# Developing Researcher Skills in Research Data Management: Training for the future - a DataPool project report

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## Introduction

There has been considerable work done in recent years on identifying the skills and attributes required by the researcher, much of which has been encapsulated in the *Vitae Researcher Development Framework* (Vitae, 2010) and the subsequent *Information literacy lens on the Vitae Researcher* Framework (Vitae,2012). Many of the principles identified apply equally in the area of researcher’s data management skills. With the increasing emphasis on data as an output of research, and on releasing the full potential of the information that it contains, the importance of ensuring that researcher’s gain the relevant awareness, attributes and skills has also increased. At the University of Southampton, under the auspices of the JISC DataPool project, work has been undertaken to improve these skills in a variety of ways. This report will look into these.

Training for researchers was not developed in isolation. A review of existing resources and teaching materials, including Edinburgh University’s MANTRA and Digital Curation Centre (DCC) outputs, was done and influenced the topics covered. Work also included looking at the *Information Literacy Lens* (Vitae, 2012) shortly after its publication and seeing how it might be translated for data. This scoping work underpinned the development of staff training (Byatt, 2013a) but also informed researcher training.

Another essential element was the worked carried out by Mark Scott and others (2012) on his *Introducing Research Data* guide. This work developed as part of the University engagement and strategy facilitated by the Professional Development Unit (PDU) and linked in particular to the Researcher Development & Graduate Centre (RDGC) aims to:

* enhance the research-centred learning and personal development of postgraduate students, through promotion of shared opportunities for learning and generic skills training, to meet current needs and prepare for future careers;
* foster best practice and to provide a focus for dissemination, debate and engagement in local, national and international developments in postgraduate research (RDGC, 2013)

The aim of the guide was to provide an introduction for new researchers to research data, its forms and its management, and to put these into a multidisciplinary context. In his work to develop the case studies, Mark Scott engaged with both researchers and students, with his interviews becoming a mechanism to raise awareness of the issues as well as that of information gathering. The guide is viewed as an iterative document and further case studies will be added to broaden the multidisciplinary benefits. This work has been documented previously in our poster (Hitchcock and others, 2012) presented at the JISC Progress event in Nottingham and Scott’s (2013a) presentation given at the International Digital Curation Conference (IDCC) in Amsterdam in January 2013 and subsequent paper (Scott, 2013b). Feedback from the initial use of the guide for training has helped inform the development of an overarching model for training across the institution.

The following diagram (fig.1) illustrates the approach taken to engage with the various groups involved with research data management from the new postgraduate researcher to the experienced principal investigator. It shows where the events would sit, the type of events offered, who the intended audience is and who would present the material.

**Fig. 1 Three-tiered Training Model**

One of the key elements of this is co-delivery. Although it would be possible to offer these events facilitated by one group or another, there are benefits in co-delivery. This facilitates wider discussion and a better understanding not just of the principles but also of real practice. In the following sections the implementation of these training events is discussed.

## Engaging with the Institution-wide Postgraduate Researcher Training Programme (PGR and Early Career Researchers)

### Researcher Development & Graduate Centre (RDGC)

In the University of Southampton the training of postgraduate (PGR) and early career researchers (ECR) is co-ordinated through the Researcher Development & Graduate Centre (RDGC, 2013) part of the Professional Development Unit (PDU). This enables the researcher to identify areas where they might lack expertise that they require to develop and find suitable training in the one place. The basic level training session, “An introduction to managing your research data”, will sit within this framework. The pilot course took the form of a 90 minute workshop, co-presented by a researcher and a member of library staff and was open to researchers from any discipline at any stage. Those who attended came from disciplines areas such as Geography, Computing, Management, Engineering and Social Sciences. It covered the principles behind the need for good data management mentioning research integrity, Funder and Research Councils requirements and Research Council UK (RCUK) and University policy, presented by the library. This was followed by a section on types and formats for data, presented by Mark Scott, and based on his previous work. The final section looked briefly at options for longer term deposit, including the use of ePrints data app developed by the University of Essex and adapted for use for the University of Southampton (Hitchcock, 2013). All sections allowed for discussion, although this mostly took place in the latter two sections.

