MANAGEMENT OF DIGITAL RESOURCES: A STUDY

C Sasikala ***R Anuradha***

Abstract

This paper studies the digitization initiatives of Indira Gandhi Memorial Library, from different view points. It focuses on digital library managerial like policy making, planning and executing the program. It also covers the end user aspect through gathering their opinions, experiences and suggestions on digital resources and services offered by the IGM Library, University of Hyderabad. The study also highlights the problems usually faced by the librarians in developing digital collection and discussed about possible solutions.

Keywords: Digital Library; Management; Technology; Preservation

1. Introduction

The global information infrastructure is transforming with the growth in full text digital resources and fast communication facilities. This is so because institutions, agencies and departments in every country are busy capturing, processing, storing and disseminating information in the digital form. One of the primary methods of digital collection building is digitization. The digitization means the conversion of any fixed or analogue media-such as books, journal articles, photos, paintings, microforms- into electronic form through scanning, sampling, or in fact even re-keying. Digital library is a library where the information is made available in electronic form and access to it is provided through computers and other media like Local area network or Internet. Digitizing information has become a boon to many including library and information professionals. It reduces storage space, increases efficiency of retrieval of information. The digital library offers users the prospects of access to electronic resources at there convenience temporarily and spatially. Users don't have to be concern with the physical library hours of operation and users don't have to go physically to the library to access resources.

Some of the Digital library initiatives undertaken so far world-over are highlighted: Medoc in Germany, Digital library projects at the National diet library in Japan, Tsinghua University Central Library in China, Biblio theca Universalis – G7 Project, Library of Congress USA, NSW Parliament News paper clippings and press releases imaging project in Austraila, Internet Archives USA, California digital libraries. In India, the major initiatives undertaken in this direction: Million Book Universal Digital Library project, Vidyanidhi project, National Mission of Manuscripts, Traditional Knowledge Digital Library (TKDL), Gyan Nidhi and Indian National Digital Library in Engineering Science and Technology (INDEST). The initiatives undertaken so far clearly indicate that there is a boom in funding for digital library projects.

2. IGM Library, University of Hyderabad and digital initiatives

The University of Hyderabad came into existence in 1974 to promote teaching and research. The University at present has eight schools of study – Chemistry, Life science, Physics, Mathematics and computer/information science, Humanities, Social science, fine arts and communication and management studies. It offer postgraduate and research program across a wide spectrum of discipline in area of Science, Art and Technology. The IGM library was established in 1975 as a central facility supports teaching and research activities of the university. The library has been over years successfully catering to the information needs of the Schools/departments and students of all subjects. It is the first University library in India to computerize all its operations and services. With modernization and networking of the library and information system the university campus has been networked with fiber optic cable and 2MB bandwidth Internet connectivity for creating local resources, cataloguing and repackaging web resources. All school/departments are catered network. Library holdings can now be accessed through this Local Network and Internet.

3. Digital resources

IGM library provide access to in – house digital resources as well as external digital resources. In – house resources are stored in web server and made accessible through Network. They are books, serials, theses & dissertations, current and back volumes of periodicals, university publication, faculty publication, theses and dissertations, project reports, Lectures of visiting experts, conferences/ workshops, seminars/ proceedings. The external resources are not stored in web server. Here the digital library only act as an intermediary by subscribing these e-books, databases and provide hyperlinks to the respective databases in the web server. IGM library is subscribing to over 8000 e-journals from several publishers like EBSCO, Elsevier, UGC-Infonet, SCOPUS- A&I database, Royal Society of Chemistry, Institute of Physics and Mathscinet have given campus-wide IP based access.

4. Objectives of the Study

The Study was intended to collect information from the Librarian and Library staff who are involved in digitization activity. Also to know whether they are satisfied with the digital resources currently available in IGM library. The specific objectives of the study were the following:

1. To ascertain information about the digitization initiatives in IGM Library.
2. To gather details about the existing digital library facilities in terms of collection, organization and dissemination of the information to students, Research Scholars and Staff.
3. To collect information about provisions of financial assistance and grants and other facilities.
4. To review the present position of digital library facility in terms of access, preservation, retrieval of digital material.
5. To find out the activities, services and area of digitalization.
6. To know the problem faced by the library staff in digitization activity and user accessing digital material.
7. To ascertain details about the future plans of the libraries in digitization material.
8. To collect the opinion and suggestions of librarians and users of digital library for improving digital library services.

