Research data management policies in USA, UK and Australia universities: An online survey

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ABSTRACT

There has been an increase in demand for research data management (RDM) policies to improve the quality of research data however, there is no clear-cut policy content to guide the process. The purpose of this study is to identify the existing RDM policies. Specifically, the study compares and differentiates the RDM policies in three developed nations (USA, UK and Australia) to ascertain how the policies vary. The RDM policies of 100 universities from the three countries, that are present online were retrieved and content analysis approach using NVivo and SPSS were performed. The results from the analysis revealed that the common underlying facts of the policies were found in the areas of access, retention, sharing, storage and ownership. All the universities share the same core values in the management of their research. They exhibit that Data Management Plan (DMP) is essential. The study concluded that the differences in the data management are mostly issues of focus areas. More so, there is no fixed retention period for research data. To resolve the few differences identified, common criteria for data management is proposed for policy considerations to ensure compliance. Finding from the study is significant to developing countries as it adds to the discourse on data management policies. The study will also enable policy makers in developing countries to draw empirical evidence from the developed world on RDM and this will form a basis for policy direction.

Keywords: Research data management policy; Data services; Open data; Data sharing, Data management plan.

INTRODUCTION

The importance of research data management (RDM) cannot be overemphasized. To achieve high-quality results, data management must be improved to preserve the value of data. If not properly managed, information can become obsolete over time, thereby disrupting its life cycle and usage by various researchers. According to Corti et al. (2014), high-quality research data can only be achieved through a broad concept that includes processes used to create, organise, document, access, and reuse data. Data management is very essential but has its own issues. Although challenging, properly managing research data through RDM can create the needed impact. As a result, many research agencies and institutions are formulating policies to streamline data management; hence, RDM policies that underlie guidelines governing the management of research data are essential in this era (Peng 2009). RDM policies in various countries are still in the developing phases and most universities have either full or partial solutions in place. A study conducted by

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Blahous et al. (2016) concluded that research data policies remain relatively rare, while supplementary material policies are well established. However, from a policy perspective, there are questions regarding RDM and open government data management for the best output of results (Viscusi et al. 2014).

Many institutions have developed and adopted RDM policies. Nevertheless, not a single university will say they need no further development or adjustment. This is because there are no clear-cut policies on data management despite an increase in demand. This development has led to different approaches to data management by universities and other research institutions. Whyte and Tedds (2011) indicated that because enough inter-organisational consultations did not occur, policies tend to vary and as such the quality and quantity differ. The DataRes project (Keralis et al. 2013) showed that various university data policies are not emphatic by themselves, but only encourage researchers to share and retain data. In developing a policy, some scholars advocate considering areas such as intellectual property rights, liability issues, distribution methods and services, data and metadata management practices, and security risks posed by data, which are considered critical as well as having limitations (Stoltenberg and Parrish 2006, Vardakosta and Kapidakis 2016). Some also believe that data management plans (DMPs) should be the key components of RDM policies. Various institutions only suggest what should be included and deemed relevant to their situation and modify content as necessary. When there is no solid institutional mandate, institutional policies are weak (Asher et al. 2013). Since there is no emphatic statement on RDM policy content, there are differences in universities' policy formulations. This weakness may be the cause of the differences and similarities in policy formulations. The conflict resulting from these differences creates adverse effects for the development of research and barriers for the reuse of data (Moles 2015). What then are the actual differences and similarities? Policy statements should be addressed both at the funding and institutional levels. Differences and similarities in data management systems across countries must be found since this would help create common data management guidelines to benefit users from diverse walks of life. A careful analysis of existing policy findings could contribute to the development of new open data policies and improvements in existing research data policies (Zuiderwijk et al. 2014; Zuiderwijk and Janssen 2014).

The purpose of this study is to identify existing RDM policies. Top universities from three countries (USA, UK and Australia) were sampled and the similarities and differences in the RDM policies were ascertained. Policy considerations and common criteria are also recommended for RDM. Hence this study addresses the following research question: "What are the differences and similarities among the various research data management policies across universities and countries?" This question may appear straightforward but the nature of RDM policies makes it difficult to answer. The results would inform policy directions and applications in developing countries by filling the gap in RDM policies.

LITERATURE REVIEW

The scope of this review is mainly RDM with a focus on policy formulation. This review discusses the overall policies and practices of RDM in the academic libraries, with emphasis on academic libraries in developed countries. The underlying concept of RDM is to ensure that policies are flexible and can enable research data to be used and the results can be traced and reproduced. Reproducibility involves the replication of scientific discoveries using independent inquiries, methods, data, tools, and protocols. Traceability is the capability to reproduce raw data from or into datasets (Peng 2009). One cannot be

achieved without the other. In traceability, all data management records are a prerequisite as well as all changes implemented. RDM emanates from processes necessary to encourage reproducibility and traceability. When RDM is well implemented, this would produce practices in which the results are reliable and verifiable as well as enabling new and innovative research built on existing data. This will ensure that the full value of universities' investment in research is realized. Various researchers have attempted to define RDM. According to Whyte and Tedds (2011), RDM means "the organisation of data, from its entry to the research cycle through the dissemination and archiving of valuable results"(p.1). RDM consists of a number of different activities and processes associated with the data "life cycle" (Cox and Pinfield 2014). According to Horizon 2020, research data should be findable, accessible, interoperable, and reusable (FAIR) (Spichtinger and Siren 2017). The authors recommended the development of data management plans (DMPs) for researchers to meet these requirements. RDM policies form part of the processes to properly manage information to obtain its full value.

Many universities, through their academic libraries, believed that they had a role to play in RDM and related services. However, their concern was financial support, which is lacking in order to implement more services (Brown, Wolski and Richardson 2015). This led Keralis et al. (2013) to conduct a study to ascertain the level at which academic librarians have responded to the RDM needs of researchers and funders' requirements. The results showed that few funders of federal funding agencies have policies that required plans for the retention and sharing of research data (Keralis et al. 2013). In a study conducted by Akers et al. (2014), a timeline was constructed for the academic libraries in eight prominent universities in the USA with key steps in developing programmes of RDM support to educate and assist researchers with managing data before, during, and after their research projects. Despite variations among the universities in their approaches to and timelines of building support for RDM, most institutions face common challenges in developing successful RDM support programmes.

In Australia, the Australia Research Council (ARC) provides standards and strategic policy, and is committed to providing high-quality strategic and policy advice and engaging with the research sector. One policy is the Australian Code for Responsible Conduct of Research. This policy places the primary responsibility for ensuring the integrity of research with individual researchers and institutions. This code is supported by guidelines that provide more details into how to comply with the codes. The guidelines form a basis for the development of processes by various institutions that promote the code's principles and responsibilities. The code includes dissemination, retention, access, and peer review (National Health and Medical Research Council 2018). The International Association for Social Science Information Services and Technology (IASSIST) has been tremendous in this regard. Since 1977, IASSIST has met each year to assess issues surrounding RDM. In 2010, a two-year effort to produce an updated five-year Strategic Plan for IASSIST was completed. One of the plans was to develop advocacy for policies that augment data access, encourage responsible data curation, and provide full support to data life cycles, and the creation, use, and preservation of data. To date, the IASSIST's members have been working toward responsible data management (IASSIST 2010).

