

Use of Digital library Software for Building Institutional Repository in Public and Private University Libraries of Bangladesh: A Study



A Thesis Submitted to the Faculty of Arts, University of Dhaka for Partial Fulfillment of the Requirements for the Degree of Master of Philosophy.

By

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February 2019

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in Public and Private University Libraries of Bangladesh: A Study**

DECLARATION

I hereby declare that the thesis entitled “**Use of Digital library Software for Building Institutional Repository in Public and Private University Libraries of Bangladesh: A Study**” is my own work and to the best of my knowledge and belief such materials as has been obtained from other sources are accordingly acknowledged in the thesis. The whole research work was conducted by me under the guidance and kind supervision of Dr. M. Nasiruddin Munshi, Professor, Department of Information Science and Library Management, University of Dhaka.

This thesis has not been previously submitted in partial or in full by me to any university or institution for the award of any degree or diploma.

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CERTIFICATE

I have the pleasure to certify that the thesis entitled “**Use of Digital library Software for Building Institutional Repository in Public and Private University Libraries of Bangladesh: A Study**” by Md. Monirul Islam, Reg. No- 39 (session 2014-15) for the degree of Master of Philosophy (M. Phil) in Information Science and Library Management under my supervision.

I also certify that this thesis represents in independent work on the part of the candidate.

Dr. M. Nasiruddin Munshi
Supervisor

Dedicated to:

My Beloved Parents and My elder brother Md. Abu Bakar Mahmud.

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LIST OF ACRONYMS AND ABBREVIATIONS

Abbreviation	Elaboration
AIC	Agricultural Information Centre
ANOVA	Analysis of Variance
BALID	Bangladesh Association of Librarian, Information Scientists and Documentalists
BAU	Bangladesh Agricultural University
BOU	Bangladesh Open University
BRACUL	BRAC University Library
BUET	Bangladesh University of Engineering and Technology
BUP	Bangladesh University of Professionals
CD	Compact Disk
CIU	Chittagong Independent University
CUET	Chittagong University of Engineering and Technology
CVASU	Chittagong Veterinary and Animal Sciences University
DAMS	Digital Asset Management System
DIU	Daffodil International University
DL	Digital Library
DLMS	Digital Library Management Software
DLS	Digital Library Software/System
DOAR	Directory of Open Access Repositories
DR	Digital Repository
DU	University of Dhaka
DUET	Dhaka University of Engineering and Technology
DUL	Dhaka University Library

Abbreviation	Elaboration
DVD	Digital Versatile Disk
EU	Eastern University
EWU	East West University
FPER	Foundation for Promotion of Education and Research
GPL	GNU General Public License
GSDL	Greenstone Digital Library
HEQEP	Higher Education Quality Enhancement Project
ICDDR,B	International Centre for Diarrheal Disease Research, Bangladesh
ICT	Information Communication Technology
IIUC	International Islamic University Chittagong
ILS	Integrated Library Software/System
INFLIBNET	Information and Library Network
IR	Institutional Repository
IRS	Institutional Repository Software/System
IU	Islamic University
INASP	International Network for the Availability of Scientific Publications
IT	Information Technology
IUB	Independent University, Bangladesh
JDDR	Journal of Diarrheal Disease Research
JHPN	Journal of Health, Population, and Nutrition
KUET	Khulna University of Engineering and Technology
LAB	Library Association of Bangladesh
LAN	Local Area Network

Abbreviation	Elaboration
LIS	Library and Information Science
LMS	Library Management System
M. Phil	Master of Philosophy
NSU	North South University
NUB	Northern University Bangladesh
OA	Open Access
OAIR	Open Access Institutional Repositories
OSDLS	Open Source Digital Library System
OSI	Open Source Initiative
OSILS	Open Source Integrated Library System
OSIR	Open Source Institutional Repository
OSS	Open Source Software
PhD	Doctor of Philosophy
PU	Premier University
RFID	Radio Frequency Identification
ROAR	Registry of Open Access Repositories
RU	University of Rajshahi
SAU	Sher-e-Bangla Agricultural University
SLiMS	Senayan Library Management Software
SU	Stamford University
UDL	UGC Digital Library
UGC	University Grants Commission
UNESCO	The United Nations Educational, Scientific and Cultural Organization

ABSTRACT

This study aims to suggest good and useful IR software for university libraries of Bangladesh. The study discusses the present conditions of IR of the university libraries of Bangladesh as well as finds out the systems and services provided by the sampled university libraries. The objectives of the study were to find out the advancement of IR in university libraries; to find out the present scenario of digital preservation through IR in higher educational institutions of Bangladesh; to specify the sectors and divisions of university libraries needed to be well identified to implement the proposed IR Software; to assess the requirements for ensuring open access to university scholarly publications; to conduct a comparative study on public and private university libraries, to develop a model plan for IR system in university libraries of Bangladesh; to find out barriers and limitations of the issues; and to put recommendations and concluding remarks.

A survey was conducted to gather information from the sample university libraries. Out of 147 universities only 17 public and private university libraries have been selected purposively as a sample to conduct the study. Data have been collected by two sets of structured questionnaires, unstructured interviews of the senior professionals, observation and field visit of the sample universities to uncover the situation. The research finds that present condition of university libraries (public and private) of Bangladesh is not satisfactory level to fulfill the need and demand of the users in the field of open access in research publications of higher education. The findings of the study have been presented with 08 chapters, 51 tables, and 23 figures/charts with detailed explanations. The researcher feels a larger percentage of the universities and its stakeholders may have participated but due to some constraints that was not possible. The universities' central library was conducted in the research not including seminar and institutional libraries.

This research explains the features of most IR software system used around the world to suggest the university libraries of Bangladesh. Important phases have been included to ensure the OA through IR system in university publications so that university libraries can improve their present conditions and new libraries can find the right route from the start.

Finally, the research opens the options not only for ensuring an effective guideline for policy makers of the government but also university authorities of all types will get helpful directions to modify their current situation. The researchers from the point of view of OA & IR will identify new possibilities toward further research.

Keywords: Digital Library System, Institutional Repository, Open Source Digital Library Software, Challenges and Remedies for Acceptance, Satisfaction, University libraries, Bangladesh.

CHAPTER: ONE

CHAPTER: ONE

INTRODUCTION

1.1 Prologue

The revolution of digital technology brings the world in hand. The new technological invention highly facilitates and accelerates the activities of educational institutions of whole world, especially in collecting and preserving the intellectual outputs. The huge amount of research works are being produced enormously in every time by different types of researchers of the higher educational institutions. Higher educational institutions are facing the new challenges to assume and disseminate these intellectual outputs and academic publications. To meet the challenges and to ensure Open Access (OA) into the research work Institutional Repository (IR) system is the most essential and considerable tool to preserve the outputs in digital format for the higher educational institutions.

Digital library denotes a total collection that organizes and stores electronic resources and digital publications always accessible and reachable through the online or world wide web. It holds thesis, dissertations, e-books, e-periodicals, photographs, reports, audio-videos or archives that are maintained by a physical library or an authority. Digital library software, it may open source or customized software presents a system for the construction and presentation of information collections. With many Open Source Software (OSS) applications now available for library and information management, Organizations now have novel options for acquiring and implementing systems. The present status of most useful institutional repository software used in different public & private university libraries of Bangladesh is appreciable for preserving the institutional publications and the intellectual outputs.

The most important problem for scholars and researchers in universities and research organizations of developing countries is the lack of access to the current literature in their subjects. Since important research output is most often published in journals with high subscription fees, collecting the required journals exceeds the capacity of most libraries. Moreover, in developing countries also the research infrastructure and the capacity to absorb scientific and technical knowledge are weak, leading to low levels of

scientific output and further under-development (Islam & Akter, 2013; Okerson, 2004). “In the last decade a great number of Digital Library (DL) and Digital Repository (DR) systems have been developed and published as open-source software. The variety of available software systems becomes a headache when an organization plans to build a repository infrastructure to host its collections” (Pyrounakis, Nikolaidou, & Hatzopoulos, 2014). DSpace, Eprints, Fedora, Greenstone, Invenio are the most useful and favorite open source Institutional Repository Softwares. Besides the above mentioned OS software, a number of repository software have also been registered as Free OS Software e.g. Hydra, DMP Online, Omeka, SobekCM DR Software, Islandora, Kora, Archivematica etc, There are some commercial repository software are being used also, like CONTENTdm, Digi Tool, SirsiDynix PortfolioTM, DXLS, VITAL, ArchivalWare etc.

This work is a report of an investigative study of digital preservation activities through Institutional Repository (IR) system in public and private university libraries of Bangladesh. The first chapter will introduce the background, statement of the problem, formulation of hypothesis, objectives of the study, population and sampling, scope, limitation and importance of the study, operational definition and organization of the thesis with conclusion.

1.2 Background of the study

Bangladesh is one of the probable and on the way of developing country in the world. The universities of Bangladesh are mainly categorized into public and private universities. The public universities are funded by the government, whereas, private universities are funded by non-government organizations and private bodies. There are also a number of international universities in Bangladesh. These are governed and funded by international bodies. At present, there are 42 Public (Government), 103 Private (Non-government) and 03 international universities in Bangladesh (UGC, 2018.). All of them have their library services with more or less modern digital library software facilities. Experience exposed that the university libraries of Bangladesh are almost tended to be placed more overtly on “collections”, rather than on services to users; on “administrative procedures”, rather than on ease of use; and on “rules and regulations”, rather than on what users want. Although a number of researches (Hossain & Islam,

2012) were conducted on digital preservation, but, attention was paid on the judgment of total library services. Literature on the use of digital library software for institutional repository in information institutions widely explained by some researchers (Tramboo, Humma, M Shafi, & Gul, 2012) in a Study on the open source digital library software's: Special references to DSpace, EPrints and Greenstone in *International Journal of Computer application (0975-8887), Volume 59- No. 16, December 2012*. No particular effort has yet been paid to the assessment of use of digital library software as institutional repository in the academic libraries of Bangladesh. The present research will be the first initiative to fulfill the gap, as taken by the researcher.

1.3 Statement of the problem

Most of the university libraries of Bangladesh have not been yet used DLS for building Institutional Repository; even there are some libraries those are not conscious about it. Open Source Digital Library Software (OSDLS) as Institutional Repository (IR) system has created opportunities for the universities of Bangladesh though library budgets is comparatively less and cannot afford to purchase, maintain and upgrade proprietary IRS. The OSDLS is more cost-effective than proprietary Integrated Library Systems (ILS). University libraries internationally tended to move towards the adoption of OSDLS for preserving institutional publications. Although the experience of library professionals on repository software is worried with the installation process, they are modestly more satisfied than users of proprietary ILS. From the literature review, it is found that there are some studies have been conducted on practical experience on implementation of specific OSS as Institutional Repository, comparative analysis of different IRs packages, library professionals' perception and satisfaction with the various or particular aspect of IRs worldwide. But comparatively less initiative has been taken to present the overall condition of IR and to assess the satisfaction level of repository users toward Institutional Repository in university libraries. In Bangladesh, a few numbers of studies have been conducted on describing the practical experience of implementation of DSpace, and usability of DSpace interface, but no effort has been made to study on the overall status of building institutional repository, factors, challenges for the adoption of IRS in higher educational institutions especially in the university libraries. Besides, a very few importance has been made to assess the satisfaction level of library professionals and users on IRS. So, it is expected to determine the extent the application of DL Software in

Bangladeshi university libraries for building awareness among library professionals and users regarding the preservation and distribution through IRS. As well as, it is desired to assess the satisfaction level of library professionals and users towards digital preservation of institutional outputs for evaluation of the effectiveness of existing IRS. It is also needed to find out the significant factors, challenges, and actual remedies for the adoption of IRS to enhance the extent of implementation and use of IRS in Bangladeshi universities. Consequently, it may be concluded that an effort has been made for the first time to study on use of institutional repository and satisfaction level in the university libraries of Bangladesh.

1.4 Formulation of hypothesis

At the beginning of this research study when the thesis topic was taken as research work we had some hypothesis regarding the present status of IR system in university libraries of Bangladesh. In the light of the objectives of the research, the following hypothesis was formulated to guide the present investigation.

- ❖ Emphasis is not given properly in IR systems than any other discipline that exists in the university libraries of Bangladesh.
- ❖ IR system is very indolence in Bangladesh though it is prospering.
- ❖ There is no university or government policy for IR implement system in higher educational institution of Bangladesh.
- ❖ IR is the ideal tool to preserve and distribute intellectual outputs but enough work is yet to be established.

1.5 Objectives of the study

This study is designed and carried out with a view to determine the origin, development and present status of Digital Library Software for building institutional repository in University Libraries of Bangladesh. It would be difficult to understand and make judgment on the quality and appropriateness of country's contemporary use of institutional repository software in public and private university libraries of Bangladesh without investigation of usefulness and its' present status.

The basic objectives of this study are set as follows:

- ❖ To introduce the origin and development of DLS for building IR presenting the present state of digital preservation in university libraries of Bangladesh.
- ❖ To evaluate the present repository software used in different university libraries of Bangladesh.
- ❖ To assess the future opportunities of DLS for building IR in university libraries of the country.
- ❖ To find out the problems in the existing IRS in Bangladesh.
- ❖ To present a model plan and put forward some recommendations that would be more effective for using the DLS as IR for the university libraries of Bangladesh.

Finally this work will focus on the benefits and hindrances of having an IR in University library, and library authorities' role in the effective management of IR and the total scenario of IR in university libraries of Bangladesh. As the strength and advantages of DLS can only be maximized through effective IRs, this study recommended that an Open Source Institutional Repository Software (OSDLS) be considered as the major benchmark of digital preservation and distribution.

1.6 Population and sampling

To examine the Open Source Digital Library Software, five (5) widely used repository software have been selected. These softwares are open-source repository system participating in the Directory of Open Access Repositories- OpenDOAR. Table 1 shows an overview of selected 5 Open Source Digital Library Software.

Table 1. The five repository software systems selected for the study

<i>Software</i>	<i>Initially Designed</i>	<i>License</i>	<i>Website</i>
DSpace	MIT Libraries and Hewlett-Packard Labs	BSD open source license	www.dspace.org
Greenstone	University of Waikato	GNU General Public License	www.greenstone.org
Fedora Commons	Cornell University and the University of Virginia Library	Apache License, Version 2.0	www.fedora-commons.org
EPrints	University of Southampton	GNU General Public License	www.eprints.org
Invenio	CERN Document Server Software Consortium	GNU General Public License	www.invenio-software.org

To examine the study and to get the concept of Digital Library (DL), Digital Preservation and Institutional Repository (IR) many literatures on digital preservation, digital library and institutional repository from national and international arena were reviewed. to get the concept of digital library, digital preservation and Institutional Repository (IR). To determine the present scenario of digital preservation in higher educational institutions of Bangladesh an overlook has been carried out in all public and private university libraries of Bangladesh. As a result we found some leading university libraries are using Open Source Digital Library Software (OSDLS) for building IR and most of the university libraries are not using the Institutional Repository for the digital preservation. Finally a survey was carried out in the 17 university libraries of Bangladesh; 7 public, 10 private university libraries those are functioning the digital preservation activities fully through institutional repository software.

For fulfill the purpose, OpenDOAR and all repository web-links were reviewed and two sets of questionnaire were prepared and distributed to the librarians/repository administrators and repository users of these universities through e-mail, Facebook messenger and by hand. Most of them returned the filled-out questionnaire and data received was analyzed properly with the help of SPSS 22nd version and Microsoft excel. Table 2 shows the total university status and sample university libraries for the study.

Table 2. Total number of university libraries for the study

<i>SN</i>	<i>Type of University</i>	<i>Number of university</i>	<i>IR Used (sample)</i>	<i>Not used</i>
1.	Public	42	7	35
2.	Private	103	10	93
	Total	145	17	128

The present study has been showed to identify the level of acceptance, evaluate the existing repository software, substantial challenges and actual situation of the implementation of Institutional Repository Software (IRS) in the public and private university libraries of Bangladesh. The study also measured the satisfaction levels of library professionals and users towards IRs to evaluate the sufficiency of collection, effectiveness of the existing services provided by the DL Software.

1.7 Scope and limitation of the study

Primarily all public and private university libraries of Bangladesh have been brought in the observation. We found that only 17 university libraries are using the Institutional Repository Software to preserve the scholarly publications of their institutions. For the completion of research, the study included these 17 university libraries located across the country those are categorically selected as general category - public, general category – private. An International university library named Islamic University of Technology (IUT) Library is using DSpace as IR but it is not included in the study.

1.8 Importance of the study

University is the leading education center for the higher education of any country. It is considered as the uppermost institution to ensure the sophisticated and advanced learning for the nation. There is no alternative of research to discover the branches of knowledge. Teachers and students of every higher educational institution make research article, research report, paper on different topics in different times. Besides this, by the different sections of diverse stages of university publish articles, newsletter, prospectuses, annual report and curriculums etc. These research output and publications should be kept in a preservation system by realistic, enduring, sustainable way.

“In this electronic publishing age, academic institutions including universities have increasingly recognized that an institutional repository (IR) is an essential infrastructure of scholarly dissemination. An IR is a digital research archive consisting of accessible collections of scholarly work that represent the intellectual capital of an institution. It is a means for institutions to manage the digital scholarship their communities produce, maximize access to research outputs both before and after publication and also to increase the visibility and academic prestige of both the institution and authors” (Jain, Bentley, & Oladiran, 2009).

“While the open access (OA) movement has been a topic of major debate and interest around the world, in the developing countries it has been seen as an unprecedented opportunity for providing equality of access to essential research information and for raising awareness of the national research output. The problems that developing countries have always faced with respect to research information are the inability to afford subscriptions to journals and the difficulty to integrate the national research output

into the global knowledge. In these issues, OA may help by creating access to information (reading) and by increasing world-wide awareness of the local research output” (Dekeyser, 2012; Islam & Akter, 2013).

The limited circulation and awareness of scholarly publications in Bangladesh has resulted in a lower visibility of its academic output in the global research community. Bangladesh does not stand alone with these problems, although it is one of the least developed and most populous nations in South Asia with a literacy rate of 72.8% (“The World Factbook-CIA,” 2018). The status of the Information and Communication Technologies (ICTs) in Bangladesh is far from impressive, as access to ICT in Bangladesh is not satisfactory. But some initiatives of government and private institutions are now breaking the ice towards countrywide ICT access. The 1980s were considered as the beginning of the automation era for libraries and information centers in Bangladesh. The libraries of the International Centre for Diarrheal Disease Research, Bangladesh (ICDDR,B) and of the Agricultural Information Centre (AIC) were pioneers in creating bibliographic databases in specialized fields, using microcomputers (Islam & Akter, 2013; Khan, 1989). “The Internet arrived in Bangladesh with UUCP e-mail in 1993 and IP connectivity in 1996. Nowadays, use of computers and Internet has dramatically increased in Bangladesh, although a significant digital divide remains throughout the country” (Islam & Akter, 2013).

So, we can say that the importance of Digital Repository system is very high. It should be studied properly giving more emphasis.

1.9 Operational definition

1.9.1 Digital Library (DL) Software

Digital library refers to a collection that constitutes electronic resources, accessible through the World Wide Web. It often contains electronic versions of books, photographs, videos that are owned by a “physical” library (NZD Library, 2012) . It is one kind of specialist software for building, maintaining, managing or running digital libraries (Wikipedia, 2017). Some worldwide famous and useful Open Source Digital Library software are DSpace, Eprints, Greenstone, Fedora and Invenio.

DSpace is a digital library system to capture, store, index, preserve and redistribute the intellectual output of a university's research faculty in digital formats. DSpace has been developed jointly by MIT Libraries and Hewlett-Packard (HP). It is now freely available to research institutions world-wide as an open source system. **Eprints** is generic archive software under development by the University of Southampton. It is intended to create a highly configurable web-based archive. EPrint's primary goal is to be set up as an open archive for research papers, but it could be easily used for other things such as images, research data, and audio archives - anything that can be stored digitally by making changes in configuration. **Greenstone** is a suite of software for building and distributing digital library collections. It provides a new way of organizing information and publishing it on the Internet or on CD-ROM. It is available for both Windows and Linux O/S. It requires Perl software to build collections. **Fedora** is one kind of digital asset management systems which maintains institutional publications, digital documents and digital library system. It is a fundamental architecture for digital repository. It is flexible, modular architecture and open source repository platform built on the principle that interoperability and extensibility are best achieved by the combination of data, interfaces, and mechanisms as clearly defined modules. **Invenio** is an open source software framework for large-scale digital repositories that provides the tools for management of digital assets in an institutional repository and research data management systems. The software is typically used for open access repositories for scholarly and/or published digital content and as a digital library.

1.9.2 Institutional Repository (IR)

An institutional repository is an archive for collecting, preserving, and disseminating digital copies of the intellectual output of an institution, particularly a research institution. An institutional repository can be viewed as a set of services that a university offers to members of its community for the management and dissemination of digital materials created by the institution and its community members. For a university, this includes materials such as monographs, eprints of academic journal articles—both before (preprints) and after (post prints) undergoing peer review—as well as electronic theses and dissertations. An institutional repository might also include other digital assets generated by academics, such as datasets, administrative documents, course notes, learning objects, or conference proceedings. Deposit of material in an institutional repository is sometimes mandated by that institution (Wikipedia, 2018).

1.10 Organization of the thesis

The text of the dissertation has been organized in a logical progression in the following eight major chapters including appendices and bibliography.

Chapter One- Introduction: This chapter includes prologue the introductory information about institutional repository, Background of study, statement of the problem, objectives of the study, population and sampling, scopes and limitations of the study, importance of the study, operational definition and organization of the thesis.

Chapter Two- Literature Review: It contains the review of the literature conducted previously in different time and different places in the world consisting of introduction, overview of the concept of DLS as IR, different to IR software, evaluation IR packages and the summary.

Chapter Three- Conceptual Framework: This chapter reflects the conceptual framework of the study including acceptance, extent of OSDLS acceptance, factors for acceptance, challenges of acceptance, remedies for acceptance, satisfactions of repository administrators & users and conclusion.

Chapter Four- Methodology: This chapter describes research methodology which is followed by the research design, research site, assessment methods, data collection method, pilot survey and statistical methods with conclusion.

Chapter Five- Present Scenario of IR and data analysis: It discusses the present condition of IR in university libraries of Bangladesh categorizing into two divisions named public and private university libraries. Data were analysed here with presenting the demographic information of repository administrators and users.

Chapter Six- Discussion: This chapter focuses discussion on data analysis including use of IR software, factors for acceptance of OSDLS, challenges for acceptance, remedies for adoption, repository administrator's and user's satisfaction with conclusion.

Chapter Seven- Model Plan: This chapter presents a model plan to build an effective IR system in the university library premises of Bangladesh providing the

characteristics, objectives, functions, scope, strategy, possible barriers and components of the model plan with conclusion.

Chapter Eight- Problems, Recommendations and Conclusion: The last chapter presents the major problems for building IR in Bangladesh and suggests some recommendations for improvement of IR in university libraries of Bangladesh. It also recommends some new zones for future research with conclusion of the study.

1.11 Conclusion

Thus, it can be concluded that the effort has been made for the first time to study on present scenario and to measure satisfaction level of professionals and users on Open Source Digital Library Software (OSDLS) in the public and private university libraries of Bangladesh. This study has tried to understand the extent of acceptance, assess the influential factors, significant challenges, and actual recommendations for the acceptance of OSDLS in the university libraries of Bangladesh. Preparatory DLS is not included in the study which can be incorporated in the future research.

CHAPTER: TWO

CHAPTER: TWO

LITERATURE REVIEW

2.1 Introduction

Literature review is the search and evaluation of the available literature in specific research area. It is the essential part of conducting any research, which provides the current knowledge including substantive findings, as well as theoretical and methodological contributions to a particular topic. A lot of studies have been conducted to assess the information all over the world in different contexts. Here we would like to mention an overview of the work which is very much related to the study. First, the literatures were reviewed on use of DLS for building IR in two perspectives: national perspective and international perspective in chapter 2.2 and 2.3 respectively. Then, we discussed the definition of digital library software and Institutional Repository and how we have used these terms in this thesis in the section 2.4 and 2.5 respectively. We provided an overview of different open source and commercial IR softwares and their evaluation to know the efficiency of existing digital library software in section 2.6 and 2.7 correspondingly. User satisfaction towards IR is also presented to know the effect of existing IR in section 2.8. Finally, in the conclusion, we talk about the research gap in the existing literature and how our research contributes to fill the gap. Thus, to determine the proposed study on assessing adoption and satisfaction of OSIR in university libraries of Bangladesh, a number of literatures have been reviewed under the concepts.

2.2 Review of national literature

In the recent times a very few initiatives have been taken by different institutions. BRAC University library has successfully formed an Institutional Repository using open sources software DSpace. The Digital IR program was funded by INASP in April, 2007. The Dhaka University Library (DUL) is the oldest and largest academic library in the Bangladesh. The library holds more than half a million books, bound journals, newspapers, etc. Very recently they have initiated to develop an institutional repository by locally digitizing its 30,000 handwritten manuscripts, 20,000 rare books, 5,000 microfilms and many special materials. The library will also integrate the repository with the existing automation software. EWUL initiated a digital library program by using the Greenstone Software from the June 2010 (Alam & Islam, 2011). 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 (Uddin, Koehlmoos, & Hossain, 2014). The authors pointed out the barriers of OA of Bangladesh and gave recommendations to overcome the barriers of OA through IR.