5. Review of Literature

A review of literature on digital library management demonstrate that challenges are not uncommon as organizations build their resources sharing system. Danial Greenstein, (2000) has revealed the key challenges confronted by libraries that are actively investing in online collections and services. Hussein Suleman & Edward A Fox (2001) is of opinion that the digital libraries are to be interoperable at the levels of data exchange and service collaboration. Such interoperability requirements necessitated the development of standards such as the Dublin Core Metadata Element Set and the Open Archives Initiative's Protocol for Metadata Harvesting (OAI-PMH). These standards have achieved a degree of success in the DL community largely because of their generality and simplicity. M.Krishnamurthy (2002) in his study the new Electronic world which is transforming not only libraries but also the organization that they serve makes the role of every information professional more complex; all of us now need additional knowledge and skills.

Krishan Gopal (2003) in his study suggests the introduction of digital technology into the process of production, distribution, and storage and retrieval of information along with the initiatives under taken to develop workable approaches. Carol Tenopir (2003) studied the online systems are designed to be used independently but that may not always yield the best results. The role of librarians as intermediaries to the search process is still necessary in a digital age. Christine L. Borgman (2003) identified four challenges faced by the digital libraries are: 1. invisible infrastructure, 2. content and collections, 3. preservation and access, and 4. institutional boundaries. Only with a better understanding of these challenges can libraries find their best fit in the information infrastructure of our networked world.

Dr.Mohan Raj Pradhan (2004) discusses the basics of developing a digital library and explains the new concepts underlying the digital library development procedures regarding technologies and managerial skills. Measures are needed to overcome the problems of computer viruses and also unauthorized use. Initial investment in digital libraries is high, as is maintenance; it is therefore essential the new sources of fund. Ronald Jantz (2005) is of opinion that developing preservation processes for a trusted digital repository will require the integration of new methods, policies, standards, and technologies. Digital repositories should be able to preserve electronic materials for periods at least comparable to existing preservation methods. Alexandros koulouris (2005) made a study of 10 leading university digital libraries world wide relating to access and reproduction of digital collection. The factors such as the creation type of material, acquisition method, copyright ownership etc. The relationship of these factors is analyzed showing how acquisition methods and copyright ownership affect the access and reproduction policies of digital collections. The common practice on access and reproduction policies are extracted and conventional policies are changed onto digital policies.Umesh Naik (2005) described one of the foremost issues in the creation of a digital library is to prepare a list of high level requirements. The goals of digitization will determine what hardware, software, human resource, materials and other tools and technologies are needed for the successful completion of the project. A clear plan must be developed before one starts detailed design and development of the library.

Digital libraries play critical role in organizing, preserving and providing access to digital resources. Present libraries are using latest technology for creation, preservation and dissemination of digital information. The library assumes responsibility for preserving information, face technical, legal and organizational challenges in responding to the new demands of digital preservation.

6. Methodology

For collection of data combination of data collection was used. The data analyzed on the nature and type of digital collection, the policies and programs, planning, formats, standardization for digital preservation. The study employed questionnaire method and discussions were made with the librarian, library staff and users to collect additional information about existing facilities in libraries.

Separate questionnaires were administered to the librarian, library staff and users of the IGM library to gather data. The survey questionnaire for the library staff covers areas like:

- Digital material policy
- Digital holdings
- Storage methods and formats
- Digital knowledge / training and
- Future needs for the services

Areas covered by the questionnaire for the users include their preferences and opinion on:

- Access to digital material
- Mode of access
- Type of material
- Problems and training
- Future needs

The scope of study includes: (1) information created originally in digital form and acquired by a repository through purchase, transfer, or legal deposit; (2) digital material created through programs or projects that convert print, photographic and manuscript materials to digital form. The digital conversion projects mainly to improve access to material and in terms of preservation; (3) the nature of accessing, type of materials accessed and problem in accessing digital material.

The present study is a case study taken up to analyze the electronic and digital library management strategies adopted by I.G.M. Library of the University of Hyderabad. Due to limitations of time the researcher could not gather the results based on the surveys of other library(s) of similar nature to evaluate and compare the services of IGML.

7. Findings

- **Library Survey :** IGM Library is the first University Library in South India that has developed a full-fledged digital library and provide global access to it. Present study makes an attempt to study various digitization activities of the library – Planning, Creation, Preservation and Management of digital resources.
- **Planning :** IGM library adheres to the authorized written policy documents approved by the library committee for managing digital material. The policies provide guide lines for acquiring material in digital form, converting the material from print to digital form, storage, Refreshing and migrating of material. It is ongoing and continuous. The policies of the institution meets well with the current needs. The materials selected for digitization are not under copyright and published in house.

