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Building Institutional Repositories in Bangladesh Using Dspace: A New Paradigm of Scholarly Communication

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Introduction

The information, communication, and technology (ICT) sector, experienced a revolution in networked information towards the end of 2002, shifting the dynamics of individually- driven innovation, institutional progress, and the development of disciplinary academic and scholarly practices. This resulted in the development of institutional repositories (IR) as a new approach that allows universities and research organizations to apply serious and systematic approach to accelerate changes in scholarly communication (Lynch, 2003).

Generation of new knowledge, effect of technological changes in communication, technology trends, and development efforts all came together to make institutional repository strategy possible. Storage costs of online information dropped

significantly, making repositories far more affordable. Standards, like the open archives metadata harvesting protocol, are now in place, and some progress has also been made in the standards for the underlying metadata itself. The thinking about digital preservation over the past few years has advanced to the point where the needs are widely recognized and well-defined. The libraries of universities and research organizations will be benefited through demonstration and sharing the experience of institutional repositories.

This article particularly focuses on the development of institutional repositories using DSpace software in Bangladesh, and provides a review of the current situation and examines prospects of IR. References in articles on institutional repositories have been reviewed to identify others for this analysis.

Aim of the Paper

The aim of this paper is to share the concept of IR in Bangladesh, and update online users regarding the development and progress of IR in Bangladesh. It will also encourage establishment of IR in the libraries of respective organizations/institutions.

Methodology

To provide a detailed analysis of the literature on institutional repositories and digital resources in Bangladesh, webliographic sources were consulted. Discussion were held with the staff members of ICDDR,B Library and the Head of BRAC University Library, Heads of East West University (EWU) Library, North South University (NSU) Library, and Independent University, Bangladesh (IUB) Library to understand their future plan of institutional repositories. Thus, views have been exchanged, opinions have been shared and then decision has been taken to describe the understanding of current situation of IR in Bangladesh. In addition, documentary sources, workshop outputs, and direct observations have been reviewed in assessing the current situation.

Defining Institutional Repository

An institutional repository is a new method for identifying, collecting, managing, disseminating, and preserving scholarly works created in digital form by the constituent members of an institution. In a position paper, the Scholarly Publishing and Academic Resources Coalition (SPARC) discussed the strategic roles of IR, and the viability and long-term impact of institution-based digital collections for preserving research and intellectual outputs of an institution. IR remains an open access model, and operates by centralizing and preserving the knowledge of an academic institution with the purpose to make that accessible to anyone with Internet access (Anuradha, 2005).

Bangladesh Scenario

It is an era of unprecedented growth of information - a technological renaissance. The information systems, both in the public and private sectors of Bangladesh, are not effective due to lack of understanding the values and therefore inadequate allocation of financial resources by respective authorities to build modern libraries. Recent developments in information, communication, and technology (ICT) have changed the scenario in Bangladesh. The socioeconomic condition, lifestyle, teaching style, office management, library management, and even the culture have been impacted by the innovations and IT revolution. The people are also not very far from developing and organizing ICT sector. Like developed countries, Bangladesh embraces the concept of establishing institutional repositories. Not-for-profit organizations, such as higher learning institutions and research organizations

might find IR useful for disseminating their intellectual outputs through Internet, for raising funds, and creating interest in the projects and activities of the respective organizations.

ICDDR,B and BRAC University, a leading private university in Bangladesh, are now working on IR using Dspace software. The NSU Library has already started their activities using DSpace software. NSU is preserving intellectual outputs of their faculty members along with others online journal articles. EWU library is planning to move with greenstone digital library software for building digital library in East West University. IUB library is working to collect print copy materials from the faculty members and researchers. These materials will be digitalized and used in developing IR. IUB will use DSpace software. Bangabandhu Sheikh Mujib Medical University (BSMMU) is also trying to set up an IR in their Library.

Some initiatives have also been taken by BanglaJOL (www.banglajol.info) with the help of International Network for the Availability of Scientific Publications (INASP) and digitize all journal articles published in Bangladesh. BanglaJOL is a database of Bangladeshi journals, covering the full range of academic disciplines. The objective of BanglaJOL is to improve the visibility of the participating journals and the research findings they carry. All the materials available on BanglaJOL are free to search, view and browse. Copyright of all included matters is retained by the journals or authors of respective journals. Permission is required for any use or re-use of the content that falls outside the concept of fair use.

D.Net, a new firm has recently been introduced in the knowledge management community, which deals with electronic resources in Bangladesh. They started working in September 2005. They have a separate, Knowledge Management Division (KMD) to digitize their resources with provisions for accessing digitized resources through Internet (http://www.dnet-bangladesh.org/).

