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Bangladesh: An Overview of Open Access (OA) Initiatives

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Abstract

The present paper describes about the universal access to knowledge and information in the network and digital environment. The paper discusses the Open Access (OA) and Institutional Repositories (IR) initiatives for global access, repository, preservation, and organized management of networked information services in an environment where both the users and resources are at varied locations. The paper highlights the importance of open access and Institutional Repositories initiatives to the system of scholarly communication in Bangladesh. The paper explains research communities' benefits of open access, salient features of ICT in Bangladesh, initiatives of institutional repositories in Bangladesh, open access movement in Bangladesh. Open Access Movement and IR could contribute significantly to economic, scientific and research growth of the respective country by providing access to scholarly materials without the economic barriers that currently exist in scholarly publishing.

Key Words: Open Access, Open Access Movement, Open Access Initiatives, Institutional Repositories, Bangladesh

Introduction

Universal access to information and knowledge is the UNESCO's overall mandate to promote the free flow of information and making information available at the fingertips of research communities. Open Access (OA) is an innovative form of scholarly communication within the digital environment aimed at achievement of universal access to information and knowledge. OA emerged as an alternative model of scholarly publishing. This is very much related to serials crisis, the term serials crisis is used to describe the rising costs of journal subscriptions during the last several years. As the budget of the libraries hardly ever rose, hence, a good number of libraries were obliged to cancel a significant amount of their subscriptions. OA to knowledge is a model adopted by many International and Inter-Governmental organizations, such as World Summit on the Information Society (WSIS), for disseminating full-text contents to online communities.[1]

OA during last decades, with growth of world population, literacy and movement, the demand for information and knowledge also increased exponentially. Similarly, there were simultaneous growth in the production and supply of information and knowledge. The quantitative increase in scientific information, had a number of implications, these included; rapid growth of research articles, rapid growth of specific journals, increase of prices of these journals, and tight library budget for purchase of these journals. The impact of increase in prices of journals has been felt in all countries across the world.[2]

Academic community in general and librarians, particularly, are concerned about constant increase in the cost of journals year after year especially in Science, Technology and Medical (STM) titles. The monopoly of commercial publishers first led to the skyrocketing prices of print journal subscriptions, then the licensing system for accessing to electronic resources and collection of electronic publications in disguise of "big deal", makes it more and more challenging for libraries to purchase the reading materials are required by libraries to meet their users' need. At the same time it is also felt that most of the research are carried out with public money, so public should have free access to the products, publications of any institutions /organizations.[3]

Aims of the Paper

The aim of this paper is to examine how the concept of OA movement and OA initiatives happened, in line context of global access to information and knowledge in Bangladesh. Also to describe the current status and progress of OA journals and institutional repositories in Bangladesh. This will provide an understanding of OA movement in Bangladesh at the same time will encourage establishment of institutional repositories and making journals published from Bangladesh freely available in OA for global research community.

Methodology

In order to get better understanding and clear ideas on OA initiatives in Bangladesh a comprehensive literature search has been conducted by the authors of this paper. An exhaustive literature search has been conducted through Google and Google scholar platform. General phrase and Boolean search techniques have been applied. The following search terms were used: **"Open Access AND Bangladesh", "Open Access initiatives AND Bangladesh", "OA AND Bangladesh", "OA journals", "Role of OA in library", "OA initiatives AND Bangladesh", "Institutional repositories AND Bangladesh"** etc. In addition, a variety of grey literature was consulted including different project proposals, reports, book chapters and conference proceedings and others. Finally, personal contacts and discussions with scientists, researchers, and librarians have also been carried out in order to explore significant information for this study.

