



Managing research data at an academic library in a developing country

Shamin Renwick, Marsha Winter and Michelle Gill

University of the West Indies, St Augustine, Trinidad and Tobago

International Federation of
Library Associations and Institutions
2017, Vol. 43(1) 51–64
© The Author(s) 2017
Reprints and permission:
sagepub.co.uk/journalsPermissions.nav
DOI: 10.1177/0340035216688703
journals.sagepub.com/home/iff



Abstract

Managing research data has become an issue for many universities. In the Caribbean, the St Augustine Campus Libraries at the University of the West Indies are keenly aware of the need to support researchers in this regard. The objectives of this study were to identify current practices in managing research data on the campus and to determine a possible role for the Campus Libraries. A pilot study of 100 researchers on the campus was conducted. Analysis of the 65 valid responses revealed that while researchers owned data sets they had little knowledge or experience in managing such. This low level of awareness is instructive and validates a role for the Campus Libraries to play in supporting researchers on campus. The Campus Libraries need to sensitize researchers about what data planning and managing research data entail as well as provide technical assistance with actual data storage.

Keywords

Academic libraries, Caribbean, data management, research data management, research data service, University of the West Indies

Submitted: 16 May 2016; Accepted: 15 December 2016.

Introduction

Managing research data has become more significant as universities make increasing requests for research funding in the face of shrinking national budgets in the Caribbean. In this troubled economic climate, there is a need to ensure there is value for money and that data management practices produce research data that has integrity so that it can be curated, reused, shared and further analysed. Data management should then be treated as a *sine qua non* and is aptly described by Kenneth Pimple, an academic whose work involves research ethics, as a “necessary twin to the scientific method” (Coates, 2014: 599). Research data is being viewed by funders as an asset and hence there is, no doubt, a growing requirement for universities to include data management plans in research grant proposals (Pryor, 2012: 4).

Many researchers at the University of the West Indies (UWI), St Augustine, Trinidad and Tobago, although actively engaged in research, appear to not have fully grasped the importance or benefits of managing their research data and, more so, the need to develop data management plans as part of their

research grant proposals. The UWI St Augustine Campus Libraries (referred to as “the Campus Libraries” from here on) recognize the need to implement a data management policy across the entire campus, given the need for academics to engage in research which will drive the growth and development of the Caribbean nations that contribute to the funding of the UWI. Consequently, The Campus Libraries seek to clearly identify their role in supporting researchers in the managing of their research data and, further, provide guidance on data management planning.

For the purposes of this study, the definition by Whyte and Tedds (2011) of data management is considered useful, that is: “the organisation of data, from its entry to the research cycle through to the dissemination and archiving of valuable results”. In developed countries, such as the United States and the

Corresponding author:

Shamin Renwick, Alma Jordan Library, University of the West Indies, Trinidad and Tobago.
Email: shamin.renwick@sta.uwi.edu

United Kingdom, the challenges of managing research data have led to the establishment of various initiatives that facilitate the sharing and preservation of data. In addition, on the UWI St Augustine Campus, the staff that support researchers have noted that international funding agencies ask for data plans as part of their application process for research grants. These funding agencies are conscious of the need to encourage scientific good practice and to achieve greater value for the research they sponsor, widely encourage – indeed, increasingly require – particular standards of data management and sharing to be followed. However, in many developing countries, these issues are only now being addressed as technologies becomes more affordable, widely available and better known.

UWI, a higher education institution located in the English-speaking Caribbean, highlights achieving excellence in research as one aspect of its mission. It envisions research as an avenue for providing creative solutions to addressing the challenges within the region, as well as helping to explore the region's potential for development, and formulating sound decision making and public policy (University of the West Indies Alma Jordan Library, 2015). Along with this assertion is the possible concern for managing not just large volumes of data, also described as “big data”, but all data, which emerges from engaging in academic research. Proper management of research data will therefore become an important part of the research cycle process. Shen and Varvel (2013: 552) advocate that the employment of data management practices in the early stages of the research process is prudent, so that data loss or discard could be prevented, hence facilitating data sets being discoverable, re-usable and easily shared.

Within the Latin America and the Caribbean, many initiatives are now emerging to ensure the proper management of research data. These include the “creation of policies in government funding agencies” and the “implementation of data repositories in universities and research institutions” (Andaur, 2016), albeit universities and research institutions in the Caribbean region have been outpaced in the establishment of many such initiatives by their counterparts in the developed nations. In addition, there is a still a great need to sensitize all researchers about these initiatives and their relevance.

The Campus Libraries have grown conscious of the need to provide data management support and envisage a role to emulate these initiatives and, with the leveraging of available information and communication technologies, hope to provide sound data management support services at the UWI.

The Campus Libraries consist of a network of libraries with one main library – the Alma Jordan Library (AJL) – and seven subsidiary or branch libraries. The AJL is described in its mission statement as the “repository and gateway for information in the support of the teaching, learning and research needs of the University community and Caribbean society” (University of the West Indies Alma Jordan Library, 2015). Being dedicated to its mission, it is continuously evaluating its potential and its position within the University so that it remains relevant to the needs of its research community. One way of ensuring relevance is to “design flexible research support services that will intersect with the research cycle at various points” (University of the West Indies Office of Research, Development and Knowledge, 2016: 23). Support for managing data is currently being explored as one type of research assistance that can be provided by the Campus Libraries to their chief stakeholders at UWI.