- **Creation of Digital Collections :** IGM Library has started creating and storing of books, serials, theses and dissertations, current and back volumes of periodicals, University publication, faculty publication, Lectures of visiting experts, conferences/workshops, and Seminars/ convention proceedings in digital form. The Library is well equipped with necessary Hardware High end book scanners both flat bedded and hand held scanners, printers, P IV PCs for processing, i2s Digibook scanner, Sony digital camera, SUN server for storage, UPS backups.
- **Different Softwares used by the library includes:** VTLS: Digital library application software, OCR fine reader 7, cleaning and editing software, scanner software, LINUX, ORACLE, Publishing software, Search Engines etc. The pages are scanned and a computer readable (digital) image of pages are produced and stored in computer. The Optical character Recognition (OCR) software convert the text image in ASCII format for editing and manipulation of information and digital document is stored in server for online access.
- **Preservation of Digital material :** IGM digital library holds the responsibility of long term preservation of digital material. They are stored in hard disk, magnetic tapes, CD ROM, Optical disk(rewritable) & WORM Optical disk (write once and read many). It accepts electronic records in any format and convert into standard format and store them in hard disk, CD ROM, Optical disc Rewritable, WORM. Digital materials are archived in TIFF, JPEG or PDF formats.
- **Access Control :** IGM Library provides access to digital resources to its students, faculty and staff. User can access the digital material through ID & Password. There is no limitation for access to the materials provided if he/she is an authorized user. The institution has chosen to mount the digital reproduction (content) for Internet access in order to support searching across the collection. Digitization work is an ongoing, there is no specific time schedule. The IGM library receives funds from University of Hyderabad, UGC, Vidyanidhi project, Universal digital library project & SUN Micro system. It also holds preservation responsibility of digital material. Currently, approximately 621 documents with 7200 MB has been stored in PDF format. The digital library supports the metadata standards.
- **Training of Staff :** The staff are trained in digitization work. They are given training in IIIT, Hyderabad and IIIT, Bangalore from time to time. There are training programs to increase the level of staff expertise with digitization of material and preservation. The Library is also a member of digital consortia – Universal digital library (UDL), Vidyanidhi and UGC – infonet.
- **User Survey :** The IGM Digital library is large depository of information collected and stored in digital form. The study has examined the use of the digital collection by potential users (such as students, Research scholars, and faculty). A structured questionnaire was prepared taking into consideration all parameters regarding digital library use.

Table 1: User sample and its composition

Sl.No	Subject /Department Reponse Rate	No.of students Scholars Response	No.of Research Response Rate	No. of Faculty
1	Mathematics, Statistics and computer / Information science	8 (4.49 %)	14 (10.77%)	6 (13.64%)
2	School of Physics	18 (10.12 %)	8 (6.16 %)	4 (9.09 %)
3	School of Chemistry	14 (7.87 %)	10 (7.69 %)	4 (9.09 %)

4	School of Life sciences	24 (13.49 %)	18 (13.85 %)	8 (18.18 %)
5	School of Humanities	10 (5.62%)	28 (21.54 %)	4 (9.09 %)
6	School of Social Science	60 (33.71%)	22 (16.93 %)	8 (18.18 %)
7	School of Art; fine art &	14 (7.86 %)	14 (10.76 %)	6 (13.64 %)
	communication			
8	School of Management studies	20 (11.23 %)	16 (12.30 %)	4 (9.09%)
9	Study India Program	10 (5.61 %)		
	Total	178 (100 %)	130 (100 %)	44 (100 %)

Five hundred questionnaires were distributed among Students, Research Scholars and faculty of academic community consisting of eight schools of study. Out of the 500 questionnaire circulated, 352 responses (70%) were received. The 352 responses comprised 178 (51%) from students, 130 (37%) from Research scholars and 44 (12%) from faculty. The subject – wise responses and the percentages are presented in Table 1.

Table 2: Frequency of visit to the library

Sl.No	Frequency of visit	No of students (N= 178)	No.of Research scholars (N=130)	No.of Faculty(N=44)
1	Daily / Regularly	60 (33.70%)	82 (63.07%)	30 (68.18%)
2	Occasionally	118 (66.30%)	48 (36.93%)	14 (31.82%)
	Total	178 (100 %)	130 (100 %)	44 (100 %)

It may be observed that the highest percent (66%) of the students visit the library occasionally. Where as 63% of the research scholars are visiting library regularly. It is also observed that highest percent of the teaching faculty are visiting the library regularly.