Mostofa, Begum, & Mezbah-ul-Islam (2015) discussed the roles of IR in enhancing higher education and scholarly communication in Bangladesh. They showed the present scenario & impact of IR in higher education and tried to show the relationship of IRs with educational research and scholarly communication. Tabassum, Roknuzzaman, & Islam (2015) explored the factors that influenced usage of digital libraries based on a case study of East West University Digital Library (EWUDL) in Bangladesh. The user satisfaction levels of the study showed that majority of users (42.6%) were satisfied with EWUDL. Thirty one percent were satisfied to some extent followed by 10.9% with extremely satisfied users. 18 respondents (14.0%) reported to be dissatisfied to some extent and 1.6% was neutral. The overall mean score reveals that users were satisfied with EWU DL to some extent. Chowdhury, *et al.*, (2011) particularly focused on the development of institutional repositories using DSpace software in Bangladesh, and provided a review of the current situation and examines prospects of IR. They described the concept of IR, updated online users regarding the development and progress of IR in Bangladesh and encouraged the establishment of IR in the libraries of respective organizations/institutions.

Islam & Akter (2013) focused on the different aspects of OA in developing countries and on the OA status in Bangladesh. They focused on Open Access Institutional Repositories (OAIR) and their scholarly communication and suggested some directions for improvement of OAIR in Bangladesh. Establishment of digital preservation system and digital library system is difficult, expensive and long-term process. Particularly in the developing countries, like Bangladesh, the process comes across some serious

challenges. The creation and maintenance of digital libraries is very expensive. Costs are incurred for production, for ongoing provision of access, and for preservation of the digital information. The cost to develop and operate a distributed architecture for long-term archiving, migration, and backup of digital materials will be high. The greatest challenge toward digitization programs in Bangladesh is the continuing cost of assembling content and providing access to the inhabitant of the country (Alam, 2012).

Shoeb (2010) described the procedure of setting up an IR at the Independent University, Bangladesh (IUB), using DSpace open source software. DSpace is the best solution to use as digital library software. It has a great extensive modular capacity that can be used to grow the collection as much bigger as needed.

Ahmed *et al.* (2014) mentioned the theses and dissertation to be included in institutional repository. They differentiate between bibliographies and digital contents. They suggested that, digital publications should be included into institutional repositories. Hossain & Islam (2012) discussed on the use of institutional repository software, but attention was paid on the judgment of total library services. Ahmed & Shoeb (2009) described the functionality of institutional repository of DSpace and Greenstone. Although it is very hard to determine which one is the best. DSpace can be used to university libraries at most.

Some research mentioned that the theses and dissertation should be included in institutional repository. They suggested that digital publications should be included into institutional repositories. They discussed on the use of institutional repository software, but attention was paid on the judgment of total library services.

2.3 Review of international literature

In the last decade a great number of Digital Library (DL) and Digital Repository (DR) systems have been developed and published as open-source software. The variety of available software systems becomes a headache when an organization plans to build a repository infrastructure to host its collections (Pyrounakis, Nikolaidou, & Hatzopoulos, 2014).

Institutional Repositories (IRs) have been considered one of the disseminating and preserving methods for scholarly research publications. However, the success of IR is dependent on the contribution of researchers and faculty members. The findings indicated that researcher were found to have a low level awareness of the university institutional repository and have a positive attitude towards providing free access to scholarly research results of the university of Oslo (Alemayehu, 2010).

Kumar (2009) stated that most of the institutes adopt the open source IR softwares for creating/developing their own repositories. He found that major documents deposited in Institutional Repository are theses, dissertations, conference papers, journal articles, reports, patents etc. The institutional repository is a very powerful idea that can serve as an engine for institutions of higher education, and more broadly for the scholarly enterprises that supports research activities.

Bankier & Gleason (2014) compared the five most widely adopted IR platforms: Digital Commons, DSpace, Eprints, Fedora, and Islandora. The comparison was divided into twelve categories to help librarians identify the features that are most important to building a successful institutional repository program at their institution. Another comparison studied by Castagné (2013) reported an environmental scan of institutional repository software packages and frameworks. DSpace, Eprints, Digital Commons and Fedora Commons were selected based on their ROAR statistics and overall suitability for a large research library. In order to discuss the Fedora framework in practical terms, two promising Fedora-based projects were selected: Islandora and Hydra.

Velmurugan (2014) stated that institutional repositories in India are developing rapidly. Open source software, especially DSpace, is increasingly being used for the creation of digital repositories. Now a day, it is a trend of institutional repository all around. Many of the institution have their repositories which they have built using various open source software. But most of the institutional repositories for testing or trial purpose only and are not maintaining properly.

Deka (2006) stated that the institutional repository is no longer a concept. In Europe and USA the different project on IR had already started. In India also slowly setting up of IR

has already started, especially by the leading academic institutions like IITs, IISc etc are coming forward. The ministry of HRD and the department of Science and Technology are encouraging in building up the IR of the institutes by providing the necessary fund. The role of UGC and INFLIBNET in this aspect is most important. UGC has already started an initiative to develop a repository for electronic Thesis and Dissertation.

Dhanavandan & Tamizhchelvan (2014) discussed about the recent trends and growth of Institutional Repository (IR) in south Asian countries. An institutional repository is an online locus for collecting, preserving, and disseminating - in digital form - the intellectual output of an institution, particularly a research institution. And it further deals about the name of the repositories, size, type, content and languages and various software. They found out South Asian countries like India, Pakistan, Nepal, Bangladesh and Sri Lanka have institutional repositories in their respective libraries but Bhutan and Maldives are not having any repositories. Among the five countries, India 62(82.67%), Bangladesh 7(9.33%), Pakistan 3(4.00%), Sri Lanka 2(2.67%) and Nepal 1(1.33%) institutional repositories have developed respectively.

Jose (2007) tried to identify the world wide extent of adoption of open source digital library software packages in various organizations through an online survey. Survey showed that DSpace is the most popular among the digital library solutions available in the open source domain. Eprints is also widely used. Education institutions dominate in the use of these packages.

Jain, Bentley, & Oladiran (2010) discussed the benefits and obstacles of setting up an IR, and librarians' and authorities' roles in the successful management of an IR. They showed the annual growth of IRs in different regions of the world. Europe and North America have the highest concentration of IRs and it seems that any institution of repute in the two regions will also have an IR. As the strength and advantages of DS can only be maximized through effective IRs, finally they recommended that an IR be considered as the principal benchmark of digital scholarship.

Halder & Chandra (2012) examined the users' attitudes towards Institutional Repository in Jadavpur University to investigate the awareness of IR in an academic institution and

different aspects associated with it. Finally the study revealed that the large numbers of people in Jadavpur University have conflict in awareness of the institutional repository, IR software and reasons for developing an institutional repository. K & Thandavamoorthy (2011) explored researchers' attitude towards deposit to open access IR as a mode of scholarly publishing. The study revealed that the majority of the science, technology and medicine scholars are aware of and positive towards deposit institutional repositories and arts. However, the humanities and social science researchers are found to have a low level awareness of the IR but were interested in contributing their research work to the university IR and have a positive attitude towards providing free access to scholarly research results of their university.

Shields, Rangarajan, & Stewart (2012) explained the role and purpose of open access digital repositories as they apply generally and MPA program student work specifically. Using download data, characteristics of the papers, and search engine optimizers, they examined the factors that contribute to the high capstone paper downloads at Texas State University.

Seshaiah (2009) explained how to build an institutional repository using Greenstone Digital Library Software. He mentioned many open source software are available to build digital repository. GSDL software is one of the open source software. It can build institutional repository effectively.

Dutta & Paul (2014) surveyed among selected science and technology faculty members of University of Calcutta covering different aspects of IR. The aspects are mainly the awareness about IR and the willingness to participate in it. Report showed that the faculty members' attitude regarding IR is more or less positive. This is a clear indication that the movement of green road to open access through institutional repository in Asian region is in the age of infancy. So, it is now time to rethink the universities or institutes of the Asian countries, particularly developing countries, to establish such repository to make available permanently all digital collections of that institution and simultaneously to overcome the access barriers within the particular language periphery (Nazim & Mukherjee, 2011).

Sanjeeva & Powdwal (2017) discussed the steps should be taken by librarians to implement OA in their respective institute libraries in Mumbai. Authors stated that librarian can support OA by providing enhanced access to OA, publishing OA works, digitizing OA, celebrating the OA week, initiating IR in institutions, encouraging faculty, increasing awareness, enlightening administrators etc.

The Digital Library Management Softwares (DLMS) present an easy to use, customizable to create online digital libraries. With these institutions/organizations can disseminate their research work, manuscripts, or any other digital media for preservations and world over dissemination of digital items. It is difficult to propose one specific DLMS systems as the most suitable for all cases (Tramboo, *et al.*, 2012).

Khan & Bhatti (2017) identified useful training programs for university librarians to acquire digital competencies and examined their digital competencies for developing and managing digital libraries in universities of Pakistan. Study revealed that university librarians in Pakistan possess only a basic level of digital competencies in developing and managing digital libraries. Thus, in Pakistan, digital library development is still in its infancy. Rafiq, Ameen, & Jabeen (2018) conducted a study to identify barriers that are hindering digitization initiatives in libraries of Pakistan. The authors reported that the lack of knowledgeable and skillful human resources, lack of financial and technological resources, absence of digitization policy, plans and procedures were identified as the major barriers to digitization initiatives in university libraries of Pakistan.

Abrizah, Hilmi, & Kassim (2015) highlighted the LIS faculty from three Malaysian library schools on their motivation to share intellectual profile, research and teaching resources in an inter-institutional repositories and why the reluctance in contributing. Mapulanga 2013) discussed the prospects and challenges of digitizing library resources and building digital repositories in the University of Malawi Libraries and revealed that digitizing library resources and building digital repositories in the UNIMA has gone through ups and downs.

Lam & Chan (2007) conducted a case study on Hong Kong University of Science and Technology (HKUST) library. Authors illustrated how HKUST library planned and set

up its IR, how it acquired and processed the scholarly output and what procedures and guidelines were established. Chen, *et al.* (2012) conducted a study to present a reading annotation and knowledge sharing tool by the Taiwan Libraries based on Web 2.0 technologies adopting DSpace IR system. Study found that annotated digital material provides useful knowledge to readers. K. Chen & Hsiang (2009) presented the practical and unique approach to construct an IR at the National Taiwan University (NTU). Authors found that a content-rich system with the much friendlier user interface like NTUR could be constructed in an effective way.

In USA, Hulse, Cheverie, & Dygert (2007) conducted a study to explore the benefits and challenges of creating a shared institutional repository and to, describe the process by which a consortium was able to establish such a service. Perhaps, ALADIN Research commons is the first consortium-based repository using the DSpace platform. Kelly (2007) showed how an institutional repository can be successfully created by university libraries with limited financial and technological resources. Study found that a serviceable repository may be created by focusing on its critical elements, and adapting existing resources, including a proprietary system currently used for other digital resources. Sharif (2013) conducting a study to share experience of implementing IR in various campuses of Aga Khan University (AKU), from selection of the product to its marketing. AKU IR site <http://ecommons.aku.edu> was available to public from the day its own branding 'eCommons@AKU'. The site was launched officially on 20th February 2014. Interesting to note that AKU libraries from Pakistan, East Africa and London uploaded more than 105,300 articles from site live to official launch.

In USA, Krevit & Crays (2007) conducted a study to examine a pilot program implemented by two higher educational institutions at Houston to design the multi-institutional repository for the Texas Medical Center. Authors found the success of the institutional repository depends on appropriate communication with faculty, a deep understanding of the publishing process, identifying appropriate partners, designing a flexible technology infrastructure, and engaging in active collaboration with key players. Graham, L. S., & Weatherford S. (2005) studied to illustrate how one medium-sized academic library was able to use a web-based digitization and repository project to

increase and promote communication and relationship between the library and the university community.

In UK, Joint (2009) conducted a study to examine the assertion of the Archiving system 'digital asset management' system (DAMs). Study found that 'DAMs' systems are in reality very under-developed. Libraries cannot implement ready-made 'DAMs' for universities in the same way that they can implement a library management system.

Francke, Gamalielsson, & Lundell (2017) conducted a study to describe the conditions for long-term preservation of the content of the IR of Swedish higher education institutions. Study revealed that the IRs at Swedish higher education institutions do not, in most cases, have an archival responsibility for any of the publications deposited in them. Jain, Priti (2011) studied in Botswana to review the latest trends in IRs, discuss the future of IRs and make some recommendations that might be relevant for developing repositories. Author reviewed the recent literature on IR including the benefits and possible obstacles of setting up an IR and suggested that, in spite of all the obstacles to successful implementation, IRs have been increasingly recognised as vital tool for scholarly communication.

Academic and research institutions in Nigeria are still struggling to overcome the many challenging issues in an attempt to make their research outputs openly accessible to scholars through open access institutional repositories (Mohammed, 2013). Okoro (2017) discussed prospects, challenges and other issues associated with the sustenance of institutional repositories in Nigerian university libraries. Finally he concluded that IR has become a hallmark of world-class universities as it confers institutional prestige and global visibility to institutions of higher learning where they exist. Ivwighreghweta (2012) also examined the challenges of IRs development in some academic intuitions in Nigeria. Study revealed that majority of the respondents has not deposited their work with IR though they were completely aware of open access IR and it was found that the major obstacle to develop of OAIR is funding. Tiemo & Ebiagbe (2016) focused on the awareness and attitude of lecturers toward the establishment of IR in Niger Delta University. Authors revealed that lecturers' awareness of IR was high and they agreed

that if the repository is established in university it will enable the deposit their work but this will violate the copy right law.

Chen & Zhang (2014) described the functionality of institutional repository. They stated the minimum functions required to build institutional repository, especially in university libraries. They distinguished among different university libraries to determine the functions. Pyrounakis *et al.* (2014)) discussed 5 widely used institutional repositories namely DSpace, Fedora, Greenstone, EPrint and Invenio and proposed suitable software for the scholarly publication. Alemay (2010) described that IR is considered one of disseminating & preserving method of digital publication of the institution. He said success of IR depends on contribution of researchers and faculty. To investigate research attitude & contribution – a survey was conducted and found the low level awareness of researchers but interested in IR.

The main focus of above papers is the comparison of the software systems based on some quantities and features. They discussed the importance, initiatives, and developments with existing situation of IR. In this study we'll try to go a step further and in addition to the comparison of DR software systems and their characteristics' description, study proposes the most suitable systems for preserving the research output properly and usefully. No particular effort has yet been paid to the assessment of use of digital library software for building institutional repository in the higher educational institution's libraries in Bangladesh. The present research will be the first initiative to fulfill the gap, as taken by the researcher.

2.4 Overview of the concept of Digital Library (DL)

The term “Digital library” has become one of the most frequently used terms in the library and information science (LIS) arena (Shuva, 2014). The term digital library and digital repository are synonymous, and both are a type of information retrieval system (Shoeb, 2010). Digital Library Federation (2004) developed DLs working definition as "Digital libraries are organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and economically available for use by a defined community or set of

communities." The digital libraries are libraries with the same purposes, functions, and goals as traditional libraries - collection development and management, subject analysis, index creation, provision of access, reference work, and preservation (Rahman, 2011; Cleveland, 1998).

2.5 Overview of the concept of Institutional Repository (IR)

A lot of experts and scholars have expressed their views on their ideas of Institutional Repositories (IR) some of which are reviewed in this study. Institutional Repository (IR) is a set of services that a library offers to the members of its community for the management and dissemination of digital materials created by the institution and its community members (Adebayo, 2013; Lynch, 2003). To know about Institutional Repositories, it would be better to be familiar with the repository. According to Wikipedia "A repository is a central place where data is stored and mined. A repository can be a place where multiple databases or files are located for distribution over a network or a repository can be a location that is directly accessible to the user without having to travel across a network." But 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 (Chowdhury *et al.*, 2011). Institutional repository often referred to as "green route" to OA publishing, which is popular to provide OA to scholarly literature (Uddin *et al.*, 2014). The term institutional repository (IR) refers to research output digitally such as journal articles or research data, e-thesis, e-learning objects, and teaching materials, or any other scholarly work such as theses and dissertations created by the faculty, research staff, and students of an institution, and accessible for end users both within and outside of the institution with few, if any, barriers to access (Crow, 2002; Mukhlesur Rahman & Mezbah-ul-Islam, 2014). It is an online locus for collecting, preserving and disseminating in digital form, the intellectual output of an institution such as research journal articles, theses, dissertations, normal academic materials, administrative document, course notes and leaving objects (Palmer, Tefteau, & Newton, 2008).

After developing a standard repository, the researchers, teachers, students, stakeholders of the university or other users will be able to access digital resources provided by this

repository; moreover, the repository can make an impact to the researchers, teachers, and students as it disseminates the publications, increasing the visibility of research output and consequently the department and the institution (Shoeb, 2010).

An institutional repository is a web-based database of intellectual materials. It could be growing and continuous record. It must be open for all and free accessible. The institutional repositories collect, store, disseminate digital resources and also preserve digital materials for long term usage. An effective institutional repository necessarily requires collaboration among librarians, information technologists, archivists and record managers, faculty and administration and policy makers (Lynch, 2003).

As the digital Institutional Repository can be any collection of digital material hosted, owned or controlled and disseminated by any institution irrespective of purpose of origin. Institutional Repository can assume many forms and serve a variety of purposes as per the functions and objectives of parent institution. A digital archive of the intellectual product by the faculty, research staff and students/ research scholar of an institution and it should be accessible to end user without boundaries (with in and out of the institution).

The institutional repository contents should consist of the following items:

- Pre-prints articles or research reports submitted for publication.
- Journal articles accepted for publication
- Seminar or Conference papers
- Doctoral theses and dissertations like MPhil, PhD Thesis
- MS thesis
- Research articles
- Projects of students
- Any teaching materials
- Projects reports
- Photographs and audio-video records
- Any research paper
- Art work

- Books

Institutional Repository (IR) is a digital archive of intellectual product created by faculty members, research scholars and students of an institution and accessible to end users both within and outside of the institution with little or no barrier. Repositories are important tools for preserving an institution's legacy facilitating digital preservation and scholarly communication.

2.6. Open Source Institutional Repository software

Three types of DL softwares for building institutional repository (IR) are being used in libraries through the world such as Proprietary, open source and freeware. As open source DR software following are the examples of institutional repository software: DSpace, Greenstone, Eprints, Fedora-Commons, Invenio, Mycore, Opus, SimpleDL, SLiMS and SobekCM. Most useful major digital repository softwares will be discussed in this research study to understand better. Table 3 shows the overview of widely used OSIR software in the world.

Table 3: The widely used OS Institutional Repository softwares

Software	Developed by	License	Website
DSpace	MIT Libraries and Hewlett-Packard Labs	BSD open source license	http://www.dspace.org/
Greenstone	University of Waikato	GNU General Public License	http://greenstone.org/
Fedora	Cornell University and the University of Virginia Library	Apache License Version 2.0	http://www.fedora-commons.org/
Invenio	CERN Document Server Software Consortium	GNU General Public License	http://www.invenio-software.org/
EPrints	University of Southampton	GNU General Public License	http://www.eprints.org/

2.6.1 DSpace



DSPACE is an open source software platform developed and supported by DSpace user community, with the help and guidance of DuraSpace. DSpace is open source DL

software that collects, preserves, and distributes digital collections. It is the top preferred open source digital repository software. Anybody can download and customize the application to fit their needs, as the software is free and open source. Initially, the software was developed by MIT and HP labs, and made open source in 2002. The platform was quickly adopted by numerous organizations around the world, as it was easy to use and provided broad access to a huge intellectual output produced in digital form (Shoeb, 2010). Currently there are over 1000 organizations in more than 100 instance of DSpace running worldwide (“Community - DSpace,” 2018). It is a digital resource management system that permits organizations, such as libraries to collect, accumulate, preserve, index, and disseminate the scholarly and intellectual outputs of a university. Some of its characteristics as shown in DSpace documentation are as:

- a) It is a service model for open access and/or digital archiving for perennial access.
- b) Provides a platform to frame an Institutional Repository
- c) Helps to make available institution-based scholarly material in digital formats.

Most of The leading public and private university libraries like, University of Dhaka Central Library, University of Rajshahi Central Library, BUET Library, BRAC University Library, NSU Library, IUB Library, East-West University Library, Daffodil International University, etc. are using DSpace as their institutional repository.

2.6.2 Greenstone

Greenstone is a suite of software for building and distributing digital library collections. It provides a way of organizing information and publishing it on the web or on removable media such as DVD and USB flash drives. Greenstone is produced by the New Zealand Digital Library Project at the University of Waikato, and developed and distributed in cooperation with UNESCO and the Human Info NGO. It is *open-source*, multilingual software, issued under the terms of the GNU General Public License (“GDL website,” 2018). It provides a new way of organizing information and making it available over the Internet. The latest version of greenstone is 3.08 released on November 2016. Listed below are some of special features possessed by the Greenstone:

- a) Accessible via web browser
- b) Full Text and Field Search

c) Flexible browsing facilities

East West University and Eastern University use the Greenstone as their digital library software to preserve their institutional publication.

2.6.3 Fedora

Fedora™ is a robust, modular, open source repository system for the management and dissemination of digital content. It is especially suited for digital libraries and archives, both for access and preservation. It is also used to provide specialized access to very large and complex digital collections of historic and cultural materials as well as scientific data. Fedora has a worldwide installed user base that includes academic and cultural heritage organizations, universities, research institutions, university libraries, national libraries, and government agencies.

The Fedora project is led by the Fedora Leadership Group and is under the stewardship of the DuraSpace not-for-profit organization providing leadership and innovation for open source technology projects and solutions that focus on durable, persistent access to digital data (<http://fedorarepository.org>).

2.6.4 Invenio

Invenio is a digital library framework. It's used for fully customized digital library, institutional repository, multimedia archive, or research data repository on the web. As integrated library system it manages MARC21 authority and bibliographic records, curates records and runs automated quality checks. It uses circulation module with customizable borrower, item acquisition and interlibrary loan workflows. It captures and preserves research output. As multimedia archive it manages audio, photo and video material.

Invenio publishes articles, reports or theses of the institute, organizes content in collections, configures ingestion workflows and approvals, mints material with permanent identifiers and disseminate material via OAI-PMH as institutional repository.

Invenio was born at CERN as a digital library software solution to run the CERN document server, managing over 1,000,000 bibliographic records in high-energy physics since 2002 covering articles, books, journals, photos, videos and more.

2.6.5 Eprints



Supplies a flexible framework to present and preserve the research output of project. It works for social media also. The tweepository package turns EPrints into a powerful social media tool, providing harvesting, archiving and visualization services for ephemeral social media data. For building repository it configure the repository to meet the particular requirements of the institution. It works with clients to create repositories for research publications, open education resources, multimedia outputs and research data sets.

2.7 Evaluation of OSDLS package

Many authors have agreed that measuring user satisfaction is the most useful and easy to evaluate information system success. Through the years different research streams have focused on developing tools and techniques for measuring user satisfaction (Roy & Bouchard, 1999).

2.8 Summary of literature review

The review of the related literature showed that different authors had described different concepts regarding Open Source Digital Library Software. The above ideas can be summarized as follows:

The term DLS also known as Digital Library Management System that is an archival system for a library. DLS refers to having all library archival functions under one system. The collecting, preserving and distributing methods might be included in an ideal DL institutional system. Each of the modules is integrated with a unified interface.

OSS is free computer software with its source code that is available under GNU General Public License in which the copyright holder provides the right to study, change and distribute the software to anyone for any purpose. There are no fundamental differences between features and functions of proprietary, freeware and open source DLSs, but the fundamental difference is visible in the development process and distribution. According to the OSI, the distribution terms of OSS must comply with 10 criteria which are free

redistribution; source code is open; derived works are allowed; integrity of the author's source code; no discrimination against persons or groups; no discrimination against fields of endeavor; distribution of license; license must not be specific to a product; license must not restrict other software; and license must be technology-neutral.

Before the computerization, library tasks were performed manually and independently from one another. In the 1960s with the growth of computer technologies, library automation was born. ILS finally was appeared during the 1970s to 1980s as a result of the improvements in computer storage and telecommunications, turnkey systems on microcomputers.

In the recent times a very few initiatives have been taken by different institutions. BRAC University library has successfully formed an Institutional Repository using open sources software DSpace. The Digital IR program was funded by INASP in April, 2007. The Dhaka University Library (DUL) is the oldest and largest academic library in the Bangladesh. The library holds more than half a million books, bound journals, newspapers, etc. Very recently they have initiated to develop an institutional repository by locally digitizing its 30,000 handwritten manuscripts, 20,000 rare books, 5,000 microfilms and many special materials. The library will also integrate the repository with the existing automation software. EWUL initiated a digital library program by using the Greenstone Software from the June 2010. At present 17 university libraries, 2 institution libraries and are using DSpace in Bangladesh. No college libraries use the Institutional Repository software. As per official website of SLiMS, three institutional libraries and one college library are using SLiMS. But, no university libraries in Bangladesh are using SLiMS yet. However, in the recent times, a very few initiatives have been taken by different institutions. BRACU Library, EWU Library, DIU Library, and BALID organize the training workshop on different OSS digital library software like DSpace, SLiMS, and Greenstone helping to build DL system for other institutes.