IR Objectives of ICDDR, B and BRAC University

The main objective of IR is to enable the organization/institution develop its digital contents and make them accessible to the users through Internet. However, the specific objectives of IR are as follows:

1. To collect and preserve various teaching and learning materials, and research outputs usually generated by faculty members, scientists, researchers, and students and make them accessible to interested individuals/groups;

2. To make the institution's library capable of providing e-library services with their e-resources, and ensure access to them for faculty members, scientists, researchers, and students;

3. To store digital information and their descriptive metadata;

4. To capture and preserve research and related contents in digital form, and to make it available online;

5. To make a bridge between users and electronic resources through the web-based technology;

6. To develop human resources of the respective library for providing better library services; and

7. To help the libraries of other universities and research organizations in establishing IR by sharing experience, knowledge and expertise.

Digital Repository of ICDDR, B

ICDDR, B, popularly known as Cholera Hospital in Bangladesh, is an international

health research organization located in Dhaka, the capital of Bangladesh. Library and Information Services Unit (LISU) logically constitutes an important unit of the organization for dissemination of its research output, among others. ICDDR,B maintains one of the best medical libraries, initially traditional and later automated one, in Bangladesh. With the great advancement of ICT globally, ICDDR,B undertook initiatives to transform the traditional library into a digital library. In 2005, the authority considered establishment of the IR, which was the beginning of establishing of its digital library. Finally, LISU started the IR project with the help of the open source software, DSpace. DSpace is a digital repository system for storage of digital information and its descriptive metadata. ICDDR,B encourages its scientists to put their research data as well as other useful information to enrich the system.

Currently, ICDDR, B maintains 14 communities for its IR, and the number is expected to grow in future. The communities include: Child Health, Cholera Research Laboratory (1962-1978), Clinical Sciences, Health and Family Planning Systems, HIV/AIDS, ICDDR, B External Publications, Infectious Diseases and Vaccine Sciences, Information Sciences, Laboratory Sciences, Nutrition, Population Sciences, Poverty and Health, Public Health Sciences, and Reproductive Health. Each community has three collection groups: conference papers, research papers, and research protocols. IR is organized along these sequences, and all are preserved and stored in IR for online access by the users. The external publications of ICDDR, B scientists are not accessible due to copyright act of the journals.

Status of IR Resources in ICDDR, B

Different types of intellectual outputs and other resources are available in IR, which are disseminated through open access. Status of IR resources is given below.

Table 1: IR Status of ICDDR, B

Community/major subject	Total number of uploaded documents	Total number of scanned documents	Total number of documents need to be scanned	
			Year	Number
Child Health	51	04		
Cholera Research Laboratory	102	04		
Clinical Sciences	180	32		
Health & Family Planning System	50	65		
HIV/AIDS	07	03		
ICDDR, B external publications in different journals (No open access due to	1461	1104	1961-1970 1971-1980 1981-1990	11 463 462

copyright act)			1991-1996	129
Infectious Diseases & Vaccine Science	102	05		
Information Sciences	01	79		
Laboratory Sciences	164	35		
Nutrition	70	07		
Population Sciences	95	47		
Poverty and Health	06	12		
Public Health Sciences	301	34		
Reproductive Health	12	07		
Total	2602	1438		1065

Source: http://dspace.icddrb.org/dspace/ and Document of ICDDR, B Library

Table 1 shows that ICDDR, B has divided its community/major subject into 14 areas. They have identified and made these communities based on their major research areas. Out of 14, one community has been categorized as external publications. Under this category, the scientists and researchers of ICDDR, B publish their articles in foreign peer reviewed journals. There is no open access to external publications of ICDDR, B due to copyright act, but this community has been treated as one of the major research areas. Up to April 2010, they uploaded 2,602 documents that included articles, research protocols, and research papers. They scanned 1,438 documents those are waiting for uploading on the web. There are 1,065 documents, which are waiting for scanning under external publications from 1961 to 1996.

No data are available about users' statistics that how many users get access to IR of ICDDR, B. It has been learnt that the provision of users' statistics of IR has not yet been prepared.

IR Activities of BRAC University

BRAC University is the first university in Bangladesh, which has established IR using open source software DSpace. Funded by the International Network for the Availability of Scientific Publications (INASP), BU started their IR project in April 2007, with the target to implement Digital Repository Project within 12 months.

In its Project proposal, BRAC University included the following programme activities:

- Identifying the needs of the concerned community, and collecting information from individual contributor and users;
- Collecting knowledge and creating policies for appropriate use of the e-resources;
- Digital library and their activities/services;
- Arrangement of training/visits by library management to have a clear idea

on IR, digital library and their activities/ services;
- Local training of BRACU library personnel on digital librarianship;
- Selection of software and technical equipment;
- Discovering and enumerating policy decisions including data formats, persistence of contents, licensing agreements and copyright issues;
- Procurement of equipment such as server, computer, scanner, CD writer, etc. for the project;
- Installation of server, network system, software like- Oracle, JVM, DSpace, appointment of a digitization firm for scanning the hard copy of documents;
- Entry of data of BRAC University and BRAC publications;
- Digitization of theses/dissertations of students and various research outputs of BRAC University and BRAC; and Piloting, monitoring, and maintaining the project.

