

Article

# Scholars' Perceptions and Practices on Research Data Management in the Universities of Gujarat: A Survey

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## A B S T R A C T

Research Data and its management process is a foundation practice of scholars. The research data included collected raw data from the selected samples for the research as well as the output of research in form of suggestions and analysis. Therefore to manage and preserve the raw data of research, one electronic platform would be needed that takes good care of data as well as enabled to serve it as per the requisites of the scholars during the research. Research Data Management, is a platform to conscious in taking care, authenticity, preservation and services of it. Collected Data is the backbone of any research. So it's much needed to organize, store and preserve the collected data during research in a proper way. Research Data Management (RDM) is that approach which overcomes all the obstacles of data collection and proper application. When data is collected in organized form then it's very easy to apply any statistical tools and techniques. Institutes can easily archive them so it helps the prospective researchers to use them in the future. It increases the usability and longevity of the data. In this digital era, data generation is exponential. To organize this huge amount of data there should be an effective management plane. In this study researcher uses the survey method of data collection through the questionnaire. The questionnaire has been filled by research scholars of the universities of Gujarat. After analyzing the responses received, get a pattern of scholars' perceptions and practices. The core objective of this study is to make scholars aware of the use of RDM and its effect on the ease of doing research. The limitation of this study only conducted on only research scholars of universities of Gujarat. Research scholars of the total of 25 universities of Gujarat i.e. state and central level are taken as a sample. This helps know the actual status of awareness and practices of research data management among research scholars. To find out, the areas that need to improve. By knowing the actual problem institute or RDM planner can plan the solution efficiently. Well structured strategy or resources like software and institutional repositories helps universities to improve Research Data Management (RDM). RDM services influence the research level. Good research always adds gems to the institution.

**Keywords:** Research Data Management, Research Data, Collected Data, Data Archiving, Data Preservation

## Introduction

Nowadays data management is becoming an inseparable part of almost every research subject area. Library and information science is one of the set of social sciences domain. Library professionals or prospective librarians deal with the data of all disciplines so it much requires knowing the practices and perceptions about them. The advent of technology triggers the research for more data generation. As a result, the technology is taken care of the storage, preservation and curation. We are in the era of technology. The research is not out of this. Almost every facet of the research process gets entangled with technology. Research data management is also much handled by the technology. Research data is generated, stored and preserved during any research activity. Generated data may be in physical or in electronic form. The process and perception of all activity related to research data is known as Research Data Management (RDM). management of research data gives the support to researchers of organization from initiation of research to the final evaluation (Bunkar, Bhatt, 2020). Research scholars' practices and perceptions about the research data management give the ideas about whole system.

The proliferation and wider availability of high-performance computing, the advancement of visualization, simulation, and other sophisticated analysis techniques and the capacity to store vast quantities of data are driving a revolution in research (Carlson, Garritano, 2010). This compiles the researcher to know about recent trends and technology. So it's necessary to get some insight into the practices or software used by research scholars.

(Davidson, Jones, Molloy and Kejser, 2014) cooperation and support of a diverse range of research-related staff. Researchers, librarians, administrators, ethics advisors, and IT professionals all have a vital contribution to make in ensuring that research data and related information is available, visible, understandable and usable over the mid to long term. This paper will provide a summary of several ongoing initiatives that the Jisc-funded Digital Curation Centre (DCC gave some points regarding emerging trends of the research data management in UK universities. Researchers found that Jisc and DDC founded UK universities developing a good environment for sustainable and supporting systems for research data management. This type of system gives a basic idea or encouragement to implement research data management systems and policies.

## Literature Review

Research data sets have usability even after use in one research. The reusability of data sets is not deniable (Darch, Sands, Borgman and Golshan, 2020) why they make these decisions, the effects on future data reuse. We present a

study, comprising interviews (n = 43. So there is a need to examine the perceptions and practices among research scholars. Without data we can't imagine any research to be authentic or complete, so it's much needed to store, preserve, curate and manage them for accurate results and analysis. Various tools and techniques are used for the management of data generated by any research. So many softwares are also used to manage data. Wulff, (2019) did a comparative study of software like PURE, Converis, and Symplectic. Researchers found that software helps in better preservation and curation of the data. Metadata standers also help in better interoperability. As we know that by the penetration of ITC, all subject domains got much exploration. This exploration is an effect of research and data analysis. Aydinoglu, Dogan and Taskin, (2017) discoverable, accessible and reusable. In this regard, the purpose of this paper is to investigate the perceptions and practices of Turkish researchers on the subject of RDM. Design/methodology/ approach: An online survey was distributed to the academicians in 25 universities in Turkey, 532 responses were gathered. Findings: Results indicate that although Turkish researchers are aware of the benefits of data management, are willing to share their research data with certain groups, have decent preservation habits, they express that they lack the technical skills and knowledge needed for RDM. In addition, no institutionalized support (staff, training, software and hardware surveyed the perceptions and practices of research scholars of 25 top universities of Turkey. Surveyor questioned about the practices used by academicians for their research data management. In 2017 the researchers of turkey were not much towards the new strategies for the RDM. They found that there is a lack of proper planning and policy. There is a need for technical skill and knowledge about the effective use of RDM. The closed system of data storage and preservation is also an issue. For proper protection and preservation, they used multiple platforms to save the data. This multiplies the same work many folds.