DSpace, Fedora, Invenio, GNUteca, OPALS, OpenAmapthèque, OpenBiblio, and SLiMS are available OSDLS packages. Greenstone and PhpMyLibrary are considered as inactive OSDLS because no development activity has been noted in their source codes or on their discussion lists for several years. Besides, Gnuteca, InfoCid, NewGenLib,

oBiblio, OPALS, OpenAmapthèque, and Kuali are considered to be just released because their communities do not currently have a critical mass of developers, contributors and users. PMB and SLiMS are considered emerging and improving OSDLS. Evergreen and NewGenLib are considered as improving but sustainable OSDLS. Finally, DSpace is considered as mature and sustainable OSDLS.

The major factors for adoption of OSDLS are cost saving, openness to customize, community and vendor support, freedom from maintenance and licensing fee, freedom from vendor lock-in, availability of source code, easy to install and maintain, concerns about the suppliers of proprietary DLS, and availability of quality documentation.

The major challenges for adoption of OSDLS are lack of sufficient technical knowledge to install and maintain, shortage of skilled manpower to install and maintain the software, lack of sufficient technical expertise to support OSDLS activities, lack of promotional activities, lack of organization policies, lack of vendor support, issues of data security, lack of high quality documentation, lack of software security, lack of major functional features and modules, reliability and longevity, availability of commercial software in the market and lack of community support.

In Bangladesh, the lowest number (13%) of university libraries is using DLS for building Institutional Repository, but the maximum number (83%) of university libraries have not been yet adopted DLS, even there are some libraries which are not aware. OSS has created opportunities for Bangladeshi universities whose library budget is comparatively less and cannot afford to purchase, maintain and upgrade proprietary DLS. It is found that OSDLSs are more cost-effective than proprietary DLSs. University libraries over the world tended to move towards the adoption of OSDLS. Although library professionals of OSDLSs experienced difficulties with installation, they were modestly more satisfied than users of proprietary DLSs.

From the literature review, it is found that there are some studies have been conducted on concept, roles, factor, development of IR, procedures to set up IR, open access IR and challenges toward digitization through IR in Bangladesh. But comparatively less initiative has been taken to assess the condition of IR in public university libraries of

Bangladesh and measure the satisfaction level of library users. Besides, there is no initiative has been made to conduct comparative analysis of available resources. It is observed that DSpace is the best solution to use as digital library software. It has a great extensive modular capacity that can be used to grow the collection as much bigger as needed.

In Bangladesh, the insufficient number of research has been conducted on describing the practical experience of implementation of Institutional Repository software, but no effort has been made to study on present status, factors and challenges for adoption of OSDLS in the university libraries of Bangladesh. Besides, a very few importance has been made to assess the satisfaction level of library professionals and users on OSDLS in Bangladesh. So, an effort has been made for the first time to study on adoption of OSDLS in the university libraries of Bangladesh.

CHAPTER: THREE

CHAPTER: THREE

CONCEPTUAL FRAMEWORK

3.1 Introduction

Based on the available literature, UGC website and observation, there are three types of universities are available in Bangladesh those are public, private and international. For building Digital Library (DL) systems, three types of Digital Library Software (DLS) namely proprietary, open source and freeware are using in these university libraries of Bangladesh. Only public & private university libraries and the used Open Source Digital Library System (OSDLS) have been included in the study.

3.2 Conceptual framework

From the available literature, it is found that there are some studies have been conducted on describing practical experience on implementation of specific OSDLS, sharing selection process and criteria of OSDLS, OSDLS solutions, migrating from proprietary ILS to OSDLS and assessing adoption of OSDLS worldwide.

Besides, some studies are performed on comparative analysis of different OSDLS packages, multidimensional evaluation of different OSDLS packages and evaluating sustainability, usability & functionalities of different OSDLS packages in different countries.

In addition, a few numbers of researchers has been carried out on describing inter-university cooperation for implementation of OSDLS, motivating access movement in digital libraries and sharing technical support related experience on OSDLS globally.

Moreover, library professionals' perception and satisfaction with the various or particular aspects of OSDLS, conducting survey to know the present status of OSDLS have been done in different countries. But comparatively less initiative has been taken to assess the factors, challenges and remedies for the adoption of OSDLS as well as assess the satisfaction level of library users towards OSDLS worldwide.

In Bangladesh, the inadequate number of research has been done on describing the practical experience of implementation of Digital Library Software, providing a customized version of DL software. Besides, assessing usability of DL software, exploring current trends of library digitization, suggesting model for digital library and conducting survey on library digitization have been carried out in Bangladesh. But, no effort has been made to study on exploring the current situation of Institutional Repository (IR), problems to implement, challenges to overcome the poor condition in higher education institution specially in public and private university of Bangladesh,

Furthermore, a very few importance has been made to measure the satisfaction level of repository administrator and users of OSDLS in Bangladesh. Thus, it is expected to explore the current situation of DLS as Institutional Repository in university libraries of Bangladesh.

The study determined to prolong the OSDLS adoption in the university libraries of Bangladesh for building awareness among library professionals and users regarding the preservation of important digital components of institutions. The study identified the major factors which influenced the library professionals significantly to absorb the Open Source Digital Library Software (OSDLS) in their university libraries. The study also identified the challenges which were the significant causes of the lower adoption of DLS in the university libraries of Bangladesh. As well as, the study assessed the satisfaction level of institutional repository administrators/ library professionals and users towards OSDLS to evaluate the effectiveness of existing DLS. Besides, the study identified the real remedies for the enhancement of OSDLS acceptance in the university libraries of Bangladesh from the professional's point of view. The library professionals included both librarians and other library officers. On the other hand, the library users included faculty members, researchers and students. Both postgraduate and undergraduate students were involved in the research.

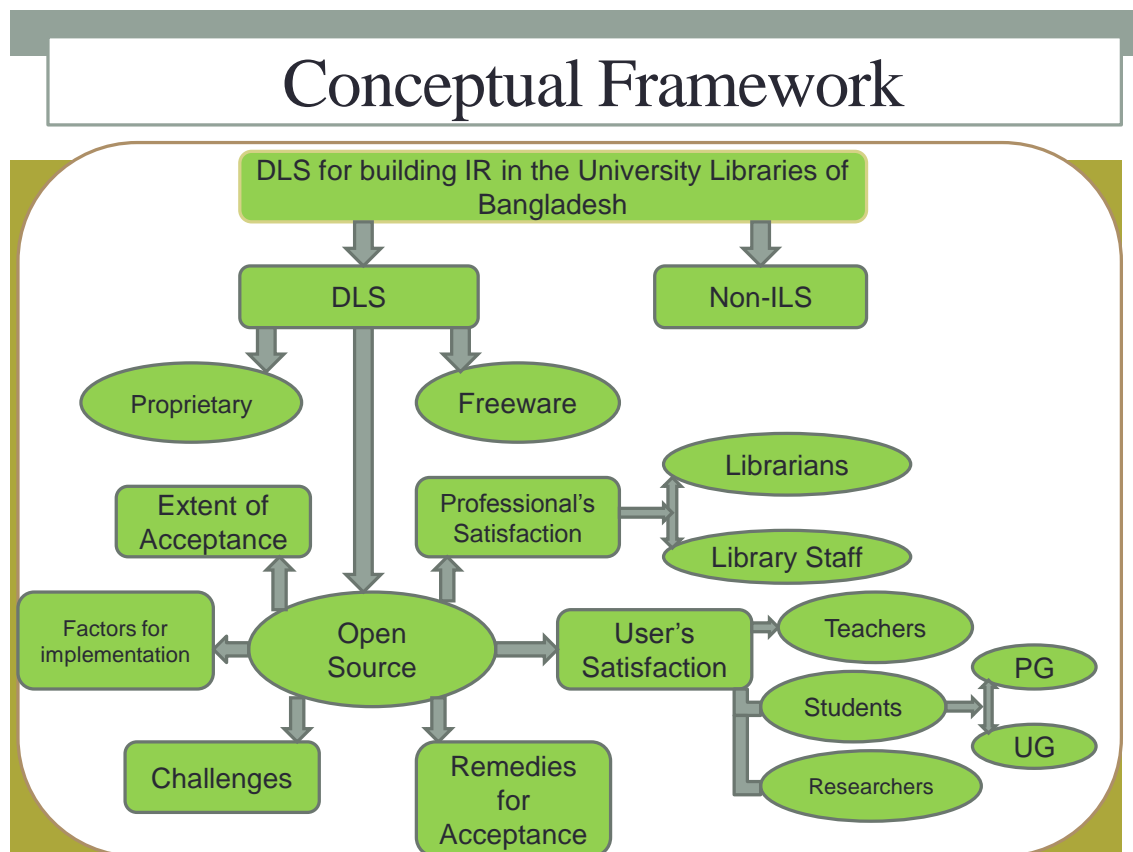


Figure 1: Conceptual framework of the study

3.3 Acceptance

Acceptance is defined for this study as making full use of the existing OSDLS in the university libraries of Bangladesh. This study explored the extent of acceptance of OSDLS in the university libraries of Bangladesh for building awareness among library professionals and users regarding OSDLS. It is expected to assess the influential factors, important challenges, and genuine recommendations for the enhancement of adoption of OSDLS in the university libraries of Bangladesh.

3.3.1 Extent of OSDLS acceptance

To assess the level of acceptance of OSDLS in the university libraries of Bangladesh, the study explored current trend of OSDLS, use of OSDLS, adopted features of OSDLS, supports for implementation and maintenance of OSDLS, training on OSDLS, ICT facilities, library resources management and user management.

3.3.2 Factors for acceptance of OSDLS

University libraries over the world including Bangladesh tended to move towards the adoption of OSDLS. From the available literature, it is found that the major factors for acceptance of OSDLS are cost-effectiveness, openness to customize, community and vendor support, freedom from vendor lock-in, concerns about the suppliers of proprietary ILS, freedom from licensing fee, availability of international standard options, open source code, easy to install and maintain, adequate features and functionalities, easy backup and restore system, easy to integrate with other software, control over the data and software, and availability of data migration facility. Question is which factors influence the library professionals to adopt the OSDLS in the university libraries of Bangladesh that have been measured in the study.

3.3.3 Challenges for acceptance of OSDLS

The OSDLS have created the opportunities for the university libraries of Bangladesh. But, most of the university libraries are not adopted ILS yet. From the available literature it is found that the major challenges for acceptance of ODILS are insufficient technical knowledge of library professionals, shortage of skilled manpower to install and maintain the software, insufficient local technical expertise to support OSDLS activities, inflexible organizational policies, lack of IT infrastructure, lack of promotional activities, lack of consortium and vendor support, issues of data and software security, lack of high quality documentation, availability of commercial software in the market, insufficient retraining program for library professionals, inadequate funding, and unwillingness of library professionals to take initiative. Question is which challenges have the significant impact on not to accept OSDLS in the university libraries of Bangladesh that have been assessed in the study.

3.3.4 Remedies for Acceptance of OSDLS

To enhance the extent of OSDLS acceptance and use in the university libraries of Bangladesh, the study identified the actual remedies based on the viewpoint of the library professionals. The remedies included UGS's separate division to monitor the DL, make sure IR policy, introduce repository education, appointment of skilled manpower, creating awareness, encouragement of researchers, developing resources, adequate IT infrastructure, Grants for training and retraining of library staff,

training/workshop/seminar on OSDLS, library professionals should be self-motivated to take initiative, librarians must be given the right to make decision, proper orientation for library staff and users, software must be made flexible enough and user-friendly, appoint minimum one IR expert/IT professional for the maintenance of OSILS, university authority should allocate more funds for maintenance of the library, availability of UPS, OSDLS course ought to be included in the department of Information Science and Library Management of Bangladeshi universities, the status of library professionals of the university libraries supposed to be raised, the government and government's agencies should allocate sufficient funds to support the acceptance of OSDLS, supervision of staff and users of OSDLS, promotional activities for OSDLS, formation of OSDLS consortium, flexible institutional policies, support of international organizations, and technical support from vendors. Besides, there was an option for the respondents to suggest the study in written regarding probable remedies for enhance the extent of OSDLS acceptance and use in the university libraries of Bangladesh.

3.4 Satisfaction

Satisfaction is the most commonly used for the measurement of the effectiveness of a system or service. Question is how to measure the user satisfaction and what variables should be included in user satisfaction scale. There is no simple definition or one to measure user satisfaction. So far no general conclusions have been arrived at as to what should be included as variables for assessing user satisfaction. Some of the variables which emerge from the literature review as well as from the experts and my practical experience that was related to user satisfaction on OSDLS have been included.

3.4.1 Professionals' Satisfaction

Overall perception of library professionals has been measured by adequacy of collection, administrator interface, user interface, software and data security, maintenance, backup and restores, customization for local needs, community, documentation and user manual, managing electronic resources.

3.4.2 Users' Satisfaction

The overall perception of institutional repository users has been measured on sufficiency of electronic resources, open access, user interface, user login facility, and advanced

search facility. The socioeconomic variables of the users also influenced the user satisfaction. User satisfaction is the perception of the repository users (faculty, research fellow, and student) and professionals that contribute to his or her satisfaction on the existing OSDLS in the university libraries of Bangladesh.

3.5 Conclusion

The variables of factors, challenges, remedies, professionals' satisfaction and users' satisfaction have been taken from the available literature. For this propose consultations have been done with professional experts and supervisors. A pilot survey had been done among five OSDLSs, 24 librarians/repository administrators, and 98 library users from 7 public and 10 private university libraries of Bangladesh. Besides, a statement has been included in the Questionnaire Booklet-1 and Questionnaire Booklet-2 to assess the overall satisfaction level of both library professionals and users on existing OSDLS.

CHAPTER: FOUR

CHAPTER: FOUR

METHODOLOGY

4.1 Introduction

Based on the research gap, this study proposed to identify the current status of digital library software, significance factor and actual recommendations for acceptance as well as assess the repository administrator and user satisfaction of OSDLS in the university libraries of Bangladesh. In this Chapter, the methodology for this research will be illustrated including research design, research site, the assessment method, data collection and statistical methods, statistical methods and pilot survey of the study.

An applicable and proper methodology is a vigorous issue for effective and qualitative research study. The study intentions to emphasis on the IR status in the university libraries of Bangladesh in relation to preserve the institutional publications, tools for users to get information easily, IT developments, knowledge development & distribution, community assignation, support for innovation, tactical development, and measuring service quality through repository software. To attain the goal both quantitative and qualitative techniques were applied in this study. Social survey and observation method were used in this research for gathering important data from sample population.

4.2 Research Design

To achieve the research objectives and test the hypotheses efforts had been made to collect both qualitative and quantitative data from primary and secondary sources of information. Primary data was collected through two sets of structured questionnaires. Questionnaire booklet-1 was designed for collecting data on IR as well as to measure satisfaction level of librarians or repository administrator of the selected university libraries of Bangladesh. Questionnaire booklet-2 was designed to evaluate users or university research scholars' satisfaction level towards IR software and its effectiveness. Moreover, review of the literature and computation of documentation and user manuals of each OSDLS packages had been conducted.

The steps of this research from beginning to end are presented with a systemic diagram in the below:

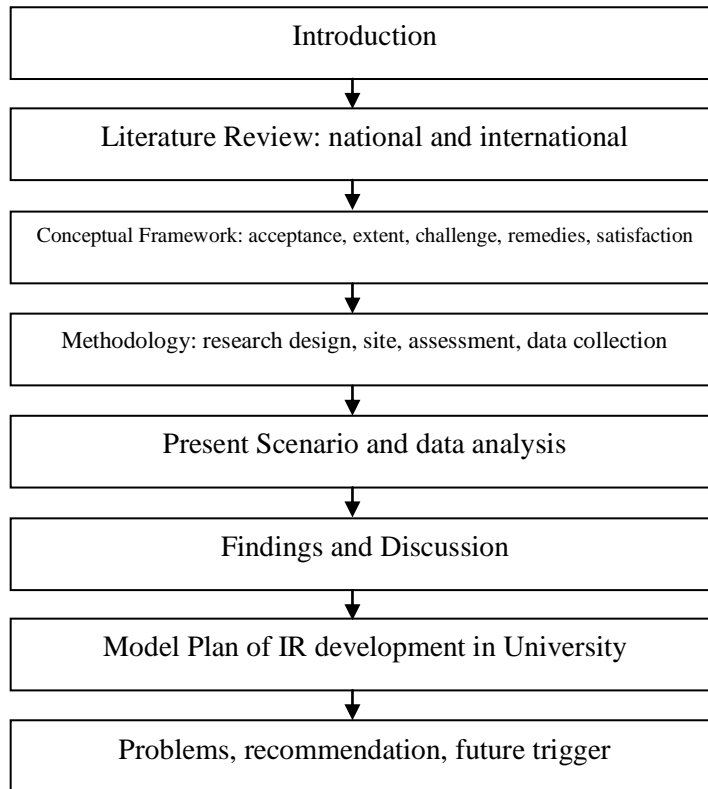


Figure 2: Design of the study plan

4.3 Research Site

There is a total of 147 university in Bangladesh (“UGC,” 2018). Among those universities whose libraries are using DLS, have been considered for this study. Based on above criterion, 7 public and 10 private university libraries have been selected for the study. Table 4 states the selected public and private university libraries.

Table 4: Selected Public and Private University Libraries

<i>SL</i>	<i>Name of University Library</i>	<i>Year</i>		<i>Type</i>	<i>Respondents</i>		
		<i>Est.</i>	<i>DLS</i>		<i>Repository Administrator</i>	<i>Faculty</i>	<i>Student</i>
1.	Bangladesh Agricultural University Library	1961	2015	Public	1	0	1
2.	Bangladesh University of Engineering & Technology Library	1962	2014	Public	1	0	2
3.	Chittagong Veterinary and	2006	2012	Public	2	5	5

	Animal Sciences University Library							
4.	Khulna University of Engineering & Technology Library	2003	2017	Public	1	0	0	
5.	Sher-e-Bangla Agricultural University Library	2001	2016	Public	1	0	0	
6.	University of Dhaka Central Library	1921	2013	Public	2	5	10	
7.	University of Rajshahi Central Library	1953	2013	Public	1	2	5	
8.	Ayesha Abed Library, BRAC University	2001	2008	Private	1	1	2	
9.	Daffodil International University Library	2002	2011	Private	1	2	5	
10.	East West University Library	1996	2010	Private	1	1	2	
11.	Eastern University Library	2003	2016	Private	1	0	0	
12.	Library & Information Division, IIUC	1995	2018	Private	2	5	40	
13.	Independent University Bangladesh Library	1993	2012	Private	1	0	0	
14.	North South University Library	1992	2003	Private	1	0	0	
15.	Northern University Bangladesh Library	2002		Private	1	0	0	
16.	Premier University Chittagong Library	2002	2017	Private	1	0	5	
17.	Stamford University Library	2002	2018	Private	1	0	0	
Total					24	21	77	

4.4 The assessment methods

Questionnaire Booklet-1 included the extent of adoption, maintenance, upgrade, services, facilities, training, awareness, strength and weakness of OSDLS. Questionnaire Booklet-1 included demographic information of academic librarians/ repository administrators; factors, challenges and remedies for the acceptance of OSDLS; and statements for measuring satisfaction level of OSDLS. Questionnaire Booklet-2 included demographic information of library users, statements for measuring satisfaction level. A 5-point Likert scale was administered containing 5= Strongly Agree, 4= Agree, 3= Less Agree, 2= Disagree, and 1= Strongly Disagree for identifying significant factors, challenges, and remedies for the adoption of OSDLS. Another 5-point Likert scale was administered containing 5= Highly Satisfied, 4= Very Satisfied, 3= Satisfied, 2= Less Satisfied, and 1= Not Satisfied for assessing satisfaction level of library professionals and users towards DLS.

4.5 Data Collection Methods

Data had been collected from the selected university libraries. The conceptual and textual information related to the present study were gathered from both primary and secondary sources of information. A total of seven public university libraries and 10 private university libraries namely Bangladesh Agricultural University (BAU) Library, Bangladesh University of Engineering and Technology (BUET) Library, Chittagong Veterinary and Animal Sciences University (CVASU) Library, University of Dhaka (DU) Central Library, University of Rajshahi (RU) Central Library, Sher-e-Bangla Agricultural University (SAU) Library, Khulna University of Engineering and Technology (KUET) Library, Ayesha Abed Library, BRAC University, Daffodil International University (DIU) Library, East West University (EWU) Library, Eastern University (EU) Library, International Islamic University Chittagong (IIUC) Library, Independent University Bangladesh (IUB) Library, North South University (NSU) Library, Northern University Bangladesh (NUB) Library, Premier University Chittagong (PUC) Library and Stamford University (SU) Library were decisively selected for this research. To give the detailed analysis of the study the websites of these university repositories were used as a vital source of information for conducting this research. Besides this, literatures on digital preservation and IR from national and international arena were reviewed to get the concept of digital preservation and IR. To determine the present scenario of digital preservation by

public university a survey has been carried out in selected libraries. A structured questionnaire were prepared and distributed to the librarians/repository administrators through e-mail and Facebook messenger. Most of them returned the filled-out questionnaire and received data was analyzed properly.

4.5.1 The Primary Sources

Primary data had been collected from Librarians/Heads of library, library professionals and users through questionnaire method. The researcher visited most of the selected libraries and distributed:

- Questionnaire Booklet-1 among librarians/ Repository Administrators/ library professionals of selected university libraries.
- Questionnaire Booklet-2 among faculty members/ researcher scholars inside the library of each university.

4.5.2. The Secondary Sources

For secondary data, different types of publications such as journals, research paper, articles, research reports, M. Phil and PhD theses and dissertations etc. have been checked to gather data and evidence regarding the research needs.

4.6. Pilot Survey

A pilot survey had been done before finalizing the questionnaires among 7 library professionals, and 79 library users from two public and two private university libraries of Bangladesh which are University of Dhaka, Chittagong Veterinary and Animal Sciences University, International Islamic University Chittagong and Daffodil International University Library. The pilot survey helped to reshape the technical and technological terms that have been used in Bangladesh context. Some statements of factors, challenges, remedies, professionals' satisfaction and user's satisfaction were deducted after conducting reliability and validity statistics. Besides, a statement was included in the Questionnaire Booklet-1 and Questionnaire-2 to assess the overall satisfaction of both library professionals and users on existing DLS.

4.7. Statistical Methods

The extent of acceptance and use of DLS in the university libraries of Bangladesh have been described in details. All the required analyses of this study can be done through the 22 version of SPSS and MS excel. So, the study used the 22 version of SPSS to calculate:

- ❖ Descriptive statistics, i.e., mean and standard deviation
- ❖ Satisfaction level of overall and different demographic groups
- ❖ Analysis of Variance (ANOVA)

Finally, tables and graphs were used to describe and represent the findings of the survey.

4.8. Conclusion

This Chapter illustrated methodology of the study, research design, specified the research questions, described population and sampling, data collection and data treatment, described assessment methods, outlined statistical methods and techniques used to analyze data. The variable of this study have been taken from the literature review and panel experts. A pilot survey had been done before finalizing the questionnaire. The pilot survey helped to reshape the technical and technological terms that have been used in Bangladesh context. Primary data were collected through two sets of structured questionnaire. Thus, it can be concluded that the methodology of this study is appropriate.

CHAPTER: FIVE

CHAPTER: FIVE

PRESENT SCENARIO OF IR AND DATA ANALYSIS

5.1 Introduction

The purpose of this chapter is to analyze the data and describe the current situation, influential factors, and significant challenges of DLS in the university libraries of Bangladesh as well as evaluate the satisfaction levels of repository administrators, professionals and repository users towards the existing institutional repository systems. At present there are forty one public, hundred-three private, and three international universities in Bangladesh (“UGC,” 2018). Among them, seven public and ten private university libraries have been selected for this study those libraries are presently using institutional repository software. The researcher visited most of the selected libraries and distributed questionnaire-1 among the Academic Librarians/ Repository Administrators to collect data regarding their existing DLS in the university libraries of Bangladesh. The primary data were collected from 98 Academic Scholars/ Repository users of the seventeen selected universities through the questionnaire-2 to reveal the existing condition, significant challenges, satisfaction level and actual conditions of repository in the university libraries of Bangladesh.

To give the present state of institutional repository in public and private university libraries those are using institutional repository software for preserving and showcasing the publications and intellectual outputs of the institutes we observed the web sites also and searched the collection as well as its types. Among them 7 Public university libraries, 10 private university libraries and 1 international university library use the IR software for digital preservation of the institutional publications. Only 7 public university and 10 private university library repository activities will be analysed in this study.

5.2 Demographic Information of Librarian/Repository Administrator

The primary data were collected from 24 librarians/ repository administrators and 98 repository users of 17 selected university libraries through the questionnaire-1&2 to reveal the existing scenario, influential factors, significant challenges, and establishment

motivation of DLS in university libraries of Bangladesh as well as evaluate the satisfaction level of repository users.

Table 5 shows the demographic information of repository administrators where 11 respondents (45.8 percent) were from the public university, and 13 (54.2 percent) were from the private university. Among the respondents, 24 (100 percent) were male; there was no female repository administrator. The greater proportion of the respondents were Assistant Librarian 9 (37.5 percent), Deputy Librarian 6 (25.0 percent), Librarian 3 (12.5 percent), Library Officer 2 (8.3), Additional Librarian 1 (4.2 percent), Jr. Asst Librarian 1 (4.2 percent), Sr. Asst Librarian 1 (4.2 percent) and Sr. Instructor 1 (4.2 percent). The highest number of the respondents were from the age group of 30-39 years 17 (70.8 percent), and 40 to 49 years 5 (20.8 percent), and 50 to 59 years 2 (8.3 percent).