Basic Concept of OA

Definition of OA

Peter Suber a dedicated promoter of the OA movement defines OA as "Open access to scientific articles means online access without charge to readers or libraries. Committing to open access means dispensing with the financial, technical and legal barriers that are designed to limit access to scientific research articles to paying customers". [4]

Benefits of OA

The OA model promotes free exchange of scholarly publications. It cut down the costs for libraries, which is very important for developing countries. Articles published in OA model are free of copyright and licensing restrictions. In OA model, author retains copyright to his / her article and gives consents for its availability in OA, thereby removing all legal barriers that exist in commercial publications. Researchers in developing countries will benefit the most from OA to the scholarly literature. OA model offers an opportunity for searching, cross-searching, citation analysis, and other value-added services such as monitoring and measuring impact, productivity and quality. [5]

OA (OA) journals

Open-access journals are treated as "golden route' for providing access to peer-reviewed journal literature in electronic format free of charge without any restrictions. Publishers of OA use all the traditional processes of commercially-produced journals except for charging subscription for their journals. [6]

Self-Archiving, Institutional Repositories (IR)

The term "self-archiving" is important for OA as it refers to the process where individual authors submit their own papers into an institutional repository. Institutional repositories

often referred to as "green route" to OA publishing, which is popular to provide OA to scholarly literature.[7]

Major OA Publishers

Some of the important OA publishers are given in the below table.

Table 1: Major OA publishers in the world

Sl. No.	Name of the publisher	URL
01.	BioMed Central	http://www.biomedcentral.com/info/about/whatis
02.	The Public Library of Science (PLoS)	http://www.plos.org/about/index.php
03.	Bioline International	http://www.bioline.org.br/info?id=bioline&doc=about
04.	MedKnow Publications	http://www.medknow.com/aboutus.asp
05.	Project Gutenberg	http://www.gutenberg.org
06.	SPARC	http://www.arl.org/sparc/about/program-plan/index.shtml
07.	Directory of OA Journals (DOAJ)	http://www.doaj.org/doaj?func=loadTempl&templ=longTermArchiving
08.	Open J-Gate	http://www.openj-gate.com
09.	Bangladesh Journals Online (BanglaJOL)	http://www.banglajol.info/
10.	The Directory of OA Repositories – *Open*DOAR	http://www.opendoar.org/about.html
11.	Science Direct (Elsevier Science)	http://www.sciencedirect.com/science/browse/all/open-access
12.	PMC Journals	http://www.ncbi.nlm.nih.gov/pmc/journals/
13.	American Chemical Society	http://pubs.acs.org/action/showPublications?display=journals
14.	PhysNet	http://de.physnet.net/PhysNet/journals.html
15.	arXiv.org	http://arxiv.org/
16.	HighWire	http://highwire.stanford.edu/lists/freeart.dtl
17.	Strategian	http://www.strategian.com/free_full_text_articles.html
18.	Wikipedia	http://en.wikipedia.org/wiki/Main_Page
19.	CUL Historical Math Monographs	http://ebooks.library.cornell.edu/m/math/index.php
20.	Mathematics Book Online	http://www.ams.org/samplings/math-history/math-history
21.	Health Education Library	http://wellnessproposals.com/wellness-library/health/
22.	IAMCR open access journals	http://iamcr.org/open-access-journals-newsmenu-322
23.	African medical journals	http://indexmedicus.afro.who.int/Journals/Indexj.htm
24.	NepJol	http://www.nepjol.info/

25.	SLJOL	http://www.sljol.info/

ICT Scenario of Bangladesh

The advancement of science and technology has made a remarkable enhancement and changed almost all spheres of life. Especially, Information and Communication Technology (ICT) has been revolutionized in all corners of the global arena and incorporated in the sectors of education, organizations, communication, and government & corporate offices and others. The services render with the help of ICT are faster and more effective. The term "ICT" describes the use of computer-based technology and the Internet to make information and communication services available to a wide range of users. ICT makes it possible to capture, store, manipulate, and distribute information in a number of formats including text, images, sound, and video and introduce new services, revitalize the existing services by providing faster access to the resources. ICT infrastructure is very important for open access initiatives for any country. OA is fully dependent on the effective use and application of ICT. ICT is the backbone of OA activities which not only harbor the OA movement but also propagates its growth and future development. With advanced ICT infrastructure the development of OA increases many folds.