The empirical literature revealed that many universities have RDM policies with which researchers must comply with in addition to their funders' requirements if any. In a study conducted by Williams, Bagwell and Zozus (2017), there was a focus on data management, data sharing, data storage, data preservation, data access, but focus on data collection and processing seemed to be lacking. According to the authors, these are research data quality

indicators. However, others focused on research observations and data collection, neglecting the other factors.

Empirical evidence of practical RDM strategies discussion from Cornell, Perdue, Rice, and Oregon universities have shown areas of interest such as preserving, validating, reusing, sharing, and protecting data and the development of DMPs to demonstrate research effectiveness (Ray 2014). Policy formulations and institutional road maps such as sharing data curation centres and services and the management of project data in archives and repositories such as copyright were also found. Steeleworthy (2014) examined RDM policy services in academic libraries in Canada. The findings revealed that the organisational structure, collection development, preservation, archives, reference, and research as key components. The study also found RDM to be the solution to gaps in research.

In the USA, the DataRes project involving 200 universities investigated librarians' effort and attitudes toward research data management and supporting data-intensive research in a digital environment (Moen and Halbert 2012). The research findings revealed that 18 percent of the institutions surveyed had policies regarding retention and sharing. Universities required grant applicants to submit DMPs regarding retention, sharing, and dissemination. It was evident in the policies as funders stated that research data should be accessible and shareable (Ribeiro et al. 2018). Matusiak and Sposito (2017) reported various types of curation services and new organisational strategies, including shared networks of RDM expertise and multi-purpose research data centres. A study conducted by Tripathi, Shukla, and Sonkar (2017a) to identify the main services provided in academic libraries revealed that libraries provide services for DMPs, preservation, data deposit, and storage. Tenopir et al. (2017) conducted a survey of research data services in academic libraries demonstrating that many libraries do not offer practical services but rather more advisory services. They also manage data storage infrastructure and collaborate with other units on campus. Keralis et al. (2013) reported that researchers needed support in the areas of data management planning, storage, data preservation, data access, and sharing. Only few showed interest in data creation and access, demonstrating the importance of requesting support (Daraio et al. 2016). Blahous et al. (2016) concluded that supplementary material policies were well established. It was clear that access to data cannot be denied but the extent to which data should be accessed was ambiguous (Sturges et al. 2015). This raised the issue of access to scholarly articles and also underlined the importance of sharing research data. It was evident in a study conducted by Higman and Pinfield (2015) that data sharing objectives influence policy formulations. According to Matusiak and Sposito (2017), the roles and duties of those in charge of data curation in both global and interdisciplinary settings should be addressed. A case study in a Tanzania university (Mushi, Pienaar and van Deventer 2020) investigated the services that need to be implemented. The authors recommended that policies should address DMPs, active data management, the choice of data for long-term preservation, and data access using catalogues and repositories. They believed this would help researchers make research data available to the international community. Most studies analyzed RDM services and support. Extant literature has not assessed the differences and similarities in data management policies across countries and country-specific conclusions.

METHOD

The method used in this study is content analysis because it has been widely used for objective, systematic, and quantitative examination of content that researchers are

interested in. Top universities from the USA, UK and Australia were sampled and RDM policies were retrieved online from the universities' websites. The list of the top universities was obtained directly from the *US News & World Report's* website (US News and World 2019). The top-ranked universities in various countries were considered because of their good research standing based on the *US News and World Report's* global and country-specific rank. A total of 100 universities were selected because the authors believed this will collect the best universities in the countries under consideration since they are the world's best according to the ranking. The 100 universities were disproportionally selected. The probability method was adopted using systematic sampling. Each country's universities were selected at regular intervals in the ranking order. The list composed of 40, 35 and 25 universities in the USA, UK, and Australia, respectively (see Tables A1, A2, and A3 in Appendix A). The number was also based on the ranking profile as more American universities are highly ranked followed by the UK and Australia. The points given to each university represents the actual global score of each university out of 100 points, depicting the overall performance of the university per the rank released.

The next step after obtaining the list of universities was to visit the universities' websites to download their RDM policies and search for RDM policies with a query on bing.com (search engine) using keywords "university name + research data management policy." These were sampled from April to June 2019. This methodology was also used in the study conducted by Tripathi, Shukla, and Sonkar (2017b). After acquiring the universities' policies, content analysis was used to produce tables of their abridgement policies (see Appendix B). A cumulative content analysis involves counting and contrasts, usually keywords or content followed by an explanation of the underlying context (Hsieh and Shannon 2005). The various RDM policies were compared and differentiated, and to achieve this, some protocols and checklists were followed as described. First, the authors thoroughly read, discussed, and summarized each university's policy. From the reading and discussion, the abridgement policies were produced in a table format (Appendix B). The policy tables were then coded and analyzed via IBM SPSS Statistics 24 software using descriptive statistics of frequencies and cross-tabulations. SPSS 24 is a Windows-based programme used for data entry and analysis and to create tables and graphs. The graphs in Figure 1 were produced using the results of the SPSS analysis.

Another analysis was also conducted using NVivo, a content analysis software that arranges the most frequent words in transcripts. It enabled the authors to search the textual content of sources, nodes, folders, and cases. A checklist of keywords located in the various RDM policies was used, and then transported into NVivo. The keywords included "security," "storage," "records," "responsibility," "ownership," "intellectual property," "retention," "use," "management plan," "sharing," "open access," and "preservation.". These lists represented the various aspects of the policies. NVivo was then used to analyze the word frequencies. A query of the 1,000 most occurring words was run. After obtaining the results, futile words that were not within the scope of the investigation were removed into a stop word list. The query was then run again in a query of the most 100 frequent words in a word cloud map (Figure 2) and whole ring lattice graph (Figure 3). The whole ring lattice graph showed the inter-relationships between words. The word cloud demonstrated the word importance and predominance. The analysis was first conducted among universities in the same country and then compared to universities in the other countries under consideration to ascertain the similarities and differences.

RESULTS

The content analysis results using cross-tabulation methodology in SPSS are shown in Figure 1 to compare the RDM policies across the three countries covering six elements, namely storage, access, DMP, sharing, ownership and retention. Table 1 presents the meaning of the six specific elements included in the policy requirements for the analysis in Figure 1.

