

DIGITIZATION OF THESES AND DISSERTATIONS IN UNIVERSITIES IN DEVELOPING COUNTRIES: STRATEGIES FOR MAKERERE UNIVERSITY

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Abstract

Digitization of libraries is currently described as a cost effective way that has the ability to organise, store, preserve, retrieve, and ensure effective usage of information. Digitization of theses and dissertations offers great opportunities for access with immense potentials in the developing world. However, many institutions in developing countries are faced with a lot of challenges in an attempt to work towards digitisation of theses and dissertations. This paper aims at providing a roadmap for the digitization of theses and dissertations in Makerere University. The study establishes the challenges and prospects of the digitisation of theses and dissertation to provide a way forward for the digitisation strategy. A qualitative approach design with a purposive sampling strategy was adopted. The results indicated that lack of skills in digital technology is a major challenge in the digitisation of theses and dissertations. It was also clear that providing a roadmap for digitisation of theses and dissertations requires a strategy for copyright protection, preservation policy, and publicity and awareness of the digitised information. The strategies for the provision of skills in digital technology, providing appropriate facilities; formulation of policies, and ensuring publicity and awareness provided a roadmap for the digitisation process in Makerere University.

1. Introduction

Digital Libraries take an embryonic form in information systems with the ability to retrieve information for users (Allard 2004:3). The recent information technology developments have focused on helping libraries respond to the challenges of information explosion, sparing storage costs and increasing user demands. Digital libraries are currently described as cost effective and allows resource sharing of the digital collection (Dervin 1996:43). Digital collections support full traditional libraries and increases access of electronic resources. Lesk (1997: 12) indicates that just as the traditional libraries have devised a number of technical solutions to their information related problems, so digital libraries should come up with advanced solutions and services to meet the ever-changing needs of information seekers in accessing and retrieving information. The concept

of digital libraries combines end user needs with technology that has the ability to organize, store, preserve, retrieve and ensure usage of information (Magara 2002:241). For example, UNESCO concept of *the memory of the world* aims at protecting the endangered cultural materials (UNESCO 1996: 24).

Developing countries face a number of problems with regard to the digitization process. Some of these problems include the high costs, limited choice available in one location, difficulty in accessing materials and problems of space and time (Sarageldin 2003:2). Sarageldin however believes that digitization based on new technologies enables immediate and easy access, ensures established standards of issues of intellectual property rights in the digital age. In fact, advocates for the digitization of libraries take it as a strategy of full “information capture” to ensure that digital objects are enriched enough to be useful over time and in the most cost-effective manner (Estabrook 1986: 60). This is because digitization of libraries has an inherent design that combines end-user needs with technology.

According to Quah (1998: 45), the information services provided by digital library demonstrate a potential for uses that extend far beyond being a showcase for technological morels. Bates (1996: 111) reveals that the immense importance of digital library initiatives offer opportunities for collaboration among themselves. Fidel (1997: 46) forecasts that digital libraries will play an increasing role in facilitating the completion of an information service work, and enable patrons to accomplish practical and specific tasks, requiring every component of their design to reinforce this mission.

Digitizing Theses and Dissertations

The terminology thesis and dissertation varies considerably not merely from country to country, but also within countries. For example, in the United States, there is no uniform agreement among graduate schools over what a thesis is or what a dissertation is (MacColl 2002:1). In the United Kingdom, thesis is meant to refer to original research, achieved usually only at great effort by students many of whom go on to become academic to careers in research, publishing and teaching in universities. Digitization of theses and dissertations offers great advantages for access, allowing users to find, retrieve, study and manipulate materials. Reliance on digitization as a preservation strategy could however place materials at risk (Arms 1999: 60-78). On the other hand, obsolescence of digital technologies and media instability renders the digitized object vulnerable to loss. While digitization has some times been proposed as having a

preservation advantage in terms of deflecting use from originals, it has been asserted that enhanced awareness of resources will result in greater demand for the originals of the thesis and dissertation. At present, the cost of digitization, creating and maintaining a migration path for preserving files is very expensive (Cornell 1998: 23). That is why compatibility with other digital resources and the collections intrinsic intellectual value is important.