Background

UWI was first established as the University College of London in 1948 and became an independent university in 1962 (University of the West Indies, 2012: vii). It comprises four campuses: the St Augustine Campus in the Republic of Trinidad and Tobago; the Mona Campus in Jamaica; the Cave Hill Campus in Barbados and the Open Campus within the various territories throughout the English-speaking Caribbean. The University is financially supported by 17 countries in the Caribbean and has a student enrolment of over 50,000.

UWI is recognized by its local and international partners, and other stakeholders, as a centre for excellence in research, especially on “matters pertaining to the Caribbean and other small island states” (University of the West Indies Alma Jordan Library, 2015). The UWI's St Augustine Campus comprises 405 full-time academic staff members in seven faculties: Engineering, Food and Agriculture, Humanities and Education, Law, Medical Sciences, Science and Technology, and Social Sciences. Each faculty has variable number of departments and affiliated research centres, the two major research centres being: the Cocoa Research Centre and the Seismic Research Centre. The UWI STA has the largest student enrollment of the four campuses: in 2014/2015, there were 18,345 inclusive of 12,405 undergraduates and 5,765 postgraduates according to current campus records. See Appendix A for a breakdown of the number of academic staff and postgraduate students at the St Augustine Campus.

Current research support

Of the six strategic themes emerging from UWI's Strategic Plan 2012–2017, “research and innovation” emphasizes the need for the UWI to “create an enabling environment to support, foster and increase the output of high quality research and innovation with an emphasis on the Caribbean” and to “increase funding and strengthen research partnerships” (University of the West Indies, 2012: 6). It is these goals which have led to the establishment of various research initiatives, though quite disparate, at the UWI St Augustine Campus.

One project, the Research Information Management System (RIMS), is a tool used to identify researchers at UWI with specific knowledge and skills. RIMS allocates each researcher a profile in RIMS where they can update personal information, learn about current research activities on the campus, access internal funding sources and locate information on and apply for internal and external grants. Through RIMS, researchers can access training and assistance with the development of research proposals (University of the West Indies Office of Research, Development and Knowledge, 2016).

Another venture, initially established by the AJL in 2008 to capture and provide a centralized location and access to research generated by researchers at the UWI St Augustine Campus, is the UWI's institutional repository, UWISpace. It was formally adopted by the entire UWI system in 2012. However, unfortunately it was found that, based on the Library's experience, the repository was not the first place of choice for researchers wishing to archive their research. This could be attributed to several reasons including lack of awareness; workload issues or that they do not really understand the usefulness of the repository in providing access to their research

Yet another activity provided by UWI is the Trinidad and Tobago Research and Development Impact (RDI) Fund. This initiative is in keeping with the UWI's strategic objectives in the area of research “to support projects that address pressing development challenges and that will achieve recognizable and substantive impact in the short and medium term (3–5 years)” (University of the West Indies, 2015). This fund, provided by the Trinidad and Tobago Government but managed by the Office of the Principal of the St Augustine Campus, offers a maximum of US\$300,000 to researchers to develop projects in priority areas such as crime, violence and citizen security, public health, climate change and environmental issues, finance and entrepreneurship, technology and society, and economic

diversification and sector competitiveness. Since the establishment of the fund in 2012, 85 concept notes have been received and 31 grants totaling over US\$2,000,000 have been approved and awarded. The RDI Fund programme managers are now seeking to develop data management plans to assist researchers and are hoping that by starting a data management conversation all the personnel from RIMS, RDI Fund and the Campus Libraries would be included.

Overview of data management support

The paper (Erway, 2013), “Starting the conversation: University-wide research data management policy”, succinctly outlines the key stakeholders, the issues and the questions that should be addressed when implementing data management policies and plans at an institution. The key stakeholders identified were the University, since the research is viewed as the property of the institution; the Office of Research; the ICT Department who ensures that the ICT infrastructure exists to support the data management initiative at the macro level. Erway (2013: 9) underscores that “[the] cyber infrastructure environment can offer advantages such as economies of scale, integration, and a focused approach to co-ordinating technology and expertise, computing power and the planning, acquisition, and management of storage space”.

Other key stakeholders are the researchers, academic units (faculties) and the library. Erway (2013: 10) argues that the library is poised to be a “key player in data management curation and preservation given its extensive experience with selection, metadata, collections, institutional repositories preservation, curation and access”.

Therefore, at the start of the data management conversation, the main areas to be considered by the various stakeholders are: data ownership – where clear policies must indicate who owns the collected data; funding agency requirements or criteria; kind and type of data worth keeping given cost concerns; content of data management policies – including time limits of data maintenance and retention as well as what should happen to the data when the researcher leaves the university; ethical considerations – such as security protocols involved and treatment of sensitive data; tracking data usage and its impact on promotion and tenure; access controls – that is, who should have access and whether embargos are involved. Finally, decisions on who should fund the management of the research data must also be considered.

Literature review

Academic libraries and data management services

The literature is replete with initiatives undertaken in the area of research data management by universities in developed countries. US librarians, in recent years, have taken a more active role in the lifecycle of research data as under President Barack Obama's administration, the Office for Science and Technology Policy (OSTP) issued a directive in 2013, followed by a memo and a plan that mandated data management plans and access to research data for federally funded projects. Therefore, it is not surprising that US universities are ahead of their counterparts in the UK, Australia, New Zealand and Ireland in the area of data management (Pinfield et al., 2014: 3).