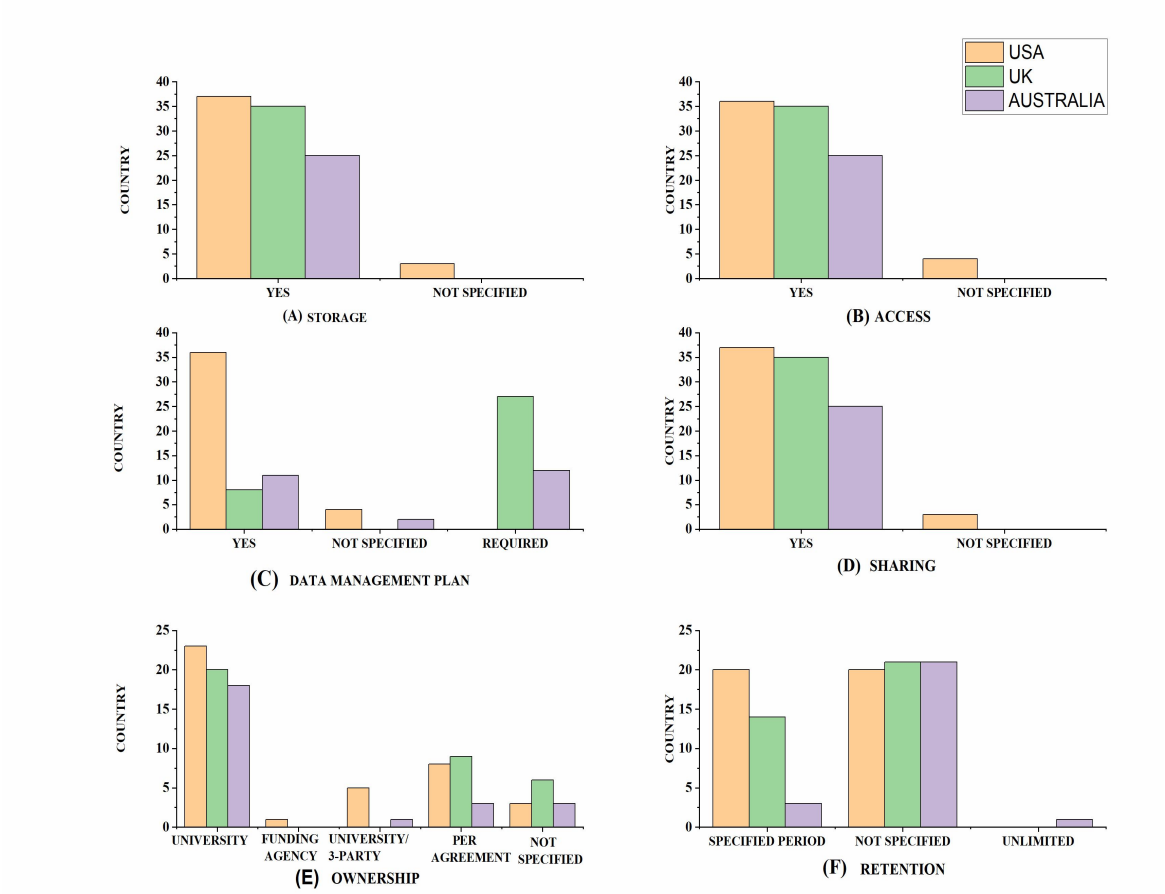

Figure 1: RDM Policy Requirements in the USA, UK, and Australia

Findings show that in the USA, 36 of 40 universities representing 90 percent had some form of DMP in place and none were required as a condition for research conducted without external funding. This fulfilled funding agencies' requirements and was not necessary for the universities. However, researchers were encouraged to use a DMP. In the UK, DMPs were required for research either with or without funding agency sponsorship at 27 (77.1%) universities compared to 8 (22.9%) universities with no requirements. All new research proposals must include RDM plans or protocols that explicitly address data capture, management, integrity, confidentiality, retention, sharing, and publication. In Australia, DMPs were required at 12 (48.0%) universities. DMPs were required by both the university and funding agencies. At fewer than half of Australia universities (11, 44.0%), DMPs were required only by funding agencies. When required by the universities, DMPs must be provided to the university and funding sources (see Figure 1C).

Table 1: Policy Elements' Requirement and its Meaning

Policy Element	Requirement	Meaning
Storage (Should the data be stored?)	Yes	It should be stored
	Not specified	No mention of requirement of storage
Access (Should the data be accessible?)	Yes	It is compulsory
	Not specified	The policy is silent on access
Data Management Plan (Should there be a DMP?)	Yes	There is policy on DMP
	Not specified	No mention of DMP in the policy
	Required	There is an emphatic statement for DMP
Sharing (Should the data be shared?)	Yes	It Is compulsory for data to be shared
	Not specified	There is no emphatic mention
Ownership (Who owns the data?)	University	Owned by the university where the researcher is.
	Funding agency	Owned by the funding body
	University/ Third party	Owned by both university and third party
	Per agreement/ As agreed	Based on the agreement before the project starts
	Not specified	No mention of any body
Retention (Should the data be retained and for how long?)	Specified period	Retention period is mentioned
	Not specified	Retention period not mentioned
	Unlimited period	Can be retained as long as needed

All of the universities studied requested access to research data. In the USA, 37 (92.5%) universities allowed access to research data, and only three (7.5%) did not address the issue of access. In the UK and Australia, all universities allowed access (35 and 25 respectively). The universities allowed access to data and funding agencies, if any. The dataset will be made available to the public. When access is not allowed to sensitive data, explanations must be provided. Thus, access did not differ significantly in all 3 countries. Figure 1B shows a bar chart demonstrating data access policies. Regarding retention, in the US, the policies were evenly distributed, with 20 (50.0%) universities specified minimum data retention requirements ranging from 3 years to 7 years, and another 20 (50.0%) unspecified, requiring that researchers must agree on a retention period at the project onset as applicable or better still as scheduled. In the UK, 14 (40.0%) specified data retention policies while 21 (60.0%) did not. In Australia, three (37.0%) universities had no data retention policies compared to 21 (62.0%) that did. In the UK and Australia, many of the policies had no specific minimum retention period. The retention period was mostly based on third-party agreements or as scheduled. This is illustrated in Figure 1F.

In the US, UK, and Australia, the data are owned by the university. This is shown by Figure 1E representing 23 (57.5%), 20 (57%), and 18 (72%) universities, respectively. Unless it was stipulated by the funding agency, the university owns the data. Only a few stipulated that ownership was based on the agreement. When third-party sponsorship is provided through funding or contracts, the terms of the arrangement will define the ownership and data usage rights. Some universities had no specific policies that could be similarly interpreted based on the agreement.

Data sharing was required at 37 (92.5%) universities in the USA, and all sampled universities in the UK and Australia (Figure 1D). This demonstrates the importance of data sharing for reproducibility. Data storage and preservation were also necessary. All of the universities required data storage. Regardless where it was stored, it had to be registered with the university (Figure 1A).

Figure 2 shows the DMPs at the universities in the three countries, separately as a country (Figures 2A, 2B and 2C) and combined (Figure 2D). This analysis demonstrates the importance of prominent data management systems used by universities in these countries. The results are interpreted as follows: the larger the data management system's font size, the closer the data management system is to data search as shown in the centre of the figure. This demonstrates that the focus is on data management systems and the frequency of word usage. The peripheral of Figure 2 shows the data management systems that were least prioritized by the universities.

A) Cloud Label Map of RDM in the USA

B) Cloud Label Map of RDM in the UK

C) Cloud Label Map of RDM in Australia

D) Cloud Label Map of RDM in all Countries

Figure 2: Cloud Label Map of RDM Policies

Figure 2A demonstrates that the most important data management system for the American universities was access, as it had the largest font size and closest match to the data search. This was followed by intellectual property rights and data sharing,

preservation, retention, and responsibility. They were the next closest to the data search and had larger font sizes than other data management systems. The peripheral of the Figure shows the data management systems that were least prioritized by the universities in the USA. They included dissemination and ownership among others.

Figure 2B shows a representation of RDM system at UK universities. The data are shown at the centre of the figure. It has the largest font size. This demonstrates the importance placed on RDM systems as it matches the research management. Closer to the data is access with storage in front and sharing and retention at the back. Adjacent to the data is ownership and preservation. Custodianship and dissemination are located at the peripheral.

Figure 2C demonstrates that access is key to data research in Australia. This is followed by storage. Data storage is very important for easy access to research data. Retention and ownership are also important. Data recording is also emphasized. Other key elements include peer review, security, sharing, archiving, and dissemination.