The advantage of a session open to any discipline was the opportunity for those with some experience to share this so that good practice might be transferred from one discipline to another. An example of this was hearing about data originally collected in the 1980’s on a BBC micro being saved in ASCII text, transferred as formats changed so that it was still usable and able to be incorporated into a current PhD. It also provides an opportunity to discuss problems encountered and possible solutions. This certainly took place in the pilot session when approaches to safe back-up were raised. The feedback for this session was fairly positive (see appendix 2), but in the qualitative comments there was a recommendation that the session was more practical. Although it had been promoted as an introduction it was helpful to receive this and we will consider changing the balance in future. We would also consider offering more focussed training on specific aspects of data management while continuing to provide this basic session as part of the postgraduate courses offer.

### Faculty

We have also investigated the use of more discipline based workshop sessions and we arranged to work with the Faculty of Humanities on the first Faculty session of this type. Mark Scott’s original work was piloted at events in the Faculty of Engineering in booklet plus lecture format embedded in their postgraduate sessions. In Scott’s IDCC paper (2013b), feedback supports the value of providing a session in this format in an engineering-based environment and might also work in other areas where there is a similar approach to good research data management practice. However, for some disciplines a longer introduction may be more beneficial, particularly where there is a wide diversity in the type of data collected. As a result it was thought more appropriate to offer a 2 hour workshop for Humanities. This was led by a researcher, Gareth Beale who had been involved with the DataPool project (see imaging case study, Beale and Pagi, 2013) and supported by a member of library staff. The participants came from a variety of disciplines within the Humanities, ranging from Modern Languages to Archaeology.

The starting point was to find out what kinds of data, if any, the participants were dealing with. This was important with subjects where traditionally there has been a view that suggested many researchers didn’t consider that they had data. The Arts and Humanities Research Council (AHRC) acknowledge that this might be the case for some by only requiring a Technical Summary and Plan for research

“… where digital outputs or digital technologies are an essential part to the planned research outcomes” (AHRC, 2012)

This implies that they may fund projects where digital outputs are not an essential part of the outcomes. However the University policy does not only cover digital data and funders may still require non-digital research data managed appropriately.

Although the workshop still covered the basic issues of what is data management, principles and benefits, these were placed within the subject context focussing on the types and forms of data relevant to the group. Using the illustration of the Domesday Project, from the mid 1980’s, this demonstrated very effectively how important format selection can be and the cost for future researchers in re-using the data. In this particular session it was able to draw in all participants and facilitated extremely helpful discussion. The final section looked at the requirements to deposit data to comply with funder and university policies as appropriate. Advice on options for deposit including ePrints Soton concluded the formal part of the session, with the remainder of the time given over to a data clinic. The data clinic was an opportunity to ask for advice on specific areas of data management relating directly to the researchers’ work, perhaps as a result of the topics covered in the workshop. An example of this was a request for a way to add the same project metadata to a large number of MP3 files as a single operation. Co-delivery (researcher/professional services) is particularly beneficial helping to address a wider range of topics.

This format facilitated good participation by those attending. It offered opportunity for everyone to hear about different types of data from those using and creating it. The formats ranged from standard print surveys, through audio files to imaging data so each session would be very different. However the value of facilitating discussion of this nature is important and beneficial. In future it might benefit from the inclusion of someone with IT background as part of the presenting team so that specific questions could be addressed more immediately, especially in the clinic section, but issues raised can be followed up after the event. The content was introductory and there is opportunity for some further discipline specific training in the future directly related to work being carried out by the researcher. This might be best facilitated by the discipline or local Doctoral Training Centre and draw in expertise from the academic community. There was also a recommendation by one participant that this should be introduced at masters’ level in a basic form.

### Doctoral Training Centre

A third approach to engage PhDs and ECRs was to offer a seminar to a Doctoral Training Centre (DTC). The aim was to showcase the type of information being provided elsewhere as a means of enabling a more in-depth discussion around issues associated with the sharing of data. An event was held with the Web Science DTC at a point that coincided with the release of the first test version of the ePrints data app. Although postponed due to bad weather the re-arranged seminar still proved to be a successful event with good engagement by those attending. Valuable discussion took place concerning the ePrints Soton data developments including whether data should be deposited with a thesis or as a separate record, University research data management policy requirements particularly in relation to IPR and data, suggestion of additional formats suitable for longer-term preservation and the developments in infrastructure in the University as a result of the DataPool project. Those who attended had a wide range of prior experience in data management and this did influence the discussions as some found the session too basic while others found it beneficial. This is a difficult balance for any such session and in future it will be important to be clear that the seminar is a more discursive, knowledge sharing than information giving event.