Table 5. Demographic Information of Librarian/Repository Administrator (n=24)

<i>Variable</i>	<i>Class</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid%</i>	<i>Cumulative%</i>
Category of University	Public	11	45.8	45.8	45.8
	Private	13	54.2	54.2	100.0
Gender	Male	24	100.0	100.0	100.0
	Female	-	-	-	-
Designation	Additional Librarian	1	4.2	4.2	4.2
	Asst Librarian	9	37.5	37.5	41.7
	Deputy Librarian	6	25.0	25.0	66.7
	Jr Asst Librarian	1	4.2	4.2	70.8
	Librarian	3	12.5	12.5	83.3
	Library Officer	2	8.3	8.3	91.7
	Sr Asst Librarian	1	4.2	4.2	95.8
	Sr. Instructor	1	4.2	4.2	100.0
Age group	30-39 years	17	70.8	70.8	70.8
	40-49 years	5	20.8	20.8	91.7
	50-59 years	2	8.3	8.3	100.0

Table 6 demonstrated the demographic information of repository users. It is found that the greater proportion of the respondents 38 (38.8 percent) are graduate students, followed by 24 (24.5 percent), Lecturer 12 (12.2 percent), Assistant Librarian 6 (6.1 percent), Assistant Professor 5 (5.1 percent), Associate Professor 4 (4.1 percent), Deputy

Librarian 2 (2.0 percent), PhD student 2 (2.0 percent), Additional Librarian 1 (1.0 percent), Library Officer 1 (1.0 percent) and MPhil Student 1 (1.0 percent). Among the respondents 28 (28.6 percent) were from the public university, and 70 (71.4 percent) were from the private university. Among the respondents, 56 (57.1 percent) were male and 42 (42.9 percent) were female. The highest number of the respondents were from the age group of 20-29 years 74 (75.5 percent), and 30 to 39 years 18 (18.4 percent), and 40 to 49 years 6 (6.1 percent).

Table 6. Demographic Information of Academic Scholar/Repository User (n=98)

<i>Variable</i>	<i>Class</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid%</i>	<i>Cumulative%</i>
Category of University	Public	28	28.6	28.6	28.6
	Private	70	71.4	71.4	100.0
Gender	Male	56	57.1	57.1	57.1
	Female	42	42.9	42.9	100.0
Designation	Additional Librarian	1	1.0	1.0	1.0
	Associate Professor	4	4.1	4.1	5.1
	Asst Librarian	6	6.1	6.1	11.2
	Asst Professor	5	5.1	5.1	16.3
	Deputy Librarian	2	2.0	2.0	18.4
	Graduate student	38	38.8	38.8	57.1
	Lecturer	12	12.2	12.2	69.4
	Library Officer	1	1.0	1.0	70.4
	MPhil	1	1.0	1.0	71.4
	PhD	2	2.0	2.0	73.5
	Post Graduate Student	24	24.5	24.5	98.0
	Professor	2	2.0	2.0	100.0
Age group	20-29 years	74	75.5	75.5	75.5
	30-39 years	18	18.4	18.4	93.9
	40-49 years	6	6.1	6.1	100.0

5.3 The use of IR in University Libraries of Bangladesh

Institutional repositories are widely developed and maintained in different areas of research around the world. In developing countries like Bangladesh, it has been seen as an unprecedented opportunity to provide equality of access to essential research information and to raising awareness of national research (Islam and Akter, 2013). A total 17 public and private university libraries are using Institutional Repository software

in Bangladesh at this moment. Present scenario of IR in public and private university libraries of Bangladesh is showed below.

5.3.1 Public University Library

Public university libraries are playing important role in preserving and distributing the intellectual output of their faculty, researchers and students. Table 7 shows that 7 Public university libraries are using the IR software for digital preservation of the institutional publications and demonstrated the used repository software name and the URL link of the repository.

Table 7. Public University Library Repository and URL

<i>S.N</i>	<i>Library name</i>	<i>Used IRS</i>	<i>URL</i>
1.	Bangladesh Agricultural University Library	DSpace	http://dspace.bau.edu.bd/
2.	Bangladesh University of Engineering and Technology Library	DSpace	http://lib.buet.ac.bd:8080/xmlui/
3.	Chittagong Veterinary and Animal Sciences University Library	DSpace	http://101.2.160.165:8080/
4.	University of Dhaka Central Library	DSpace	http://repository.library.du.ac.bd/xmlui
5.	University of Rajshahi Central Library	DSpace	http://repository.ubn.ru.nl/
6.	Sher-e-Bangla Agricultural University Library	Customized/ DSpace	http://www.saulibrary.edu.bd/daatj/ public/index.php
7.	Khulna University of Engineering and Technology Library	DSpace	http://library.kuet.ac.bd:8001/jspui/

Table 8 shows the number of repository collection in public university libraries of Bangladesh.

Table 8. Institutional Repository Collections in Public University

<i>SL</i>	<i>Name of the university library</i>	<i>IR collection</i>
1.	Bangladesh Agricultural University Library	1435

2.	Bangladesh University of Engineering and Technology Library	4750
3.	Chittagong Veterinary and Animal Sciences University Library	61
4.	Dhaka University Central Library	822
5.	Rajshahi University Central Library	8
6.	Sher-e-Bangla Agricultural University Library	4653
7.	Khulna University of Engineering and Technology Library	340
Total		12069

It is mentioned that the use of Digital Library Software (DLS) as Institutional Repository (IR) in university libraries all over the world as well as in Bangladesh are increasing day by day. But at this moment this is the present collection of IR items in university libraries of Bangladesh. Following are the overview of IR in public university libraries of Bangladesh.

5.3.1.1 Bangladesh Agricultural University (BAU) Library

Bangladesh Agricultural University (BAU) is situated at the western side of the old Brahmaputra River covering an area of 1200 acre, 3 kilometers away south of Mymensingh town. It has total 6 faculties and 43 departments. BAU central library has a collection of over 1,84,942 volumes and 2,000 periodicals. The number of journals is 151. The library has copies of M.S and PhD theses. Besides the central library, the Faculty of Agricultural Economics & Rural Sociology has its own library which contains reference books and journals in the field of Agricultural Economics (“BAU Library,” 2018). Table 9 demonstrated that there are 6 communities based publications are available in the repository of BAUL and the number of publication is 1435. Publication type is MS Thesis. The access of this repository is restricted for users. Only registered member can access to the repository within the local area network (LAN).

Table 9. Community based Publication in BAU Institutional Repository

<i>SL</i>	<i>Community</i>	<i>Collection</i>	<i>Type</i>
1.	Faculty of Agricultural Economy & Rural Sociology	75	MS Thesis
2.	Faculty of Engineering and Agricultural technology	101	MS Thesis
3.	Faculty of Agriculture	752	MS Thesis
4.	Faculty of Animal Husbandry	97	MS Thesis
5.	Faculty of Fisheries	215	MS Thesis
6.	Faculty of Veterinary Science	195	MS Thesis
Total		1435	

Source: BAU institutional repository administrator (on 30 August 2018)

5.3.1.2 BUET Library

Bangladesh University of Engineering and Technology (BUET) is one of the most prestigious institutions for higher studies in the country. The BUET campus is in the heart of Dhaka- The capital city of Bangladesh. BUET Central Library provides services to collect, preserve, and distribute digital material. Repositories are important tools for preserving an organization's legacy; they facilitate digital preservation and scholarly communication. There are 4750 publication items are available under 4 communities in the repository (“BUET Institutional Repository,” 2018) . The table 10 shows the status of publications of BUET institutional repository.

Table 10. Community based Publication in BUET Institutional Repository

<i>SL</i>	<i>Community</i>	<i>Collection</i>	<i>Type</i>
1.	Academic Calendar	21	Calendar, prospectus, syllabus, course curriculum etc
2.	Dissertation/Theses	4114	MS Thesis
3.	Publications	01	MS Thesis
4.	Question Papers of BUET	614	MS Thesis
Total		4750	

Source: BUET institutional repository (on 30 August 2018)

The first community named Academic calendar consists of 12 sub-community which include academic calendar, prospectus, course curriculum, rules regulations & syllabus and booklet. There are total 21 collections of different departments (table 11).

Table 11. Publication of 1st Community in BUET University Institutional Repository

<i>S.N</i>	<i>Sub-Community</i>	<i>Community</i>	<i>Collection</i>
1.	All Dept. of BUET	Academic Calendar	21
2.	Dept. of Architecture		04
3.	Dept. of Chemical Engineering		01
4.	Dept of Civil Engineering		02
5.	Dept. of Computer Science and Engineering		03
6.	Dept. of Electrical and Electronic Engineering		02
7.	Dept. of Industrial and Production Engineering		01
8.	Dept. of Materials and Metallurgical Engineering		01
9.	Dept. of Mechanical Engineering		01
10.	Dept. of Nava Architecture and Marine Engineering		0
11.	Dept. of Urban Regional Planning		01
12.	Dept. of Water Resources Engineering		01
Total			21

The Second community named Dissertation/Theses consists of 21 sub-communities which include dissertations or theses. There are total 3918 dissertation collection from different departments and institutes (table 12) .

Table 12. Publication of 2nd Community in BUET University Institutional Repository

<i>S.N</i>	<i>Sub-Community</i>	<i>Community</i>	<i>Collection</i>
1.	BUET Publication	Dissertation/ Theses	02
2.	Dissertation- Dept. of Architecture		70
3.	Dissertation- Dept. of Chemical Engineering		91

4.	Dissertation- Dept. of Chemistry	148
5.	Dissertation- Dept. of Civil Engineering	696
6.	Dissertation- Dept. of CSE	251
7.	Dissertation- Dept. of EEE	621
8.	Dissertation- Dept. of Glass and Ceramic Engineering	03
9.	Dissertation- Dept. of Industrial and Production Engineering	311
10.	Dissertation- Dept. of Materials & Metallurgical Engineering	102
11.	Dissertation- Dept of Mathematics	115
12.	Dissertation- Dept. of Mechanical Engineering	297
13.	Dissertation- Dept. of Naval Architecture and Marine Engineering	35
14.	Dissertation- Dept. of Petroleum and Mineral Recourse Engineering	65
15.	Dissertation- Dept. of Physics	289
16.	Dissertation- Dept. of Urban and Regional Planning	298
17.	Dissertation- Dept. of Water Resources Engineering	279
18.	Dissertation- Institute of Appropriate Technology	09
19.	Dissertation- Institute of ICT	104
20.	Dissertation- Institute of Water and Flood Management	127
21.	Publications of Journal, Conference, Seminars etc.	05
Total		3918

The Third community named Publications consists of 3 sub-communities which include publications. There is only 1 publication from different department of CSE (table 13).

Table 13. Publication of 3rd Community in BUET University Institutional Repository

<i>S.N</i>	<i>Sub-Community</i>	<i>Community</i>	<i>Collection</i>
1.	Publications- Dept. of Architecture	Publications	0
2.	Publications- Dept. of CSE	-	01
3.	Publications- Dept. of EEE	-	0
Total			1

The Fourth community named Question Papers of BUET consists of 14 sub-communities which include question papers. There is only 516 question papers from different department (table 14).

Table 14. Publication of 4th Community in BUET University IR

<i>S.N</i>	<i>Sub-Community</i>	<i>Community</i>	<i>Collection</i>
1.	Dept. of Architecture	Question Papers	56
2.	Dept. of Biomedical Engineering		02
3.	Dept. of Chemical Engineering		44
4.	Dept. of Civil Engineering		47
5.	Dept. of CSE		46
6.	Dept. of EEE		52
7.	Dept. of Glass and Ceramic Engineering		0
8.	Dept. of Industrial and Production Engineering		45
9.	Dept. of Materials and Metallurgical Engineering		44
10.	Dept. of Mechanical Engineering		46
11.	Dept. of Naval Architecture and Marine Engineering		44
12.	Dept. of Petroleum and Mineral Resources Engineering		0
13.	Dept. of Urban and Regional Planning		44

Total

516

5.3.1.3 Chittagong Veterinary and Animal Science University (CVASU) Library

“The Chittagong Veterinary and Animal Sciences University Central Library” was established in 1995 along with the Chittagong Government Veterinary college. In 2006 the government transferred Chittagong Government Veterinary College into Chittagong Veterinary and Animal Sciences University. The Library acts as the prime source of information for both academic and research needs. The Central Library generally manages knowledge both in print and digital formats, ensures seamless discovery and access to these scholarly resources and provides it to the University patrons. It provides high-quality ambiance for both reflective and collaborative work and study. To ensure effective and efficient information services to the patrons, CVASU Central Library has introduced state of the art automation technology using Radio Frequency Identification (RFID). It is moving forward to make the University as a center of excellence providing world class library and Information services” (“Digital Library – CVASU,” 2018) . There are 6 communities based publications are available in the CVASU library repository. These communities include another 12 sub-communities. Table 15 reflects the community based records in the repository of CVASU. It shows that the number of publication is 61. The Publications/collection types are power point, proceedings, images, thesis, clinical & production report etc.

Table 15. Community based Publication in CVASU Institutional Repository

<i>SL</i>	<i>Community</i>	<i>Collection</i>	<i>Type</i>
1.	CVASU Annual Scientific Conference	05	Power point, Proceedings, images
2.	Fisheries	00	Thesis
3.	Food Science and Technology	05	Thesis, report
4.	Photo Gallery and Newspaper Cutting	05	Image
5.	Syllabus and Curriculums	01	Syllabus
6.	Veterinary Medicine	45	Clinical & Production Report, thesis
Total		61	

Source: CVASU institutional repository (on 30 August 2018)

5.3.1.4 University of Dhaka (DU) Central Library

On the first day of July 1921 the University of Dhaka opened its doors. The University was set up in a picturesque part of the city known as Ramna on 600 acres of land. The University of Dhaka is dedicated to the advancement of learning, and is committed to promoting research in all fields of knowledge (“DU,” 2018) . It has the largest and oldest library. The popular and user friendly software named DSpace has been used for Dhaka University repository. The goal of this repository is to increase the visibility, use and impact of the university's research publications by offering them to use through the university’s own digital archive (“DU Institutional Repository,” 2018).

There are total 17 communities and 85 sub-communities having more than Eight Hundred scholarly publications and resources from different departments and institutes in DUCL repository. The archive consists of MPhil thesis (171), PhD thesis (313), Research work/article (174), MS thesis (49), Thesis (93) and others (22) Table 16 shows the community based publication in DU central library repository.

Table 16. Community based Publication in DU Institutional Repository

<i>SL</i>	<i>Community</i>	<i>Collection</i>	<i>Type</i>
1.	DU Institutional Repository Policy	01	Policy
2.	Dhaka University Library	16	Manuscript
3.	Faculty of Arts	209	M. Phil & PhD thesis, Int`p report, research work/article, thesis
4.	Faculty of Biological Science	277	M. Phil & PhD thesis, research work/article, thesis
5.	Faculty of Business Studies	40	M. Phil & PhD Thesis
6.	Faculty of Earth & Environmental Science	10	M. Phil & PhD Thesis
7.	Faculty of Education	00	-
8.	Faculty of Engineering and Technology	08	M. Phil & PhD Thesis
9.	Faculty of Fine Art	01	PhD Thesis
10.	Faculty of Law	06	PhD Thesis
11.	Faculty Medicine	05	M. Phil Thesis
12.	Faculty of Pharmacy	15	M. Phil & PhD Thesis
13.	Faculty of PGD MS and Research	03	PhD Thesis
14.	Faculty of Science	25	M. Phil & PhD thesis, research work/article
15.	Faculty of Social Sciences	109	M. Phil & PhD thesis, research work/article, thesis
16.	Institutes	97	M. Phil & PhD thesis, MS Thesis, research work/article, thesis
17.	Research Centres	0	-
Total		822	

Source: DU institutional repository (on 30 August 2018)

The archive consists of full text materials produced in the university, such as thesis, journal articles, conference publications and research materials produced by the Departments/Institutes of the Dhaka University. Table 17 shows the total status of M. Phil & PhD theses categorized in different department under various faculties and institutes.

Table 17. MPhil & PhD theses status in DUCL repository

<i>Dept. Name with theses number</i>	<i>Faculty Name with theses number</i>	<i>M. Phil thesis</i>	<i>PhD thesis</i>
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Dept. of Arabic (15)	Arts (149)	02	13
Dept. of Bengali (32)		13	19
Dept. of English (02)		0	02
Dept. of History (15)		08	07
Dept. of Information Science and Library Management (08)		05	03
Dept. of Islamic History and Culture (13)		07	06
Dept. of Islamic Studies (39)		11	28
Dept. of Linguistics (03)		02	01
Dept. of Music (03)		02	01
Dept. of Pali & Buddhist Studies (02)		0	02
Dept. of Persian Language and Literature (07)		05	02
Dept. of Philosophy (06)		03	03
Dept. of Sanskrit (01)		0	01
Dept. of Urdu (03)		01	02
Dept. of Biochemistry and Molecular Biology (05)	Biological Science (62)	03	02
Dept. of Botany (14)		04	10
Dept. of Clinical Psychology (06)		06	0
Dept. of Microbiology (14)		06	08
Dept. of Psychology (05)		05	0
Dept. of Soil, Water and Environment (5)		01	04
Dept. of Zoology (13)		03	10
Dept. of Accounting & Insurance (05)	Business Studies (35)	03	02
Dept. of Banking and Insurance (03)		02	01
Dept. of Finance (05)		0	05
Dept. of International Business (01)		0	01
Dept. of Management Information System (01)		0	01
Dept. of Management Studies (07)		02	05
Dept. of Marketing (12)		01	11
Dept. of Tourism and Hospitality Management (01)		0	01

Dept. of Geography and Environment (09)	Earth & Environment Science (09)	03	06
Dept. of Applied Chemistry and Chemical Engineering (05)	Engineering and Technology (06)	03	02
Dept. of Applied Physics, Electronics and Communication Engineering (01)		0	01
Dept. of Oriental Art (01)	Fine Arts (01)	0	01
Dept. of Law (03)	Law (03)	01	02
Dept. of Clinical Pharmacy and Pharmacology (09)	Pharmacy (15)	03	06
Dept. of Pharmaceutical Chemistry (02)		0	02
Dept. of Pharmaceutical Technology (04)		01	03
	Postgraduate Medical Science and Research (02)	0	02
Dept. of Biomedical Physics and Technology (03)	Science (13)	02	01
Dept. of Chemistry (07)		01	06
Dept. of Mathematics (02)		01	01
Dept. of Physics (01)		0	01
Dept. of Anthropology (03)	Social Science	02	01
Dept. of Economics (01)	(42)	0	01
Dept. of International Relations (02)		02	0
Dept. of Mass Communication and Journalism (02)		0	02
Dept. of Peace and Conflict Studies (03)		01	02
Dept. of Political Science (15)		09	06
Dept. of Population Science (1)		0	01
Dept. of Public Administration (12)		11	01
Dept. of Sociology (01)		0	01
Dept. of Women and General Studies (02)		0	02
Bangladesh Institute of Health Science (03)	Institutes (36)	03	0
Institute of Business Administration (02)		0	02
Institute of Education and Research (09)		09	0
Institute of Health Economics (03)		01	02
Institute of Nutrition and Food Science		05	03

(08)	Institute of Social Welfare and Research	09	01
(10)	Institute of Statistical Research and Training (01)	01	0
Total		373	210

There are so many Research works, Articles, Theses paper, Internship Report besides M. Phil and PhD theses preserved in the repository. The following two tables show those total research work, paper and reports (table 18, 19).

Table 18. Total research work preserved in DUCL repository

<i>Department name with number of collection</i>	<i>Faculty</i>	<i>Research Work/Article</i>	<i>Thesis paper</i>	<i>Internship Report/others</i>
Dept. of History (01)	Arts (37)	01	0	0
Dept. of Information Science and Library Management (35)		08	26	01
Dept. of Music (01)		0	0	01
Dept. of Fisheries (60)	Biological	0	60	0
Dept. of Soil, Water and Environment (140)	Science (200)	0	140	0
Dept. of Law (01)	Law (01)	01	0	0
Dept. of Mathematics (08)	Science (08)	05	03	0
Dept. of Criminology (09)		09	0	0
Dept. of Economics (01)	Social Science	01	0	0
Dept. of International Relation (01)	(62)	01	0	0
Dept. of Peace and Conflict Studies (02)		01	01	0
Dept. of Political Science (02)		02	0	0
Dept. of Population Science (01)		01	0	0
Dept. of Public Administration (03)		03	0	0
Dept. of Sociology (43)		0	43	0
Institute of Energy (34)	Institute (50)	0	0	34
Institute of Modern Language (01)		01	0	0
Institute of Social Welfare and Research (15)		0	15	0

Total	358	34	288	36
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Table 19. Total scholarly publications preserved in DUCL repository

<i>Scholarly Publications</i>	<i>Number</i>
M. Phil Thesis	163
PhD Theses	210
Research Article	34
Theses Paper	288
Internship Report	36
Others	14
Total	745

5.3.1.5 Khulna University of Engineering and Technology (KUET) Library

Khulna University of Engineering & Technology (KUET) is one of the leading public universities of Bangladesh giving special emphasis in the Engineering and Technology and Technological Education and research. The campus of this university stands at North-West corner of Khulna City Corporation, about 12 KM from the city center, in the midst of an impressive natural beauty having vast greenery spreading over an area of 101 acres land (“KUET,” 2018). Recently the authority organized three-day training on ‘Open Source Software DSpace’ for librarians and IT professionals of KUET from 22 April 2018 at BRAC University by collaborating BRAC University Ayesha Abed Library. The program was Funded by Higher Educational Quality Enhancement Project of the University Grants Commission and designed for the DSpace implementation team of KUET with an objective of providing technical and practical knowledge for enhancing the library services. There are total 3 communities with 18 sub-communities having more than Seven Hundred scholarly publications of different researcher from different department in KUET repository (“KUET Institutional Repository,” 2018). Table 20 shows the community based publication in KUET Library repository.

Table 20. Community based Publication in KUET Institutional Repository

<i>SL</i>	<i>Community</i>	<i>Collection</i>	<i>Type</i>
1.	Faculty of Civil Engineering	220	Thesis
2.	Faculty of Electrical and Electronic Engineering	85	Thesis
3.	Faculty of Mechanical Engineering	35	Report, thesis
Total		340	

Source: KUET institutional repository (on 30 August 2018)

5.3.1.6 University of Rajshahi (RU) Central Library

University of Rajshahi is one of the largest Universities in the country and the largest with the highest seat of learning in the northern region of Bangladesh. After its foundation on July 6, 1953, the university has passed 62 years providing higher education and research. The university is located at the green premises of Motihar which is very close to the mighty river Padma and seven km. east from the Rajshahi City Center (RU-home, 2018). The repository of RU is launched temporarily not officially. There are about three thousand records are ready to upload in the repository. But due to the permission of higher authority either these records will be uploaded for publicly accessible or not, the records are not uploaded in repository yet. There are total 13 communities where only 06 communities have 08 publications in the university central library repository. Table 21 shows the total publications under different communities and faculty.

Table 21. Community based Publication in RU Institutional Repository

<i>SL</i>	<i>Community</i>	<i>Collection</i>
1.	Faculty of Agriculture	01
2.	Faculty of Arts	02
3.	Faculty of Business Studies	00
4.	Faculty of Engineering	01
5.	Faculty of Law	00
6.	Faculty of Life and Earth Science	02
7.	Faculty of Science	00
8.	Faculty of Social Science	00
9.	Institute of Bangladesh Studies	01
10.	Institute of Biological Sciences	00
11.	Institute of Business Administration	00
12.	Institute of Education and Research	00
13.	Rajshahi University Central Library	01
Total		8

Source: RU institutional repository link and respectable person (on August 2018)

RUCL Repository has 07 M. Phil & PhD theses categorized in different department under various faculties and institutes. Table 21 shows the total M. Phil and PhD thesis of RUCL repository.

Table 22. MPhil & PhD theses status in RUCL repository

<i>Dept Name with theses number</i>	<i>Faculty with number</i>	<i>M. Phil thesis</i>	<i>PhD thesis</i>
Dept. of Agronomy and Agriculture Extension (01)	Agriculture (01)	0	01
Dept. of Islamic History & Culture (01)	Arts (02)	01	0
Dept. of Bangla (01)		0	01
Dept. of Applied Physics and Electronic Engineering (01)	Engineering (01)	01	0
Dept. of Psychology (02)	Life & Earth Science (02)	0	02
Institute of Bangladesh Studies (01)	Institute (01)	0	01
Total	7	2	5

5.3.1.7 Sher-e-Bangla Agricultural University (SAU) Library

Sher-e-Bangla Agricultural University (SAU) is located in the heart of the capital city, Dhaka with excellent public transportation facilities to reach the university. The SAU campus stands on 86.92 acres (35.19 ha) of picturesque land covered by green plantations. The University was established for the expansion of higher agricultural education and committed to promote research in various fields of agricultural sciences and to offer extension services. A number of research projects have been undertaken by the different departments of the University (“SAU,” 2018) . SAU has awarded Higher Education Enhancement Program (HEQEP) project through competition. Earlier a Digital Institutional Repository (DIR) namely DSpace introduced and fully customized to preserve the thesis, dissertations (Masters and PhD level) and scholarly articles published in the Journals of SAU. Unfortunately the hard disk has been crashed where all digital publications were preserved. For this reason the link of DSpace (archive.saulibrary.edu.bd) is disabling now. The authority maintain another customize software (made by joomla CMS). There are total 4653 collections are available under 5 communities in the repository. Table 23 shows the records of SAU through the running software:

Table 23. Community based Publication in SAU Institutional Repository

<i>SL</i>	<i>Community</i>	<i>Collection</i>	<i>Type</i>
1.	Bangabandhu Sheikh Mujibur Rahman Agricultural University	887	MS & PhD thesis
2.	Bangladesh Agricultural University	2835	MS & PhD thesis
3.	Patuakhali Science and Technology University	48	MS & PhD thesis
4.	Sher-e-Bangla Agricultural University	864	MS & PhD thesis
5.	Sylhet Agricultural University	19	MS & PhD thesis
		4653	

Source: SAU institutional repository (on 30 August 2018)

5.3.2 Comparative analysis of IR in public university

The researcher analysed the retrieved data and re-arranged the same in ascending order of provided records to find out the highest number of available records of the repositories.