The technology poses the on going opportunities as well as challenges for planning for the digitization of the library in terms of amount of digital collections and how they can be accessed by whatever software domination in the future. It is important therefore for a library to upgrade its on going processing power and storage capacity to support the digital library programme so as to meet the demand for access to digital collections. Though digitization can sometimes serve preservation purposes, it is clear that, so far, digital resources are at their best when facilitating access to information, and weaken when assigned the traditional library responsibility of preservation. The reason for the weakness of digital library as a preservation is complex. Microfilms with the preservation reformatting medium of choice, is projected to last several centuries when made on silver halide film and kept in a stable environment. It requires only a lens and light to read, unlike computer files, which require hardware and software, both of which are developed in often-proprietary forms that quickly become absolute, rendering information inaccessible. For example, there is a significant concern by Bates (1996: 54) that many of the collections that may be of the highest research and teaching value will not be digitized for web access because of the structures of copyright that might apply. That is why many library websites these days contain a disproportionate amount of public domain material that limits source base for research. In addition, the digitization is limited in terms of manuscripts, musical scores and performances, photographs and graphic materials and morning images, are extremely rare, traipse or, in fact; unique, and gaining access to them is very difficult.

Despite the high cost of digital preservation, many institutions worldwide are taking on ambitious projects in order to utilize the available technology to digitize the theses and dissertations. So a number of attempts towards digitization of theses and dissertations in the world. However, most of the attempts are characterized by increasing large amounts of money in projects, intrinsically valuable information remains unpublished. In UK, a number of attempts have been made to promote the digitization processes including The UK Online Theses group (UTOG), Networked Digital Library of theses and Dissertations (NDLTD), Scholarly communications Group, the Open Archive Initiative Project of Metadata Harvesting (OAI-

PMH), and The Thesis ALIVE in UK. The Thesis ALIVE in UK aims, for example, at generalizing the Metadata creation process for all the UK theses and dissertations while at the same time linking it to an ETD (MacColl 2002:5). Attempts have been made to enable access to theses and dissertations in UK by the use of index to thesis, the Pro quest services, the SIGLE (5) service, or the British Library Public Catalogue Books files.

In African academic institutions, the research function is the most practical collaborating application of the majority of institutions (Magara 2002:250). For example, the process of setting a digital library has been exhibited for a long time since 1998. Library staff have been trained in digitalizing and managing a digital library, news paper indexing, Uganda national bibliography, union list of serials, general catalogue, internet and email services and for a long time linking users to the African Virtual University. Tibenderana (2004:248) views the Makerere University Library as moving into a fully transformation of a library into an information super highway.

Status of Digitization Process in the Makerere University Main Library

The level of digitization of thesis and dissertation in Makerere University library is still inadequate in terms of functions and computer facilities. Makerere University library systems provide very few digitized services to the users. Though the digitization exercise is under way, users prefer manual systems. The table below shows some attempts towards digitization in Makerere University Library.

Table 1: Systems/Projects in the Digitization Process

System/project	Description
Database of African Theses and Dissertations (DATAD)	Identifying dissertations for post graduate students Scanning abstracts Entering abstracts in the databases according to database design Proof reading the database. This is entered in Africana Section. Reading abstracts on CD-ROM Sent to Association of African Universities (AAU) and entered on the server. Accessed worldwide. Member Universities access free of charge.

MakLIBS Library Catalogue	Enables you to search anywhere: books, newspapers, and periodicals. You can search by author, title, subject, publisher, call number, and journal title. It keeps information on archives, reference materials and Africana Section Collections (Theses, Dissertations and Uganda Imprint). It links with Online journal databases, e.g EBSCO, EMERALD, GALE (Thomas Learning), Oxford University Press, Royal Society of London, Hanari Database, Agora Database, Cochrane Medical Library, Blackwells Publishing and eSAP. The data is being entered in all sections and all branches of the University Library.
Microfilming	Documents are microformed into microfilm and microfiche.
Electronic Document Delivery (EDD)	Handles requests for articles in collaborating universities and send them accordingly. E.g. British Library
Electronic Supply of Academic Publications (eSAP)	Can be accessed to and from participating universities in developing countries and supported by International Association of University Presidents. The participating Universities include; Catholic University of East Africa, Dar es Salaam, Kenyatta University, Makerere, Nairobi, Sokoine, Uganda Martyrs University, University of Zimbabwe, and St. Augustine University.