Figure 2D demonstrates that the most important elements in all countries are access followed by retention, sharing, storage, ownership, preservation, and dissemination.

Figure 3 shows the correlation among the three countries various policies' content. A ring lattice graph is to depict the inter-relationships between words. It also shows the areas that are more focused. This query was performed to further confirm the findings in Figure 2 (word cloud map of universities policies). A higher concentration implies that the policies focus more on those elements, demonstrating the area of focus. A lower correlation indicates less focus. The analysis revealed that the focus areas are on access, retention, data management, and sharing; and the areas less focused are on security, peer review, intellectual property, and records.

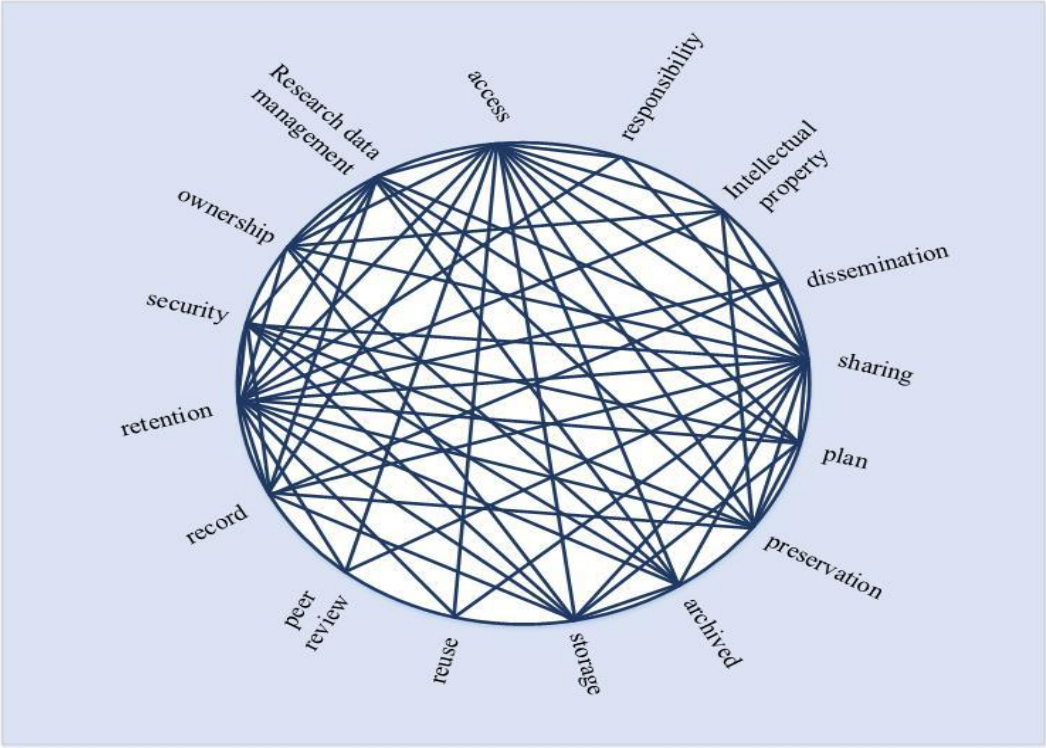

Figure 3: Whole Ring Lattice Graph

DISCUSSIONS

The results of this study demonstrate that the top universities in USA, UK and Australia emphasized RDM policies, which is of significant importance. At most universities, funding agencies' policies take precedence over university policies, except at the University of Liverpool, which is quite emphatic that their policies take centre stage. All of the UK universities provide RDM training. While some provide central storage, others do not. In the UK, where research is supported by contract or grants to the university that include specific provisions regarding ownership, retention, and data access, the provisions of the agreement take precedence. The university provides access to services and facilities for the storage, backup, deposit, and retention of research data and records to enable researchers to meet their requirements under this policy and those of their research funders.

Similarities among the Universities' Policies

Figure 2 demonstrates that the most important elements in RDM policies are access, followed by retention, sharing, storage, ownership, preservation, and dissemination. This is also evident in Figure 3, which shows the correlation among the various policies. The common underlying elements of the policies in the all universities are DMP, access, retention, sharing, storage, and ownership. The universities sampled demanded DMPs that include a data description and details on data access and sharing of the research. The data should have open access. Researchers must also adhere to particular data formats to enable other researchers to access the original data. There should be documentation detailing sources, coding, and metadata. There are also rules regarding data backup, replication, and versions. The majority of universities sampled (96; 96%) provided access to Dataverse, an online data repository, to share, preserve, cite, explore and analyze research data. Data security is paramount so everything must be done to secure the data produced. All of the universities share the same core values in the management of their research data, and many have RDM to meet researchers' need. In most of the policies, the funders' policies take precedence over those of the universities. Almost all of the policies centre on the responsibilities of researchers. Other areas of interest are budgets, privacy, intellectual property, archiving, and adherence to citation of the research data (see Figure 2D).

Differences among Universities' Policies

Universities in the USA focus more on access, intellectual property sharing, and preservation. Universities in the UK focus more on data sharing, access, and retention. Universities in Australia focus on storage, retention, and access. It is compulsory to register data with the universities but not necessarily the case in other countries' universities. The UK has more RDM organisations and dedicated websites for that purpose. In other countries, data is either managed by the library or university staff. UK universities can link their DMP online for access to their RDM using the same credentials, which is rare at universities in the USA. In Australia, there is more emphasis on peer review and authorship that should be specified at the project onset. There is a general consensus regarding storage. The only disagreement is related to where data should be stored. Opinions are divided over whether data should be stored, either at the university or outside. Some thought that data should be registered with the university no matter where they are stored. Not all of the universities provide central storage. The few that provide central storage limit the time frame for which data can be stored or archived. The data must be moved to different storage centres after expiration with all the risks associated. Some universities demand for payment for data storage. Some policies state that when possible, researchers should seek to recover the direct costs of managing research data generated by projects from the research funders. However, this is not explicitly mentioned in the US universities'

policies. A study conducted by Tammaro et al. (2018) reported significant variations in terminology, level of policy development, models of RDM services, and technical infrastructure across institutions and countries. This study found that it was mostly an issue of focus objectives and not necessarily differences in RDM services.

The results of the NVivo query also confirmed the following elements, namely, security, storage, record, responsibility, ownership, intellectual property, retention, use and reuse, DMPs, sharing, access, and preservation. Responsibility is related to the role of individuals regarding security, storage, and records. Of note, most of the policies focused on these elements. A study conducted by Williams, Bagwell, and Zozus (2017) reported that preservation, data sharing, access, and data storage were key components of data management processes. This validates the findings as these have become the focus of many RDM policies. To find common ground between the similarities and differences, a research data life cycle model was developed since these are the areas of focus at most of the universities. This is represented in Figure 4. A good RDM policy should indicate how data are going to be created and managed at the DMP level. Data ownership in terms of property rights should be indicated prior to project onset. Data storage is also critical because if data are not well preserved, they may be damaged and become obsolete. This calls for preservation for data to be used and reused as the need arises. Data dissemination is another key aspect. It should be specified if data is available for sharing or not. Data should be accessible to all parties and open to the public if no private content is involved. For data to be accessible, data must be retained. Retention is very important to address any issues that may arise after a research project is completed. Above all, the responsibility of every party involved in the project should be specified. A proposed RDM life cycle model extracted from the universities' policies is shown in Figure 4. The model was developed by comparing the currents study's findings with that of Van den Eynden (2011) to draw conclusions.