Figure 3 demonstrated that the highest number of records (4750) is preserved by BUET Library, secondly (4653) SAU Library, thirdly (1435) BAU Library, then (822) DU Central Library, (340) KUET Library, (61) CVASU Library and the lowest number of records (8) is maintained by RU central library.

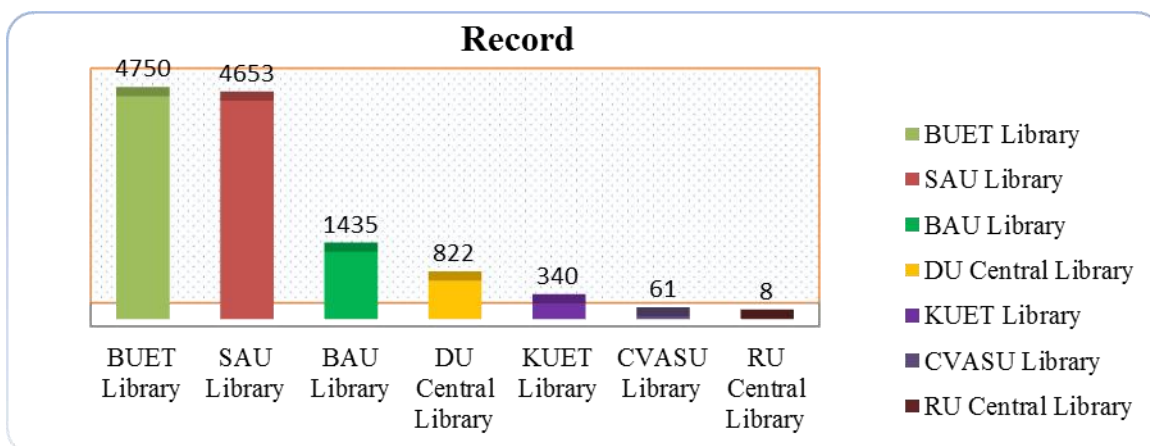


Figure 3: Public University Library Repositories with number of records

Figure 4 shows that the highest number of collection types is MS Thesis (90%). The another records items are PhD thesis (3%), M. Phil thesis (2%), Thesis & Report (4%), Research article/work, Policy & Manuscript, Syllabus, calendar, prospectus, curriculum, Power point, proceedings, image, Clinical & productive report (1%) etc.

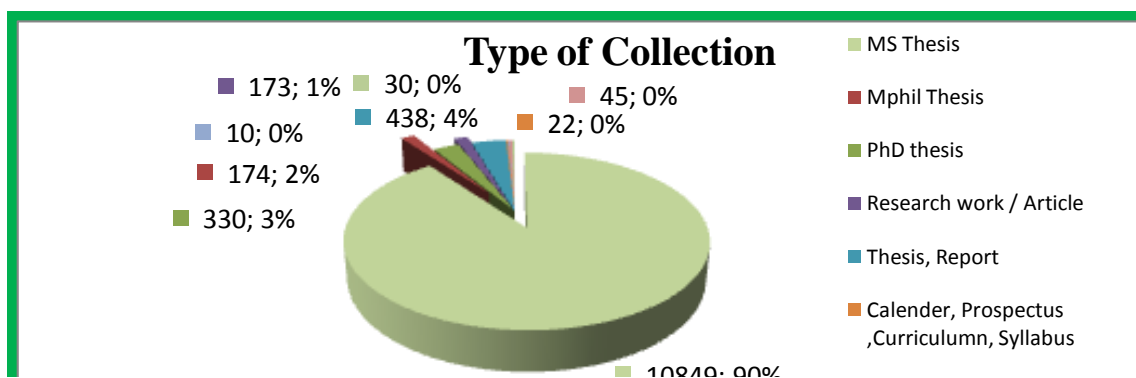


Figure 4: Collections status of surveyed public university repositories

5.3.3 Private University Library

There one hundred three private universities are available in Bangladesh. Only 10 private university libraries are using Digital Library Software for building Institutional Repository. Table 24 shows demonstrated scenario of DLS of private university with used IR software and their *url* links.

Table 24. Private University Library Repository and URL

<i>S.N</i>	<i>University Library name</i>	<i>Used IR</i>	<i>Repository URL</i>
1.	Ayesha Abed Library, BRAC University	DSpace	http://dspace.bracu.ac.bd/oai/request
2.	Daffodil International University Library	DSpace	http://dspace.daffodilvarsity.edu.bd:8080/
3.	Eastern University Library	DSpace Greenstone	http://dspace.easternuni.edu.bd:8080/xmlui/ http://gsdl.easternuni.edu.bd/greenstone/cgi-bin/library.cgi
4.	East West University Library	DSpace, Greenstone	http://dspace.diu.ac.bd/oai/request http://gsdl.ewubd.edu/greenstone/cgi-bin/linux/library.cgi
5.	International Islamic University Chittagong Library	DSpace	https://dspace.iiuc.ac.bd/xmlui/
6.	Independent University Bangladesh Library	DSpace	http://www.dir.iub.edu.bd:8180/
7.	North South University Library	DSpace	http://dspace.2283337.n4.nabble.com
8.	Northern University Bangladesh Library	DSpace	http://202.74.245.22:8080/xmlui/
9.	Premier University Chittagong Library	DSpace	http://101.2.163.148:8080/xmlui/
10.	Stamford University Library	DSpace	http://182.160.110.28:8080/jspui/

Following are the overview of IR used in private university libraries of Bangladesh. Table 25 shows the number of repository collection in public university libraries of Bangladesh.

Table 25. Institutional Repository Collection in Public University

<i>SL</i>	<i>Name of the university library</i>	<i>IR collection</i>
1.	Ayesha Abed Library, BRAC University	6064
2.	Daffodil International University Library	1645
3.	Eastern University Library	337
4.	East West University Library	2287
5.	International Islamic University Chittagong Library	170
6.	Independent University Bangladesh Library	275

7.	Northern University Bangladesh Library	1004
8.	North South University Library	0
9.	Premier University Chittagong Library	13
10.	Stamford University Library	60
Total		11855

5.3.3.1 BRAC University Library

Since its inception in 2001, BRAC University has become one of the most reputed educational institutions in Bangladesh. The construction of the new University campus in Savar, comprising a 14-storey building of 17 lakh square feet on 5 acres of land, is well under way (“BRAC University,” 2018). There are total 21 communities where only 6064 publications are available in BRAC University Central Library Repository (“BRACU Repository,” 2018). Table 26 shows the total picture of publications under different communities.

Table 26. Community based Publication in BRAC University Institutional Repository

<i>S.N</i>	<i>Community</i>	<i>Publication</i>
1.	Ayesha Abed Library	26
2.	BRAC (1972-2004)	336
3.	BRAC Business School (BBS)	1820
4.	BRAC Development Institute (BDI)	27
5.	BRAC Institute of Governance and Development (BIGD)	337
6.	BRACU Institute of Language (BIL)	39
7.	BRACU Faculty Publications	526
8.	BRACU News Archive	1101
9.	BRAC University Archives	14
10.	BRAC University Publications	238
11.	Centre for Research on Bangla Language Processing (CRBLP)	63
12.	Department of Architecture	220
13.	Department of Economics and Social Sciences	20

	(ESS)	
14.	Department of Mathematics and Natural Sciences (MNS)	193
15.	Department of Pharmacy	45
16.	e-Bulletin	161
17.	Institute of Educational Development (IED)	46
18.	James P. Grant School of Public Health (JPGSPH)	141
19.	School of Engineering and Computer Science (SECS)	704
20.	School of Law	07
Total		6064

Source: BRAC University Institutional Repository

5.3.3.2 Daffodil International University (DIU) Library

Daffodil International University (DIU) is recognized in independent government assessments as one of top graded universities in Bangladesh. The university has been founded by Daffodil Group with the approval of the Ministry of Education under the Private University Act of 1992 and its amendment in 1998 and Daffodil International University came into being on 24th January 2002 (“DIU,” 2018) . There are total 26 communities where 1645 publications are available in Daffodil International University Central Library Repository (“DIU Archive Home,” 2018) . Table 27 shows the DIU research and publication archive under the different communities.

Table 27. Community based Publication in DIU Institutional Repository

<i>S.N</i>	<i>Community</i>	<i>Collection</i>
1.	Business Administration	171
2.	Computer Science and Engineering	28
3.	DIU Journal of Allied Health Sciences	23
4.	DIU Journal of Business and Economics	180
5.	DIU Journal of Humanities & Social Science	33
6.	DIU Journal of Science and Technology	215
7.	DIU Library	17

8.	Economic Census	66
9.	Electrical and Electronic Engineering	43
10.	Electrical and Telecommunication Engineering	36
11.	English	2
12.	IAUP Triennial & Young Scientists Conference 2017	526
13.	ITU Journal	6
14.	Journalism & Mass Communication	18
15.	Law	2
16.	Multimedia & Creative Technology	0
17.	Natural Science	1
18.	Newsletter	15
19.	Nutrition and Food Engineering	2
20.	Pharmacy	25
21.	Proceedings of ICTERC	22
22.	Proceedings of NCCIS	68
23.	Public Health	1
24.	Real Estate	13
25.	Software Engineering	0
26.	Textile Engineering	132
Total		1645

Source: DIU Institutional Repository

5.3.3.3 East West University (EWU) Library

East West University, rated among the top private universities of Bangladesh, is an institution that promotes eastern culture and values and meaningfully blends eastern and western thought and innovation. As an institution of higher learning that promotes and inculcates ethical standards, values and norms. After being accorded permission by the Government under the Private University Act (Act 34) of 1992, East West University was launched in 1996 (“History| EWU,” 2018) . East West University Library is one of the pioneer libraries in Bangladesh in terms of comprehensive collections, variety of services, up to date technology, professionally skilled manpower, user education, service marketing etc. EWU Library is an integral part of the university and designed to meet the

information, research, and curriculum needs of its students, faculty and staff members (“EWU Library,” 2018) . After conducting a comparative analysis among e-print, DSpace and Greenstone University Library decided to use GSDL for its various strong features, simplicity, user friendliness both for staff client and end user. So they initiated Digital Library program by using GSDL from June, 2010. Later they took initiative to manage its intellectual output with the help of open source software: DSpace. Now the library is enriching its digital collection in the form of audio-video collection, news clippings, Bengali collections, e-book and thesis collection through DSpace.

There are total 14 communities where 2287 publications are available in East West University Library Repository (“EWU, DSpace Home,” 2018). Table 28 shows the total picture of publications under different communities.

Table 28. Community based Publication in DIU Institutional Repository

<i>S.N</i>	<i>Community</i>	<i>Collection</i>
1.	Center for Research and Training (CRT)	130
2.	Department of Applied Statistics	3
3.	Department of Business Administration	307
4.	Department of Computer Science & Engineering	151
5.	Department of Economics	8
6.	Department of EEE	112
7.	Department of ECE	165
8.	Department of English	105
9.	Department of Genetic Engineering and Biotechnology	0
10.	Department of Pharmacy	521
11.	Department of Social Relations	6
12.	EWU Library	39
13.	EWU News Archive	540
14.	EWU Publication	200
Total		2287

Source: EWU Institutional Repository

Besides this institutional repository software EWU library maintains another digital library software name greenstone. It includes MPRHGD, E-Journal, Image Library, Virtual Book Collection, Newsclippings, Video Library, Bangla Songroho, Thesis Collection and Audio Library. The last up date is on 9 January 2014.

5.3.3.4 Eastern University (EU) Library

Committed to an ideal of “quality higher education at an affordable cost”, a group of educational philanthropists established Eastern University in 2003. The University has at present four faculties. Eastern University has academic partnership with over 20 universities of the World. The present campus consisting of four large buildings is located in Dhanmondi, Dhaka. A huge campus on sprawling lush green is under construction in the University Zone in Ashuila. The digital library of the University has more than 15000 books, over 100 national and international research journals, 700 audio visual materials, 25000 online journals and a large number of eBooks through 41databases. The library services can be accessed any time of the day and night over internet from anywhere (“EU,” 2018). The repository of Eastern University is developed in 2016 using DSpace software for preserving the university’s legacy which facilitates digital preservation and scholarly communication. The prime goal of the repository is to increase the visibility, use and impact of the university’s research publications. There are total 10 communities where only 337 publications are available in East West University Library Repository (“EU Repository Home,” 2018) . Table 29 shows the total picture of publications under different communities.

Table 29. Community based Publication in EU Institutional Repository

<i>S.N</i>	<i>Community</i>	<i>Collection</i>	<i>Type</i>
1.	Audio Visual Archive	5	Audio, video
2.	Center for Research and Development	2	-
3.	Eastern University Journal	77	Article
4.	Eastern University Newsletter	33	Newsletter
5.	Eastern University Publications	33	-
6.	Image Archive	0	image
7.	Internship Reports and Term Papers	2	Report
8.	News and Feature Archive	120	News, feature

9.	PhD and MPhil Thesis	5	Thesis
10.	Publications of EU Family	60	Publication
Total		337	

Source: EWU Institutional Repository

5.3.3.5 International Islamic University Chittagong (IIUC) Library

International Islamic University Chittagong (IIUC) is one of the top graded Government approved private universities in Bangladesh. It is one of the most prestigious and elite private universities in Bangladesh upholding the motto "Combines Quality with Morality". IIUC is mostly popular because of having one of the most beautiful Campuses in the country. It was founded in 1995 under the Private Universities Act of 1992 (Act no. 34 of 1992). Islamic University Chittagong Trust (IUCT) is the founder organization of this university. The campus is in Kumira, Chittagong ("Wikipedia-IIUC," 2018). Since its inception, IIUC authority has been taking all possible steps to build up a well-equipped modern library. Now it becomes one of the most extensive libraries among all the private university libraries of Bangladesh. The library is now fully automated through Integrated Library System. The IIUC Digital Institutional Repository is developed using DSpace software where all the publications are being published. Access and download facilities of about 35000 online journals, 15500 eBooks, and four million e-Theses are available. In addition to these collections, the library subscribes printed issues of a large number of journals, foreign and local magazines, and almost all leading national newspapers of Bangladesh ("About | IIUC Central Library," 2018) .

Library & Information Division of International Islamic University Chittagong is preserving its digital publications through 8 communities. There are total 188 publications are available in International Islamic University Chittagong Central Library Repository ("IIUC Repository Home," 2018). Table 30 shows the total picture of publications under different communities.

Table 30. Community based Publication in IIUC Institutional Repository

<i>S.N</i>	<i>Community</i>	<i>Publication</i>	<i>Type</i>
1.	Center for Research & Publication	0	-
2.	IIUC Archives	0	-
3.	IIUC Journals	172	Research Article
4.	IIUC News Archive	0	-
5.	IIUC Publications	0	-
6.	International Conference	0	-
7.	Publications of IIUC Family	16	Article
8.	Theses, Dissertations and Reports	0	-
Total		188	

Source: IIUC institutional repository

5.3.3.6 Independent University, Bangladesh (IUB) Library

Founded in 1993, Independent University, Bangladesh is one of the oldest private universities in Bangladesh where academic excellence is a tradition, teaching a passion and lifelong learning a habit. The IUB campus sprawling over 3 acres, has an amphitheatre, state-of-the-art laboratories, a well-equipped library with online access to journals and books, above 50 classrooms, lecture galleries, a world-class auditorium, gymnasium, food court, playground, medical centre, counseling centre, students dormitory and an alumni office (“IUB,” 2018). There are total 14 communities where 275 publications are available in Independent University, Bangladesh Library Repository (“IUB Library,” 2018). Table 31 shows the total picture of publications and its types under different communities.

Table 31. Community based Publication in IUB Institutional Repository

<i>S.N</i>	<i>Community</i>	<i>Publication</i>	<i>Type</i>
1.	Bangla Language Institute	0	-
2.	Center for Health, population and Development	6	Article
3.	International Center for Climate Change and Development	19	Article
4.	IUB Journal on Nazrul Abbasuddin	7	Article (pdf, MS Word), Image (JPEG)

5.	IUB Library	29	Manual, book, training overview, presentation
6.	IUB Publication	15	AR, Class Schedule,
7.	Miscellaneous	14	Article, Video
8.	News Clippings	21	Image (png)
9.	Policies and Forms	10	Policy, Progress Report, Forms
10.	School of Business	76	Internship Report, Thesis
11.	School of Environmental Science & Management	15	Article
12.	School of Liberal Arts & Social Sciences	54	Article, Proceedings
13.	School of Life Science	2	Article
14.	School of Public Health	7	Catalogue, Article
Total		275	

5.3.3.7 Northern University Bangladesh (NUB) Library

In 2002, a group of eminent academics recognized this exponential increase in demand and established Northern University Bangladesh on 17 October in order to bring quality education within the reach of students with modest economic means. NUB has 5 Faculties situated within the Dhaka Metropolitan city with its Permanent Campus near Haji camp at Ashkona, Dakshin Khan (“NUB,” 2018) .

There are total 14 communities where only 1013 publications are available in Northern University Central Library Repository (“NUBDIRL Home,” 2018) . Table 32 shows the total picture of publications under different communities.

Table 32. Community based Publication in NUB Institutional Repository

<i>S.N</i>	<i>Community</i>	<i>Collection</i>	<i>Type</i>
1.	Academic Bibliography-NUB	109	Bibliography
2.	Bangabandhu Sheikh Mujibur Rahamn and Netaji Subhas Chandra Bose Research Centre	59	-
3.	Books Authored by NUB Scholars	12	Books
4.	Books: Recommended Reading	794	Books
5.	Center for Management and Development of	2	

Research (CMDR)			
6.	Conference-Seminar-Workshop	12	Proceedings
7.	Development Reports	1	Report
8.	English Language and Literature	7	-
9.	Good Reads	4	-
10.	Internee Reports - Theses - Dissertations	1	-
11.	Newspaper Articles	4	-
12.	NUB Environment Club	3	-
13.	NUB Librarian's Desk	4	-
14.	NUB Working Paper	1	-
Total		1013	

Source: NUB Institutional Repository

5.3.3.8 North South University (NSU) Library

North South University (NSU) was established in 1992 by the then Foundation for Promotion of Education and Research (FPER). It is situated at Bashundhara, Dhaka. “North South University (NSU) Library grew over the years since 1992. This is the first fully automated library in the country using Bi-lingual Library Management System, developed by NSU Library, which supports MARC-21, web-based online circulation, browse databases of books, CDs, journals, newspapers and magazines, full-text online books and journals, develop institutional repositories, auto email alert services, etc. The NSU library started developing its online journals and books repositories in 2003. These repositories cover books and articles written by teachers, students and researchers of NSU and full-text articles of 160 online subscribed journals from 2002 to date. The numbers of articles and books of these repositories are increasing day by day” (“Library | NSU,” 2018).

The repository is not open access to all. Only NSU members holding individual password can access to the repository. The NSU library formally launched its full-text journals and books repositories in 2003 with its own software NSU-LMS. These two repositories cover books, conference papers and journals articles written by teachers, students and researchers of NSU and articles of 160 online subscribed journals from 2002 to date. The numbers of articles and books of these repositories are over 21,500 and around 2000 respectively and it’s increasing day by day. Later the library started

digitization of its theses, reports and news-clippings on NSU by using the same software. All registered members of NSU library get access to all these digital repositories by using individual username and password from inside and outside campus through Internet. It should be mentioned here that the NSU library never used open source software, e.g. DSpace, Greenstone, Koha etc for automation and digitization of its resources (Rahman et al., 2015). It is informed by the researchers over telephone with NSU repository administrators that the NSU repository preserved 135 repository collections. Recently the NSU authority decided to use Open Source Digital Library Software for preserving and distributing their institutional publications. They have decided also that these resources will be open for all.

5.3.3.9 Premier University (PU) Chittagong Library

Premier University was established in the year 2002 at Prabartak Circle, Chattogram. Primarily Primer University Chittagong Library repository consists of 8 communities. 3 communities contain only 13 digital publications and rest 5 communities don't contain any publication ("Premier University Library," 2018) yet. Table 33 shows the total publications under the different communities.

Table 33. Community based Publication in PUCL repository

<i>S.N</i>	<i>Community</i>	<i>Collection</i>
1.	Faculty of Arts	0
2.	Faculty of Business Studies	0
3.	Faculty of Engineering	1
4.	Faculty of Law	0
5.	Faculty of Science	0
6.	Faculty of Social Science	0
7.	News Archives	3
8.	Premier University Publication	9
Total		13

Source: PUC Institutional Repository

5.3.3.10 Stamford University (SU) Library

Stamford University, Bangladesh was founded in the city of Dhaka in 1994 and then it was known as Stamford College Group, Bangladesh. It was upgraded as a private university with the permission of the Government of Bangladesh in 2002 and emerged as Stamford University, Bangladesh (“SUB,” 2018). Stamford University Library starts its journey since 2002. There are total 14 communities where only 60 publications are available in Stamford University digital repository for university research (“SU Digital Repository,” 2018). Table 34 shows the total picture of publications under different communities

Table 34. Community based Publication in SU Institutional Repository

<i>S.N</i>	<i>Community</i>	<i>Collection</i>
1.	Department of Architecture	0
2.	Department of Business Administration	19
3.	Department of Civil Engineering	0
4.	Department of Computer Science & Engineering	0
5.	Department of Economics	1
6.	Department of EEE	17
7.	Development English	0
8.	Department of Environmental Science	0
9.	Department of Film & Media	0
10.	Department of Journalism & Media Studies	0
11.	Department of Law	23
12.	Department of Microbiology	0
13.	Department of Pharmacy	0
14.	Department of Public Administration	0
	Total	60

Source: SU institutional repository

5.3.8 Comparative analysis of IR collections in Private University Repository

The researcher analysed the retrieved data and re-arranged the same in ascending order of provided records to find out the number of available records of the repositories. Figure 5 demonstrated that the highest number of records (6064) is preserved by BRAC University Library, secondly (2287) by East West University Library, thirdly (1645) by Daffodil International University Library, then (1004) by Northern University Library, (337) by Eastern University Library, (275) by Independent University, Bangladesh, (170)

by International Islamic University Chittagong, (60) by Stamford University, (13) by Premier University Chittagong Library.

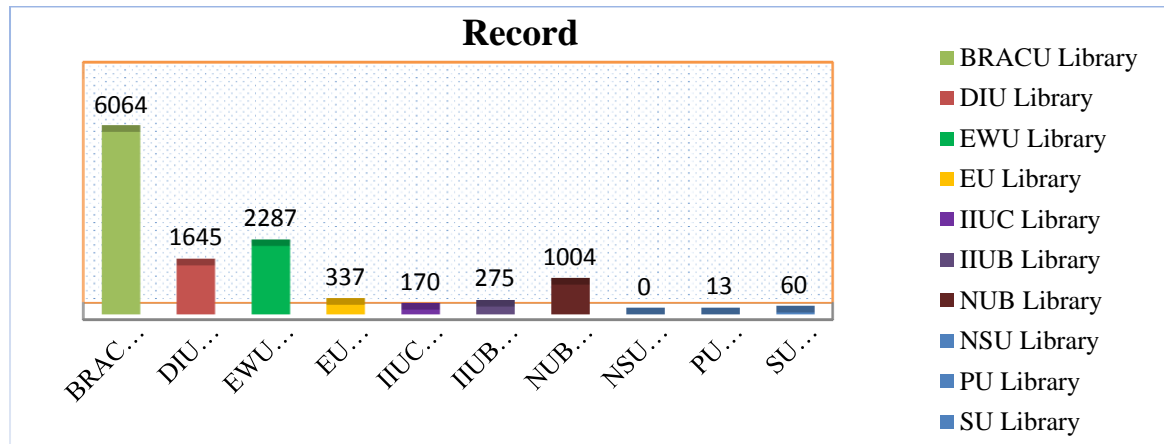


Figure 5. Records status of surveyed private university library repositories

5.4 Motivation of IR establishment

The IR Administrators (n=24) were asked to indicate the motivation for establishment IR of selected universities indicating the visibility of university research output, free access to university publications, preserving the university resources, and evaluation of researchers and departments. Table 35, 36, 37 and 38 demonstrate the motivations of the respected universities.

Table 35 reveals that the motivation of IR establishment for visibility of university research output was either important or very important to the largest group 18 (75 percent). It is not very important to 4 (16.7%) respondents. 2 (8.3%) shows that it is not at all important.