Table 3: Access to digital material

Sl.No	Type of Digital Material	No. of Students (N =178)	No of Research Scholars (N=130)	No of Faculty (N = 44)	Total (N = 352)
1	Library	118 -66.29%	70 -53.84%	20 -45.45%	208 -59.09%
2	Department (N= 352)	48 -26.96%	48 -36.92%	24 -54.54%	120 -34.09%
3	School (N = 352)	16 -8.98%	14 -10.16%	28 -63.63%	58 -16.47%
4	Hostel (N = 178)	8 -4.49%	-	-	8 -4.49%
5	Home (N = 352)	8 -4.49%	8 -6.15%	-	16 -4.54%

It is evident from the analysis of data that highest percent of respondents are accessing the digital material in the library and from the departments. Among the faculty, majority (63%) are depending on the facility available in their concerned school followed by Department (54%). However, significant percent of them (45%) are also found to be using the central library facility.

Table 4: Access Modes

Sl.No	Access Mode	No. of Students (N =178)	No of Research Scholars (N=130)	No of Faculty (N = 44)	Total (N = 352)
1	OPAC	40 (22.47%)	58 (44.61%)	12 (27.27%)	110 (31.25%)
2	INTERNET/ Intranet	150 (84.26%)	72 (55.39 %)	20 (90.90%)	242 (68.75%)

Highest percentage of the users access the digital materials through Internet (68.75%). Compared to the teacher and research scholars, the percent of students accessing Internet is more. However, significant percent of users are found to be accessing digital resources through library OPAC.

Table: 5 Type of Digital material access

Sl.No	Type of Digital Material	No. of Students (N =178)	No of Research Scholars (N=130)	No of Faculty (N = 44)	Total (N = 352)
1	Books	98 (55.05 %)	80 (61.53 %)	18 (40.90%)	196(55.68%)
2	Journals	70 (39.32 %)	98 (75.38%)	36 (81.81 %)	204(57.95%)
3	Conference Proceedings	4 (2.24 %)	20 (15.35 %)	12 (27.27 %)	36(10.22%)
4	Thesis	24 (13.48 %)	32 (24.61 %)	6 (13.63 %)	62(17.61%)
5	CD ROM	12 (6.74 %)	4 (3.07 %)	6 (13.65 %)	22(6.25%)

Among different types of digital sources electronic journals are accessed by highest percent of users (57.95%), followed by books (55.68%). User category wise preferences for different digital materials shows that among the students highest percentage (55%) accessed digitized books. Electronic journals were found to be most preferred digital information sources among the faculty (81%) and research scholars (75%).

Table No 6: Problems in accessing digital material

Response	No of students (N= 178)	No.of Research scholars (N=130)	No.of Faculty(N=44)	Total (N=352)
Yes	78 (44.82 %)	44 (33.84 %)	22 (50 %)	144(40.91%)
No	100 (56.18 %)	86 (66.15 %)	22 (50 %)	208(59.09%)

Regarding the problems faced while accessing digital collections, highest (59%) percentage of users are not facing problems in accessing the digital material. But among the faculty, the opinion was shared equally by them (50% each). As noticed in the table students and Research scholars are facing some problem or other in accessing digital resources. Next table (Table 7) highlights the nature of problems stated by the users.

Table 7: Nature of problem in accessing digital material

Sl.No	Nature of Problem	No. of Students (N =178)	No of Research Scholars (N=130)	No of Faculty (N = 44)	Total (N = 352)
1	Access slow	40 (51.28 %)	25 (56.82 %)	14 (63.64 %)	79(54.87 %)
2	Inadequate system	19 (24.36 %)	15 (34.09 %)	4 (18.18 %)	38(26.38 %)
3	Inefficient display of information	11 (14.10 %)	4 (9.09 %)	4 (18.18 %)	19(13.18 %)
4	Not aware of down loading	8 (10.26 %)	-	-	8 (5.55 %)

The nature of problems faced by students, Research scholars and faculty in accessing digital material can be grouped into four categories. They have complained about the speed of the Internet connectivity which is causing access problem. Other issues raised by the users include inadequate number of systems, inefficient display and lack of knowledge in downloading files from online digital sources.

Table 8: Training on the use of digital library services

Response	No of students (N= 178)	No.of Research scholars (N=130)	No.of Faculty(N=44)	Total (N=352)
Yes	106 (59.56 %)	82 (63.08 %)	12 (27.28 %)	200 (56.81%)
No	72 (40.44 %)	48 (36.92 %)	32 (72.72 %)	152 (43.19%)

It is noticed from the responses that majority of the users need training in down loading and printing of digital materials (56.81%). This percentage is high in the case of research scholars (63%) compared to students (59%) and faculty (27%).

