the discomfort many librarians feel about not having all the answers at the time of an interview, it could be useful to develop more in-depth scenarios that encourage them to think about post-interview strategies like making referrals to other areas (e.g. ethics advisors, storage specialists), checking relevant university policies or undertaking further investigation (e.g. to find out about a journal policy or locate a suitable discipline repository). Developing a scenario of this kind would require greater effort to identify the skills that an expert practitioner would use to work through these events and the main steps she/he would take (Naidu, 2010, 45). As noted above, there is also further scope to consider issues-based and speculative-based approaches as an alternative or supplement to the kind of scenarios used at Monash and Griffith.

Partnering with learning specialists would ensure best practice in educational design. Despite the many benefits described here, scenario-based learning will not always be appropriate, and should be adopted thoughtfully, in the context of the learning styles of participants and explicit learning objectives. A more formal approach to educational design would also include a greater component of evaluation. Clark and Mayer (2012) describe five different categories by which scenario-based e-learning could be evaluated: motivation; learning effectiveness; learning efficiency; transfer to the workplace, and return on investment (121). The scenarios described here engaged attendees at the time of the workshops, and a survey of participants remains a valid way to measure this type of engagement: "In some cases, motivation – that is, the satisfaction of your learners – is sufficient to support instructional product decisions. Some managers may feel that, if the learners see value in the training, that's sufficient

justification" (123). However, it does not necessarily follow that any significant changes in practice occurred afterwards that would demonstrate transfer to the workplace, which is likely to be the most important of the above categories for libraries attempting to develop research data management services. More work on pre- and post-session self-assessments would be useful, not least because librarians would be able to track the development of their skills over time.

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