Table 35. Motivation for establishment of IR (for visibility of university research)

<i>Importance</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Not at all important	2	8.3	8.3	8.3
Not very important	4	16.7	16.7	25.0
Important	9	37.5	37.5	62.5
Very important	9	37.5	37.5	100.0
Total	24	100.0	100.0	

Figure 6 demonstrates that the motivation of IR establishment for ensuring open access (OA) was either important or very important to the largest group 18 (75 percent). It is not very important to 4 (16.7%) respondents. 2 (8.3%) shows that it is not at all important.

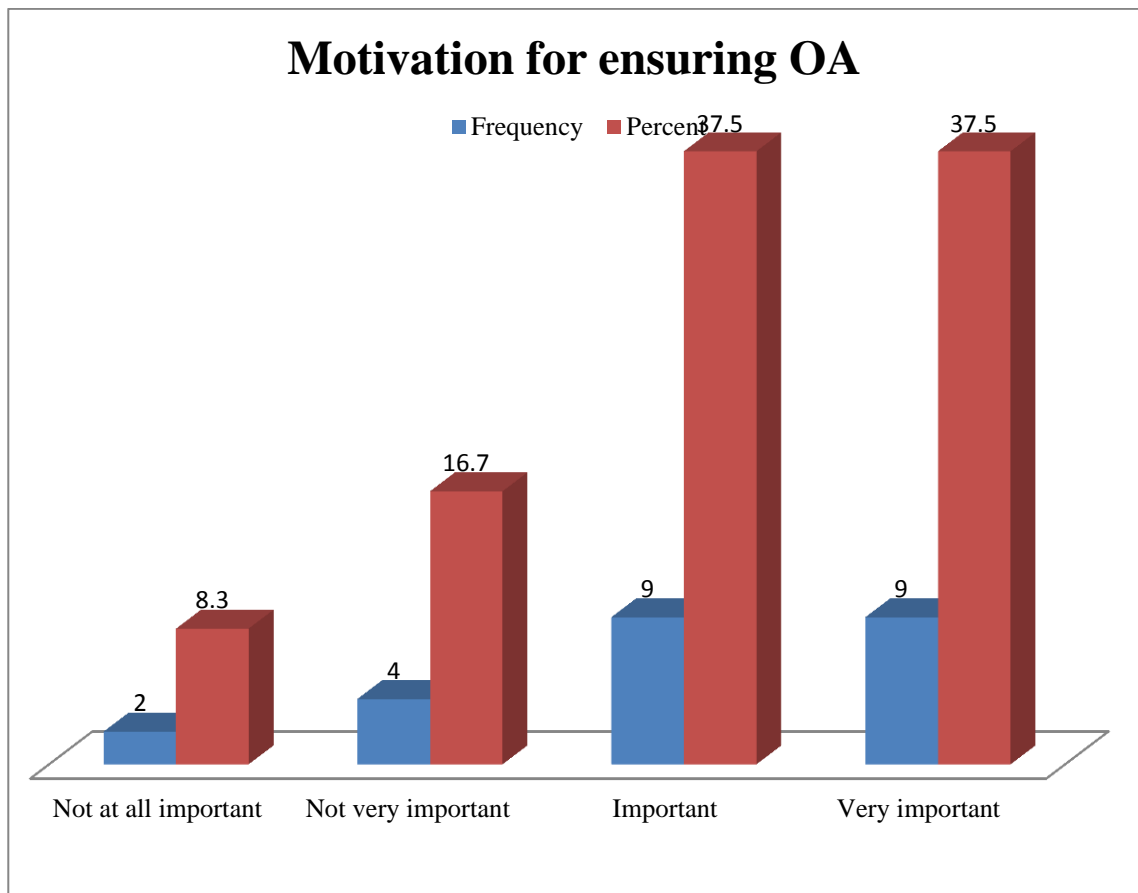


Figure 6: Motivation for establishment of IR (for ensuring Open Access)

Table 36 demonstrates that the motivation of IR establishment to preserve intellectual research outputs was important to the largest group 9 (37.5 percent). It is very important to 6 (35%), not very important to 4 (16.7%) respondents. 5 (20.8%) respondents show the neutrality.

Table 36. Motivation for establishment of IR (to preserve research outputs)

<i>Importance</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Not very important	4	16.7	16.7	16.7
Neutral	5	20.8	20.8	37.5
Important	9	37.5	37.5	75.0
Very important	6	25.0	25.0	100.0
Total	24	100.0	100.0	

Table 37 and figure 7 demonstrate that the motivation of IR establishment to evaluate the researchers and departments was either important or very important to the largest group

16 (67 percent). It is not very important to 4 (16.7%) respondents. 5 (20.8%) respondents show the neutrality.

Table 37. Motivation for establishment of IR (for evaluation the researchers & departments)

<i>Importance</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Not very important	3	12.5	12.5	12.5
Neutral	5	20.8	20.8	33.3
Important	8	33.3	33.3	66.7
Very important	8	33.3	33.3	100.0
Total	24	100.0	100.0	

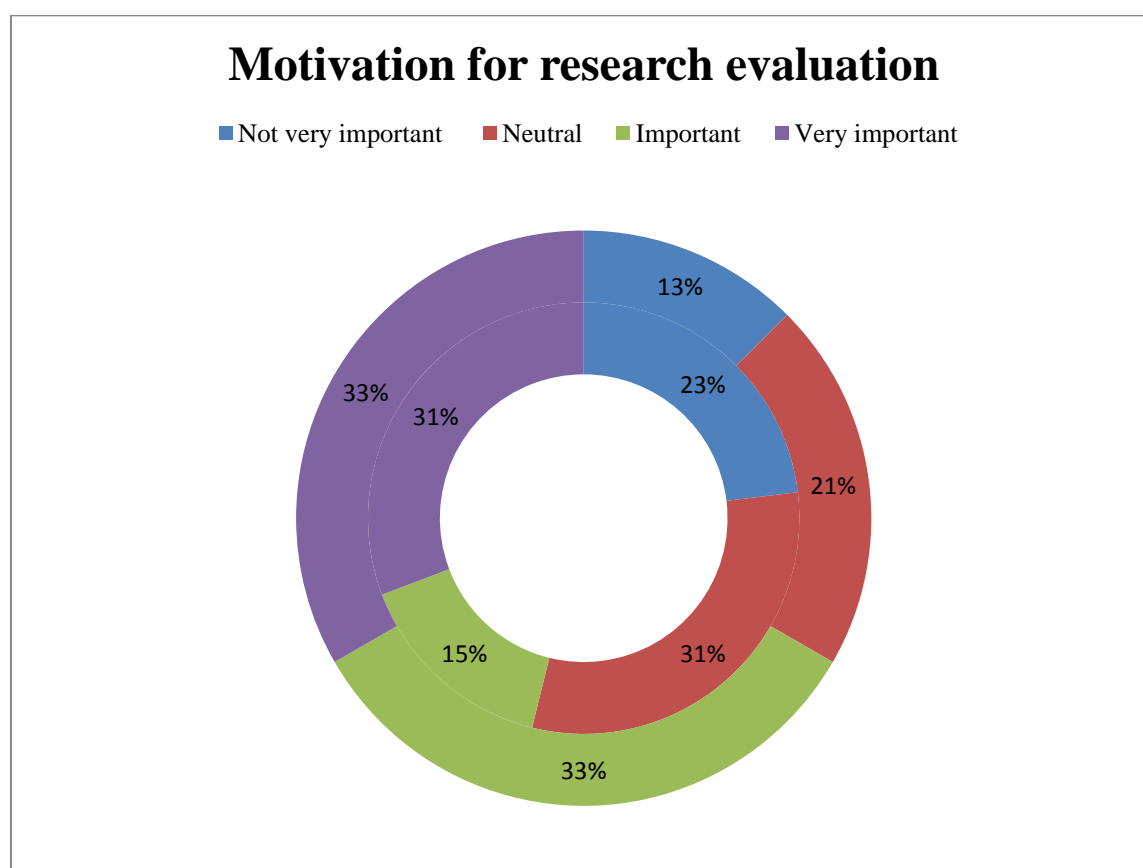


Figure 7: Motivation of IR for researchers & department evaluation

5.5 Facilities and Policy

Table 38 reveals that 58.3 percent university authorities have computer lab facility to use institutional repository and 41.7 percent university authority haven't computer facility.

Table 38. Computer Facility for using IR in university libraries

<i>Condition</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Yes	14	58.3	58.3	58.3
No	10	41.7	41.7	100.0
Total	24	100.0	100.0	

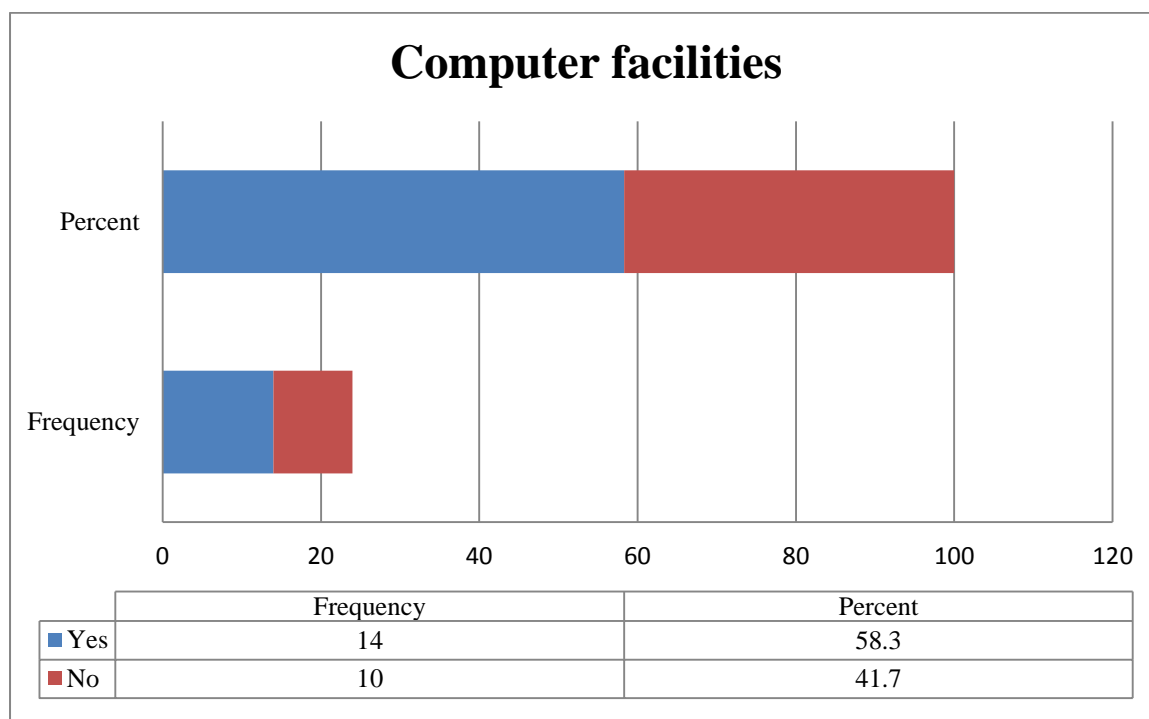


Figure 8: Computer facilities in selected university libraries

Table 39 and figure 9 reveal that 29.2 percent university organized training on IR for the research scholars & users and 70.8 percent university authority didn't organize any training for the IR users.

Table 39. Training for Using the IR

<i>Condition</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Yes	7	29.2	29.2	29.2
No	17	70.8	70.8	100.0
Total	24	100.0	100.0	

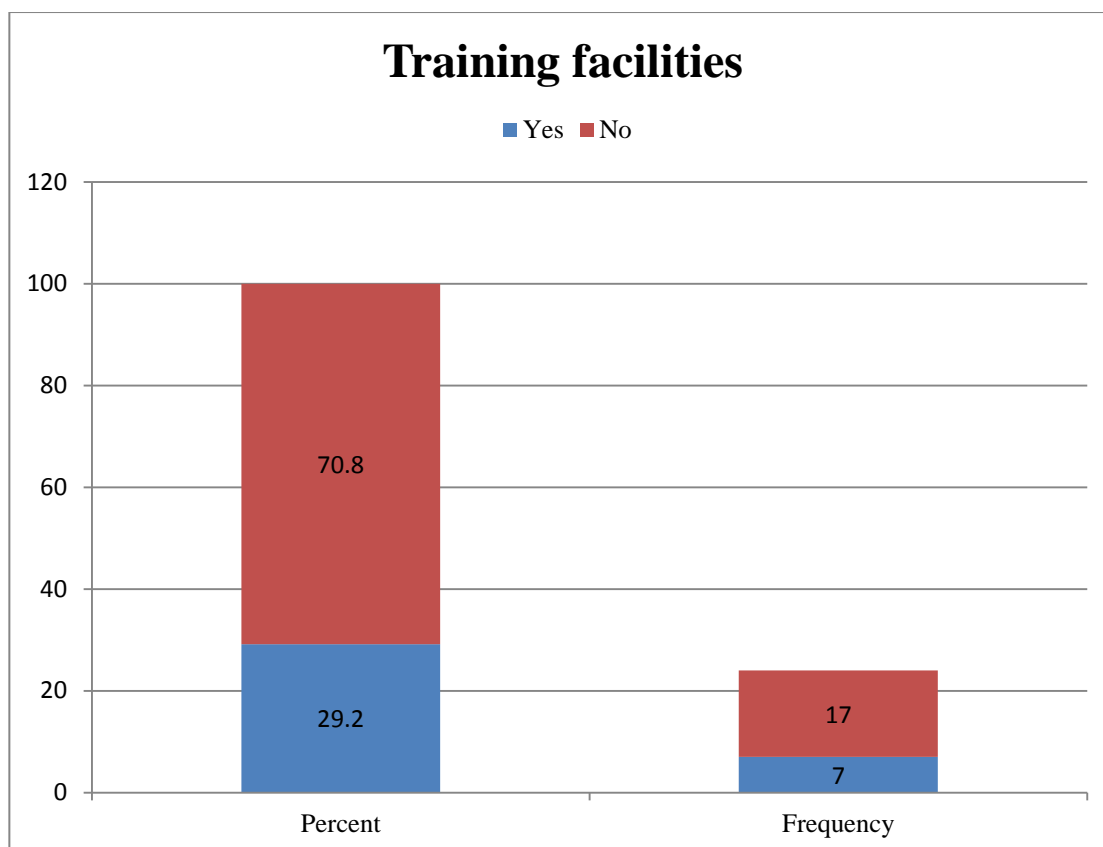


Figure 9: Status of training facilities in the university libraries

Table 40 and figure 10 demonstrate the availability of IR policy in university. Table and figure state that 79.2 percent university has no IR policy and 8.3 percent have IR Policy and the rest 12.5 percent don't know about IR policy.

Table 40. Availability of IR policy

<i>Condition</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Yes	2	8.3	8.3	8.3
No	19	79.2	79.2	87.5
Don't know	3	12.5	12.5	100.0
Total	24	100.0	100.0	

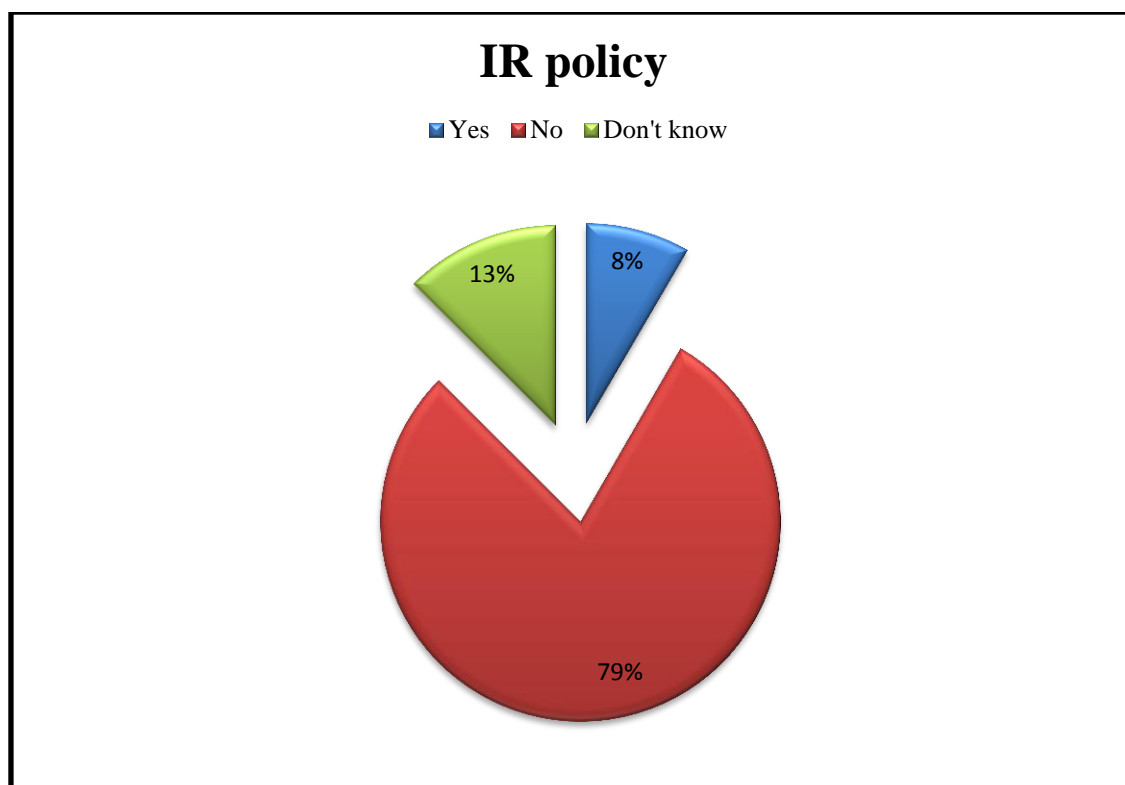


Figure 10: Availability of IR policy in university libraries

5.6 Measurement of adequacy and satisfaction Level

Table 41 shows that a considerable number of Repository Administrators 9 (37.5 percent) told that the adequacy of their collection is poor, 7 (29.2 percent) told slightly adequate, 3 (12.5) told almost adequate, according to 3 (12.5 percent) is inadequate and 2 (8.3 percent) stated that the collections are adequate.

Table 41. Adequacy of IR collection in the repository according to the Repository Administrator (n=24)

<i>Adequacy</i>		<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Valid	Adequate	2	8.3	8.3	8.3
	Slightly adequate	7	29.2	29.2	37.5
	Almost adequate	3	12.5	12.5	50.0
	Poor	9	37.5	37.5	87.5
	Inadequate	3	12.5	12.5	100.0
	Total	24	100.0	100.0	

Figure 11 reflects the adequacy of IR collection in the repository system run by university libraries of Bangladesh according to IR admin.

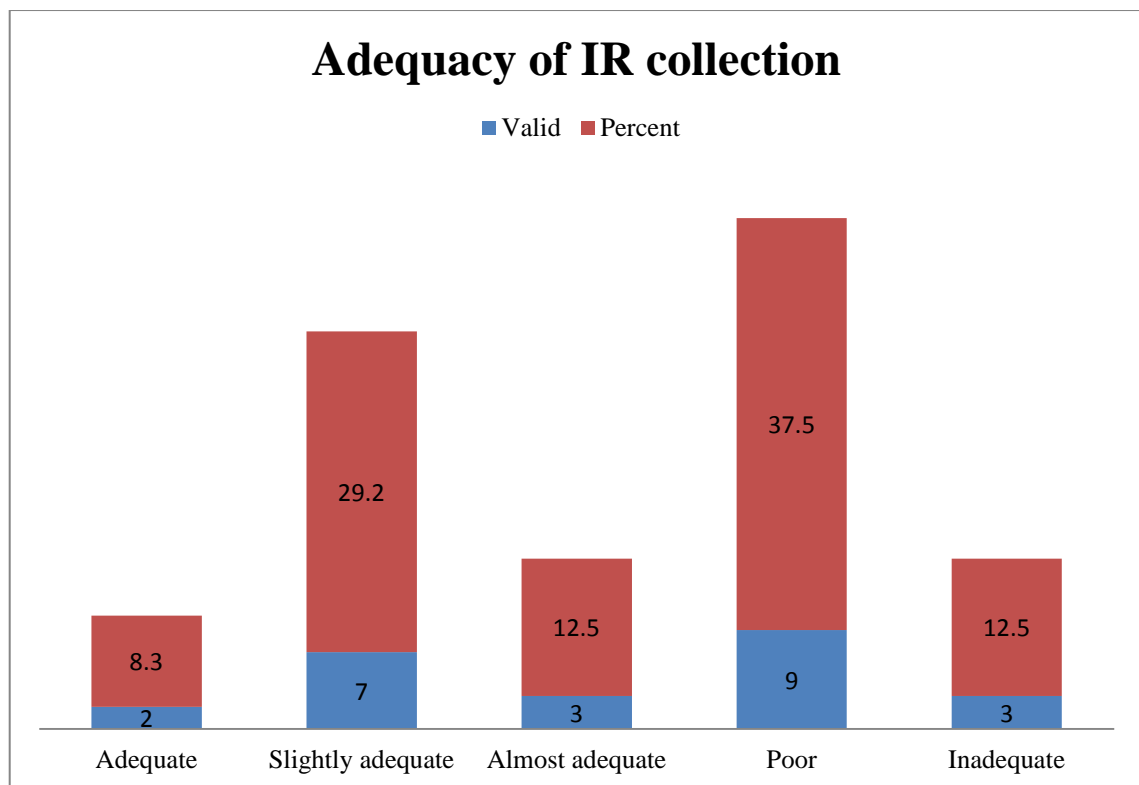


Figure 11. Adequacy of IR collection in the repository according to IR admin

Table 42 shows the satisfaction level of repository administrators. The largest group 7 (29.2 percent) is not satisfied with current repository collections and the smallest group 1 (4.2 percent) is highly satisfied with the present repository preservations. 7 (29.2 percent) are less satisfied, 7 (29.2 percent) are satisfied and 2 (8.3 percent) are very satisfied with their present repository collections.

Table 42. Satisfaction level of IR Administrators (n=24)

<i>Satisfaction</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Not satisfied	7	29.2	29.2	29.2
Less satisfied	7	29.2	29.2	58.3
Satisfied	7	29.2	29.2	87.5
Very satisfied	2	8.3	8.3	95.8
Highly satisfied	1	4.2	4.2	100.0
Total	24	100.0	100.0	

Figure 12 shows that 29% are satisfied, 9% are very satisfied & 4% are highly satisfied and 68% are less satisfied or not satisfied with their repository collections of the university libraries.

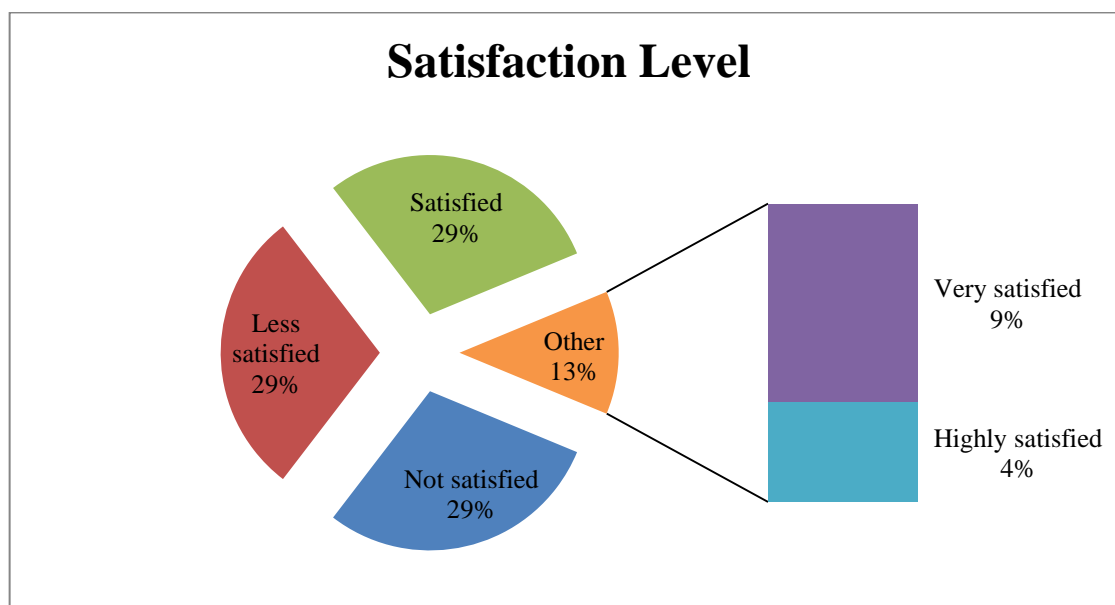


Figure 12: Satisfaction level of IR administrators

Table 43 shows a considerable number of Repository Users (37.8 percent) told about the availability of their collections are inadequate. 33.7 percent told it poor, according to 17.3 percent it is slightly adequate, 6.1 percent told adequate and 5.1 percent said it is almost adequate.

Table 43. Adequacy of IR collection in the repository according to the Repository Users (n=98)

<i>Adequacy</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Adequate	6	6.1	6.1	6.1
Slightly adequate	17	17.3	17.3	23.5
Almost adequate	5	5.1	5.1	28.6
Poor	33	33.7	33.7	62.2
Inadequate	37	37.8	37.8	100.0
Total	98	100.0	100.0	

Figure 13 shows the status of adequacy of institutional repository collections in the university libraries of Bangladesh according to IR users where the largest group (72%) expressed that the IR collections are either poor or inadequate.