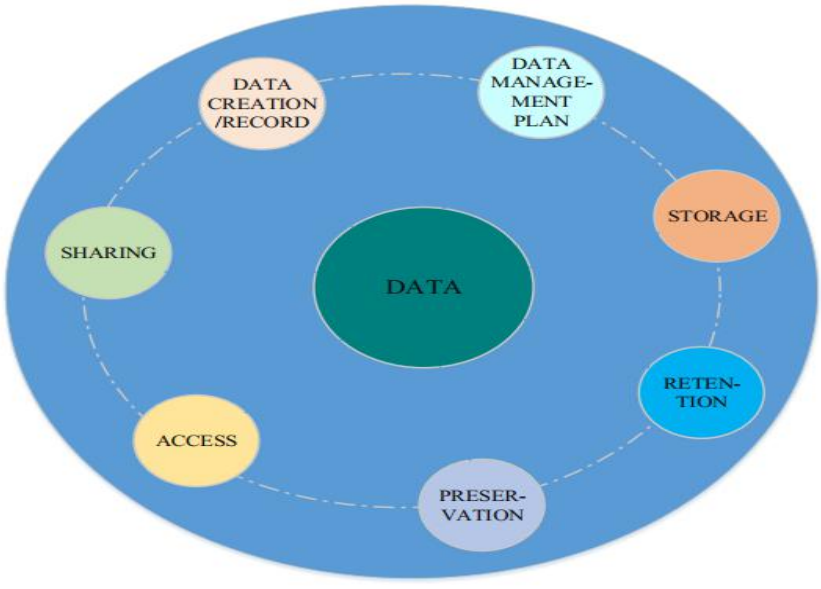

Figure 4: A Proposed Research Data Management Life Cycle

According to Van den Eynden (2011), creating, processing, analyzing, preserving, accessing, and reusing data are key. However, the RDM life cycle model in this study differs substantially. According to this model, RDM starts with data creation and records. The data need to be created. For better results, a DMP detailing how data will be collected and

managed is necessary. This is the end process since it can be updated during the course of data creation. This is related to other elements within the life cycle. Therefore, it should be part of the research data life cycle. Also, creating data means information will be analyzed and processed. It is unnecessary to specify these two elements since research data are not created without processing and analysis. The authors believe that DMPs are very important for producing high-quality data. Storage was also discussed; it is an important element in RDM and should be taken seriously. The data storage location is very important because if information are not properly stored, they cannot be found or used. Retention is another element that must be taken seriously because if data are not retained, issues that may arise cannot be addressed adequately. Research data also need to be preserved by any means possible and everything should be done to preserve data to avoid deterioration. Research data must be stored, retained, and preserved. RDM services must engage the full data life cycle including DMPs, maintenance preservation, and archiving (Yoon and Schultz 2017). This emphasizes the importance of DMPs. This model differs from other models because it incorporates DMPs and storage as key elements of RDM that cannot be overlooked. It must be however noted as Cox and Tam (2018) put it that the data life cycle can suit only a particular purpose and not all objectives.

CONCLUSIONS

This paper has presented a systematic research to compare the RDM policies of highly ranked universities in the USA, UK, and Australia. The analysis reveal the similarities and differences in various universities' RDM policies. The universities' common underlying policies are found in the areas of access, retention, sharing, storage, and ownership. Other areas of interest included budget, privacy, intellectual property, and archiving. All of the universities share the same core values in the management of their research data and many have RDM services. In most of the policies, the funders' policy take precedence over that of the universities. The study recommends that policymakers and stakeholders focus on data access, sharing, retention, security, storage, record, responsibility, ownership, intellectual property, use and reuse, DMPs and preservation. Any university with a research data policy should prioritize these key concepts to obtain high-quality results if compliance is followed.

The study reveals that there are few differences in the DMP of the countries considered. In the area of DMP, the USA primarily focuses on fulfilling funders' policies without requiring research be conducted without external funding. There is no fixed retention period for research data, it is either scheduled or as long as needed. One approach may not be the solution as Matusiak and Sposito (2017) suggested that common ground can be reached regarding the similarities among the universities. It is not necessary for DMP to fulfill funders' requirements only but for university projects as well. Based on the findings, to resolve the few differences identified, common data management criteria have been proposed for policy considerations and to ensure compliance. The authors advocate for a common approach to the formulation of RDM policies by recommending level ground through the RDM life cycle model approach since the differences are not divergent. It is therefore important for requirements to be flexible to enable research. Data management as required by various agencies is complex. What seems beneficial will be unattainable if too many requirements are necessary. A holistic approach should be applied to policies to make them more practical and enable research freedom. Not all university policies must be adopted, but the global research interest should be considered.

This study was limited to RDM requirement policies' relationship to the data life cycle. The authors did not assess researchers' compliance levels. This study was also limited to the various RDM policy documents available online. Future research should focus on the current compliance levels to inform the feasibility using both online and offline sources.

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APPENDIX A

Table A1: The USA Universities and the Data Management Policy Websites

No	University Name	Point	Policy Site
1	Harvard University	97.6	https://researchdatamanagement.harvard.edu/ https://researchdatamanagement.harvard.edu/policies
2	Massachusetts Institute of Technology	93.8	http https://osp.mit.edu/grant-and-contract-administration/reporting-and-closing-out-award/record-retention s://libraries.mit.edu/data-management/
3	Stanford University	90.8	https://doresearch.stanford.edu/policies/research-policy-handbook/conduct-research/retention-and-access-research-data
4	University of California, Berkeley	86.9	http://researchdata.berkeley.edu/
5	California Institute of Technology	86.6	http://ora.research.ucla.edu/RPC/Pages/AdditionalPolicies.aspx
6	Columbia University	84.7	https://research.columbia.edu/research-data-columbia
7	Princeton University	84.6	https://libguides.princeton.edu/rdm https://records.princeton.edu/retention-schedules/how-use-schedule
8	University of Washington	84.2	http://guides.lib.uw.edu/research/dmg https://www.washington.edu/research/policies/gim-37-research-data/
9	Yale University	83.9	https://provost.yale.edu/sites/default/files/files/PrinciplesAndGuidelines_06-07-2018.pdf
10	Johns Hopkins University	83.6	https://www.hopkinsmedicine.org/institutional_review_board/guidelines_policies/guidelines/record_retention.html http://web.jhu.edu/administration/provost/programs_services/research/Data_Management_Policy.pdf
11	University of California, Los Angeles	83.2	http://www.library.ucla.edu/support/research-help/research-data-services http://guides.library.ucla.edu/data-management-sciences?_ga=2.184151974.1421964555.1552835224-1126727234.1552835224
12	University of Chicago	83.0	http://guides.lib.uchicago.edu/datamanagement http://guides.lib.uchicago.edu/datamanagement/dmp
13	University of California, San Francisco	82.7	https://guides.ucsf.edu/datamgmt
14	University of Pennsylvania	82.4	https://guides.library.upenn.edu/data-management
15	University of California, San Diego	82.3	https://library.ucsd.edu/research-and-collections/data-curation/best-practices.html / https://blink.ucsd.edu/research/policies-compliance-ethics/guidelines.html
16	University of Michigan, Ann Arbor	81.2	https://guides.lib.umich.edu/datamanagement/planning
17	Duke University	80.5	http://library.duke.edu/data/guides/data-management/ https://provost.duke.edu/wp-content/uploads/FHB_App_P.pdf
18	Cornell University	78.6	https://data.research.cornell.edu/services#Storage,%20backup,%20and%20recovery
19	North-Western University	77.2	http://research.northwestern.edu/sites/research/files/policies/Research_Data.pdf
20	New York University	76.3	https://guides.nyu.edu/data_management
21	University of North Carolina, Chapel Hill	76.3	https://ehs.unc.edu/files/2015/10/ar2010.pdf
22	University of Wisconsin, Madison	75.5	https://research.wisc.edu/compliance-policy/ https://research.wisc.edu/data-security-management-and-retention/
23	Washington University in St. Louis	75.6	https://research.wustl.edu/create-a-data-management-plan/
24	University of Texas, Austin	75.4	https://www.lib.utexas.edu/research-help-support/research-data-services
25	University of California, Santa Barbara	74.5	https://www.policy.ucsb.edu/
26	University of Minnesota, Twin Cities	74.1	https://policy.umn.edu/research/researchdata