(Tripathi, Chand, Sonkar and Jeevan, 2017) talked about the metadata standers, preservation, sharing, storage and availability of data in the public domain. The researcher found that 45% of researchers have depended on experimental data and 42.7% depend on sample surveys. Researcher and faculty members generate varieties of data but didn't use metadata for their organizations.

## Objectives

The main aim of the study is to know the pattern of research scholars in managing research data. Practices and perceptions of the research scholars of selected universities in Gujarat about research data storage form of data preferred by them, the metadata used by them, and the backup plans.

- To find out the level of awareness about RDM by the research scholars of Selected Universities in Gujarat
- To identify the data pattern preferred by the research scholars
- To find out the most preferred storage space or electronic platform used for data preservation/storage by the research scholars
- To identify the research data backup strategy of research scholars
- To find out the institutional repository used in the Universities
- To find out the metadata standard used by research scholars

### Limitations

This study is mainly focused on the perception of research scholars collected through structured questionnaires. Various studies have questioned the authenticity of survey-based researchers. However, it would be interesting to study the RDM practices and policies of different Universities. A comparative study of RDM practices can also be undertaken.

The survey is conducted among research scholars of LIS at the universities of Gujarat. There are a total of 25 universities governed by the central government and state government. However, courses in Library and information science are being conducted in only 9 universities. The discussion and conclusion is only based on the responses received by the research scholars of respective universities.

**Table 1. Number of Responses Received by Respective Universities**

Name of the university	Total number of responses
Central University of Gujarat	6
Gujarat Vidyapith	2
Gujarat University	4
Sardar Patel University	5
M.S. University	2
Saurashtra University	1
Bhavnagar University	-
Veer Narmada South University	-
Hemchandracharya North Gujarat University	-

### Methodology

The investigator has used the survey method through online. The questionnaire is prepared for the collection of data. The questionnaire is prepared through Google form and circulated among the research scholars. Both types of questions are used in the questionnaire i.e. close-ended

and open-ended. The selection of research scholars for the survey has done randomly. Participation has been voluntary in the survey. A total of 22 completed responses have been received. 18 responses have been under study while 4 responses out of the sample area. Based on the responses investigator evaluated and presented the study.

## Data Analysis and Interpretation

### Awareness About RDM

Awareness about the Research Data Management (RDM) is the primary perception of the research scholars. Research data is the backbone of any research so, it must be necessary to get an idea about how to manage it. According to (Wiorogórska, Leśniewski and Rozkosz, 2018) the knowledge about research data management is directly linked to higher education. It reflects the level and status of the institutes through their scholars. According to the response to the questionnaire, 94.40% of research scholars know about the Research Data Management (RDM). This a good sign. Only 5.60% don't know about RDM. These responses show the research scholars are attentive and active regarding the concept and perception of RDM.

### Method of Storage and Backup

**Table 2. Responses for Storage and Backup of Research Data**

Storage and backup	Response %
Desktop/ laptop computers	77.8%
External hard drive s (including USB drives)	44.4%
Lab books/ field notes/ other printed or handwritten materials	16.7%
Internet-based storage (dropbox, Google docs or other software)	44.4%

Research data storage and backup is the crucial stage in the research data management process. The device or process of storing data gives a base for use over and over. It assures the researcher that the collected data is safe and it won't be lost. According to Louise Corti stated that, data collection and sharing the strategies allows researchers to how they handle data during the study process (Stoyanova, 2015). Table 2, shows that 77.8% of researchers use desktop or laptop computers for their research data storage and backup whereas internet-based storage like dropbox, Google docs, or other software is used by 44.4% of researchers. These data show that most of the research scholars rely upon and having faith in private storage devices like desktop or laptop computers. This shows the fear of stolen or showing the intention of not making data public. Internet-based storage (44.4%) shows the open approach of data storage by the use of research data management software or cloud platform.