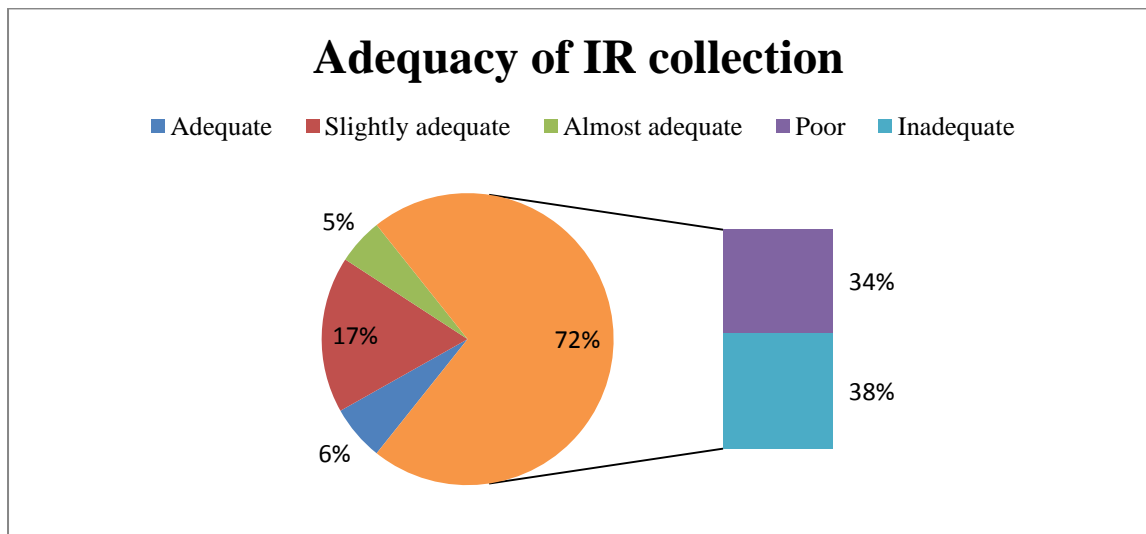


Figure 13: Status of adequacy of IR collection according to users

Table 44 shows the satisfaction level of repository users. The largest group 42 (42.9 percent) are not satisfied with current repository collections and the smallest group 4 (4.1 percent) is highly satisfied with the present repository preservations. 26 (26.5 percent) are less satisfied, 21 (21.4 percent) are satisfied and 5 (5.1 percent) are very satisfied with their present repository collections.

Table 44. Users' (n=98) satisfaction with present IR collections

<i>Satisfaction</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Not satisfied	42	42.9	42.9	42.9
Less satisfied	26	26.5	26.5	69.4
Satisfied	21	21.4	21.4	90.8
Very satisfied	5	5.1	5.1	95.9
Highly satisfied	4	4.1	4.1	100.0
Total	98	100.0	100.0	

Figure 14 demonstrates that 30% repository users are either satisfied or very satisfied or highly satisfied and the largest part 70% are either not satisfied or less satisfied with their repository collection.

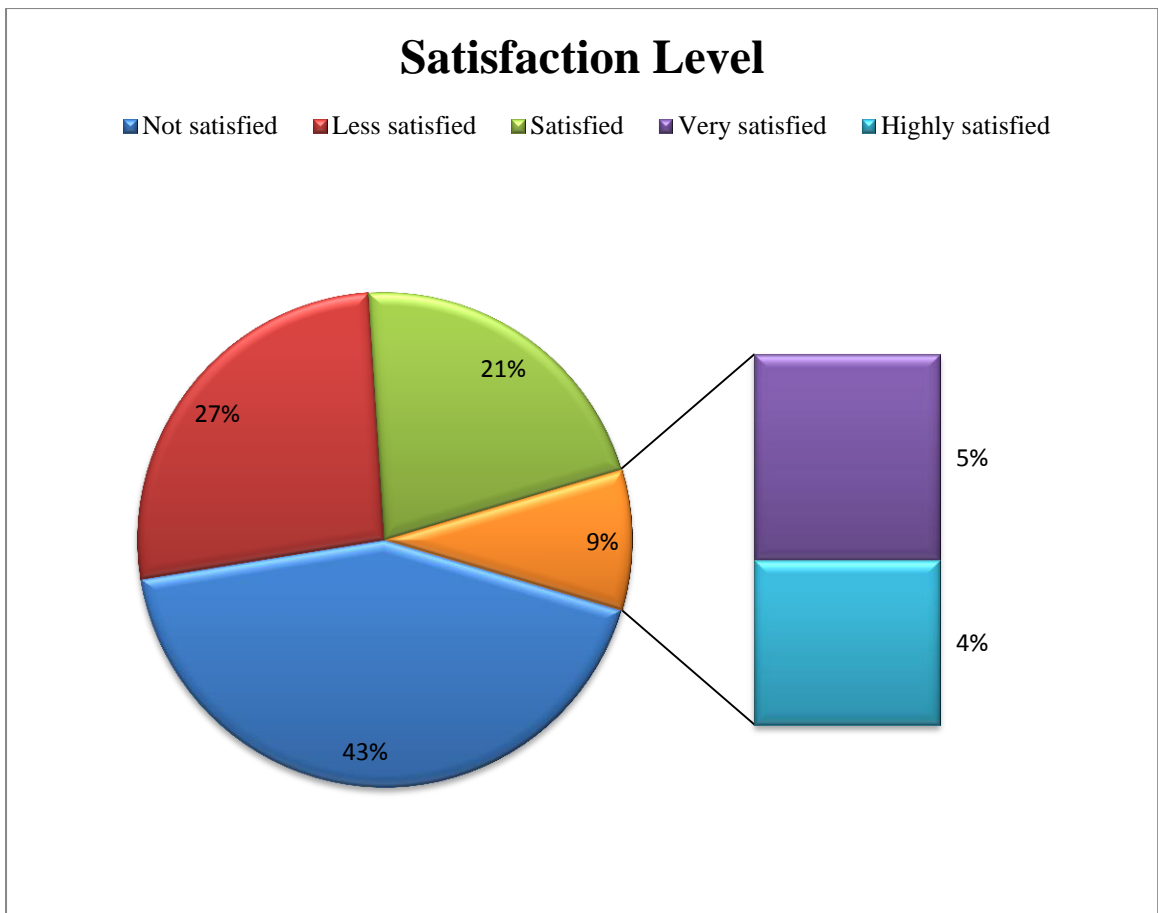


Figure 14: Satisfaction level of IR users

5.7 Recommendations and comments about IR

Table 45 and figure 15 show that the largest group 15 (62.5 percent) recommended DSpace and 5 (20.8 percent) recommended Greenstone. 2 (8.3 percent) recommended SLiMS, 1 (4.2 percent) recommended Fedora and Invenio for the university libraries as OSDLS.

Table 45. IRs recommended by Repository Administrators (n=24)

<i>Name of Software</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
DSpace	15	62.5	62.5	62.5
Greenstone	5	20.8	20.8	83.3
Fedora	1	4.2	4.2	87.5
Invenio	1	4.2	4.2	91.7
SLiMS	2	8.3	8.3	100.0
Total	24	100.0	100.0	

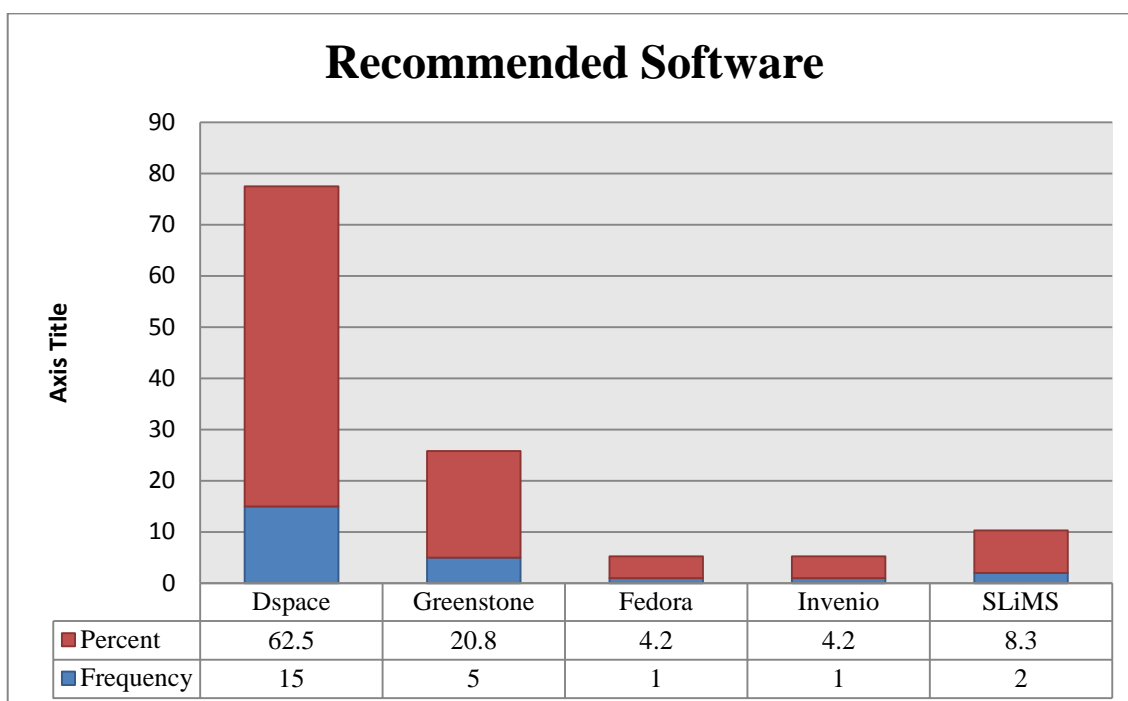


Figure 15: Recommended software by IR administrators

Table 46 and figure 16 show that a considerable number of Repository Administrators 15 (62.5 percent) are agree for making a separate wing by UGC and 4 (16.7 percent) are strongly agree, 3 (12.5 percent) are neither agree or disagree and 2 (8.3 percent) are disagree with this recommendation.

Table 46. Agreement for making separate wing by UGC according to IR administrator ($n=24$)

<i>Agreement</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Disagree	2	8.3	8.3	8.3
Neither agree or disagree	3	12.5	12.5	20.8
Agree	15	62.5	62.5	83.3
Strongly agree	4	16.7	16.7	100.0
Total	24	100.0	100.0	

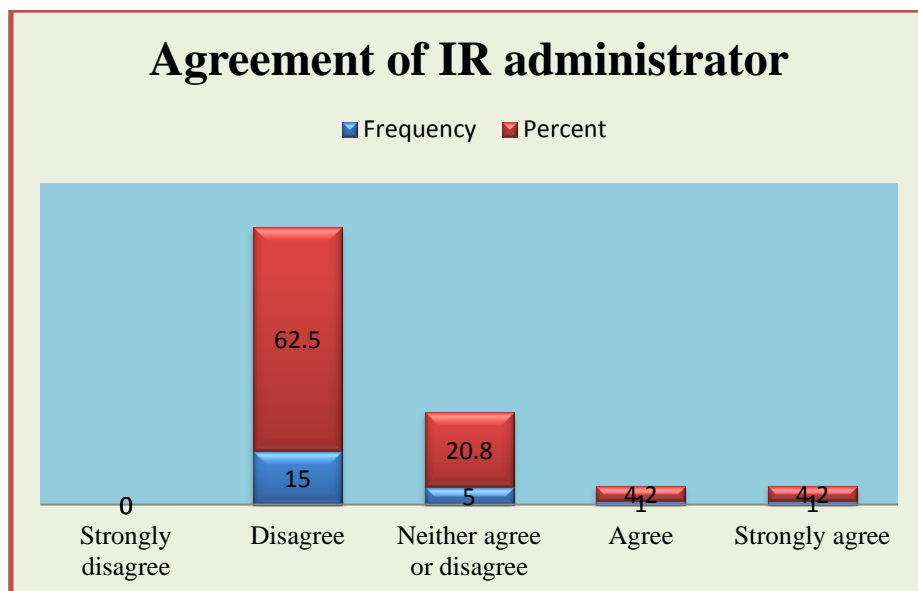


Figure 16: Agreement for making separate wing by UGC according to IR admin

Table 47 and figure 17 show that the largest number of Repository Users 41 (41.8 percent) are agree for making a separate wing by UGC, 15 (15.3 percent) are strongly disagree, 14 (14.3 percent) are neither agreed nor disagreed, 14 (14.3 percent) are disagreeing and 14 (14.3 percent) are strongly agree with this recommendation.

Table 47. Agreement for separate wing by UGC according to IR users (n=98)

<i>Agreement</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Strongly disagree	15	15.3	15.3	15.3
Disagree	14	14.3	14.3	29.6
Neither agree or disagree	14	14.3	14.3	43.9
Agree	41	41.8	41.8	85.7
Strongly agree	14	14.3	14.3	100.0
Total	98	100.0	100.0	

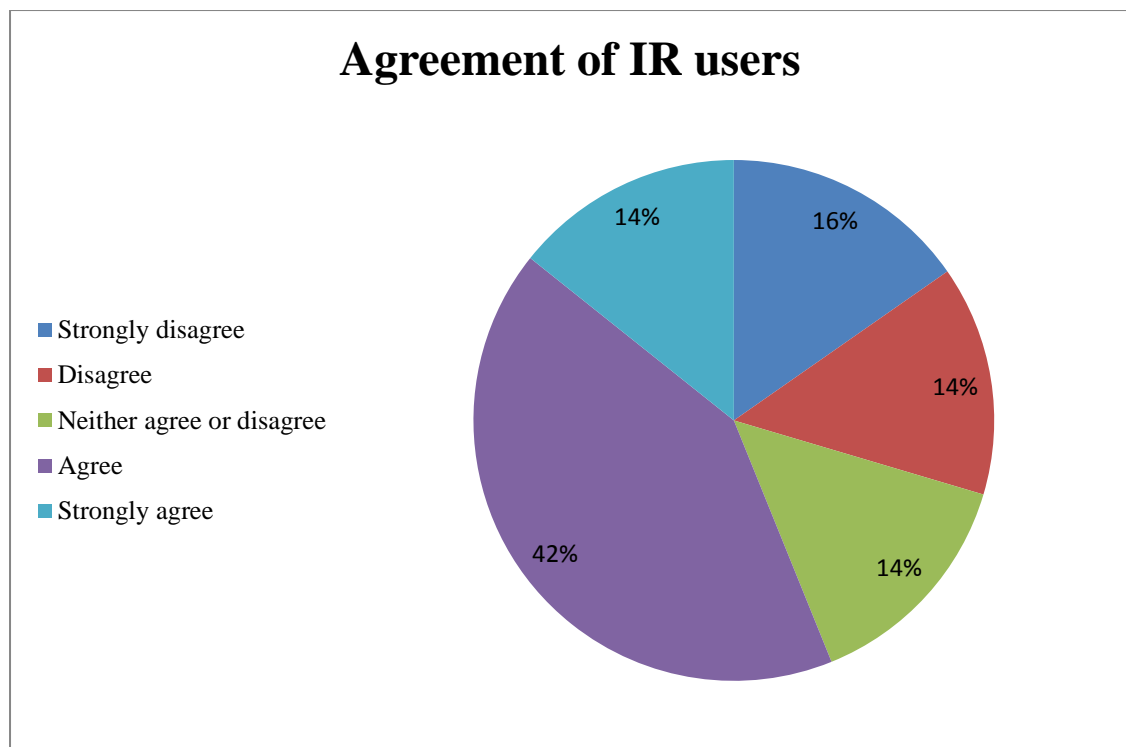


Figure 17: Agreement for making separate wing by UGC according to IR users

Table 48 and Figure 18 show that a considerable number of Repository Administrators 8 (33.3 percent) told that UGC should give direction to university for making standard of IR and 7 (29.2 percent) recommended to ask annual report from university authority, 6 (25 percent) suggested to form a repository committee and 3 (12.5 percent) recommended to ensure accountability.

Table 48. Steps should be taken by UGC according to IR Administrators (n=24)

<i>Steps</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Should form a committee	6	25.0	25.0	25.0
Should give direction to university	8	33.3	33.3	58.3
Ask annual report from university	7	29.2	29.2	87.5
Should ensure accountability	3	12.5	12.5	100.0
Total	24	100.0	100.0	

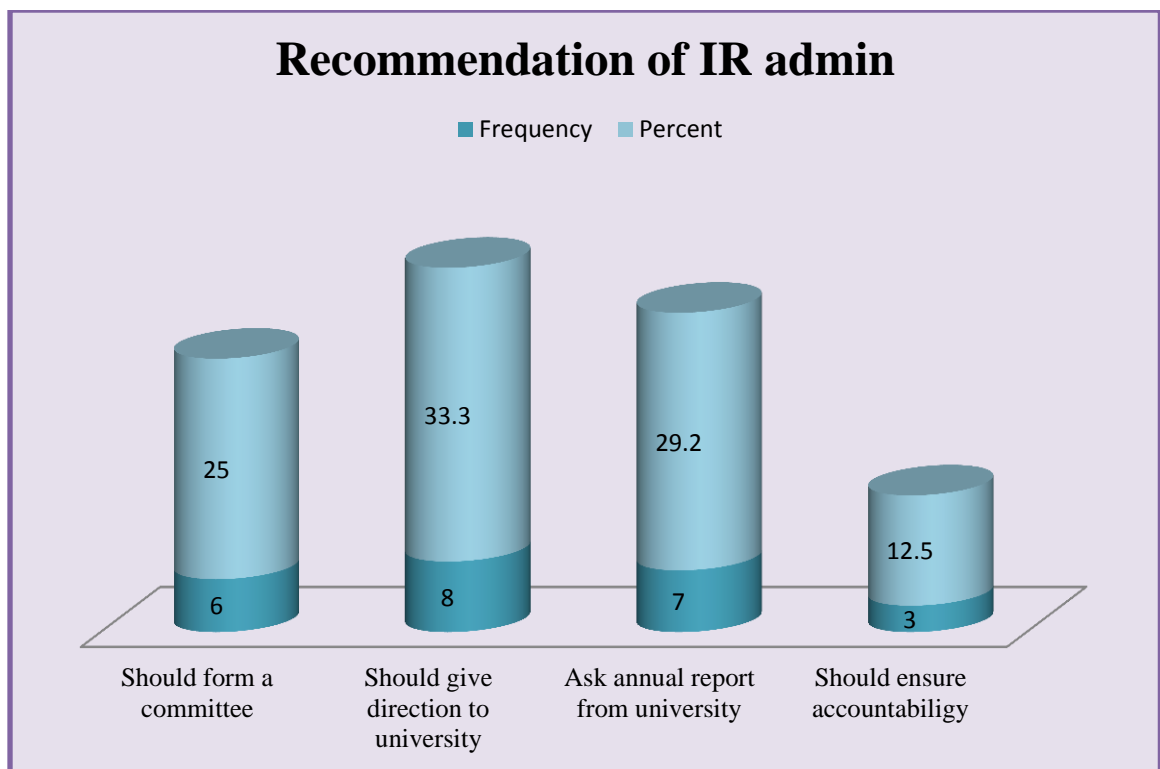


Figure 18: Statements of IR Administrators

When we asked repository users ($n=98$), do you think that IR should immediately be introduced in all public and private university libraries of Bangladesh? Maximum replied positively. Table 49 and figure 19 show that the significant number of repository users 47 (48 percent) are agree, 15 (15.3 percent) are neither agree nor disagree, 22 (22.4 percent) strongly agree, 8 (8.2 percent) disagree and 6 (6.1 percent) strongly disagree with the statement.

Table 49. Users' ($n=98$) Statement for establishment of IR in the university library

<i>Agreement</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Strongly disagree	6	6.1	6.1	6.1
Disagree	8	8.2	8.2	14.3
Neither agree nor disagree	15	15.3	15.3	29.6
Agree	47	48.0	48.0	77.6
Strongly agree	22	22.4	22.4	100.0
Total	98	100.0	100.0	

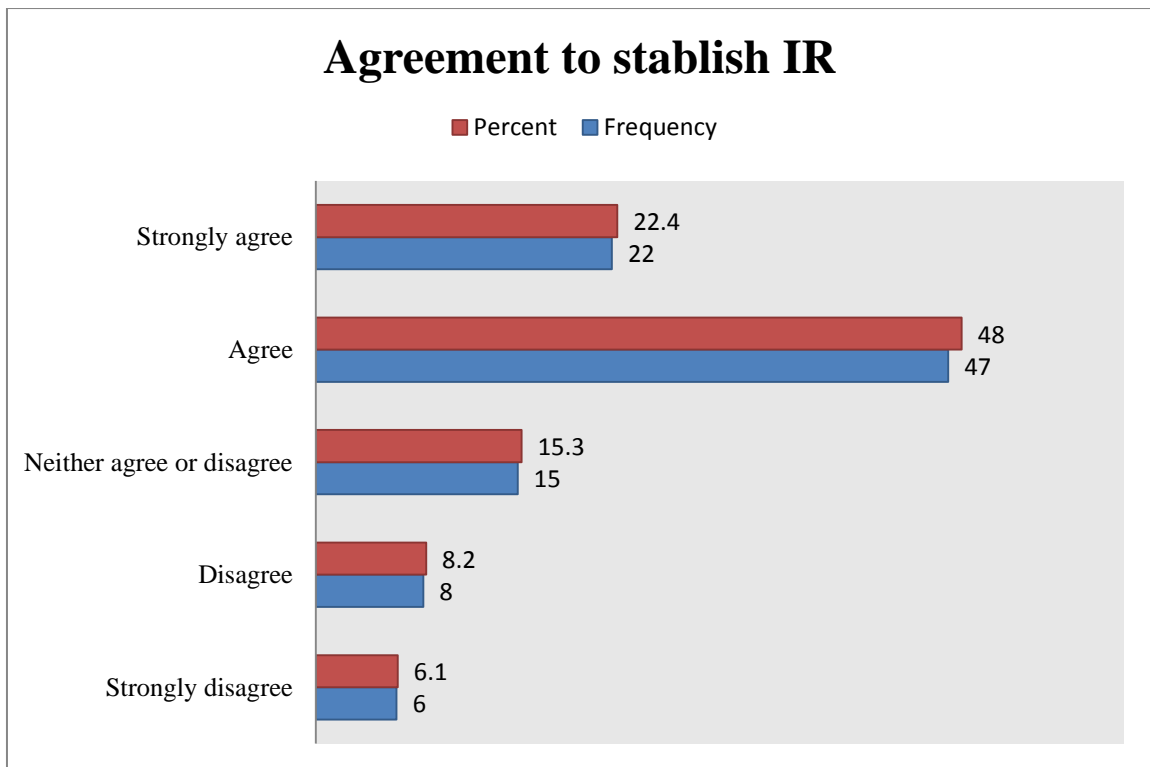


Figure 19: Statement of users on establishment of IR in university libraries

The respondents were asked about the initiatives should be taken to introduce IR by university authority and they suggested some ideas. Table 50 shows that a considerable number of repository users 38 (38 percent) told that they should make sure a repository act, 31 (31.6 percent) recommended appointing minimum one IR expert, 16 (16.3 percent) suggested forming a committee and 13 (13.3 percent) recommended to request faculty to submit hard or softcopy.

Table 50. Steps should be taken by university authority according to users (n=98)

<i>Steps</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
to make a committee	16	16.3	16.3	16.3
to appoint IT expert	31	31.6	31.6	48.0
request faculty to submit hard or softcopy	13	13.3	13.3	61.2
make sure repository act	38	38.8	38.8	100.0
Total	98	100.0	100.0	

Figure 20 reflects that the highest number suggested that university should make sure a repository act to maintain DLS for preserving intellectual outputs.