Source: DATAM Methodology Manual, Makerere University Library Website, Filed

The library has in place many programmes towards the digitization process of the library services. Few of them like OPAC provide bibliographic information that shows references and where it can be accessed. In others, like EDD, eSAP that require physical delivery of documents, is limited by copyright policy in place. Although the DATAD project by the Association of African Universities provides information including the bibliographic, key words and abstract, it is still limited with the capacity to computerize full text thesis, even then, no policy on copyright is available to guide its digitization and use. It is therefore important to establish the challenges facing the digitization of theses and dissertations and ascertain the prospects of digitization of theses and dissertations in Makerere University Library.

1.1 Statement of the Problem

A number of attempts have been exhibited towards the digitalization of theses and dissertations in the past few years and continues to expand its reach and capabilities with immense potentials in the developing world. However, many developing countries are faced with a lot of challenges in an attempt to work towards the digitization of theses and dissertations. Makerere University has itself attempted to digitize theses and dissertations, however the process is faced with lots of challenges including high costs associated with maintaining the process of access, rapid obsolescence of digital technologies, the risk of media instability that may render the digitized object vulnerable to loss, and risk of copyright violation. It is therefore important to examine challenges and prospects of Makerere University Library to be able to provide a strategy for the digitization process of theses and dissertations.

1.2 Aims and Objectives of the Study

The main aim of this study was to examine the challenges and prospects of digitizing theses and dissertations with specific reference to Makerere University Library. The paper will therefore be able to:

- ◆ Examine the challenges of digitization process in Makerere University Main Library.
- ◆ Establish the prospects for the Digitization process of theses and dissertations in Makerere University Library.
- ◆ Provide strategies for the digitizing theses and dissertations in Makerere University Library.

2. Methodology

A qualitative research study design collected data about challenges and prospects of digitization of theses and dissertations. This study was conducted in Makerere University Main Library from purposively selected heads of various departments, staff working in automation and students. The study basically collected both primary and secondary data through a self-administered questionnaire to the staff of Makerere University Library more especially in the African section. The open-ended verbal interviews were conducted among the heads of departments of the Library. A total 50 respondents that constituted 19 library staff and heads of sections from the Main Library and 31 students were used for this study. These respondents had different characteristics as regards to their sex, gender, academic qualification and marital status.

3. Findings

This section present and discuss the findings of the study. This section indicate the challenges and prospects of digitization of theses and dissertations in academic institutions.

3.1 Challenges in the Digitization of Theses and Dissertations in Makerere University Library

All respondents were requested to indicate the challenges faced with the digitization process in Makerere University. Respondents were required to rank their responses whether they strongly agree, or strongly disagree. Various challenges as indicated in the table below were identified by the study.

Table 2: Challenges of Digitising Thesis and Dissertations at Makerere University Library

Challenges	Strongly agree%	Agree %	Disagree %	Strongly disagree	Total%
Limited skills in digital technology and Bandwidth	58	27	09	06	100
Lack of adequate resources	54.6	25.8	10	9.6	100
Lack of adequate funds	44	17.3	22.7	16	100
Occupational IT breakdown	44	20.9	19.6	15.5	100
Lack of more appropriate software	50	21.3	14	14.7	100
Rapid absence of digital technologies & media instability	39	15	14	32	100

The table above shows that majority of the respondents (58%) strongly agreed that limited Skills in Digital technology is major challenge in the digitization of theses and dissertations in Makerere University Library. It was established that most of the library users do not have appropriate and ideal digital skills in using the digital library. It was also clear that the inadequate resources limit a number of users to acquire with appropriate knowledge. That is why majority of users suggested that the administration should consider digital technology as one of the mainstream priority aspect in the library. Further more, the findings indicated that lack of training in digital skills makes it difficult for library management and the University

Administration to digitise thesis and dissertations. It was also established that, most library users are at different levels of ICT application. This puts the durability of the digitisation equipment at a risk including poor handling.

