

Selection & Appraisal: A Discussion Paper

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1. Introduction

There has been much discussion in academic journals and the news media about the coming 'data deluge'. In fact, the data deluge is already with us, according to IDC, a global ICT intelligence provider, who forecast that in 2011 the amount of digital data in the world will be 10 times the 2006 amount [1]. Considering the sheer quantities involved (281 exabytes in 2008), it is most unlikely that curators will be able to preserve all the data being created and will have to make decisions about which data is worthy of long-term curation. Research data creators and curators will have to understand and apply selection criteria in order to manage the vast quantities of data created now and in the future.

This paper aims to provide an introductory discussion about archival approaches to appraisal (selection), and to raise the possible application of such approaches to selecting research data for long-term retention. Archivists have been dealing with the issues involved with curation of digital resources for many years and much of the archival literature about digital records is highly relevant to digital resources more generally.

This paper begins with a brief overview of archival appraisal as it has developed over the last century, followed by an introductory discussion about why selection is necessary. The final part of the paper looks at issues of selection/appraisal of research data and concludes with some initial recommendations for activities ANDS could undertake to progress the resolution of the issues raised in the paper.



2. What is Appraisal?

“Appraisal is the noblest function, the central core of contemporary archival practice.” [2]

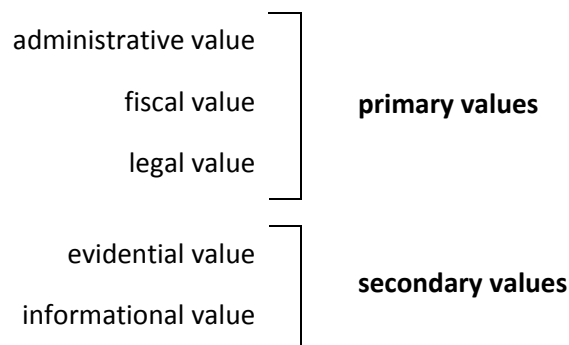
Appraisal is perhaps the most contentious, and certainly one of the most difficult, of the professional undertakings of the archivist. It is the activity that determines forever what records will be preserved for posterity. In a very real way, archivists, certainly those working in jurisdictional archives, shape national narratives about the past.

The Australian Records Management Standard, AS 4390, defined appraisal as the process of evaluating records to determine which are to be retained as archives, which are to be kept for specified periods, and which will be destroyed.[3] The UK National Archives (TNA) defines appraisal as: “the process of distinguishing records of continuing value from those of no further value so that the latter may be eliminated”[4] The similarities are obvious, and the intent is clear: appraisal is the process whereby some records are selected for ongoing retention, and other records (the great majority) are deemed not of sufficient value to justify permanent retention. Thus, appraisal, as a process, involves the assessment of records to determine their ongoing value.

What archivists call ‘**appraisal**’ is often referred to outside the archival profession as ‘**selection**’ or ‘**acquisition**’, and is often closely linked to institutions’ policies on collection development. Appraisal has only been added to the functional repertoire of archivists in the twentieth century. Before then, the archivist’s role was traditionally just to accept and care for whatever records of the administration had survived.[5] In the twentieth century, however, with the proliferation of records and the development of multiple technological processes for copying, more and more paper records lasted in organisations beyond their original administrative purpose. This gave rise to the need for archivists to make decisions about which records should be kept and become part of the archives’ collections, and the consequent development of theories of and policies for appraisal.

3. Traditional Archival Appraisal

Because appraisal is a recent addition to the archivists’ role, it has, until recently, been hampered by a dearth of theoretical writing. Consequently, approaches to appraisal that developed over the 20th century were based on the practical experience of institutional archivists working with paper records. Despite some terminological differences across jurisdictions, there was widespread consensus in the archival community about the criteria to be used to appraise and select (paper) records. These criteria were first fully enunciated by US archivist TR Schellenberg (who visited Australia in 1954), in his classic monograph on modern archives.[6] Schellenberg made clear his views about the two types of values to be assessed when appraising records: primary value, or the value of the records to their creator; and secondary value, the value of records to wider society after their business use has finished. These two types of value were determined by assessing records according to 5 criteria [7]:





To these standard criteria is often added an additional one that considers the intrinsic value of records, ie. do they have ongoing significance as cultural artefacts/objects in their own right?