Although academic libraries have been involved in storing, managing and archiving data, these institutions have now been compelled to implement research data management policies and programmes. Some research data management services have been led by the library but, generally, university technology services, research offices, data-intensive departments or groups spearhead initiatives to provide data services (Henderson and Knott, 2015). Additionally, the focus on research data opens opportunities for libraries to aid researchers in preparing and executing management plans and the libraries that become engaged with data management gain the benefit of deeper involvement with their constituents (Breeding, 2016: 17). This association implies a commitment that requires the allocation or reallocation of resources, both staff and technical infrastructure (Breeding, 2016). The identification of other data services provided on campus not only prevents duplication of services but also leads to opportunities for collaborations. The initiation of this relationship between the library and data service providers can lead to the development of a community of practice for research (Grynoch, 2016).

Surveys of data management needs and practices

Surveys have been conducted to determine the data management practices and services offered at institutions (Buys and Shaw, 2015; Tenopir et al., 2015; Whitmire et al., 2015). The study by Buys and Shaw (2015) revealed that researchers at a university in Chicago stored data in a variety of ways: on departmental services/external drives – 50%; computer hard drive – 66%; flash drives (which limit data sharing and long-term preservation) – 27%; and cloud storage (such as Dropbox) – 31%. In terms of retention trends, both the humanities and the sciences preferred to

retain all types of data indefinitely. Respondents, asked about the types of training and assistance needed, disclosed that they required guidance with providing long-term access to their research data, preservation services for data storage and back-up during active projects. Tenopir et al. (2015: 17) investigated the levels of research data services (RDS) offered by universities in the US and Canada. They discovered that collaboration between the library and researchers was fruitful and provided benefits to all. And that few academic libraries have hired data librarians because it is perceived by some institutions that there was not adequate demand for RDS services to warrant hiring a full-time data librarian.

Types of support offered

As Erway (2013) alluded, there are a number of considerations and issues that must be addressed when implementing RDS. The literature provides guidance to any institution wishing to establish such an initiative.

There exist various flavours of data management services offered. Generally, the data service support provided by the library help in crafting data management plans, guidance on data management throughout the lifecycle, and data set archiving and dissemination (Swanson and Reinhart, 2016: 98). RDS include providing to the campus researchers, training or active involvement in data management planning, data management guidance during research, research documentation and metadata, research data sharing, and curation of completed projects and published data (Fearon et al., 2013). Universities have adopted several approaches when initiating their RDS. It can be implemented on a needs basis, as in the case of the Virginia Commonwealth University which initially did not develop a specific plan but sought instead to be open to the needs of their researchers, as the new Director of Data Management learned about researchers, staff, faculty, students, resources and focused on developing a solid communication plan to reach the target audience (Henderson and Knott, 2015). Conducting a pilot which provides curating services for the data that graduate students produce leading up to their electronic theses and dissertations can be a starting point for some universities (Creamer, 2015; Doty et al., 2015). University of Virginia libraries built RDS to provide data discovery, acquisitions and research software support expertise in the use of restricted data (Clairbourn, 2015). In this case, a statistician was hired to head the library's data research team and the library "experimented with the concept of blended librarianship, creating teams of scientists, social scientists, data scientists and library experts".

Developing a team approach by relying on pre-existing skillsets is also a strategy that can be adopted by universities implementing RDS. Libraries are already skilled in collecting, sharing, curating and preserving information, and can provide support in the three key competencies of research data management which are: providing access to data, advocating and supporting management, and managing data. For example, cataloguers can provide assistance with description and determining suitable metadata standards; liaison librarians can bring knowledge of discipline research practices; and reference skills may be applied in the interviews and questions with researchers prior to developing data management plans (Gynoch, 2016).

Challenges of implementation of research data services

The implementation of data services is not without challenges. Tenopir et al. (2014) report in a survey of academic librarians at US and Canadian universities that while data services are developing rapidly and librarians can provide subject knowledge support to researchers, they felt more training was needed to be effective. In a study by Goldman et al. (2015: 8), they noted that librarians identified conferences, Internet-based learning and on-the-job training as primary preparation for librarians to provide data services.

Marketing and communicating to the key stakeholders on campus are critical when developing data services on a campus. The University of Montana identified three strategies for marketing data management services to researchers – partner up, be social and simplify, since obtaining buy-in from the key stakeholders is crucial (Mannheimer, 2014: 42). Mannheimer asserts that the libraries should partner with the campus stakeholders, such as the IT department and those responsible for research on the campus, and a unified front must be demonstrated to researchers. Additionally, in order to gain their trust, Mannheimer underscored the need to communicate with stakeholders which includes using social media to raise awareness at the university about data management.

As noted in the literature, the studies identified document, in general, the experiences of universities in developed countries but the literature is silent regarding a developing country perspective. In the US, the development of academic libraries' RDS has been largely driven by the government's mandate to make publicly-funded research accessible. Even though the Trinidad and Tobago Government has been funding research, this perspective has not yet taken root in the Caribbean.

The Campus Librarian, having grown conscious of the need to provide data management support to the researchers at the St Augustine Campus, convened a Data Management committee to commence examining the ways in which the Campus Libraries could provide such assistance to researchers on the campus with managing large quantities of data generated from their research. One of the first strategies identified was to conduct an exploratory survey to determine the extent to which researchers were engaged in data management and their accompanying needs as well as the role that the library could play in this respect.