This type of session will be run in the future with other DTCs. Further sessions will also be offered to the Web Science DTC with different emphases, both theoretical and practical. The selection of the Web Science DTC for this first RDM seminar arose out of the breadth of research area covered and the strong connection to ePrints and open access. These assumptions and the level of relevant IT knowledge might not be replicated in other DTCs and content will need to be adjusted.

## Engaging with the Early Career Researcher and Principal Investigators

In July 2012 the University of Southampton Research Data Management Policy was released on the University calendar along with related guidance web pages, housed on the library website, and a desk side support service (Byatt, 2013b) established. The aim of ResearchData@Soton service is to provide assistance to researchers in the process of preparing bids that require a data management or data sharing plan, or any other help with research data, by providing a focal point while using a network of services to respond. Responses would be provided through email, phone or meeting and involve Research Innovation Services, iSolutions, Library, Legal Services, Finance as appropriate. As a direct result of the requests that arose and the network of staff who responded through the ResearchData@Soton service an opportunity was provided to organise specific data management planning training sessions focussed around particular funders. Through Sandy Mackinnon, Business Relationship Manager, iSolutions, it was possible to target an appropriate audience using an existing network. Although there had always been the plan to provide this type of training, finding the mechanism to do so in a disparate institution is not always straight forward. Two sessions were planned and delivered, the first to Medicine and the second to Health Sciences. Due to the numbers involved a further session has already been planned.

The first session, delivered to the Faculty of Medicine, had attendees ranging from Post Doctoral Researcher to Senior Lecturer. It was held as a one hour lunchtime event entitled “Research Data Management: Managing your research data for the future”. With the range of staff who attended it was important to cover the basic principles as well as more funder specific information. From our early experience of support for MRC proposals, through the ResearchData@Soton service, there was evidence that even researchers with some experience did not identify with some of the terminology used in the data management environment or were not aware of the impact that some of their choices might have. By using two recent examples, Crowe (2013) *The case of the missing data* and European Biotechnologist (2013) *Why your PI told you NEVER to throw away old data* it was simple to demonstrate the value of making choices that increases the visibility and discoverability of data. These examples demonstrated the need to incorporate clear references to data in documents, the cost and effort required to extract data from obsolete formats, and that you may not know when your data might become crucial in the future. This was followed by information about the local IT infrastructure and support available before some time was spent on looking at the Medical Research Council Data Management Plan template.

In this first iteration the balance was not quite right, with the information about formats and capturing metadata not presented directly in the context of the requirements listed on the Medical Research Council template. Some had expected the time to be spent working through how to complete an MRC Data Management Plan and were less interested in the reasons behind the requirement. The pressure on time for all involved means that in future it will be better to clearly badge an event either as a briefing, where the focus is more general, covering principles including good research practice, academic integrity and future re-use, or as a workshop, with a more practical element, and market the sessions appropriately. However the feedback for the event (see appendix 2B) still demonstrated that it met the expectations of the majority and was a valuable introduction to research data management.

The second session took place the following week and was for an audience from the Faculty of Health Sciences. This Faculty draws its funding from a range of funders some of whom do not have specific requirements for data management outlined in their proposals, but still require the research they fund to have longer term impact and for this to be demonstrated in the bid. They may have requirements for communicating or sharing the results, including data. In order to do this the research data needs to be managed and creation of a data management plan, even if not included with the proposal, is a helpful and valuable tool. With this in mind this presentation was more general, but as the MRC template covers the key elements of a data management plan it remained the main example. However learning from the Faculty of Medicine all sections were directly related to inclusion in a Data Management Plan.

The evaluation of this session did show an improvement in the overall scores. Comments seemed to confirm that there was a need to include the basic concepts, and data management landscape. Interestingly this was the first session where the issue of print based research data management was raised. This was valuable in emphasising that research data management, in general, and the University policy is not only about digital format but also covers the traditional forms. Significant emphasis has been given to the digital due to the additional issues that need to be addressed, but it will be important to retain the skills and expertise in preserving non-digital where this is necessary. This also allowed for a discussion that helped to place research data management in its wider context, in particular making links to ethics approval and appraisal for retention or destruction. While all funders recognise the need for compliance with, and the importance of, Data Protection and confidentiality, it is important that the ethics approval processes enable data sharing whenever this is possible.