27	University of Colorado, Boulder	74.1	https://www.colorado.edu/libraries/research-assistance/data-services
28	University of Pittsburgh	74	http://www.provost.pitt.edu/documents/RDM_Guidelines.pdf
29	Boston University	74	https://libguides.bc.edu/dataplan/bcdatapolicy
30	Ohio State University, Columbus	73.2	http://orc.osu.edu/files/ResearchDataPolicy.pdf
31	University of Maryland, College Park	73.1	https://www.president.umd.edu/sites/president.umd.edu/files/documents/policies/VI-2300A.pdf / https://www.lib.umd.edu/data
32	University of Illinois, Urbana-Champaign	72.7	https://www.library.illinois.edu/rds/ https://databank.illinois.edu/policies
33	University of California, Santa Cruz	72.5	https://officeofresearch.ucsc.edu/about/policies.html
34	University of California, Davis	72.2	https://www.library.ucdavis.edu/service/data-management/ https://research.ucdavis.edu/wp-content/uploads/retention_disposition_reqs.pdf
35	University of Southern California	72.1	https://policy.usc.edu/record-management/ https://research.usc.edu/files/2018/08/GuideToResearch_Summer2018.pdf
36	Rockefeller University	71.8	http://www2.rockefeller.edu/sr-pd/
37	Georgia Institute of Technology	71.5	http://www.rcr.gatech.edu/data-management
38	Pennsylvania State University, University Park	71.4	https://libraries.psu.edu/research/research-data-services/data-management
39	Emory University	71.4	http://researchdata.emory.edu/
40	Vanderbilt University	71.3	http://researchguides.library.vanderbilt.edu/datamanagement

Table A2: UK Universities and the Data Management Policy Websites

No	University Name	Point	Policy Site
1	University of Oxford	85.8	http://www.admin.ox.ac.uk/media/global/wwwadminoxacuk/localsites/researchdatamanagement/documents/Policy_on_the_Management_of_Research_Data_and_Records.pdf
2	University of Cambridge	82.3	https://www.imperial.ac.uk/media/imperial-college/medicine/sph/ide/perc/Participant-Privacy-Information_-Patient-Experience-study---walk-in-sexual-health-clinic.pdf
3	Imperial College London	81.6	https://www.imperial.ac.uk/media/imperial-college/research-and-innovation/scholarly-communication/public/rdm-guide.pdf
4	University College London	77.3	http://www.ucl.ac.uk/isd/services/research-it/documents/uclresearchdatapolicy.pdf
5	University of Edinburgh	74.8	http://www.provost.pitt.edu/documents/RDM_Guidelines.pdf https://www.ed.ac.uk/information-services/about/policies-and-regulations/research-data-policy
6	King's College London	72.7	https://www.ed.ac.uk/information-services/about/policies-and-regulations/research-data-policy
7	University of Manchester	70.7	http://documents.manchester.ac.uk/display.aspx?DocID=33802
8	University of Bristol	70.1	http://www.bristol.ac.uk/media-library/sites/university/documents/governance/UOB_RDM_Policy.pdf
9	London School of Hygiene & Tropical Medicine	68.6	http://www.lshtm.ac.uk/research/researchdataman/rdm_policy.html
10	University of Southampton	68	https://library.soton.ac.uk/researchdata/unipolicy
11	University of Glasgow	68.3	https://www2.le.ac.uk/services/research-data/documents/GlasgowRDPolicy.docx
12	University of Birmingham	67.2	https://intranet.birmingham.ac.uk/as/libraryservices/library/research/rdm/Policies/Research-Data-Management-Policy.aspx
13	Queen Mary, University of London	65.0	https://www.qmul.ac.uk/media/arcs/policyzone/Research_Data_Management_policy_for_publication_Dec13.pdf
14	University of Liverpool	64.9	https://www.liverpool.ac.uk/media/livacuk/computingservices/research-data-management/researchdatamanagementpolicy.pdf

15	University of Sheffield	64.4	https://www.sheffield.ac.uk/polopoly_fs/1.553350!/file/GRIPPolicyextractRDM.pdf https://www.sheffield.ac.uk/polopoly_fs/1.356709!/file/GRIPPolicySenateapproved.pdf
16	University of Warwick	64.1	https://warwick.ac.uk/services/ris/research_integrity/code_of_practice_and_policies/research_code_of_practice/datacollection_retention/research_data_mgt_policy/ https://warwick.ac.uk/services/ris/research_integrity/code_of_practice_and_policies/research_code_of_practice/datacollection_retention/
17	University of Nottingham	63.6	https://www.nottingham.ac.uk/fabs/rgs/research-data-management/creating-data/policies.aspx https://www.nottingham.ac.uk/academicservices/documents/researchanddevelopment.pdf#Research%20and%20Development%20Retention%20Schedule
18	University of Leeds	63.3	https://library.leeds.ac.uk/info/14062/research_data_management/68/research_data_management_policy#activate-tab1_university_research_data_policy%20
19	University of Exeter	63	http://www.exeter.ac.uk/media/universityofexeter/research/openaccess/OA_RDM_Policy_Final.pdf
20	Cardiff University	61.6	https://www.cardiff.ac.uk/__data/assets/pdf_file/0004/937021/research-integrity-and-governance-code-of-practice-v2.pdf
21	University of Sussex	60.9	https://www.sussex.ac.uk/webteam/gateway/file.php?name=rdm-policy-oct-2014.pdf&site=269
22	Newcastle University	60.8	https://www.ncl.ac.uk/media/wwwnclacuk/research/files/Research%20Data%20Management%20Policy%20Principles%20Code%20of%20Good%20Practice.pdf
23	Durham University	58.6	https://www.dur.ac.uk/resources/research.innovation/policy/ResearchDataManagement3.0FINAL.pdf
24	University of Aberdeen	58.6	https://www.abdn.ac.uk/staffnet/documents/policy-zone-research-and-knowledge-exchange/DRAFTResearchDataManagementPolicy.pdf https://www.abdn.ac.uk/staffnet/documents/policy-zone-research-and-knowledge-exchange/2017-UoA-guidance-on-keeping-research-records-V0.3(2).pdf
25	University of Leicester	58.6	https://www2.le.ac.uk/services/research-data/documents/uol_rdmprinciples
26	University of York	58.3	https://www.york.ac.uk/about/departments/support-and-admin/information-services/information-policy/index/research-data-management-policy/#tab-3
27	London School of Economics and Political Science	58	https://info.lse.ac.uk/staff/services/Policies-and-procedures/Assets/Documents/resDatManPol.pdf
28	Lancaster University	57.7	https://gap.lancs.ac.uk/Pages/default.aspx https://webcache.googleusercontent.com/search?q=cache:mYE7xqDLntgJ:https://gap.lancs.ac.uk/policy-info-guide/5-policies-procedures/Documents/SEC-2013-2-0776-Research-Data-Policy.doc+&cd=5&hl=en&ct=clnk&gl=us
29	University of St. Andrews	56.5	https://www.st-andrews.ac.uk/media/research-data-management/documents/policy/USTAN%20RDM%20policy.pdf
30	University of Dundee	55.7	https://www.dundee.ac.uk/media/dundeewebsite/ethics/documents/Policy-to-Govern-the-Management-of-Research-Data.pdf
31	University of East Anglia	55.2	https://portal.uea.ac.uk/documents/6207125/8017832/RDM_Procedures_Guidance+Oct+2015.pdf/86c0951b-5af5-4cce-bb57-370a8e214d28
32	Queen's University Belfast	54.9	https://www.qub.ac.uk/home/media/Media,763208,en.pdf
33	University of Reading	54.5	http://www.reading.ac.uk/web/files/reas/RDM_PolicyGuidance_1-0.pdf
34	Royal Holloway, University of London	51.0	https://intranet.royalholloway.ac.uk/library/documents/policies/researchdatamanagementpolicy.pdf
35	St George's University of London	49.9	https://www.sgul.ac.uk/images/about/Policies/SGUL_RDM_Policy_May_2016.pdf