Overall situation of Information and Communication Technology (ICT) in Bangladesh is poor. Public access to global network and information is extremely limited due to economic condition of Bangladesh, where as the per capita income of Bangladesh is Taka 57652 (U$ 742) in 2011 and real GDP growth is 6.66%.[8]

Infrastructure of ICT in Bangladesh is weak. Overall, Bangladesh ranks 118 among 133 countries, which is worse than most of its South Asian counterparts in the ICT sector. India, Sri Lanka, and Pakistan rank higher than Bangladesh. Bangladesh's low ranking on infrastructure is due to factors such as low level of secure internet servers, lack of widespread and consistent electricity supply and low Internet bandwidth. Bangladesh is ranked as one of the lowest in the world (130), in human resource capacity, i.e. in terms of investment by companies in staff training and employee development.[9]

Table 2: Mobile Phone Subscribers in Bangladesh

The total number of Mobile Phone subscribers has reached 106.934 **million** at the end of **July 2013.**
The Mobile Phone subscribers are shown below:

Operators	Active Subscribers*
Grameen Phone Ltd. (GP)	44.666
Banglalink Digital Communications Limited	27.324
Robi Axiata Limited (Robi)	23.770

Airtel Bangladesh Limited (Airtel)	7.897
Pacific Bangladesh Telecom Limited (Citycell)	1.361
Teletalk Bangladesh Ltd. (Teletalk)	1.916
Total	106.934

* Subscribers in Millions - The above subscribers' numbers are declared by the mobile operators
Source:
http://www.btrc.gov.bd/index.php?option=com_content&view=article&id=780:mobile-phone-subscribers-in-bangladesh-january-2012&catid=49:telco-news&Itemid=502

Table 3: PSTN Phone Subscribers in Bangladesh

The total number of PSTN Phone Subscribers has reached **1028.19 thousand** at the end of **May 2010**.
The PSTN Phone subscribers are shown below:

Operators	Subscribers*
BTCL	872.41
Telebarta Ltd.	56.42
Jalalabad Telecom Ltd.	10.90
Onetel Communication Ltd.	39.57
Westec Ltd.	17.00
Sheba Phone Ltd. (ISL)	11.62
S. A. Telecom System Ltd.	18.03
Banglaphone Ltd.	2.24
Total	**1028.19**

* Subscribers in Thousands - The above subscribers' numbers are declared by the PSTN operators
Source:
http://www.btrc.gov.bd/index.php?option=com_content&view=article&id=410:pstn-phone-subscribers-in-bangladesh&catid=49:telco-news&Itemid=502

Table 4: Internet Subscribers in Bangladesh

The total number of Internet Subscribers has reached 35631.269 **thousand** at the end of **June 2013**.
The Internet subscribers are shown below:

Category	Subscribers*
Mobile Internet	33904.841
ISP + PSTN	1221.62
WiMAX	504.808
Total	35631.269

* Subscribers in Thousands - The above mentioned figure represents the number of Active subscribers only. A subscriber/ connectionusing the internet during the last Ninety (90)days is considered to be an Active subscriber.
Source:
http://www.btrc.gov.bd/index.php?option=com_content&view=article&id=769:internet-subscr ibers-in-bangladesh&catid=49:telco-news&Itemid=502

ICT initiatives taken by the present Government:

The 2008 elections in Bangladesh brought in a new government with a broad platform to reduce poverty as well as improve governance, rule of law and citizen's access to government services. "Digital Bangladesh" has been proclaimed a high priority of the Government in the pre-election manifesto. ICT is the backbone of any digital initiative. ICT covers the vast area of information technology, communication technology and of course the telecommunication technology; categorically processing of information and ensuring connectivity. Again it is mentionable that Prime Minister Sheikh Hasina dreamed for a Digital Bangladesh. Without ICT sector development the dream of a Digital Bangladesh would be only a dream for the total nation.