In practice, the value assessments (appraisal decisions) are made by articulating a set of criteria that make explicit the value propositions. So, for example, most of the archival institutions in Australia use the following appraisal criteria (with very minor variations) for assessing records of their jurisdictions [8]:

1. evidence of the source of authority, foundation and machinery of the government and its institutions.
2. evidence of the deliberations, decisions and actions of the government and its institutions relating to key functions and programs and significant issues faced in governing.
3. information that is considered essential for the protection and future well-being of citizens and their environment.
4. records that have substantial capacity to enrich knowledge and understanding of aspects of history, society, culture and people.
5. records that have a special capacity to illustrate the condition and status of the jurisdiction and its people, the impact of government activities on them, and the interaction of people with the government.

Traditional appraisal approaches occupied the archival profession for most of its existence, up until the increasing proliferation of computer systems and software applications in the 1980s and 1990s led to a need to evolve appraisal thinking to deal with the ever increasing number of digital records.

4. Digital Records Appraisal

Although the traditional appraisal criteria are clearly relevant for formal archives programs (jurisdictional and institutional) assessing the paper records of organisations (private and public), it is not at all certain that they can be applied unmodified to digital records. Within the archival community through the 1990s, there was a growing realisation that the approach to appraisal, generally implemented once a record ceased to be of day-to-day business use, do not readily translate to the digital domain.

There are a number of reasons for this, not least the changing appreciation of how records are used, that gave rise to the 'recordkeeping continuum' view of records and information developed at Monash University [9]. As well, it was recognised that decisions about value and hence about preservation, need to be made as early in the life of digital records as possible, to ensure they survive long enough to be taken into a repository in a preservable form. By their very nature, digital records are completely dependent on technology and this imposes very different requirements when it comes to considering the value of such materials. A final issue that pushed archives institutions to consider and adopt different models for approaching appraisal is the sheer proliferation of information and the enormous quantities of digital records that are created and kept by people and organisations. In such a world it is simply impossible to assess archival value at the level of records or even higher-level aggregations of records.

One of the outcome of these dialogues in the archival community was the development of what is called the 'macro-appraisal' model. This model is often defined as a "planned, strategic, holistic, systematic and comparative approach to researching and identifying society's need for records".[10] In practice, it focuses on appraising the context in which a record is created using a top-down perspective and is often referred to as 'functional appraisal'. [11] The approach has been widely adopted by archives



institutions across all Australian jurisdictions as well as in many non-Australian jurisdictional archives. In practice, the criteria set out in section 2 above are still applied, but they are used to assess the value of a government business activity rather than the records which are the evidence of that business activity.[12] But methodologies based on a top-down functional appraisal have become the norm in government archives in Australia.

An inadequacy of this functional approach as implemented in Australia is that it privileges the specific business needs and records management practices of individual government agencies. It does not take account of wider societal needs for adequate documentation of the functions of government as a whole. Nationally, the National Archives of Australia (NAA) has to date not developed any strategic view of how the broader context of Commonwealth Government functions should be documented. A project to develop a macro-appraisal approach was initiated by NAA in 2003-4 but, although it was intended to be implemented to 2005 the project outcomes have not yet been realised. The promise of macro-appraisal remains unfulfilled in Australia as yet.

Macro-appraisal, as an archival approach to appraisal, offers some hope that increasing volumes of digital records can be appraised more efficiently and economically. However, it is unclear that such approaches are relevant to other communities deliberating about how to select digital objects for long-term retention. It is not obvious, for example, how a macro approach would function in the realm of research data without privileging particular research activities over others. More investigation of the validity of such an approach to research activity is necessary.

5. Why is Selection Necessary?

Outside the archives and library communities there is not yet a widespread recognition of the fact that selection is necessary, and that not everything can be kept forever. It may be possible (technologically) to keep all digital data always, although even that ubiquitous assumption must be considered suspect [13], so it is reasonable to ask 'why don't we just decide to keep everything'. However, despite the prevalence of the view that 'storage is cheap so why not keep it all', there are other problems that are not accounted for by such a simplistic notion.