Majority of respondents showed lack of adequate resources as a challenge in the digitization process of the thesis and dissertations in Makerere University library. From the observations and interviews, the findings revealed that there was inadequate equipment especially computers in various sections and departments. Observations also showed the inadequacy in equipments for the operation of the digital technology. It was observed that library digital services are characterized by occasional breakdown of computer servers thus causing Internet disconnections. For example, there were cases of Local Area Network (LAN) breakdown that limit some users at different terminals by sharing or exchange information. Sometimes, the LAN cannot allow high-speed data transmission for data transfer within the library and to other departments and branches. It was also observed that although information on theses and dissertation was available, accessing this information in the library was always not easy.

From the interview conducted with the library administration, it was observed that most of the sub libraries lack the digital library equipments and skills. There was a total lack of a two –way communication flow to enable other library users to connect to the digital library at the main library. None of these technologies have been apportioned to help the sub libraries to easily access the digital library. It was also observed that there was little knowledge on the technical architecture that underlies any digitization process in the library system.

It was discovered that although the library had in place different avenues and approaches for digitisation of thesis and dissertations, there was no single policy that addresses the issue of Copyright. The copyright is in terms of what information can be digitised, who has access to the digitised information and with which rights. More so, even if the digitised information is accessed in bibliographic form, users need to access the materials. This normally requires photocopying of the copies for the benefit of the users. There is also lack of a comprehensive policy that addresses the preservation and conservation of theses and dissertations. In many cases dissertations are missing in areas where they were stored and in some cases no indication was shown to show the where about of a missing dissertation.

It was further discovered that a lot of materials that had been researched were not accessed to the users. Members expressed that there were no

avenues that motivated students and lecturers to publish their works. The Copyright issues also limit this strategy. According to students, they did not know what rights they have about their own researches vis-à-vis the University rights. The attempts that had been done for students to publish their works with their supervisors were limited by lack of publishing avenues, e.g. lack of access to international refereed Journals. There was nobody in the university who was following up how theses and dissertations that had been done could be published. More so, there was no university programmes and requirement that bound students to publish their works.

3.4 Prospects of Digitising Theses & Dissertations in Makerere University Main Library

From the questionnaires and interviews, the following prospects were established:

Table 3: Prospects in Digitising Theses's and Dissertations in Makerere University Library

Challenge	Prospects/way forward
Inadequate equipments	Expand the net work (Local Area Network) Increasing the quantity and quality of scanner and printers Putting more computers in the library information centers More installation of digital cameras More faster scanners which are like copiers CD writers
Lack of reliable and comprehensive digital information	Introducing the application of CD-Rom technology Information repackaging Creation of more WebPages and links Timely up loading of information on the library website
Limited ICT skills for the working staff	Increased use of education to facilitate self guidance On job training More refresher courses of the library staff

	<p>More staff development programme</p> <p>E-learning training</p>
Lack of appropriate software in the library	<p>The library intends to use simple and understandable software, which are user friendly like Procite, adobe Photoshop.</p> <p>Experts in the library have designed appropriate programmes to suite the library users</p> <p>The library had purchased more useful software.</p>
Inadequate funds	<p>Library is seeking more financial aid from the donors like from Africa Development Bank, Norad, eSAP,</p> <p>There is increased information sharing among libraries</p>
Challenge Occasional ICT breakdown	<p>There is increased supervision by library staff</p> <p>Increased technicians stand by</p> <p>Regular system servicing</p> <p>The library has installed effective use of virus guard programmes.</p>
Poor professional advice	<p>Library at times hires, qualified IT staff</p> <p>Think tank consultative meetings</p> <p>There is constant evaluation of ICT in the service</p>

Source: Field Research (2004)

It was clear from the study that for a library to prosper, there was a need to solicit more funds to purchase equipments, install appropriate software and increased training of both the working staff and library users in ICT. It was also clear that there was a need for the introduction of computers in the various departments. It was seen that there was a need to ensure that digital technology was put in place for accessing thesis and dissertations in all sections of the library.