Bangladesh enters 3G era

On 14 October 2012, Teletalk Bangladesh Limited (a public limited company) launched 3G (Third Generation) services for the first time in Bangladesh in order to build "Digital Bangladesh" in enhancing the participatory role of Teletalk.[10] Grameenphone, Robi, Airtel and Banglalink, four other telecom operators in Bangladesh, also joined 3G mobile and internet services recently with the holding of the country's biggest auction to make a new advanced mobile service available for the first time in Bangladesh enabling fast spread of mobile internet. Grameenphone, Robi, Airtel and Banglalink acquired 25 megahertz spectrum at a cost of $525 million or Tk 40.81 billion through auction process for 3G mobile phone service operation in the country. Of the 40 megahertz (MHz) spectrum of 2100 band, Grameenphone vied for 10 MHz spectrum, while Robi, Airtel and Banglalink for 5 MHz spectrum each. The rest 15 MHz spectrum has remained unsold. The base price of per MHz spectrum was $20 million and every incremental bid call was set at $1.0 million.[11]

Some achievements of the present Government

There are some achievements achieved by the present Government is mentioned below:
- Mobile phone based medical advice from qualified doctors (from 64 district hospitals and 418 Upazilla hospitals) free of charge on 24/7 basis.
- Remote online telemedicine from Community clinics to Upazilla Hospitals
- Dissemination of health care information via SMS to citizens
- Remote phone consultation with doctors provided by all telecom operators
- SMS and email based public exam results

- Online students registration for SSC/HS C students
- E-books of all public school books made available online
- Online student admission by some colleges under National University
- SMS based registration for public universities admission test, and SMS based dissemination of exam results
- ICT enabled innovative class room project in collaboration with Microsoft
- Union Information and Service Centres
- Website for National Infokosh
- SMS-Based Utility Bill Payment
- Dhaka City Corporation Call Centre
- National Web Portal: The National Web Portal (www.bangladesh.gov.bd) is a citizen-centric gateway for all government information and services that can be accessed electronically. The website is positioned as the online one-stop shop for all government eServices and is providing information on the most popular citizen services, the basic information of the structure of Bangladesh Government, current news, upcoming events and other important information and links to all government ministries, divisions and departments.
- Single Website with Downloadable Forms: This website (www.forms.gov.bd) reduces time and cost to access forms from many different organs of the government.
- Agricultural Radio and TV Shows
- Internet Connectivity at Upazilla Health Complex

OA movement in Bangladesh

The concept of OA movement in Bangladesh is being developed based on reducing the huge pressure of library budget for subscription to journals. A few libraries in Bangladesh subscribe journals for their respective libraries. OA movement in Bangladesh is very slow and rate of progress of OA is very low.

First OA movement in Bangladesh started from icddr,b by making publicly available icddr,b Journal of Diarrhoeal Disease Research (JDDR) in 1997, later the Journal of Health, Population, and Nutrition (JHPN) in 2000, and then building an Institutional Repositories (IR) in 2005. Till now five initiatives are taken for building Institutional Repositories in Bangladesh, one is by icddr,b and the others are by BRAC University, Independent University Bangladesh, Daffodil International University, and East West University. There are some other universities, public and private both, are trying to develop IR in their respective universities. However, currently, OA with some exceptions is available in Bangladesh through both golden and green routes.

Golden route is where the author or author's institution can pay a fee to the publisher at publication time, the publisher thereafter making the material available 'free' at the point of access (the 'gold' route) to journal articles. Green route is where the author can self-archive at the time of submission of the publication (the 'green' route) whether the publication is grey literature (usually internal non-peer-reviewed), a peer-reviewed journal publication, a peer-reviewed conference proceedings paper or a monograph.

Institutional repository of icddr,b and Journal of Health, Population and Nutrition (JHPN) can be referred as green route and gold route respectively.

Per Capita Income Model Open Access HINARI: Experiences from Bangladesh

HINARI has divided into two groups of countries, i.e. band 1 and band 2, for getting access to HINARI resources based on per capita income (World Bank figures). The institutions, working as not-for-profit, of these countries may register for access to the journals through HINARI. Institutions in countries with GNI (Gross National Income) per capita below $1600 are eligible for free access. Institutions in countries with GNI per capita between $1601- $4700, those institutions should pay a fee of $1000 per year / institution.[12] Bangladesh categorized as low income country as per World Bank classification is entitled to free access to HINARI. Bangladesh falls in group/band 1.