Consider that "if the growth of content (per byte or per object) keeps pace with this declining cost [of storage], then the real cost of keeping everything may actually be the same as it is now, or higher" [14]. Secondly, no digital preservation approach can survive without appropriate mirroring and backup systems. This instantly increases the storage cost by at least a factor of two. Thirdly, keeping everything means that the noise to signal ratio of searches will be high, requiring additional individual effort to ascertain which data is the intended target of a search. Finally, we must consider the cost of creating and managing preservation metadata, and the cost of preservation actions on data that does not need to be retained. Does the cost of selection outweigh the combined cost of creating and managing metadata, and undertaking preservation actions? Although no-one really knows the answer to this question there is some evidence that the answer is no, given the extremely large volumes involved and the absolute necessity to keep adequate metadata to ensure the data is findable, understandable and useable over time.

Beyond all this is the inescapable fact that long-term retention of data requires a commitment to incur continuous costs in the future; this necessarily imposes on any community a requirement for careful analysis and selection of what should be retained.

In the archives world, the great proportion of records are not retained but destroyed at some point after they have ceased to be of immediate business use. In Australia, the National Archives has generally kept 7-8% of the total federal government output of records. Quantities in the US and Europe are much smaller, for example only some 4-5% of UK government records are kept. The point to note is



that only a very small number of the volumes of records created by government are deemed worthy of permanent retention.

6. Appraising/Selecting Research Data [15]

Some ideas about generic high-level criteria for selecting research data have appeared in the literature over the last decade and a half. A very early report, dating from 1995, is, *Preserving Scientific Data on our Physical Universe: A New Strategy for Archiving the Nation's Scientific Information Resources*, a publication of the US National Research Council.[16] This report proposes a set of high-level criteria for selection that could be applied to data from both “observational and laboratory sciences”. The proposed selection criteria consist of:

- **Uniqueness of data:** do other copies of the data exist somewhere else?
- **Accessibility - adequacy of documentation:** the data needs at a minimum sufficient metadata to enable another scientist in the discipline to understand and use it.
- **Accessibility – availability of hardware:** does the hardware necessary to access the data still exist? [Or is the data kept in a form that is machine independent?]
- **Cost of replacement:** is it possible to recreate the data, and if it is, how much would it cost and is that cost acceptable?
- **Peer review:** has the data undergone a formal peer review to assess its integrity and completeness, or has the data been used in publications in peer-reviewed journals? [17]

In 2002, Microsoft Research published a report, *Online Scientific Data Curation, Publication, and Archiving*, which stated that “once published scientific data should remain available forever so that other scientists can reproduce the results and do new science with the data”. [18] The report goes on to summarise a possible generic approach to selection of scientific data: “Ephemeral data must be preserved; stable data need not be preserved. Metadata is ephemeral”. [19]

In 2003 ERPANET [20] and CODATA [21] held a joint workshop on “Selection, appraisal, and retention of digital scientific data”. Representatives of a number of scientific disciplines as well as archivists and librarians discussed these issues over the course of a 3 day workshop, but the only conclusion reached was that there were noticeable differences in approach across all sectors and, although a generic approach was needed, there was still much work to be done to reach agreement. [22]

The practitioners guide published by the UK Digital Curation Centre (DCC), the *DCC Curation Reference Manual* [23], includes a chapter on “Appraisal and Selection” [24]. The author, Dr Ross Harvey, suggests that archival appraisal criteria “cannot be applied to data without modification” [p. 10]. He further argues that “sectoral differences should be further investigated and appraisal and selection strategies developed on this basis” [p. 11]. Nevertheless, Harvey acknowledges that “a generic framework to assist in making selection and appraisal decisions is helpful” [p. 17]. At the time of this article, Harvey was not able to point to any generic framework nor was he in a position to develop one for DCC.

An extensive search will uncover quite a number of discipline based selection/appraisal approaches – although it may be better to see these as institution based approaches rather than specific discipline focussed. For example, both the UK Data Archive (a social science data archive funded by the ESRC) and the Inter-University Consortium for Political and Social Research (based at the University of Michigan) have developed their own criteria for selecting data. These institution based approaches have not been explored further in this paper but could serve as models for further development of selection guidance for the Australian research community.