Methodology

In order to explore the area of interest identified, a decision was made to conduct a pilot study at the UWI St Augustine Campus Annual Research Expo, held September 2015. In the social sciences, a pilot study may be conducted as a feasibility study in preparation of a larger study or can be done to test a survey instrument. Van Teijlingen and Hundley (2001: 1) outline several reasons for conducting a pilot study which include using it as a means of assessing the full-scale study, collecting preliminary data, determining the resources needed for a planned study, designing research protocols and determining if they are effective or not. There are also limitations which include making inaccurate predications based on the pilot data. While it is not the norm to publish pilot studies, they can be useful because they provide details about lessons learned.

Results from this pilot study would inform and guide a more detailed future study, possibly including the other UWI Campuses, as well as help to facilitate decision making as it relates to the level and type of input required by the Campus Libraries in the short term.

Study population and sample

The study population was the researchers at the St Augustine Campus, namely the 5,765 postgraduate students and the 405 academic staff, i.e. 6,170 researchers. The composition of academic staff and postgraduates by Faculty and Centre is outlined in Appendix A.

It was decided to target a sample 100 researchers for the purpose of this pilot study. As a result, 100 print copies of the questionnaire were available at the Campus Libraries' booth at the Campus 2-day Annual Research Expo in September 2015 and library staff manning the booth approached faculty and postgraduate students asking them to complete the questionnaire. The results of this survey were used to prepare a mini-report that was submitted to the Campus Librarian and is the foundation of this paper.

Survey instrument: questionnaire

The survey instrument consisted of nine questions. Questions 1–4 identified researcher status on the St Augustine Campus and helped to determine whether they were involved with data collection/management or analysis within the last 10 years; the kind of research data with which they were involved; and how much data was collected. Questions 5–7 required respondents to identify their back-up and storage preferences, and what was done with the data once the research was completed. Question 8 sought to establish the researcher's need for assistance and in what specific area. The final question invited researchers to share comments or concerns about data management.

All responses were collated in Microsoft Excel. SPSS 18 software was used to produce descriptive and cross tabulation statistics. A sample of the questionnaire used in this study is shown in Appendix B.

Results

Response rate

Of the 100 questionnaires distributed, 65 valid responses were completed and returned: as such, there was a 65% response rate. The number of responses (65) is the equivalent of approximately 0.01% of the study population (6,170 researchers).

Respondents

Table 1 shows the distribution of responses per faculty and for each research centre.

Respondents were from six of the seven faculties on the UWI St Augustine Campus as well as two main research centres. Each faculty has a varied number of departments and the sample also represented respondents from 27 departments and 52 subject disciplines. The respondents reflected a fair representation across the St Augustine Campus of persons engaged in research. See Appendix A for breakdown of the researchers and their Faculty/Centres.

Question 1 – Respondent status

The researcher status included faculty, postgraduate students and other persons engaging in research on the UWI St Augustine Campus. Figure 1 shows a breakdown of the respondents by status: faculty, postgraduate students or other category.

There was a ratio of 1:2 of faculty: postgraduate students. The “other” category included: a “graduated postgrad” and a “media specialist”. Academic staff was represented at each faculty except at the Faculty of Food and Agriculture. There were no postgraduates

Table 1. Faculties and centres participating in the survey.

Faculty	Centre	Frequency	%
Engineering		12	19
Food and Agriculture		9	14
	Cocoa Research Centre	5	8
Humanities and Education		5	8
Medical Sciences		7	11
Science and Technology		7	11
	Seismic Research Centre	1	2
Social Sciences		16	25
Total		65	100

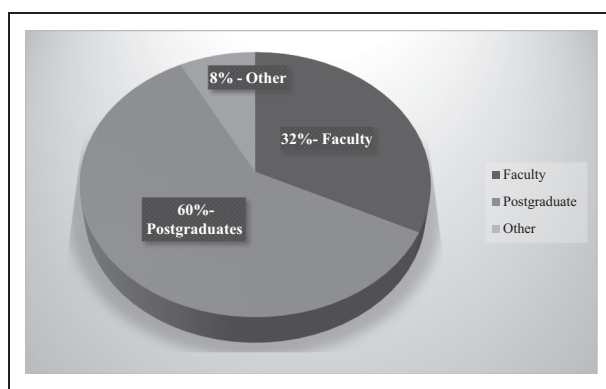


Figure 1. Status of respondents.

at the two centres as postgraduates are associated with the relevant faculties. The breakdown of the status of the respondents by Faculty/Centre is shown in Appendix D Table D1.

Question 2 – Length of time respondents involved in data management

The length of time correspondents have been involved in data management is shown in Table 2.

Approximately one-third of respondents (32%) had only recently (i.e. <1 yr) got involved in managing data and about one-quarter of respondents had been managing data for over five years. See Appendix D Table D2 for a breakdown of length of time respondents have been handling data by Faculty.

Question 3 – Types of research data used

Table 3 shows the types of research data managed by respondents.

Table 2. Length of time respondents involved in managing data.

Length of time	Frequency	%
< 1 yr	21	32
2–3 yrs	14	22
3–5 yrs	13	20
>5 yrs	17	26
Total	65	100

Table 3. Types of research data managed.

Type of data managed	Frequency	Probability
Survey	40/65	0.62
Time Series	8/65	0.12
Experiment	27/65	0.42
Observation	30/65	0.46
Multimedia	7/65	0.11
Other	2/65	0.03

Table 4. Size of data managed.