The collective name for four programmes – HINARI, AGORA, OARE and ARDI – or Research4Life provides developing countries with free or low cost access to academic and professional peer-reviewed content online. The concept of Research4Life is simple: research in health, agriculture, development and innovation, and the environment are better informed when these are based on the most recent, high quality and relevant scientific knowledge. Research4Life applies this delivering knowledge to the world's poorest countries. Research4Life is empowering universities, colleges, research institutes and government ministries as well as non-governmental agencies and hospitals, with access to scientific knowledge that was never before imagined. The Health InterNetwork Access to Research Initiative (HINARI) plays a significant role to provide free or very low cost online access to the major journals in biomedical and related social sciences to local, not-for-profit institutions in developing countries. In 2013, there are more than 5,300 institutions in more than 100 eligible countries, areas and territories registered for HINARI. Up to 12,700 journals (in 30 different languages), up to 24,900 e-books, up to 70 other information resources are now available to health institutions in more than 100 countries, areas and territories benefiting many thousands of health workers and researchers, and in turn, contributing to improve world health. At present, the total number of participating organizations from Bangladesh are registered with HINARI is about 260.

On 4th January 2011 the four publishers i.e. American Association for the Advancement of Science, American Society for Animal Science, Elsevier Science, and Thomson Scientific (Current contents only) blocked their access to HINARI for Bangladesh. Although, HINARI has given information in their announcement that the Springer and Lippincott Williams Wilkins also blocked their access to HINARI for Bangladesh. In fact, Springer and Lippincott Williams Wilkins withdrew their access from HINARI program in 2006 and 2008 respectively. So, these two publishers already blocked their access few years back, not in 2011. This blockade created a massive blow for the users of Bangladesh, particularly icddr,b researchers as icddr,b is one of the top most HINARI users in Bangladesh. The blockade hampered normal research activities in icddr,b as the researchers had access to 1,610 full-text journals obstructed by Elsevier Science. Scientists and researchers of icddr,b faced challenges in retrieving information for their

research work as they do their research in a developing country like Bangladesh with a limited resources. Library services of icddr,b were severely affected by this blockade and Librarians also faced problems in providing services to researchers. In this situation, one of the former senior health system scientists of icddr,b Dr. Tracey Lynn Perez Koehlmoos (co-author of this article) and Dr. Richard Smith former editor of BMJ started campaigning through HIFA 2015 List Serve Group against that decision and **described the situation as "very discouraging" as there was not even access of their own papers and also shared their views with other research communities of the world.** As an outcome, one editorial [13] and one statement of Elsevier [14] published in the Lancet, one feature was published in PLoS Medicine, [15] and also news was published in British Medical Journal.[16] Thanks to the efforts of these two scientists, that immediately drew attention to the concerned publishers, editors of major journals, researchers and other users from around the globe. Elsevier made a statement in the Lancet regarding the blockade. Adverse reactions were shown from research community of Bangladesh for the blockade. In the mean time American Association for the Advancement of Science withdrew their blockade.

Finally, great publisher Elsevier Science turned back to HINARI on 19th January 2011. Also Lippincott Williams Wilkins reopened access of their journals through HINARI in March 2011. It may also be mentioned here that a significant journal title the Lancet is now available online through OA from Bangladesh. Dr. Tracey Lynn Perez Koehlmoos and Dr. Richard Smith played an important role in returning back Elsevier Science, with full text journals of Elsevier, to HINARI platform applicable for Bangladesh. There are almost 260 organizations, registered with HINARI programme, of Bangladesh got relief from the struggling of accessing to more than 2000 full text journals of Elsevier. It helps Bangladesh a lot.

OA Repositories in Bangladesh

icddr,b, for the first time in Bangladesh, is established its IR in 2005. Then it is followed by BRAC University in 2008.[17] Recently, Independent University Bangladesh, Daffodil International University, and East West University leading private universities in Bangladesh, are now working on IR using DSpace software. Bangabandhu Sheikh Mujib Medical University (BSMMU) is making an attempt to set up an IR in their Library. In December 2011, BSMMU organized a two-day-long training course on DSpace for building institutional repositories in different universities of Bangladesh with the financial support of University Grants Commission (UGC) of Bangladesh. Some features of IR in Bangladesh are given below.