4. Discussion

The study revealed that lack of skills in digital technology was a major challenge in the digitisation process of theses and dissertations. Actually Magara (2002:153) believes that literacy levels affect the adoption of ICT into their organisations. In fact, teaching the community how to use tools of digital library to locate information is potentially the most significant role of the librarians (Tibenderana 2004:251). Lack of adequate resources as the challenge for the digitization of thesis and dissertations was identified by Cornel (1998) who noted that the cost of digitization and creating and maintaining a migration path for preservation files is very expensive. It is important to note that while making an under used collection more accessible, it should be viewed in conjunction with other factors such as compatibility with other digital resources and the collections intrinsic intellectual value. Arms (1999) notes that failure to consider some of those factors may render the digitized object vulnerable to loss. He indicated that while digitization has sometimes been proposed as having a preservation advantage in terms of deflecting use from originals, it has been asserted that enhanced awareness of a resource will result in greater demand for the originals. More so, Fidel (1998) asserts that technology possess on going opportunities as well as challenges for the digitization of libraries. He noted that planning for the digitization of the library must ensure that the vast digital collections can be accessed in future by whatever software domination.

Rapid access to digital technologies and media poses the problems of preservations and copyright issues. According to Chepesuik (1997:49), libraries are, for the most part, simply caretakers of information—they don't own the copyright of the material they hold. It is unlikely that libraries will ever be able to freely digitise and provide access to the copyrighted materials in their collections. According to him, libraries are required to develop mechanisms for managing copyright, which will allow them to provide information without violating its rights. These rights include usage tracking, identifying and authenticating users, providing the copyright status of each digital object and the restrictions on its use or the fees associated with it, and handling transactions with users by allowing only so many copies to be accessed, or by charging them for a copy, or by passing the request on to a publisher.

There are difficulties in data migration in terms of costs and standards. The bottom line is that no one really knows how best to migrate digital information (Bates 1995). Even if there was adequate technology available today, information would have to be migrated from format to format over many generations, passing a huge and costly responsibility to those who

come after. That is why digital preservation standards is required to consistently store and share materials preserved digitally (Chepesuik, 1997).

5. Conclusions

From this study it can be concluded that to realize maximum benefits from digitization of the thesis and dissertations, there is need to provide users with appropriate skills, acquire more digital facilities, design and formulate an institutional ICT policy which can allow all the library departments capture, access the information in these theses and dissertations from any where in the university. It is also clear that providing a strategy for the digitization of theses and dissertations requires a strategy for copyright protection, preservation and conservations and public awareness of these digitized materials.

6. Recommendations

1. Provision of appropriate skills in the digitization process:

- Library and information workers within the Library should endeavor to acquire relevant and more skills in the use of the available databases.
- The LIS training schools should carry out training needs assessment on digitization of library systems and introduce the skills to its curriculum appropriately.
- Makerere University Library services should organize staff and user oriented training on how to acquire the skills necessary for use in the digitization and use of digitized library materials.

2. Provision of appropriate facilities for the digitization process of theses and dissertations:

- ◆ To promote resource sharing within the community that will ease the digitization of the theses and dissertations in the library, much attention should be directed towards the creation and maintenance of local databases especially researches carried out within the community.
- ◆ Makerere University administration should provide support in soliciting financial, social and good will support in the running and managing of the Library.

3. Designing and Formulating digitization policies with regards to theses and dissertations:

- ◆ To address the issues of copyright and intellectual rights. There is a need to develop a policy on the metadata that aims at generating

appropriate software for validating the approved theses. Schemas need to be developed that describe theses and dissertations according to their various structural elements that should support the expert of metadata in various formats describing the full text of the theses.

- ◆ A preservation and conservation policy to protect the use of theses and dissertations should be developed and accessed by the users.