Size	Frequency	%
<100GB	46	71
100–500GB	8	12.3
>500GB	11	17
Total	65	100

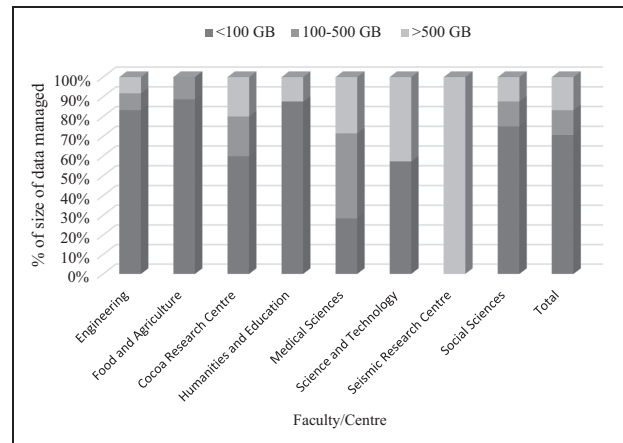
In terms of data managed, the probability of the most used (in descending order) was: survey, observation, experimental, time series and multimedia. In the category of other, the following is a list of methods of data collection identified by the researchers:

- examination
- field survey
- historical (Tobago)
- manage all data for IGDS (Institute of Gender and Development Studies)
- qualitative analysis on literature
- surveillance.

Question 4 – Size of data managed

Table 4 and Figure 2 illustrate the size of data managed by respondents.

It was found that few respondents (17%) were using data >500GB. Of this category, three researchers were from the Faculty of Science and Technology as well as two from Medical Sciences and two from Social Sciences. Somewhat surprisingly, it was revealed that none of the respondents in the Faculty of Engineering were using data sets > 500GB.

**Figure 2.** Bar graph of size of data managed by respondents.**Table 5.** Methods of storage.

Storage method	Frequency	Probability
Email myself	38/65	0.58
Flash drive	43/65	0.66
External hard drive	35/65	0.54
Cloud storage	26/65	0.40
Second computer	16/65	0.25

Most of the respondents (71%) were involved in data of <100GB in size. Of this category, 12 researchers were from the Faculty of Engineering; 10 from Social Sciences and eight from Food and Agriculture. See Appendix D Table D3 for a breakdown of the size of data managed by Faculty.

Question 5 – Methods of data storage utilized

Table 5 shows the methods of storage where respondents were asked to tick all that apply.

In order of preference, the probability of the storage methods most used was: flash drives, email oneself; external hard drives; cloud storage and, last, using a second computer. Other storage methods noted were: hardcopy, hard drive, multiple computers, Synology 8T drive.

Question 6 – Methods of back-up utilized

Preference for back-up methods is shown in Table 6 where respondents were asked to tick all that applied.

It was found that the descending order of the probability of using a back-up method was: external hard drives; email oneself/flash drives; cloud storage and using a second computer.

Table 6. Back-up methods.

Back-up method	Frequency	Probability
Email myself	32/65	0.49
Flash drive	32/65	0.49
External hard drive	39/65	0.60
Cloud storage	23/65	0.35
Second computer	14/65	0.22

Table 7. Data use after project.

Comment	Frequency	%
No comment	12	18
Publish	10	15
Store	29	45
Delete	2	3
Share	3	5
Further analysis	7	11
I plan to use the data collected to inform my collection of short stories	1	1
Return to lecturer (undergraduate project - collection of data, Department of Physics)	1	1

Question 7a – What is done with data after project

What respondents did with their data after the research project is outlined in Table 7.

Of note is that 45% stored; 15% published and 11% said further analysis was done on their data.

Question 7b – Plans for data after project

Table 8 illustrates the respondents' stated plans for the data after the project.

Though 55% did not respond to this question, 12% wanted to retain data for further analysis and 11% wanted to publish and store their data.

Question 8 – Assistance required

The assistance that respondents claimed they needed regarding their data management is shown in Table 9. Respondents were asked to tick all that applied.

The descending order of the probability that the support required will be used was: archiving for long term preservation; the associated permissions to do so; organizing for easy retrieval; storage and back-up.

Question 9 – Concerns and comments

Respondents were asked to identify any further concerns and comments. As this was a pilot project, this was left as an open-ended question to discover concerns which were not identified in earlier questions.

Table 8. Proposed plans for data after project.

Comment	Frequency	%
No comment	36	55
Publish	7	11
Store	7	11
Delete	1	1
Share	3	5
Further analysis	8	12
Generate a report to submit to superiors	2	3
Papers; background info for project funding	1	1

Table 9. Assistance required.

Assistance required	Frequency	Probability
Storage	16/65	0.25
Back-up	13/65	0.20
Archiving	28/65	0.43
Retrieval	19/65	0.29
Permission	20/65	0.31

Table 10. Concerns and comments.

No.	Categories	Number of comments and concerns in categories
1	Back-up, storage and preservation issues	13
2	Data management policy	6
3	Data analysis	3
4	Training	1
5	Other (which was a comment on the study itself)	1
6	No comment	41

There were 13 comments and 11 concerns and these have been coded and shown in Table 10.

The categories of comments/concerns in order of the number of responses were (1) back-up/storage and preservation; (2) data management policies; (3) data analysis; and (4) training. One comment indicated that the library's interest in data management was an excellent initiative. Appendix C details the concerns and comments as stated on the received questionnaires. Though 41 (63%) of respondents did not have further concerns or comments, the comments that were noted illustrate the wide-ranging areas of support required by researchers.