In Australia, the *Australian Code for the Responsible Conduct of Research* [25], published in 2007 by the National Health and Medical Research Council, the Australian Research Council, and Universities Australia, is a guide for institutions and researchers in responsible research practices and research integrity. One section of the Code [2.1] covers the retention of research data and 'primary materials'. The section asks research institutions to develop policy on the retention of 'materials and research data', with a complementary policy covering the disposal of research data and materials. Section 2.1 also sets out a general requirement to retain research data for a minimum of 5 years from date of publication, with some exceptions:

- short term research projects whose purpose is assessment need only be retained for 12 months;
- for clinical trials it may be necessary to retain the data for 15 years or more;
- gene therapy research data "must be retained permanently"; and
- "if the work has community or heritage value, research data should be kept permanently...preferably within a national collection".

This provides a useful starting point for Australian research institutions, but begs some questions. Why the non-binding view on data from clinical trials (and how was the period of 15 years arrived at)? Why is gene therapy privileged above all other research fields? How can researchers or institutions determine whether research has community or heritage value (and what exactly do those terms mean)?

NOTE: Most academic institutions in Australia are established under legislation of the relevant State or Territory. As such, academic institutions fall under the ambit of State and Territory Acts dealing with public records and/or archives unless specifically exempted. Records/Archives legislation of Australian states and territories deals with, among other things, selection (appraisal) of the records and the power to make decisions about the destruction or retention of records (including data) created and managed by bodies covered by the archives legislation. This decision making power of jurisdictional archives institutions is usually realised in the form of legislative instruments known as 'disposal schedules' or 'disposal authorities'. These instruments have the force of law and therefore override the Code where there is a difference in the retention requirements.

7. Role of ANDS

It is not clear if, or how archival concepts and approaches to appraisal and selection of records can be applied to selecting research data for ongoing retention. To properly analyse the range of archival approaches and their relevance or otherwise to research data of all kinds would require a longer research project and has not been attempted here.

However taking note of the archival experience it seems essential that the research community develop a high-level approach to selecting research data. This high-level approach must take into account the need to document the outputs of government-funded research activity in Australia (both within and without the bureaucracy) and the increasing societal focus on sharing and reuse of data.

As a starting point this paper offers the following recommendations:

1. **ANDS should convene workshops with researchers, institutions and funders to explore the issues around data retention;**
2. **ANDS should subsequently develop or fund the development of a comprehensive retention framework for research data in Australia;**
3. **ANDS should propose comprehensive changes to the relevant section of the *Australian Code for the Responsible Conduct of Research* so the next version specifies appropriate**



recommendations in regard to the retention and disposal of research data and primary materials.;

4. **ANDS should broker and support cross-disciplinary discussions with the aim of achieving international best practice in data selection across the Australian research community.**
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ENDNOTES