International Centre for Diarrhoeal Disease Research Digital Repository, Bangladesh (icddr,b)

Organisation: International Centre for Diarrhoeal Disease Research, Bangladesh
Description: This is a subject repository providing access to research into Diarrhoeal Disease, Population sciences, Poverty and health, Child health, Clinical sciences, HIV/AIDS, Gender, Health and family planning system and

Nutrition. Some items are only available to registered users.

OAI-PMH:	http://dspace.icddrb.org/dspace-oai/request
Software:	DSpace
Collection Size:	4397 items (September 15, 2013)
Subjects:	Biology and Biochemistry; Nutrition; Cholera; Diarrhoeal Diseases; HIV/AIDS; Population; Infectious diseases; Chronic Diseases; Environment; Public Health; Health and Medicine; Library and Information Science
Content:	Articles; Conferences; Special reports
Languages:	English
Remarks:	Special items include Research Protocols

Source: http://dspace.icddrb.org/dspace/

Independent University, Bangladesh (IUB)Institutional Repository

Organisation:	Independent University, Bangladesh (IUB)
Description:	The purpose of this repository is to collect, preserve, and distribute digital materials of IUB. Repositories are important tools for preserving an organization's legacy; they facilitate digital preservation and scholarly communication.
Software:	DSpace
Collection Size:	101 items (September 15, 2013)
Subjects:	Multidisciplinary
Content:	Articles; Conference papers; Theses; Books; Reports; Unpublished gray literature
Languages:	English

Source: http://dir.iub.edu.bd:8081/

Eat West University Institutional Repository

Organisation:	Eat West University, Bangladesh
Description:	The main objective of this repository to collect, preserves, and disseminates/distributes digital materials among the information seekers as well as the EWU community. This is an important tools for facilitating digital preservation and scholarly communication.
Software:	DSpace
Collection	35 items (September 15, 2013)

Size:

Subjects: Multidisciplinary

Content: Articles; Conference papers; Theses; Books; Reports; Unpublished gray literature

Languages: English

Source: http://dspace.ewubd.edu:8080/

Daffodil International University Institutional Repository

Organisation: Daffodil International University, Bangladesh

Software: DSpace

Collection Size: 396 items (September 15, 2013)

Subjects: Multidisciplinary

Content: Articles; Conference papers; Theses; Books; Reports; Unpublished gray literature

Languages: English

Source: http://dspace.daffodilvarsity.edu.bd:8080/

BRAC University Institutional Repository

Organisation: BRAC University, Bangladesh

Description: This site provides access to the output of the institution. The interface is in English. The Digital Institutional Repository program is funded by the International Network for the Availability of Scientific Publications (INASP).

Software: DSpace

Collection Size: 2005 items (September 15, 2013)

Subjects: Multidisciplinary

Content: Articles; Conferences; Theses; Unpublished gray literature; Books

Languages: English

Source: http://dspace.bracu.ac.bd/

Table 5: OA status of icddr,b Publications

Publications	2000	2012	Comments on the achievement

			of OA
No. of Journals	02	01	OA fully achieved
No. of periodicals	05	07	OA fully achieved
No. of peer reviewed articles	92	237	OA partly achieved
No. of working papers (including special publications, scientific reports, and annual reports)	16	13	OA fully achieved
No. of communication bulletins /materials etc.	03 (Glimpse, Shasthya Sanglap, and Electronic Disc Bull)	08	OA mostly achieved
Others (monographs, books chapters, etc.)	18	27	OA partly achieved

OA journals in Bangladesh

BanglaJOL is a database of journals published in Bangladesh, covering the full range of academic disciplines. The objective of BanglaJOL is to give greater visibility to the participating journals, and to the research they convey.

The project BanglaJOL, supported by INASP, was initiated in June 2007 and officially launched in September 2007 for making Bangladeshi journals publicly available through OA. It aims to promote the awareness and use of Bangladesh-published journals in all disciplines by providing access to tables of contents (TOCs), abstracts and full text on the Internet. BanglaJOL uses the Open Journals System created by the Public Knowledge Project based in Canada. BanglaJOL is grateful to RDMFA for their support of this project. The Editing and Publishing Association of Bangladesh has also provided valuable support and management of the service. [18]

At present BanglaJOL plays a significant role in making Bangladeshi journals available through OA. BanglaJOL is financed by INASP/RDMFA and INASP is funded by other agencies. There is growing concern of sustaining BanglaJOL activities if INASP fund stops. So it is becoming apparent that initiatives are needed to create a platform from where OA journals will be published from Bangladesh on a regular basis or to secure additional fund sources to continue BanglaJOL current activities either from public sources or through any joint efforts of all concerned.