Discussion

Major findings from 65 respondents in this study, which reflect perspectives from a developing country,

were that managing data was relatively new as about one-third of respondents had only recently, i.e. less than one year, got involved in managing data and one-quarter had been managing data sets for >5 years. In terms of data collection, survey methods are the most popular with the others most used in descending order being observation, experimental, time series and multimedia. Using large data sets (i.e. >500GB) was relatively low among respondents, over 70% still dealt with data sets >100GB. This finding was a revelation for the authors who expected that large data sets would have been in greater use.

The preferred methods for storage and back-up methods were mainly flash drives, external hard drives or emailing oneself. Using cloud storage or a second computer was not as heavily used. However, probability of storage methods being used, such as, flash drive usage (0.66) and cloud storage (0.40) were greater than at a university in Chicago where these methods were used at 27% and 31%, respectively, according to Buys and Shaw (2015). Use of external hard drives was similar in both studies but emailing oneself as a method of storage was not mentioned in the US study. Of note is that after a project less than 50% stored data, only about 15% published their data and even less (11%) retained data for further analysis.

Regarding assistance identified, most wanted help with archiving of data and in order of descending probability were: help with permissions for use of the data; easy retrieval; storage and back-up of data.

Both comments and concerns identified proved useful and instructive; they identified the knowledge or concepts UWI researchers had on data management and also assisted in identifying possible roles the Campus Libraries may be able to play in assisting researchers in data management. Based on the most noted area of concern (back-up/storage and preservation) The Campus Libraries can prioritize strategies to assist in this area and the development of data management policies. Providing training in data analysis and data management is another area that can be considered. These activities should be done in collaboration with other University departments who also have an interest in the area of data management. Possibly, as well, the concept of data literacy may be included in information literacy workshops for postgraduate students and in meetings with the Faculty.

Conclusion

This pilot instrument yielded valuable perspectives on data management on the UWI St Augustine Campus in Trinidad and Tobago, a developing country. Though the Campus Libraries had concerns that big

data may have been an issue, it was revealed that not many of the researchers in this pilot study used large data sets. However, this may increase in the near future as technology evolves, and the generation, as well as availability, of data increases. It was established that there was a need for assistance and policy from UWI researchers to manage data in general, not necessarily of only of big data sets, efficiently. There was no conclusive comment that the Campus Libraries, themselves, needed to actively provide a data management service as the question regarding assistance did not specify any specific “assistance from the Campus Libraries”. Nevertheless, it is apparent from the findings and comments that there is a role for the Campus Libraries in both raising this issue for consideration by the University’s administration as well as providing advice and technical support on the topic of data management to researchers.

Limitations

It can be noted that whilst 65 responses may be adequate to get a general idea of developments in current data management needs and practices, the cross tab analysis showed that this number was inadequate to reflect specific Faculty considerations. (See some of the cross tabulations analysis in Appendix D tables.)

Recommendations

Many respondents were unable to identify the types of assistance which the library specifically could provide in helping them to manage research data. This low level of awareness is instructive, and suggests the Campus Libraries need to inform researchers of the type of service they can provide with planning for data storage, protecting, archiving, storing and preserving the data as well as retention and retrieval methods to allow for further analysis later on. The Campus Libraries would also need to work with the various research departments on the campus to develop a data management policy. It is recommended that in order to do this the Campus Libraries should form two teams, one responsible for sensitization, advocacy, and policy development; and a second team to undertake the technical support of preparing data plans as well as the tasks involved of providing a data service.

Further research

Further work identified for the Campus Libraries can be undertaken in either of two methods:

- A longer survey with more detailed questions shared widely on campus to gain an overview

of exactly who may want assistance and support from the library. This survey should try to determine the services the library can provide and whether researchers would be receptive and fully utilize these services.

- Using either purposive or snow-balling sampling methods to identify persons by who currently have data management needs and conduct either focus groups or personal interviews.

These approaches would assist the library to determine the most appropriate way forward and the optimal role that can be undertaken, accordingly. In addition, a cross-campus study would also serve to make comparisons and yield even more rich results, and the sharing of these would be of tremendous benefit to the entire University.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