Table A3: Australia Universities and The Data Management Policy Websites

No	University Name	Point	Policy Site
1	University of Melbourne	76.6	https://policy.unimelb.edu.au/mpf1242
2	University of Sydney	74.4	http://sydney.edu.au/policies/showdoc.aspx?recnum=PDOC2013/337
3	University of Queensland Australia	72.2	https://ppl.app.uq.edu.au/content/4.20.06-research-data-management
4	Monash University	72.1	https://www.monash.edu/__data/assets/pdf_file/0011/797339/Research-Data-Management-Policy.pdf
5	Australian National University	71.7	https://policies.anu.edu.au/ppl/document/ANUP_007403
6	University of New South Wales	69.7	https://www.gs.unsw.edu.au/policy/documents/researchcode.pdf https://policies.anu.edu.au/ppl/document/ANUP_007402
7	University of Western Australia	67.9	http://www.governance.uwa.edu.au/procedures/policies/policies-and-procedures?method=document&id=UP12%2F25
8	University of Adelaide	58.3	https://www.adelaide.edu.au/policies/4043/?dsn=policy.document;field=data;id=7345;m=view
9	Curtin University of Technology	58.2	http://policies.curtin.edu.au/local/docs/policy/Research_Data_and_Primary_Materials_Policy.pdf
10	Macquarie University	58.1	https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policies/responsible-conduct-of-research/media/The-Macquarie-University-Code-for-the-Responsible-Conduct-of-Research_June2017.pdf
11	Deakin University	58.1	https://policy.deakin.edu.au/document/view-current.php?id=23 https://policy.deakin.edu.au/download.php?id=539&version=2&associated
12	Griffith University	58.0	https://www.griffith.edu.au/__data/assets/pdf_file/0018/186021/2016-rdm-best-practice-v.1.8.docx.pdf
13	Queensland University of Technology	57.8	http://www.mopp.qut.edu.au/D/D_02_08.jsp
14	James Cook University	57.8	https://www.jcu.edu.au/policy/research-management/code-for-the-responsible-conduct-of-research
15	University of Technology Sydney	56.2	http://www.gsu.uts.edu.au/policies/documents/research-management-policy.pdf
16	University of Wollongong	56.0	https://www.uow.edu.au/content/groups/public/@web/@gov/documents/doc/uow116802.pdf
17	University of Newcastle	54.2	https://www.ncl.ac.uk/media/wwwnclacuk/research/files/Research%20Data%20Management%20Policy%20Principles%20Code%20of%20Good%20Practice.pdf
18	University of Tasmania	54.2	http://www.utas.edu.au/__data/assets/pdf_file/0004/411997/Management-of-Research-Data-Policy-December-2017.pdf
19	University of Western Sydney	53.1	https://policies.westernsydney.edu.au/view.current.php?id=00311
20	RMIT University	50.9	https://www.rmit.edu.au/about/governance-and-management/policies/research-policy http://mams.rmit.edu.au/e9xncqs3y1w1.pdf
21	University of South Australia	50.8	https://i.unisa.edu.au/policies-and-procedures/university-policies/research/res-17/
22	Flinders University	50.4	https://www.flinders.edu.au/integritygovernancerisk/policyandsecretariat/archives/research-data-management.cfm
23	Swinburne University of Technology	48.0	https://www.swinburne.edu.au/media/swinburneeduau/research/docs/pdfs/Research_Data_Management_Guidelines.pdf
24	La Trobe University	42.5	https://policies.latrobe.edu.au/download.php?id=106&version=1
25	Australian Catholic University	40.8	https://policies.acu.edu.au/research/general_policies/research_data_management_policy

APPENDIX B

Table B1: Abridged Research Data Policy in the USA Universities

No	University Name	Access	DMP	Storage	Sharing	Ownership	Retention
1	Harvard University	Yes	Yes	Yes	Yes	University	7 years
2	Massachusetts Institute of Technology	Yes	Yes	Yes	Yes	University	As scheduled
3	Stanford University	Yes	Yes	Yes	Yes	University	3 years
4	University of California—Berkeley	Yes	Yes	Yes	Yes	University	As scheduled
5	California Institute of Technology	Yes	Yes	Yes	Yes	University	As scheduled
6	Columbia University	Yes	Yes	Yes	Yes	University/ Third party	3 years
7	Princeton University	Yes	Yes	Yes	Yes	University/ per agreement	As scheduled 3 -10 years
8	University of Washington	Yes	Yes	Yes	Yes	University / Third party	6 years
9	Yale University	Yes	Yes	Yes	Yes	University / Third party	3 years
10	Johns Hopkins University	Yes	Yes	Yes	Yes	University	5 years
11	University of California--Los Angeles	Yes	Yes	Yes	Yes	Per funding agencies	As scheduled
12	University of Chicago	Not specified	Yes	Yes	Yes	Per agreement	As scheduled
13	University of California--San Francisco	Yes	Yes	Yes	Yes	Not specified	3 years
14	University of Pennsylvania	Yes	Yes	Yes	Yes	Not known	As scheduled
15	University of California--San Diego	Yes	Yes	Yes	Yes	University	As scheduled
16	University of Michigan--Ann Arbor	Yes	Yes	Yes	Yes	Not specified	As scheduled
17	Duke University	Yes	Yes	Yes	Yes	University	5 years
18	Cornell University	Yes	Yes	Yes	Yes	University	As appropriate
19	Northwestern University	Yes	Yes	Yes	Yes	University	3 years
20	New York University	Yes	Yes	Yes	Yes	University	3 years
21	University of North Carolina--Chapel Hill	Yes	Yes	Yes	Yes	University	As applicable
22	Washington University in St. Louis	Yes	Yes	Yes	Yes	University	As applicable
23	University of Wisconsin—Madison	Yes	Yes	Yes	Yes	University	7 years
24	University of Texas—Austin	Yes	Yes	Yes	Yes	Not specified	Not specified
25	University of California--Santa Barbara	Not known	Not specified	Not known	Not known	Not specified	Not specified
26	University of Minnesota--Twin Cities	Yes	Not known	Yes	Yes	University/ Third party	As appropriate
27	University of Colorado—Boulder	Yes	Yes	Yes	Yes	Not specified	6 years
28	University of Pittsburgh	Yes	Yes	Yes	Yes	University	7 years
29	Boston University	Yes	Yes	Yes	Yes	University	3 years
30	Ohio State University—Columbus	Yes	Yes	Yes	Yes	University	5 years
31	University of Maryland--College Park	Yes	Yes	Yes	Yes	University	Not specified
32	University of Illinois--Urbana-Champaign	Yes	Yes	Yes	Yes	Per agreement	As long as needed
33	University of California--Santa Cruz	Yes	Yes	Yes	Yes	The university	Not specified