Chart 1: Ratio of Bangladesh OA journals Compared to Worldwide DOAJ OA Journals as on September 15, 2013
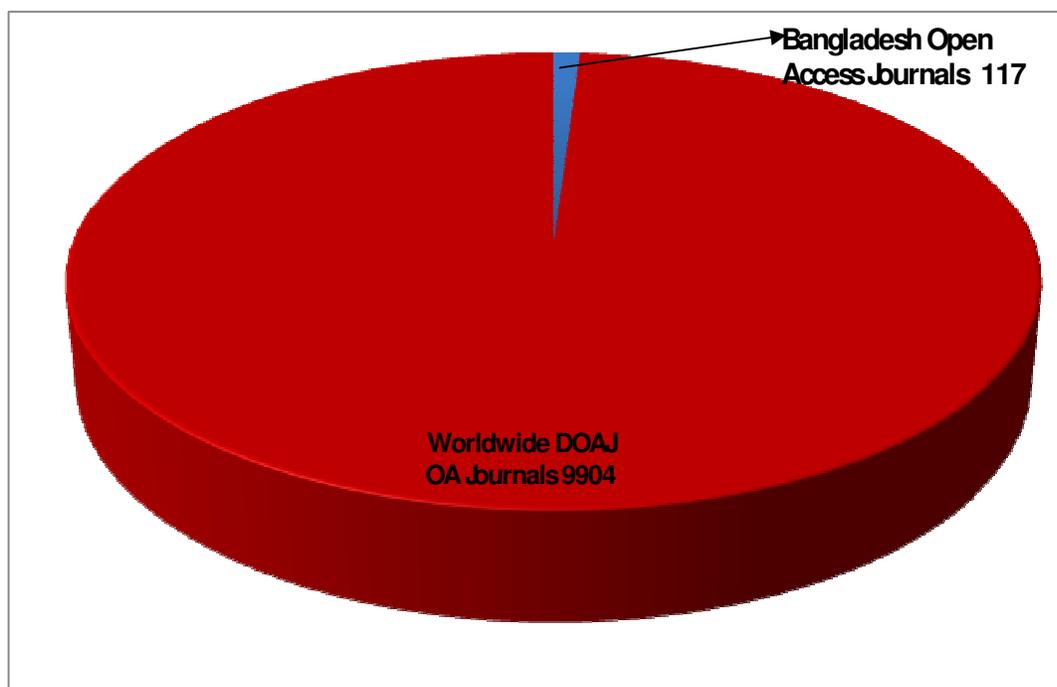
Directory of OA Journals (DOAJ):

The aim of the Directory of OA Journals is to increase the visibility and ease of use of OA scientific and scholarly journals. The Directory covers 30 [19] scientific and scholarly journals published from Bangladesh. There are many journals published from Bangladesh not included in DOAJ. Bangladesh OA journals have only 1.18% share that are available in BanglaJOL platform compared to the DOAJ OA journals globally. Bangladesh covers one of the small segments of OA journals considering OA journals available in the world (Chart 1 above).

Barriers of OA in Bangladesh

Barriers of OA are as follows:

i)   Lack of financial support for managing OA journals.
ii)   Lack of awareness amongst authors/researchers/scientists about benefits of depositing their work in OA repositories.
iii)   Attitudes of authors are not positive towards publishing their research papers.
iv)   Scientists/writers are not aware or properly informed of this movement.
v)   Publishers are not properly informed about this OA movement.
vi)   The publisher's willingness to adopt OA for the fear that they would not be able to recover the cost of their publishing process or generate a sufficient surplus.
vii)   Lack of awareness amongst authors/researchers/scientists about benefits of depositing their work in OA repositories.
viii)   Acceptance of articles submitted in OA repositories as equivalent to the traditional journals for promotion and tenure jobs.