References

- Andaur G (2016) Research data management in Latin America and the Caribbean: An overview. Available at: <http://learn-rdm.eu/research-data-latin-america> (accessed 12 August 2016).
- Breeding M (2016) Systems librarian. *Computers in Libraries* 36(3):15–17.
- Buys CM and Shaw PL (2015) Data management practices across an institution: Survey and report. *Journal of Librarianship and Scholarly Communication* 3(2). DOI: 10.7710/2162-3309.1225.
- Clairbourn MP (2015) Bigger on the inside: Building research data services at the University of Virginia. *Insights* 28(2): 100–106.
- Coates H (2014) Ensuring research integrity: The role of data management in current crises. *College & Research Libraries News* 75(11): 598–601.
- Creamer A (2015) Current issues and approaches to curating student research data. *Bulletin of the Association for Information Science and Technology* 41(6): 22–25.
- Doty J, et al. (2015) Making student research data discoverable: A pilot program using Dataverse. *JLSC* 3(2): 1–25.
- Erway R (2013) *Starting the Conversation: University-Wide Research Data Management Policy*. Dublin, OH: OCLC Research.
- Fearon D, Gunia B, Pralle B, et al. (2013) SPEC Kit 334: Research Data Management Services. *Association of Research Libraries*. Available at: <http://publications.arl.org/Research-Data-Management-Services-SPEC-Kit-334> (accessed 15 November 2015).
- Goldman J, Kafel D and Martin ER (2015) Assessment of data management services at New England Region Resource Libraries. *Journal of eScience Librarianship* 4(1): 1–17.
- Grynoch T (2016) Implementing research data management services in a Canadian context. *Dalhousie Journal of Interdisciplinary Management* 12. DOI: 10.5931/djim.v12.i1.6458.
- Henderson ME and Knott TL (2015) Starting a research data management program based in a university library. *Medical Reference Services Quarterly* 34(1): 47–59.
- Mannheimer S (2014) Ready, engage! Outreach for library data services. *Bulletin of the Association for Information Science and Technology* 41(1):42–44.
- Pinfield S, Cox AM and Smith J (2014) Research data and libraries: Relationships, activities, drivers and influences. *PLoS ONE* (12): 1–28.
- Pryor G (2012) *Managing Research Data*. London: Facet.
- Shen Y and Varvel VE (2013) Developing data management services at the Johns Hopkins University. *Journal of Academic Librarianship* 39(6): 552–557.
- Swanson J and Reinhart AK (2016) Data in context: Using case studies to generate a common understanding of data in academic libraries. *Journal of Academic Librarianship* 42(1): 97–101.
- Tenopir C, Sandusky RJ, Allard S, et al. (2014) Research data management services in academic research libraries and perceptions of librarians. *Library & Information Science Research* 36: 84–90.
- Tenopir C, Hughes D, Allard S, et al. (2015) Research data services in academic libraries: Data intensive roles for the future? *Journal of eScience Librarianship* 4(2): e1085. DOI: 10.7191/jeslib.2015.1085.
- University of the West Indies (UWI) (2012) *Strategic Plan*. Available at: [https://www.mona.uwi.edu/opair/strategic-plan/UWI+Strategic+Plan+2012-2017+\(Final\).pdf](https://www.mona.uwi.edu/opair/strategic-plan/UWI+Strategic+Plan+2012-2017+(Final).pdf) (accessed 29 April 2016).
- University of the West Indies (UWI) (2015) *RDI Fund: The UWI-Trinidad and Tobago Research and Development Impact Fund*. Available at: <https://sta.uwi.edu/rdifund> (accessed 29 April 2016).
- University of the West Indies (UWI) Alma Jordan Library (AJL) (2015) *About UWI*. Available at: <http://sta.uwi.edu/about> (accessed 4 May 2016).
- University of the West Indies (UWI) Office of Research, Development and Knowledge Transfer (ORDKT) (2016) *Research and Information Management System*. Available at: <https://sta.uwi.edu/ordkt/rims.asp> (accessed 15 May 2016).
- van Teijlingen ER and Hundley V (2001) The importance of pilot studies. *Social Research UPDATE* 35. Available at: <http://sru.soc.surrey.ac.uk/SRU35.pdf> (accessed 15 May 2016).
- Whyte A and Tedds J (2011) *Making the Case for Research Data Management*. Edinburgh: Digital Curation Centre. Available at: www.dcc.ac.uk/resources/briefing-papers/making-case-rdm (accessed 9 November 2015).

Whitmire AL, Boock M and Sutton SC (2015) Variability in academic research data management practices: Implications for data services development from a faculty survey. *Program: Electronic Library and Information Systems* 49(4): 382–407.

Author biographies

Shamin Renwick is the Head, User Services, Alma Jordan Library, UWI, St Augustine Campus, Trinidad and Tobago. She has over 30 years' experience working in libraries and has been a school librarian; Head, Multimedia and IT Unit at a Medical Sciences library; and a Faculty Liaison Librarian for Science and Agriculture Faculties. In her current role, she is a member of the Library's senior management team and oversees all aspects of services to the academics, researchers and students including information literacy; collection development and maintenance; and outreach. Among other publications, she has co-edited a book entitled *Caribbean Libraries in the 21st Century: Changes, Challenges, and Choices*. She is a Fellow of the Chartered Institute of Library and Information Professionals (CILIP), UK and a Past President of the Association of Caribbean University, Research and Institutional Libraries (ACURIL). She is a recipient of several awards including the ACURILEANA Star 2007 for Research and Publication.

Marsha S. Winter is a librarian at the Alma Jordan Library, UWI, St Augustine, Trinidad and Tobago. She received her MLS from Syracuse University and has been in the field of librarianship since 2004. She has worked at the Heritage Library, National Library and Information Systems (NALIS) in Trinidad and Tobago as a reference and outreach librarian. She is currently responsible for content recruitment for the University of the West Indies institutional repository and is involved in the digitization of the AJL holdings. Her professional interests are digital libraries, institutional repositories and metadata.

Michelle Gill is a Faculty Liaison Librarian in Science and Agriculture at Alma Jordan Library, UWI, St Augustine Campus; in the Republic of Trinidad and Tobago. She has a BSc Major in Chemistry with Minors in Mathematics and Biochemistry. Ms Gill is a teacher by profession but entered the field of librarianship and completed her MLIS at the University of the West Indies. She has varied research interests some of which include:- emerging information communication technologies in libraries, information security of open source resources used in libraries, disaster preparedness planning in libraries, and library space redesign efforts. Her current research focuses on examining a role for academic libraries and librarians in research data management at the UWI St Augustine Campus.

Appendix A. Number of academic staff and postgraduate students at the St Augustine Campus

Faculty	Centre	No. of academic staff		No. of postgraduate students		No. of researchers
		Sub-total	Total	Sub-total	Total	TOTAL
Engineering			72			1137
Food and Agriculture		31	34			228
	Cocoa Research Centre	3		0		
Humanities and Education			76			958
Law			10			29
Medical Sciences			71			531
Science and Technology		63	74	500		504
	Seismic Research Centre	11		4		
Social Science			68			2378
TOTAL			405			5765
						6170

Source: Internal UWI St Augustine records from the Registrar's Office and the Campus Information Technology Services (CITS), 2016.