## Conclusions and further developments

By the end of the project the full three tier training model (Fig.1) outlined in the introduction will have been delivered, tested and embedded across a range of disciplines and target groups via RDGC, Faculty and DTC training events with plans for a full rollout in the near future. The feedback from these sessions will inform the iterative development of further training that will continue to involve partnerships between PhD researchers, academic staff and Professional Services staff from the Library, iSolutions, Research and Innovation Services, and other relevant groups. The core resource “Introducing Research Data” guide will continue to be developed and new material added in this evolving process.

There are advantages in taking this multi-level approach. It provides opportunities for different groups to be targeted but also facilitates their attending joint events. There is value in encouraging cross and multi-disciplinary exchange of good ideas. This was demonstrated in the discoveries identified in the report by Beale and Pagi (2013) on imaging. However it can make is slightly more difficult to meet the needs of all who attend so it is important to be clear about the focus of the event, its content and the expected audience in advance.

The entry level for researchers needs to link to the Researcher Development Framework to ensure that these skills become embedded in the researcher attributes. Over time we may be able to assume a greater level of prior knowledge, but currently it is best to assume minimal prior knowledge and adapt when the participants demonstrate high levels of expertise. In generic sessions it may be more important to provide time for discussion on the different aspects of data management in order for the benefits to be demonstrated, practices to be changed and misconceptions addressed.

Faculty based sessions have the advantage that they can be more bespoke and deal specifically with particular types of data, highlight discipline specific best practice and guidance on appropriate funder requirements. However, even in areas where it might seem obvious who might be the main funder, any training session needs to be flexible enough to cover the unexpected and being able to respond to this is one of the advantages of co-delivery.

The structure of a Doctoral Training Centre is such that it can draw in a range of experience. Opportunities to develop approaches to data management can be broached in the seminar environment and offer opportunities to explore these in more depth. The Doctoral Training Centre sessions are an important avenue that enables the promotion of good practice while facilitating review and discussion on the core principles such as what level of metadata is required to meet different audiences.

Co-delivery of the researcher training has been important. Where the sessions are aimed at postgraduate or early career researchers it has been invaluable to work with an active researcher. Further developments in this area will need to draw on similar expertise to maintain a researcher-led approach, perhaps through the funding of “data champions” to ensure that theory and practice remain closely linked. Sessions for those with more experience and an interest in writing proposals co-delivery with an expert in a related area such as IT has also been beneficial. This adds weight to the guidance and information provided as well as facilitating networking and knowledge transfer. Future work will benefit from the links established through this project and will be further developed as training responding to the results of the Professional Services training needs analysis (Byatt, 2013a) is rolled out.

All the sessions so far have led to an improved understanding of the data management landscape. Examples of good practices have been discovered and shared, while issues over commonly used services have been raised. Some misconceptions have been addressed, for example, why it might not be correct to consider Dropbox as a safe back-up location or why storage on a personal University area might not be as long-term as storing it on the University research drive.

The Institutional Data Management Blueprint (IDMB) 10 year roadmap that in the medium term (3-6 years) one of the core components was

“Embedding data management training and support across the disciplines through partnership working between services and researchers.” (Brown et al, 2011, p.7)

The work carried out by the DataPool project has gone a long way to meeting this recommendation. Further developments, including the full rollout of the three-tiered training model (fig. 1) to RDGC, all Faculties and DTCs, are still required in training to enable researchers to benefit not just from the work within the institution but also those going on elsewhere within the higher education environment. The skills and expertise need to be embedded earlier in the researchers’ career to encourage good habits. There were recommendations from some who attended sessions that it was relevant at masters’ level, and possibly also for final year undergraduate students. From October a new MSc Instrumental Analytical Chemistry will embed data management into one of the modules, using the guide (Scott, 2012) as the basis and is one example of how these ideas will be taken forward through various avenues within the University. Greater understanding of how metadata and data can be linked together, the appraisal of data for preservation and the implications of depositing data in a repository are all areas that will be developed having been established as integral to the institution’s offer to all researchers.