No	University Name	Access	DMP	Storage	Sharing	Ownership	Retention
34	University of California—Davis	Yes	Yes	Yes	Yes	University	3 years
35	University of Southern California	Yes	Yes	Not known	Not known	University	Not known
36	Rockefeller University	Not known	Not known	Not known	Not known	Not known	Not known
37	Georgia Institute of Technology	Yes	Not known	Yes	Yes	Per agreement	Not specified
38	Pennsylvania State University-University Park	Yes	Yes	Yes	Yes	Not specified	Not specified
39	Emory University	Yes	Yes	Yes	Yes	University	Per agreement
40	Vanderbilt University	Yes	Yes	Yes	Yes	University	Not specified

Table B2: Abridged Policy Content for the UK Universities

No	University Name	Access	DMP	Storage	Sharing	Ownership	Retention
1	University of Oxford	Yes	Yes	Yes	Yes	University	3 years
2	University of Cambridge	Yes	Yes	Yes	Yes	University	As long as required
3	Imperial College London	Yes	Yes	Yes	Yes	University	10 years
4	University College London	Yes	Yes	Yes	Yes	University	As scheduled
5	University of Edinburgh	Yes	Require	Yes	Yes	As agreed	As scheduled
6	King's College London	Yes	Yes	Yes	Yes	Not specified	As scheduled
7	University of Manchester	Yes	Require	Yes	Yes	University	As agreed
8	University of Bristol	Yes	Require	Yes	Yes	As agreed	Not specified
9	London School Hygiene & Tropical Medicine	Yes	Require	Yes	Yes	As agreed	Not specified
10	University of Southampton	Yes	Require	Yes	Yes	University	10 years
11	University of Glasgow	Yes	Required	Yes	Yes	University	Not specified
12	University of Birmingham	Yes	Required	Yes	Yes	University	10 years
13	Queen Mary, University of London	Yes	Required	Yes	Yes	University	Not specified
14	University of Liverpool	Yes	Required	Yes	Yes	University	10 years
15	University of Sheffield	Yes	Required	Yes	Yes	University	Not specified
16	University of Warwick	Yes	Required	Yes	Yes	University	10 years
17	University of Nottingham	Yes	Required	Yes	yes	Not specified	Not specified
18	University of Leeds	Yes	Required	Yes	Yes	Not specified	Not specified
19	University of Exeter	Yes	Required	Yes	Yes	Not specified	Not specified
20	Cardiff University	Yes	Required	Yes	Yes	University	As agreed
21	University of Sussex	Yes	Required	Yes	Yes	Not specified	As scheduled
22	Newcastle University	Yes	Yes	Yes	Yes	As agreed	10 years
23	Durham University	Yes	Required	Yes	Yes	University	10 years
24	University of Aberdeen	Yes	Required	Yes	Yes	Not specified	As agreed
25	University of Leicester	Yes	Required	Yes	Yes	Not specified	As scheduled
26	University of York	Yes	Required	Yes	Yes	University	10 years
27	London School of Economics and Political Science	Yes	Required	Yes	Yes	Not specified	7 years
28	Lancaster University	Yes	Yes	Yes	Yes	Per agreement	10 years
29	University of St. Andrews	Yes	Required	Yes	Yes	Not specified	Per agreement
30	University of Dundee	Yes	Required	Yes	Yes	University	Per agreement
31	University of East Anglia	Yes	Required	Yes	Yes	University	10 years

No	University Name	Access	DMP	Storage	Sharing	Ownership	Retention
32	Queen's University Belfast	Yes	Yes	Yes	yes	University	5 years
33	University of Reading	Yes	Required	Yes	Yes	University	3 years
34	Royal Holloway of London	Yes	Required	Yes	Yes	University	Not specified
35	St George's University of London	Yes	Required	Yes	Yes	Per agreement	As scheduled

Table B3: Abridged Policy Content for Australia Universities

No	University Name	Access	DMP	Storage	Sharing	Ownership	Retention
1	University of Melbourne	Yes	Required	Yes	Not specified	Per agreement	5 years
2	University of Sydney	Yes	Required	Yes	Not specified	University	As long as needed
3	University of Queensland Australia	Yes	Not specified	Yes	Not specified	University	As long as needed
4	Monash University	Yes	Not specified	Yes	Not specified	Not specified	Not specified
5	Australian National University	Yes	Required	Yes	Yes	Third party	As long as needed
6	University of New South Wales	Yes	Yes	Yes	Yes	University	As long as needed
7	University of Western Australia	Yes	Yes	Yes	Yes	Not specified	As long as needed
8	University of Adelaide	Yes	Required	Yes	Yes	University	5 years
9	Curtin University of Technology	Yes	Yes	Yes	Yes	University	As long as needed
10	Macquarie University	Yes	Yes	Yes	Yes	University	As long as needed
11	Deakin University	Yes	Yes	Yes	Yes	As case may be	Permanent
12	Griffith University	Yes	Yes	Yes	Yes	As case may be	As long as needed
13	Queensland University of Technology	Yes	Required	Yes	Yes	University	As long as needed
14	James Cook University	Yes	Yes	Not specified	Yes	University	5 years
15	University of Technology Sydney	Yes	Yes	Required	Yes	University	As long as needed
16	University of Wollongong	Yes	Yes	Required	Yes	University	As long as required
17	University of Newcastle	Yes	Yes	Required	Yes	University	10 years
18	University of Tasmania	Yes	Yes	Yes	Yes	University	As long as needed
19	University of Western Sydney	Yes	Yes	Required	Yes	University	As long as needed
20	RMIT University	Yes	Yes	Yes	Yes	University	As long as needed
21	University of South Australia	Yes	Yes	Yes	Yes	University	As long as needed
22	Flinders University	Yes	Yes	Yes	Yes	Not specified	As long as needed
23	Swinburne University	Yes	Yes	Required	Yes	University	As long as needed
24	La Trobe University	Yes	Yes	Required	Yes	University	As long as needed
25	Australian Catholic University	Yes	Yes	Required	Yes	University	As long as needed