Table 9: Suggestions Digital library services

Suggestion	No. of Students (N =178)	No of Research Scholars (N=130)	No of Faculty (N = 44)	Total (N = 352)
No of computers should be increased	24 (13.48%)	25 (19.23 %)	6 (13.63 %)	55 (15.62 %)
Training requires	80 (22.73 %)	40 (22.47 %)	32 (9.23 %)	8 (18.19 %)
Internet Connectivity should be fast	98 (55.06 %)	61 (46.92 %)	30 (68.18 %)	189(53.69 %)
User friendly software for downloading in any format	16 (8.99 %)	12 (9.23 %)	-	28 (7.95 %)

It may be observed from the findings that majority (53%) of users suggested that the Internet connectivity speed should be increased. Users have also requested to organize training program on down loading, saving and printing of digital materials. Some of the users requested to increase the number of computers in the campus for accessing of digital materials. Some of the users even suggested to adopt more user friendly software for down loading of digital materials in any format i.e. PDF, HTML or XML.

8. Conclusions and Suggestions

The 21st century witnessing a knowledge revolution resulting from rapid growth in information and communication technology, acceleration of technical change and intensification of globalization. Creating digital resources for providing wider and seamless global access to digital information to the users in distributed environment became a challenging task for any contemporary librarian. The present study is an attempt to analyze the present situation in IGM library, University of Hyderabad. Regarding the frequency of use of library and digital material in the library, it is observed that a large number of faculty and research scholars are accessing and using regularly both in-house and external digital resources. This indicates the optimum utilization of library resources. IGM Library has framed regulations to allow access to the digital material to the registered users of the university. The library provides access to the digital material to its users regardless of their geographical location. It is also observed that the problems faced by users using Digital Libraries are quite similar to the traditional libraries with some changes due to electronic rather than physical resources. The nature of problem can be broadly categorized as slow access, inadequate number of systems, inefficient display of information and lack of awareness in access, use and downloading information from digital resources.

There are number of managerial and technical issues that are to be addressed by the digital librarians to provide satisfactory services to the users. The workflows and processes are only one aspect of digital libraries but there are number of issues that need to be considered. When creating a digital library like users, management support, staff authority and responsibility, policy related to IPR, security, finance, leadership and coordination etc. Before starting to create a digital library it is important to evaluate the hardware and software aspect so that the digitization process can run smoothly without further investment for it. There is another important aspect of the digital library i.e. preservation of digital contents. Therefore, the preservation technology must also be addressed while planning the creation of a digital library. There are two main methods for transferring information contained on magnetic or optical media onto new media; harvesting and migration seem to be the only logical answers to preserve the information. Migration is an active system-based approach. Migration preserves information by continually moving it between one system and its replacement. The difference between the two methods is that migration preserves the structure of the file and its information while harvesting merely copies the information.

Building a digital information is a complex process involving requirements analysis, careful planning, and well informed choices. Ultimately, every library's goal is to meet the information needs of its users. The digital library infrastructure will assist staff in creating the tools and supporting applications to manage a growing collection of library work in digital form, will help to ensure long term preservation, and will provide new and innovative library services to the users. Acquiring & implementing application development tools for programming staff, testing implementation of digital content that use the core

software defining the library's corporate requirements for electronic document management and determining the best approach for implementing an electronic document management system. All hardware and software dependencies should be avoided and all digitization equipment must be capable to support the requirements for long-term preservation.

The library professionals should pay keen interest to understand the various provisions about the copyright act, patterns, and designs etc. The liabilities and safeguards in regards to the librarians and libraries should be taken care of to avoid the infringement of the copyright act. The Government of India has passed the copyright law before attaining independence and amended in different periods to protect the copyright till date. In digital and new worked environment, it would be ideal if there is a single world law on copyright to safeguard the intellectual property rights, at the national, & international level.

The role of Library professional is also changing in the digital library environment. Library professionals with their expertise, knowledge and techniques of where to look up and how to find out information for a given query can help the users in their search for information by extending personal help and assistance. Library professionals should acquire such skills in handling the information sources and users tactfully and render satisfactory information service in the fast changing digital library environment. It is also necessary for their very survival and survival of the library profession.

In a Country like India where resources are limited, funds are inadequate; librarians have to take careful and judicious decisions in selecting library materials for digitization. However, taking into consideration the user's information needs other requirements, university libraries may plan for digitization projects. Only through digitized information, university libraries can share their resources with other libraries and make their resources available to a large number of users through the web.

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