- 1 IDC, "The Diverse and Exploding Digital Universe: An Updated Forecast of Worldwide Information Growth Through 2011", *IDC White Paper*, EMC 2008, p. 3. At: <http://www.emc.com/collateral/analyst-reports/diverse-exploding-digital-universe.pdf>
- 2 C. Couture, "Archival Appraisal: A Status Report", *Archivaria* 59, 2005, p. 107.
- 3 Adapted from Standards Australia, *AS 4390-1996, Records Management, Part 1*, Clause 4.3. AS 4390 has been superseded by the International Standard on Records Management, ISO 15489-2002, which, unfortunately, does not define appraisal.
- 4 The National Archives, *Appraisal Policy*, August 2004, p. 3. At: http://www.nationalarchives.gov.uk/documents/appraisal_policy.pdf [last checked 19 February 2010].
- 5 Sue McKemmish, Barbara Reed, Michael Piggott, "The archives" in Sue McKemmish, Michael Piggott, Barbara Reed, Frank Upward (eds.), *Archives: Recordkeeping in Society*, Wagga Wagga, 2005, p. 174.
- 6 T. R. Schellenberg, *Modern Archives*, Chicago, University of Chicago Press, 1956.
- 7 Adapted from Ross Harvey's discussion in the *DCC Digital Curation Manual*, "Chapter 4: Instalment on Appraisal and Selection", p. 10. At: <http://www.dcc.ac.uk/resource/curation-manual/chapters/appraisal-and-selection/appraisal-and-selection.pdf> [last checked 16 February 2010].
- 8 These 5 criteria are mirrored with very few differences in the Commonwealth, South Australian, New South Wales, and Victorian appraisal policies. Intrinsic value is not a criteria used by government archives in Australia, except as a secondary consideration.
- 9 Sue McKemmish, "Yesterday, Today, and Tomorrow: A Continuum of Responsibility", *Proceedings of the Records Management Association of Australia 14th National Convention, 15-17 Sept 1997*, RMAA Perth 1997. At: <http://www.infotech.monash.edu.au/research/groups/rcrg/publications/recordscontinuum-smckp2.html>
- 10 Adrian Cunningham and Robyn Oswald, "Some Functions are More Equal than Others: The Development of a Macroappraisal Strategy for the National Archives of Australia", *Archival Science*, no. 5 2005, pp. 163–184.
- 11 *Archives: Recordkeeping in Society*, p. 179. Functional appraisal is not exactly an equivalent to 'macro-appraisal', since the latter implies overarching strategies for documenting functions in context, something absent from implemented functional appraisal approaches.
- 12 There is a good summary discussion of these developments in *Archives: Recordkeeping in Society*, pp. 178-181.
- 13 See "The Diverse and Exploding Digital Universe: An Updated Forecast of Worldwide Information Growth Through 2011", *IDC White Paper*, March 2008, which reports that the amount of digital data created in 2007 exceeded (for the first time) the amount of storage available (new and existing). IDC estimate that by 2011 half the digital information created will not be able to be stored (p. 2).
- 14 Paradigm Project: *Workbook on Digital Private Papers, Section 04: Appraising digital records: a worthwhile exercise?* At: <http://www.paradigm.ac.uk/workbook/appraisal/digital-appraisal.html> [last checked 17 February 2010]
- 15 This is not an exhaustive examination of the literature.



- 16 National Research Council, *Preserving Scientific Data on our Physical Universe: A New Strategy for Archiving the Nation's Scientific Information Resources*. Washington, D.C., National Academy Press 1995.
- 17 *Preserving Scientific Data on our Physical Universe*, p. 34.
- 18 Jim Gray et al., "Online Scientific Data Curation, Publication, and Archiving", *Microsoft Research Technical Report MSR-TR-2002-74*, July 2002. Available at: <http://research.microsoft.com/apps/pubs/default.aspx?id=64568>.
- 19 Jim Gray et al., p. 1. By ephemeral data, the authors mean data that cannot be reconstructed or reproduced. Specifically, this refers to data about events that are unique, or cannot be repeated for whatever reason, such as sunspot activity, rainfall, volcanic eruptions, oil price, etc. By stable data, the writers mean data derived from simulations, 'reductions of other data, and measurements of time-invariant phenomena'. The paper also discusses metadata, by which it means such things as emails, design documents, procedures and programs that enable the production of derived datasets. This is an eccentric view of metadata, certainly, but the point is nevertheless apt: data is not meaningful, and cannot be understood and used over time without some of the supporting information. The authors of this paper believe such information is ephemeral, and, because ephemeral, it must be preserved.
- 20 A European Commission funded activity, 2002-2004, to provide a clearing house and knowledge-base in the area of preservation of cultural heritage and scientific digital objects. See: <http://www.erpanet.org/>
- 21 The Committee on Data for Science and Technology of the International Council for Science, which works to improve the quality, reliability, management and accessibility of data of importance to all fields of science and technology. See: <http://www.codata.org/>.
- 22 ErpaNET/CODATA, The Selection, "Appraisal and Retention of Digital Scientific Data: Final Report", *ErpaNET/CODATA Workshop*, Lisbon 15-17 December 2003, p. 26. At: <http://www.erpanet.org/events/2003/lisbon/LisbonReportFinal.pdf> [last checked 25 February 2010]
- 23 Formerly the DCC Digital Curation Manual: <http://www.dcc.ac.uk/resources/curation-reference-manual>.
- 24 See <http://www.dcc.ac.uk/resources/curation-reference-manual/completed-chapters/appraisal-and-selection> (January 2007)
- 25 The Code is available from: <http://www.nhmrc.gov.au/publications/synopses/r39syn.htm>.



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