Findings

Understanding, perception, and awareness of OA in Bangladesh are still low. Developed countries, scientifically advanced nations, have already acknowledged the benefits of OA and are making fast growth in publishing journals through OA and building institutional repositories. At this stage, Bangladesh is not up to the mark in terms of having only five institutional repositories and these five repositories are managed by an international research organization and four private universities in Bangladesh. Considering, there are currently, 110 universities in Bangladesh that includes public, private and international.[20] Till now there is no public university that maintains institutional repository in Bangladesh. Out of 73 private universities, only four universities maintain IR in their respective institution. Since these four university librarians take the initiatives to establish IR in their institution, of course, with the support of university management.

It is understood that the authorities don't feel any obligation to establish IR. First of all authorities don't have any idea on IR and OA. There are three reasons, i.e. lack of fund, awareness and professional librarian, public university management can't move forward for establishing IR and OA. In private sector, private university management, with some exceptions, are not willing to invest money in developing modern libraries using advanced technologies that affects the development of IR and OA in their respective institution.

Libraries are the most-affected victim of the current model of scholarly publications. With dramatic increase in number of research publications and steep increase in their cost, the libraries are no longer in a position to acquire research publications they require for satisfying needs of their users. For the greater interest of libraries to adopt strategies to promote OA and remove some of the obstacles in this movement such as: establish institutional repositories and popularize them amongst faculty and researchers; help faculty and researchers proactively to archive their research papers in institutional and other repositories; help launching of OA journals in their respective institution; generate awareness about the OA movement amongst researchers and scientists as well as funding agencies.

Researchers, as authors of research articles, have very important role to play in the process of providing OA to their scholarly publication by submitting a copy of their articles in OAI digital repositories (self-archiving) and by publishing their articles in OA journals.

Role of icddr,b in Bangladesh

icddr,b can play a significant role to facilitate worldwide access to the full text of Bangladeshi Journals. We propose, icddr,b may be the hub of regional OA centre in near future in considering the following key points:

- icddr,b is the first introducer of Gold and Green routes in Bangladesh in 1996 and 2005 respectively;
- First IR in Bangladesh is established at icddr,b in 2005;
- Fast growth of research in Bangladesh;
- It is an International Centre for research activities;
- icddr,b alone publishes a good number of publications from Bangladesh;
- ICT infrastructure of icddr,b is well established.

In view of the above, we would like to offer the following recommendations in order to give a good shape of OA movement in Bangladesh.

Recommendations

In Bangladesh OA is still in infancy, so it is suggested to develop it and go for "OA".

i) To change the attitudes of authors for publishing research papers in OA journals;
ii) Universities and research organizations should set-up institutional repositories and mandate deposition of all scholarly publications by their researchers and faculties into these repositories;
iii) Library professionals are to be trained in setting up the institutional repositories;
iv) Library professionals should take initiatives to make parent organization management understand about OA and IR;
v) Adequate financial support are required from government and respective institutions;
vi) To develop awareness programme among authors, researchers, scientists, faculty members, publishers, institutions, library professionals, university management, general people, readers;
vii) To develop high-tech infrastructure for ICT;
viii) All higher learning institutes and research organizations of Bangladesh should become a part of the global system of digital libraries and OA movement;
ix) Appropriate policy is needed to support OA initiatives.

Conclusion

OA 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 OA among various institutions. A few OA initiatives have been undertaken and are operational, and some are still in the developmental stage. The future of OA in Bangladesh is dependent upon a proper policy and establishment of appropriate framework. In the implementation of OA, library professionals of Bangladesh should play a proactive role in the growth of collections in IR. [21]

OA is no longer just an idea to be deconstructed, analyzed, and reanalyzed. True open access is the long-term answer to access to scientific literature in low-income and middle-income countries in a way that the per capita income model open access HINARI can never be.[22] We now have information about how publishers are practicing it and how scholars and researchers are reacting to it. The really intriguing question about the topic today is to deal with the reality of OA and its exciting promise.

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