## Institutional Repository

According to the (Witt, 2008) repository architecture of Purdue libraries' is distributed with several repositories which handles different types of content, workflow and several structures. There are three repositories for files, papers, and study datasets that were used in 2008 as "Purdue e- Scholar", which function as an umbrella for all repositories. Repositories of any institution or university give the researchers a great platform to store, preserve, curate and options for future use. According to the responses 50% of institutes/ universities having Institutional Repositories (IR) whereas 50% don't have. This shows the lack of infrastructure and lack of interest to upgrade the institutes or universities.

### Types of Institutional Repository

**Table 3. Preferred Types of Data Repository**

Types of repository	Response %
Centralized multidisciplinary data repository	50
Centralized discipline-specific data repository	27.8
Decentralized multidisciplinary data repository	16.7
Decentralized discipline-specific data repository	5.6

According to the questionnaire responses, 50.0% of research scholars prefer centralized data storage with a multidisciplinary repository. This is a good sign that research scholars prefer to multidisciplinary data repository which facilitates interdisciplinary data sharing. One time data collection may help more than one discipline, ultimately makes cost-effective for infrastructure.

### Research Data Loss and Reasons

**Table 4. Data Loss Reasons and Response %**

Data loss reasons	Response %
Deleting files accidentally	38.9
Mechanical damage of hardware	22.2
Theft of computer or hardware	5.6
No, I don't lose	50

In the current situation with the advent of technology, researchers generate and collect enormous data. For the storage of a vast amount of data, there is a need for a comprehensive plan and policy (Tenopir et al., 2011). These plans and policy reserve and secure the research data. Researchers can't afford the loss of data. Research data loss is the loss of complete study. So it's necessary to make backup collected research data that does not affect

the researcher's effort. Responses say that 50% don't lose their research data but 50% losses their research data. If 5 out of 10 researchers lose their research data, that is the subject of concern. So there should be planned strategies and systems that no data should be lost. Data loss means loss of study then ultimately loss of development. According to responses, 38.9% of researchers lose their research data accidentally, whereas 22.2% by mechanical damage and 5.6% by device theft.

### Use of Metadata while Storing Research Data by Researchers

Metadata is data about the data. Metadata describes the collected data. While storing research data the use of metadata makes data interoperable. It makes it more accessible in the sense of the future. Metadata standers like Dublin Core provide the ease to export or import the data on a common platform. The use of Metadata standards makes institutes or universities more communicable in respect of data sharing or preservation (Tenopir et al., 2011). Questionnaire responses show that 50% of researchers don't use any type of metadata while storing their research data. Only 22.2% of researchers use metadata standards while storing data. Rest has used the metadata but not with standers, which does not help in storing and sharing the data. These data tell that we need to make policy or practices while storing data, which facilitate preservation, data curation, sharing and maximize the use of data to a greater extent.

### Discussion

Research data management awareness is foundation knowledge for any research scholar. A significant number of researchers know about the RDM according to the responses. At the same time, most of the researchers prefer desktop and laptop computers or data storage. Which shows not very much intended towards the technology or internet-based option. The policy and plane and some training are needed to make them familiar with internet-based options. Very few respondents used internet-based services like Google drive or cloud-based options. The institutions and universities should develop the institutional repository infrastructure for data storage, curation and sharing. Centralized and multidisciplinary data storage is promoted by maximum research scholars. There should be proactive planning and policy regarding RDM from the parent organization. The metadata standards are the main concern. Because most of the users don't use metadata standards while storing data. This makes the data for limited use. It makes it tough to interoperate. So, metadata standers must be used by researchers, institutions or guides should increase to use them. The survey summarizes that the researcher should take the research data management process as a crucial process in the duration of the study. It makes difference in getting accurate and reliable results.



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## Questionnaire

1. Do you know about Research Data Management (RDM)?
  - a. Yes
  - b. No
2. What is your current method of data storage or backup?
  - a. Desktop/laptop computers
  - b. External hard drive s (including USB drives)
  - c. On department/ university server
  - d. Internet-based storage (dropbox, Google docs)
  - e. Lab books/field notes/other printed or handwritten materials
3. Do you use metadata for storing your research data?
  - a. Yes, with metadata standards
  - b. Yes, individually and consistently
  - c. Yes, individually and not consistently
  - d. No
  - e. I don't know about it
4. Which type of data repository do you prefer to store your data?
  - a. Centralized multidisciplinary data repository
  - b. Centralized discipline-specific data repository
  - c. Decentralized multidisciplinary data repository
  - d. Decentralized discipline-specific data repository.
5. Have you ever experience research data loss?
  - a. Yes
  - b. No
6. Reason for data loss:
  - a. Deleting files accidentally
  - b. Mechanical damage of hardware
  - c. Theft of computer or hardware
  - d. No, I don't lose
7. Is there an institutional repository in your institution or university?
  - a. Yes
  - b. No