On 26 June 2008, BU launched its Digital Repository programme by conducting a workshop. The workshop was attended by library professionals of different universities and research organizations. In the workshop, the Head of BU Library shared her experience and knowledge on IR and made a presentation to the participants. She informed the participants the processes undertaken in establishing IR for BU.

Table 2: IR Status of BRAC University - http://dspace.bracu.ac.bd/

Community/Major Subject	Total number of uploaded documents	Total number of scanned documents	Total number of documents needed to be scanned	
			Year	Number
BRAC Business School (BBS)	17	17	2009-2010	12
BRAC Development Institute	18	18	2009-2010	04
BRAC University Publications (journals, prospectus and annual reports)	143	00		
Center for Research on Bangla Language Processing (CRBLP)	25	00		
Computer Science & Engineering	129	20	2009-2010	11
Department of Architecture	06	06		
Department of Mathematics and Natural Science	06	06		
Economics and Social Sciences	07	07	2009-2010	08
English and Humanities	46	46	2009-2010	10
Institute of Governance Studies	21	00	2009-2010	62

James P grant School of Public Health	11	00	2009-2010	05
Total	569	120		112

Source: http://dspace.bracu.ac.bd/dspace/ and file of BRAC University Library

N.B.: Data collected as of April 2010

Table 2 describes the status of BU repository. BU has 11 communities in the repository. Total number of uploaded documents is 569. Total number of scanned documents is 120 those are waiting for uploading. BU Library receives some hard copy of dissertations and theses from students, those are required to be scanned for making soft copies. Besides, there are 112 documents needed to be scanned. No provision is made of getting users' statistics till now.

Comparison of IR between ICDDR, B and BU

ICDDR, B is an international health research institution. It is dedicated to saving lives through research and treatment. The communities of IR are based on the research agenda of ICDDR, B. Research findings and outcomes of ICDDR, B are disseminated among researchers through IR. Research papers, research protocols, and conference papers are the major resources of IR of ICDDR, B.

BU is one of the leading private universities in Bangladesh. Hence, BU is engaged in providing education to students of undergraduate and graduate programmes of different disciplines. The base of IR of BU is made on different subjects are taught in BU. Theses, dissertations, conference proceedings, and research papers are the main resources of IR of BU.

Prospective Research Organizations in Bangladesh for Building Institutional Repositories

At present, there are 31 public universities, 51 private universities, 2 international universities, and a good number of research organizations in Bangladesh. All these organizations have the capability in terms of information resources to organize IR in their respective organization. Public universities have their own publications and a good number of working documents. However, the lack of infrastructural facilities, budget and skilled IT persons are the main obstacles in reaching their desired goals. Private universities started their academic activities since 1992. Top-ranking private universities are well-equipped in respect of IT facilities and skilled human resources. But compared to public universities, the private universities have less publications and a small number of working documents. However, libraries of private universities, particularly top-ranking universities, are more progressive in organizing electronic resources compared to the public universities.

Some research organizations have enormous publications, which are helpful in decision-making process with regards to development of economic activities of the country. These are very potential research organizations in Bangladesh, such as Bangladesh Institute of Development Studies (BIDS), Bangladesh Agricultural Research Council (BARC), and Bangladesh Medical Research Council (BMRC). These organizations are well-established in their respective fields. If the above-mentioned organizations plan for effective organization of IR, Bangladesh will be able to organize and disseminate research outputs to the people who are not able to access them in traditional forms. The collective efforts for making IR in Bangladesh will definitely bring excellent results.

Conclusion

Open access facilitates the availability and distribution of scholarly communication freely, as a means and effort to solve the problem of inaccessibility, primarily due to financial constraints, especially in developing countries. In Bangladesh, there has been a gradual realization of the usefulness of open access among various institutions. A few open access initiatives have been undertaken and are operational, and some are still in the developmental stage. The future of open access in Bangladesh is dependent upon a proper policy and establishment of appropriate framework. In the implementation of open access, library and information science professionals of Bangladesh should play a proactive role in the growth of collections in IR.

Recently introduced IR performs an important role in giving a new shape of ICDDR, B and BU libraries. The open access movement and IR could contribute significantly to economic growth by broadening the market for scholarly publications and research results, especially in science, business, and medicine. Lower access costs would help broaden usage. Economist Joel Mokyr found in his studies of knowledge creation and dissemination that lower access costs brought knowledge to people who used that knowledge as the basis of invention and innovation (Mokyr, 2002). He also pointed out that ideas and knowledge may be expensive to generate but inexpensive to use once implemented. The future will bring greater innovation and technologies through open access and IR.

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