4. **Ensure public awareness of the digitized theses and dissertations:**

- ◆ There is a need for advocacy programme in the library to promote the digitations, use and dissemination of information about theses and dissertations.
- ◆ The Library should ensure availability of university library theses and dissertations live through the provision of links with the Electronic Gateways to help its materials be accessed online. The DATAD project need to be promoted and the CD-ROM and the database be accessed.
- ◆ Makerere University should produce a newsletter and/or a journal where recent researches can be published.
- ◆ Through the National Council for higher education, universities should start a databank of all researches that are registered and conducted in higher education institutions in Uganda.
- ◆ Library staff responsible for the theses and dissertations should make user indices on particular subjects to ensure quicker access to theses and dissertations.

References

- Allard, S. (2004). Digital Libraries: A Frontier for LIS Education. Available from:
http://www.alise.org/conferences/conf00_Allard_digital_libraries.htm. Accessed July, 23rd, 2004.
- Arms, W. Y. (1999). 'Scholarly Communication, Digital Libraries and D-Lib Magazine'. *D-Lib Magazine*. New York: Pan Books Limited.
- Bates, M. S. (1996). 'Learning about the Information Seeking of Interdisciplinary Scholars and Students'. *Library Trends*; 45(2): 155-164.
- Bates, (2004). *Preserving digital information: The Report of the Task Force on Archiving of Digital Information*. Commissioned by the

Commission on Preservation and Access and the Research Libraries Group. Available from:

<http://www.rlg.org/ArchTF/tfadi.index.htm>. Accessed July 25th, 2004.

Cornell, K. (1998). *Flexible and Extensible Digital Object and Repository Architecture*. New York: Columbia University Press;

Dervin, B. (2004). 'Implementing a Digital Library Study Using Sense-making'. In: *Libraries, People and Change: A Research Forum on Digital Libraries*. Available from: <http://edfu.lis/uiuc.edu/allerton/96/breakout/dervin.html>. Accessed July, 17th, 2004.

Estabrook, K. (1986). 'Librarianship and Information Resources Management: Some Questions and Contradictions'. *Journal of Education For Library And Information Science*; 27:3-4.

Fidel, R. (1997). 'Information Seeking And Subject Representation: An Activity. Theoretical Approach To Information Science': *Journal of Academic librarianship*; 13: p.46-61.

Fidel, R. (1996). *W3C and digital libraries. D-Lib Magazine*. Available at: <http://www.dlib.org/dlib/november96/11miller.html>. Accessed June, 13th 2004.

Government of Uganda. (1997). The Copyright and Neighbouring Rights Bill.

Lesk, P. (1997). *Digitizing of materials in Libraries*. London: Mackay.

MacColl, J. (2004). Electronic Theses and Dissertations: A Strategy for UK. Anadne, UKOLN: Available at <http://www.anadne.ac.uk/issues32/thesis-dissertations/intro.html>. Accessed on July 22nd, 2004.

Magara, E. (2002). 'Application of Digital Libraries and Electronic Technologies in Developing Countries: Practical Experience in Uganda'. *Library Review*, 2002; 51(5): 241-255.

Magara, E. (2002). 'Applications of Digital Libraries and Electronic Technologies in Uganda'. *African Journal of Library, Archives & Information Science*; 12(2): p. 145-154.

Quah, M. (1998). 'Is there a future for co-operative collection development in the digital age'? *Library Trends*; 9(24).

Serageldin, I. (2003). *The Digital Libraries of Tomorrow: First Draft*.

Tibenderana, P.K. (2003). 'High Tech with High Touch: Digital Library Services in Africa'. In: *Africa Communication Challenges in the 21st Century*, Editor: Mukwaya KK, Birungi G., Tibenderana P., Kampala: Makerere University.

Unesco. (1996). 'Digital libraries: issues and architectures'. In: *Proceedings of the Second Annual Conference on the Theory and Practice of Digital libraries*; 24-30

Other Sources

Association of African Universities. *Database of African Theses and Dissertations: DATAD Methodology Manual*, Edited by Mary Materu-Behitsa and Justin Chisenga