Appendix B – Data management planning questionnaire

The St Augustine Campus Libraries is conducting a survey to determine data management practices of UWI Faculty and postgraduate students who engage in research on the UWI St Augustine Campus.

The information gathered from this survey will ultimately be used to craft a sustainable Data Management Plan for the University of the West Indies, St Augustine Campus. Thank you for your participation

Name: _____ Faculty: _____

Dept.: _____ General Subject area: _____

1. Kindly tick your responses.

Faculty [] Postgraduate Student [] Other _____

2. Have you been engaged in or assisted with the collection/ management/analysis of data in the last ten years?

Less than a year [] 1–2 years [] 3–5 years [] More than 5 years []

3. What kind of research data did you collect/manage/analyse?

Tick all the options which apply.

- a. Survey – questionnaires, focus groups, interviews []
- b. Time series []
- c. Experimental []
- d. Observation []
- e. Multimedia []
- f. Other _____ []

4. How much data was collected?

<100GB [] 100–500GB [] >500GB []

5. How do you currently store your data? (Tick all those which apply)

- a. Email myself []
- b. Flash drive []
- c. External hard drive []
- d. In the Cloud []
- e. Second computer []
- f. Other _____

6. How do you currently back-up your data? (Tick all those which apply)

- a. Email myself []
- b. Flash drive []
- c. External hard drive []
- d. Cloud computing []
- e. Second computer []
- f. Other _____

7. After your research project, (a) what have you done with your data or (b) plan to do with your data?

(a) _____

(b) _____

8. With regard to managing your data, do you require assistance in any of the following areas? (**Tick all the options which apply**)

- | | |
|--|--------------------------|
| a. Storage | <input type="checkbox"/> |
| b. Back-up (current files) | <input type="checkbox"/> |
| c. Archiving of digital files for long-term preservation | <input type="checkbox"/> |
| d. Easy retrieval of data | <input type="checkbox"/> |
| e. Permission to use/gain access | <input type="checkbox"/> |

9. Are there any concerns or comments you would like to share regarding data management?

Thank you for completing this survey!

Appendix C- Comments and concerns

No.	Comments (A)	Concerns (B)
1	Active data management policy must be implemented on campus	Accessibility of data to students
2	Archival databases - these should be better popularized to students who are not typically involved in research	Analysis of data
3	Excellent initiative	Confidentiality & data will not be erased
4	General info on how to manage, safeguard would be helpful	If I store my data with the university will the university have claim to all my research/data
5	I am of the view that data management must be done correctly and properly	Is there any software that allows for easy data storage, back-up and update on multiple computer systems
6	I understand the risks of using flash drives/external hard drives to back up data but I am not convinced about the security of the Cloud	Ownership; IP rights; proper handover of data
7	It is easy to lose or misplace data if it isn't labelled correctly. Ensure when saving/storing data that it is name appropriately	Privacy & protection
8	Just having someone to market the process of data mgmt. (knowledge-wise) easier and less cumbersome and challenging	Security, patent details
9	Make SPSS more simple that data management can be simplified	Storage of the volumes of data presents challenges in terms of appropriate filing and retrieval
10	Overall UWI guidelines for storage and naming of files would be helpful across the campus	Synchronizing data between hard drive and external drive
11	Should have a workshop on this; very helpful for new students - where to start	The main concern is storage and retrieval of data for public and UWI internal access for future use
12	The space provided for staff on the intranet is too limited and frequent deleting is necessary	
13	UWI should take advantage of cloud [storage] such as Moodle and Google drive. Current system cluttered and inefficient	
Total	13 Comments	11 Concerns

Appendix D: Cross tabulation analysis by Faculty and Centres

Table D1. Status cross tabulation.

Faculty * Status cross tabulation		Status			Total
Count		Academic staff	PostGrad	Other	
Faculty	Cocoa Research Centre	4	0	1	5
	Engineering	5	6	1	12
	Food and Agriculture	0	9	0	9
	Humanities and Education	3	5	0	8
	Medical Sciences	5	2	0	7
	Science and Technology	1	5	1	7
	Seismic Research Centre	1	0	0	1
	Social Sciences	2	12	2	16
Total		21	39	5	65

Table D2. Data management time cross tabulation.

Faculty* Data management time cross tabulation		Data mgt time				Total
Count		<1 yr	2–3 yrs	3–5 yrs	>5 yrs	
Faculty	Cocoa Research Centre	0	0	1	4	5
	Engineering	3	3	1	5	12
	Food and Agriculture	4	3	2	0	9
	Humanities and Education	4	0	3	1	8
	Medical Sciences	2	1	1	3	7
	Science and Technology	3	0	3	1	7
	Seismic Research Centre	1	0	0	0	1
	Social Sciences	4	7	2	3	16
Total		21	14	13	17	65

Table D3. Data size cross tabulation.

Faculty * Data size cross tabulation		Data collection			Total
Count		<100GB	100–500GB	>500GB	
Faculty	Cocoa Research Centre	3	1	1	5
	Engineering	10	1	1	12
	Food and Agriculture	8	1	0	9
	Humanities and Education	7	0	1	8
	Medical Sciences	2	3	2	7
	Science and Technology	4	0	3	7
	Seismic Research Centre	0	0	1	1
	Social Sciences	12	2	2	16
Total		46	8	11	65