In conclusion, the IDMB recommended approach of bottom-up/top-down has enabled training to be embedded within the University structure. The multi-level approach has facilitated opportunities for cross- and multidisciplinary sharing of ideas and will continue to be a valuable means of providing research data training. Co-delivery has been an essential element in the success of events offered and it will be important that this model is maintained for the future. Key to the engagement with the researchers at any event requires the focus of the event to be clear in advance and the value in co-delivery is that it can facilitate the unexpected ensuring that each session is successful.

# Appendices

## Selected Training Evaluations

The following evaluations are a selected sample of events that have been offered to researchers during the DataPool project and relate some of the sessions referred to in the main report.

### Gradbook Training event - Research Data Management: An introduction to managing your research data

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| --- | --- |
| **Course:** | An Introduction to managing your research data |
| **Forms Returned** | 6 |  |  |
| **Number attended** | 8 |  |  |
| **Presenter** | Dorothy Byatt; Mark Scott |
| The presentation and facilitation skills of the event leader(s) | **[Score]** | 4.2 |   |
| Overall rating of the event | **[Score]** | 4.2 |  |
| The administrative arrangements prior to the event | **[Score]** | 3.8 |  |
| The content of the event was as advertised | **[Score]** | 4.3 |  |
| The event addressed my needs | **[Score]** | 4.2 |  |
| Would you recommend this event to a colleague/fellow student? | **Yes** | 66.7% |  |
|   | **Maybe** | 33.3% |  |
|   | **No** | 0.0% |  |
| [**Score** 1= Very Unlikely / Very Poor; 5 = Very Likely / Very Good] |
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### Faculty of Medicine – Managing your research data of the future

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| **Course:** | Managing your research data for the future |
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| **Forms Returned** | 22 |  |  |
| Number attended  | 24 |  |  |
| **Presenter** | D. Byatt; S. Mackinnon |
|  |  |  |   |
| The presentation and facilitation skills of the event leader(s) | **[Score]** | 3.8 |
| Overall rating of the event | **[Score]** | 3.6 |
| The administrative arrangements prior to the event | **[Score]** | 3.9 |
| The content of the event was as advertised | **[Score]** | 4.0 |
| The event addressed my needs | **[Score]** | 3.6 |
| Would you recommend this event to a colleague/fellow student? | **Yes** | 54.5% |
|   | **Maybe** | 40.9% |
|   | **No** | 4.5% |
| [**Score** 1= Very Unlikely / Very Poor; 5 = Very Likely / Very Good] |
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### Faculty of Health Sciences – Managing your research data for the future

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| **Course:** | Managing your research data for the future |
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| **Forms Returned** | 8 |  |  |  |
| Number attended  | 10 |  |  |  |
| **Presenter** | D. Byatt; S. Mackinnon |  |
|  |  |  |  |  |
| The presentation and facilitation skills of the event leader(s) | **[Score]** | 3.9 |   |  |
| Overall rating of the event | **[Score]** | 4.1 |  |  |
| The administrative arrangements prior to the event | **[Score]** | 4.3 |  |  |
| The content of the event was as advertised | **[Score]** | 4.6 |  |  |
| The event addressed my needs | **[Score]** | 4.5 |  |  |
| Would you recommend this event to a colleague/fellow student? | **Yes** | 75.0% |  |  |
|   | **Maybe** | 25.0% |  |  |
|   | **No** | 0.0% |  |  |
| [**Score** 1= Very Unlikely / Very Poor; 5 = Very Likely / Very Good] |
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### Faculty of Humanities – Data Management for the Humanities

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| **Course:** | Data Management for the Humanities |
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| **Forms Returned** | 4 |  |  |  |
| Number attended  | 10 |  |  |  |
| **Presenter** | G. Beale; D. Byatt |  |
|  |  |  |  |  |
| The presentation and facilitation skills of the event leader(s) | **[Score]** | 5.0 |   |  |
| Overall rating of the event | **[Score]** | 4.8 |  |  |
| The administrative arrangements prior to the event | **[Score]** | 4.8 |  |  |
| The content of the event was as advertised | **[Score]** | 4.8 |  |  |
| The event addressed my needs | **[Score]** | 4.8 |  |  |
| Would you recommend this event to a colleague/fellow student? | **Yes** | 100.0% |  |  |
|   | **Maybe** | 0.0% |  |  |
|   | **No** | 0.0% |  |  |
| [**Score** 1= Very Unlikely / Very Poor; 5 = Very Likely / Very Good] |
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