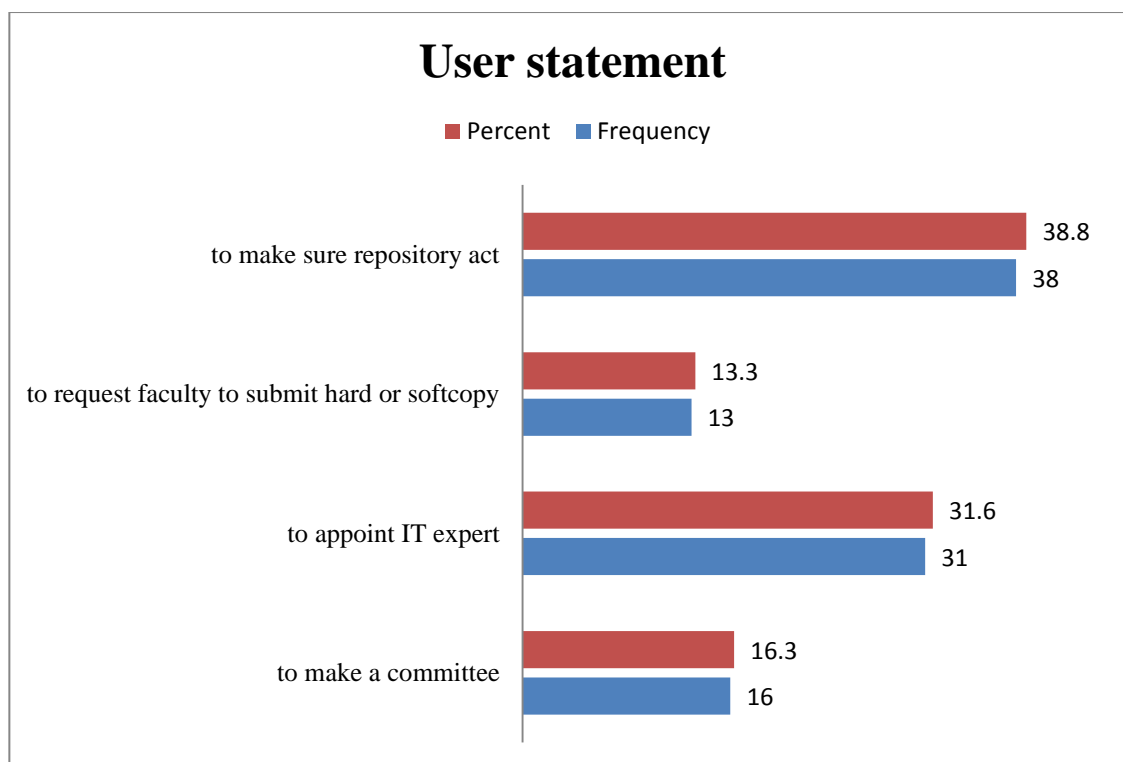


Figure 20: Users statement towards the university authority

5.8 Problem faced in building IR

Table 51 and figure 21 show that a considerable number of Repository Administrators 9 (37.5 percent) faced the lacking of IR skilled professional, 5 (20.8 percent) find the negligence from university authority, 4 (16.7 percent) found the insufficient publications to store, 4 (16.7 percent) faced the lacking of instruments and 2 (8.3) faced the reluctance to deposit the papers from researchers.

Table 51. Problems faced by repository administrators (n=24)

<i>Problems</i>	<i>Frequency</i>	<i>Percent</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Lacking of IT skilled professionals	9	37.5	37.5	37.5
Lacking of instruments	4	16.7	16.7	54.2
Negligence of faculty/researchers	2	8.3	8.3	62.5
Insufficient publications	4	16.7	16.7	79.2
Negligence from university authority	5	20.8	20.8	100.0
Total	24	100.0	100.0	

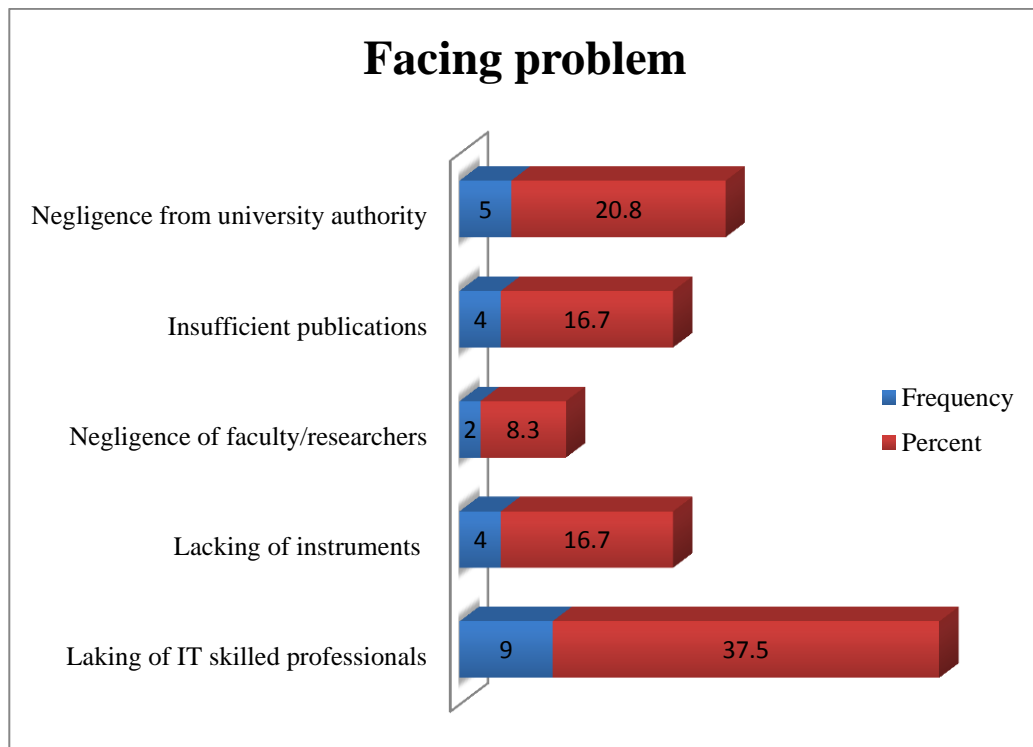


Figure 21: Problems faced by repository administrators

5.9 Conclusion

The contribution to the digital nation-building process, many library professionals in Bangladesh are working to bring their libraries up to global standards. This study was conducted among 24 Academic Librarians/Repository Administrators and 98 Academic Scholars and Repository Users of seven public and ten private university libraries of Bangladesh. It is found that only thirteen percent university libraries are using DLS as their Institutional Repository in Bangladesh. Seven public university libraries out of forty one and ten private university libraries out of hundred-three are presently using digital library software for preserving and distributing the digital materials.

CHAPTER: SIX

CHAPTER: SIX

DISCUSSION

6.1 Introduction

The purpose of the study is to explore the present situation, motivations for embellishment, current facilities, significant challenges, actual remedies for the acceptance and measurement of adequacy as well as the repository administrators' and academic scholars or repository users' satisfaction on Digital Library System in the university libraries of Bangladesh. A survey was done among 98 repository users and 24 repository administrators from the public and private university libraries of Bangladesh.

Quality of service and facilities can be measured in two ways either by evaluating the services in comparison to the best available in the world or measuring the satisfaction levels of the users on these services and facilities. This study takes into account the repository users and repository administrators for evaluating the effectiveness of the existing Digital Library Software (DLS) as Institutional Repository (IR). The users and administrators' responses for satisfaction were computed by university category through ANOVA to assess the difference between the satisfaction levels regarding existing IR of public and private universities.

6.2 Use of Institutional Repository (IR) Software

For building digital Bangladesh, it is needed to progress its libraries continuously. Only eleven percent university libraries have implemented digital library system using open source software in Bangladesh. The study showed that seven public university libraries out of forty-two and ten private university libraries out of hundred-three are currently using Digital Library Software (DLS). Among them, more than half of the university libraries did not use any automation software previously.

All the university libraries that are currently using DLS have their dedicated server. Among them, most of the university library installed their DSpace OSDLS in Linux-Debian server and Linux-Ubuntu server.

BRACU Library, EWU Library, DIU library and some commercial vendors provide support for implementation and maintenance of DLS through DSpace in Bangladesh. Some university libraries upgraded their DLS with stable upgraded versions of DSpace.

It is also found that overall 12069 items are preserved by public university repository and 11855 by private university repository. It is revealed that comparatively public university ahead from private university regarding the preservation of digital contents and intellectual item of the respected institutions.

6.3 Motivation of IR establishment

The motivation for establishment IR of selected universities was indicated by the visibility of university research output, free access to university publications, preserving the university resources, and evaluation of researchers and departments. The motivation of IR establishment for visibility of university research output was either important or very important to the largest group 18 (75 percent). The motivation for ensuring open access (OA) was either important or very important to the largest group 18 (75 percent). The motivation of IR establishment to preserve intellectual research outputs was important to the largest group 9 (37.5 percent). The motivation of IR establishment to preserve intellectual research outputs was important to the largest group 9 (37.5 percent). The motivation of IR establishment to evaluate the researchers and departments was either important or very important to the largest group 16 (67 percent).

6.4 Facilities and IR policy

It is identified that overall fifty nine percent ICT facilities are available in the selected university libraries. Twenty nine percent university libraries organized in-house training on OSDLS for their library staff and the professionals of other libraries and Seventy one percent university libraries didn't organize any training for the users and staffs. . Seventy nine percent university libraries have no IR policy on OSDLS.

6.5 Challenges for acceptance of OSDLS

Among the challenges and problems for acceptance of OSDLS in the university libraries of Bangladesh, it is noticed that a considerable number of repository administrators thirty eight percent faced the lacking of IR skilled professional, twenty one percent found the

negligence from university authority, seventeen percent found the insufficient publications to store, seventeen percent faced the lacking of instruments and nine percent faced the reluctance to deposit the papers from researchers.

6.6 Recommendations and comments about IR

The descriptive statistics has been applied for identifying the possible recoveries for the enhancement of OSDLS adoption in the university libraries of Bangladesh from the viewpoint of repository administrators and library professionals. To suggest OSDLS for university libraries sixty three percent recommended DSpace and twenty one percent recommended Greenstone. Eight percent recommended SLiMS, four percent recommended Fedora and Invenio. On agreement “UGC should establish a separate wing for supervising the preservation of digital and scholarly publications” sixty three percent expressed their covenant for making a separate wing by UGC, seventeen percent expressed their strong agreement. Thirteen percent are neither agreed nor disagreed and eight percent are disagreed with this agreement. To give the statement on which steps should be taken by UGC, thirty three percent told that UGC should give direction to university for making standard of IR, twenty nine percent recommended to ask annual report from university authority, twenty five percent suggested to form a repository committee and thirteen percent recommended to ensure accountability.

Among repository users forty two percent are agreed for making a separate wing by UGC, fifteen percent are strongly disagreed, fourteen percent are neither agreed nor disagreed, fourteen percent are disagreeing and fourteen percent are strongly agree with this recommendation. On asking IR should immediately be introduced in all public and private university libraries of Bangladesh, maximum users replied positively. The significant number of repository users (forty eight percent) is agreed. Fifteen percent are neither agreed nor disagreed, twenty three percent are strongly agreed, eighty two percent are disagreed and six percent are strongly disagreed with the statement.

The respondents were asked about the initiatives should be taken to introduce IR by university authority and they suggested some ideas. Among repository users 38 percent told that they should make sure a repository act, thirty two percent recommended

appointing minimum one IR expert, sixteen percent suggested to form a committee and thirteen percent recommended to request faculty for submitting hard or softcopy.

The observation found that IT infrastructure should be developed in the university libraries. Training for library staff, professional body should be arranged by university authority for acceptance of ODILS, librarians should ensure right decision, software must be made flexible enough and user-friendly, library staff and users may be given proper orientation on the benefits and use of OSDLS and university authority should allocate more funds for maintenance of the repository, there must be uninterrupted power supply i.e. generators, and OSDLS course ought should be included in the Department of Information Science and Library Management of Bangladeshi universities.

6.7 Librarian/Repository Administrators' satisfaction on OSDLS

User satisfaction is the most important for assessing the effectiveness of any system or service. This study was conducted among 98 repository users of seven public and ten private universities of Bangladesh. The study measured the overall and individual differences in satisfaction level of users towards OSDLS. Among repository administrators thirty eight percent told that the adequacy of their collection is poor, twenty nine percent told slightly adequate, thirteen percent told almost adequate, according to thirteen percent is inadequate and eight percent stated that the collections are adequate. The results suggested that the repository administrators were not satisfied with present repository collections of OSDLS and the level of satisfaction was reasonably very low. Twenty nine percent users are not satisfied with current repository collections and four percent users are highly satisfied with the present repository preservations. This survey shows that twenty nine percent are satisfied and only eight percent are very satisfied with their present repository collections.

6.8 Repository users' satisfaction on OSDLS

The satisfaction level of repository users towards OSDLS was not significant difference between the public, and private university libraries of Bangladesh indicated that the library users of both public and private university were same satisfied with the services provided by OSDLS. Study shows that thirty eight percent told about the availability of

repository collections are inadequate. Thirty four percent told it is poor, according to seventeen percent it is slightly adequate, six percent identified it as adequate and five percent said it is almost adequate. Study shows the satisfaction level of repository users. The largest group (42.9 percent) is not satisfied with current repository collections and the smallest group (four percent) is highly satisfied with the present repository preservations. Twenty seven percent are less satisfied, twenty two percent are satisfied and five percent are very satisfied with their present repository collections.

This study was conducted among 24 library professionals of seven public and ten private university libraries of Bangladesh. The study assessed the overall and individual differences in satisfaction level towards OSILS from professionals' viewpoint. The results suggested that the library professionals were less satisfied with the existing services of OSDLS and the level of satisfaction was reasonably not well. Most of the librarian or repository administrator rated that present collection of digital and intellectual contents are inadequate. The satisfaction level of OSDLS in the university libraries of Bangladesh was a significant difference among the users of students, teachers, and researchers indicated that the teachers were significantly more satisfied than the researchers and students with the services provided by the existing OSDLS. The researchers were significantly more satisfied than the students with the repository services. The researcher's observation found that the highest number of the repository users search MPhil and PhD research through OSDLS, while the lowest numbers of the interviewees search sound clippings. The study showed that journal article attained the exclusive recognition of the users.

6.9 Conclusion

The study revealed that only eleven percent university libraries have implemented digital library system using open source software in Bangladesh. Overall eighty percent modules of existing OSDLS were being used in the selected university libraries of Bangladesh. The result shows that there is no significant difference regarding the adopted features of existing OSDLS between public and private university libraries of Bangladesh. The overall satisfaction ensured favorable appreciation by library professionals and users indicated that the existing OSDLS is efficiently performing in the university libraries of Bangladesh. But the adequacy of the collection is not adequate that

should be increased gradually. Thus it can be concluded that the mythology of this study is appropriate and this effort has been made to assess the acceptance and satisfaction of OSDLS in university libraries of Bangladesh for the first time that will trigger further study on institutional repository software.

CHAPTER: SEVEN

CHAPTER: SEVEN

MODEL PLAN

7.1 Introduction

The purpose of this chapter is to present a model plan to build effective Institutional Repository (IR) system in the university library premises. As it is clear from the findings of this study that the usage and present scenario of digital preservation through Institutional Repository software in public and private university libraries of Bangladesh is not satisfactory to meet the present research demand of the researchers, an attempt has been made to propose a fundamental model plan for establishing effective IR system in university libraries of Bangladesh. The model plan will help the university libraries those are using IR and other university libraries also those are planning and interested to establish Digital Library Software for building Institutional Repository. The prime objective of the library of a higher educational institution is to fulfill the needs and demands of the students, faculty and research fellows. Most of the Public and Private University libraries of Bangladesh are contributing tremendously by preserving the digital publications to ensure open access to the institutional repository. A good number of faculty members, research scholars and students are encompassed in teaching and research activities, and they need immense information and resources relating to their research areas. The information seekers depend on the university libraries for their required research and advance searching.

The chapter describes a model plan for university libraries of Bangladesh to build institutional repository easily and effectively, reflecting the findings of this research as well the literature review in concerned field.

7.2 Characteristics of the model plan

The university libraries are trying to provide information according to the user's interests. The performance of the respective university libraries depends on the satisfaction level of the faculty members, researchers and students. To meet up the maximum demands of the users regarding repository services the library should ensure an effective IR policy and present an ideal IR model. It is necessary to build a system that can meet the

information needs and expectations of the researchers and advance level students. The model plan has the following characteristics:

- It has been proposed based on the economic condition of Bangladesh;
- The plan includes all the necessary elements which elements should be inserted in the repository system;
- The model plan has been proposed to set up a modern IR system by ensuring all modern tools and technological advances;
- The plan has been proposed to set a digital repository system suitable and affordable for all university libraries of Bangladesh;

7.3 Objectives of the model plan

Institutional repositories should be thoughtful however, when adopting this model. Being able to provide customizations on a large scale may necessitate the adoption of technologies that can support such individualized service.

“Institutional repository staff should also consider the language they use and how they present the services they offer. As with many disciplines, librarians tend to use terminology that is only meaningful to others in the profession. Concepts such as “ingest” and “digital object” are confusing and faculties are not aware of the context in which these words are being used. Even the term “institutional repository” is ambiguous until a professor has had their work included in the IR collection” (Armstrong, 2014). So “The model is important because it highlights the decisions that libraries must make in order to ensure open access of its users to digital preservations of higher educational institutions. A model plan is very necessary to identify the information needs and level of satisfaction of the library users. Model plan acts as a scale or tool to measure information needs and to assess the satisfaction level of library users” (Islam, 2014).

The ultimate goals of the proposed model are to preserve all university publications and intellectual outputs digitally and to establish a useful IR system to meet up needs and demands of the faculty members, research fellows and advance level students of university of Bangladesh. However, based on the survey result, the following objectives have been selected for the proposed model plan:

- a) To develop a comprehensive mechanism to get access in institutional repository swiftly;
- b) To establish an effective information dissemination system in university libraries of Bangladesh;
- c) To help the faculties and other researchers for teaching and research activities;
- d) To develop and increase the users' satisfaction level;
- e) To familiar the library staffs with the modern IR system;
- f) To ensure digital preservation of university research outputs;
- g) To ensure open access to the university resources;
- h) To ensure better infrastructural facilities regarding Digital Library System (DLS);
- i) To propose guidelines for designing very effective IR system for higher educational institutions;
- j) To propose a standard model for establishing IR system in university libraries;
- k) To identify the roles of all bodies who should be involved in the implementation of IR system;
- l) To indicate and give the right directions for implanting the IR system in a cost effective way.

Probable benefits of the model plan will be as follows:

- a) Effective IR system of the university libraries for long time preservation;
- b) All kinds of institutional publications and intellectual research outputs will be properly preserved;
- c) Better management and maximum accessibility to the institutional resources will be ensured;
- d) Appropriate utilizations of the institutional publications and research outputs on digital format adopting modern IR systems;
- e) Development of Digital Library System (DLS) for preserving the valuable publications of respected higher educational institutions; and
- f) Enhancement of the capabilities of library human resources.

7.4 Functions of the model plan

Bearing in mind the current position of the university libraries of Bangladesh the following tasks and actions have been selected for the proposed model plan:

1. Accepting useful and updated repository software to provide the best services to the university researcher and advance level students.
2. Collecting and preserving the university resources with the help of modern IR tools and techniques;
3. Introducing with new facilities and enhancing the effectiveness of the IR facilities.
4. Making a standard format for IR system; and
5. Groundwork of development stages to implement the digital library management system in the university libraries of Bangladesh.

7.5 Scope of the model plan

The model plan comprises all the key components required for development of Institutional Repository system in public and private university libraries of Bangladesh. Therefore, it makes provisions not only for ensuring the effective guidelines for the university publications policy makers from university authority to collect, preserve and disseminate the university publications but also the University Grant Commission (UGC) will find a helpful direction to monitor the university publications.

The areas which have been covered by the plan are necessities of standard digital library services through the university libraries; providing efficient services to the faculty members, researchers and research students and bringing digital collection to the remote users; introduction of Institutional Repository and development strategies; and proposing standards for the university repository growth and development.

7.6 Strategy of the plan

This Model Plan has been suggested in the perspective of socio-economic condition of Bangladesh and has been prepared with detailed attention and review of the university library atmosphere including university vision, mission, objectives, repository users, annual budget, library staffs, repository collection, users satisfaction, deposit tendency of

faculty, university act, UGC regulation, library standard, information needs and demand, impact of repository collections etc.

7.7 Possible Barriers of the model plan

Bearing in mind the present university library status in Bangladesh and reviewing the significant literature the following barriers may be faced by suggested model plan:

- Unwillingness of the university authority to build IR;
- Copyright permission for digital preservation of the university publications;
- Inadequate financial support;
- Absence of national and university repository policy/standard;
- Lack of skilled and trained repository professionals;;
- Absence of appropriate library standard;
- Lacking of infrastructural and technological facilities;
- Absence of cooperation for founding consortium and networking from participating university libraries; and
- Reluctance to register in OpenDOAR.

7.8 Components of the Model Plan

The following necessary components were recognized for establishing the repository system in public and private university libraries and distributed commonly for setting an Institutional Repository platform.

- An Opens Source Digital Library Software (OSDLS)
- DSpace Institutional Repository Software
- Repository administrator
- Skilled IR professional
- Item collections, such as thesis, dissertation, article, report, presentation etc.
- Structural development of the repository software
- Operational activities
- Target
- OpenDOAR/Digital Library Consortium
- Library IR branch
- Monitoring by UGC wing

7.9 Model Plan for building IR in University Libraries of Bangladesh

In view of the earlier discussion, and based on previous theoretical literature review a conceptual model of institutional repository for university libraries of Bangladesh is proposed in Figure 22 and figure 23 respectively.

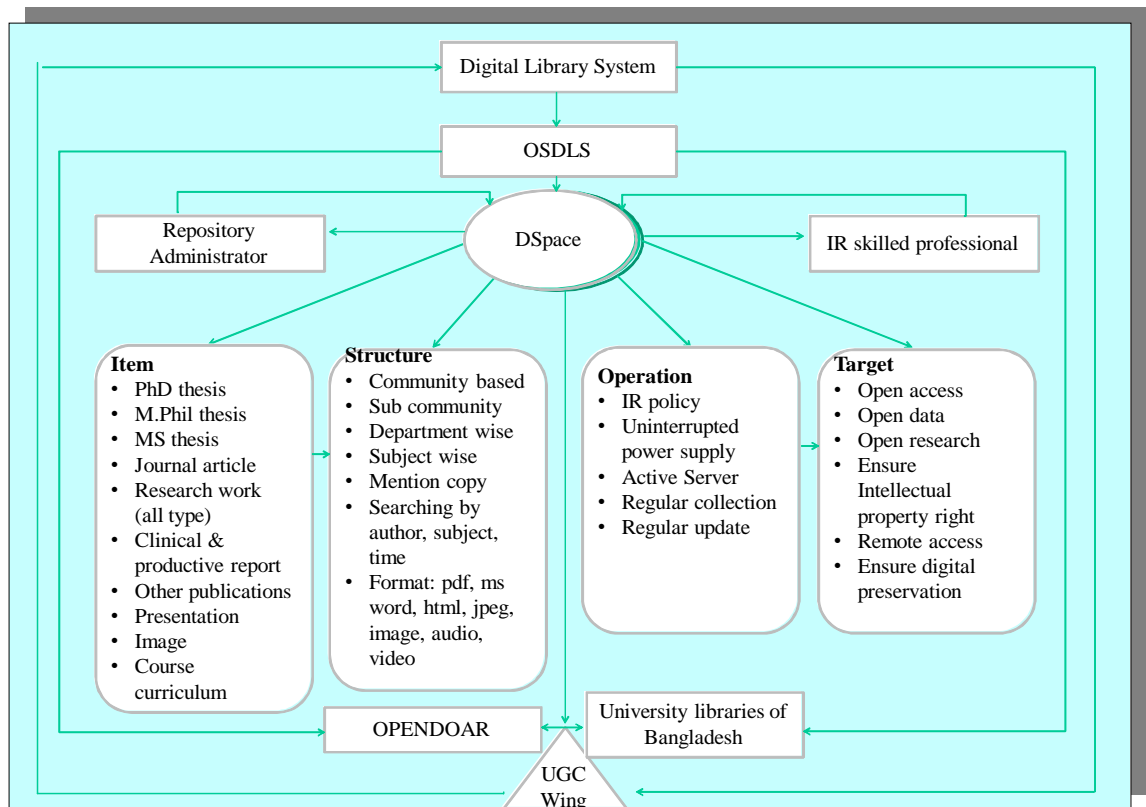


Figure 22: Proposed Model of IR System for University

7.10 Description of the components

7.10.1 An Open Source Digital Library System (OSDLS)

There are many alternatives for choosing repository software now-a-days. University authority should select an ideal Digital Library System (DLS) for IR purposes. Like many of the digital library projects, the university libraries should use Open Source Software (OSS) as its repository. The main advantage of open source software is that it provides tractability for homegrown customization and attractive modules enhancements.

Many universities have the limitation to build IR for the financial condition. Cost saving software can be the ideal solution in this field.

7.10.2 DSpace Institutional Repository Software

IR ensures the long time preservation of the institutional publications. Publicly accessible, standard, provision for searching and retrieving the desired documents should be included in the repository software. Considering personal experience and reviewing related literature DSpace IR software has been proposed for the university libraries of Bangladesh as well as considering the following standards:

- a) provide network access and user & repository administrator friendly interface;
- b) easy functions;
- c) support multimedia content; and
- d) allow users to search the text of all documents in different ways etc.

7.10.3 Repository administrator

For supervising and maintaining the repository work a responsible personnel has been proposed in the model, who will be called repository administrator.

7.10.4 Skilled IR professional

To operate and coordinate all repository activities a skilled IR professional should have in the IR section of the library premises.

7.10.5 Items should be collected

IR should have to create in each library for collecting, preserving and showcasing intellectual research items produced by faculty members, re and students of the university. Besides this, Administrative documents, reading materials, important presentations, valuable images, teaching materials, curriculums and prospectus etc. can be preserved in the institutional repository. To keep the standard level the following items should be preserved in the repository:

- a) PhD thesis
- b) MPhil thesis
- c) Dissertation
- d) MS thesis

- e) Journal article
- f) Research work
- g) Clinical and productive report
- h) All important university publications

7.10.6 Structural development competition

To operate the repository software and to search and find the collection easily and smoothly collection should be uploaded properly and effortlessly. The collection should be categorized under the following structure:

- a) Community based: all collections should be categorized broadly and primarily in community basis. Every faculty will be included in community.
- b) Sub community basis: Every community will be consisted with some sub communities.
- c) Department and subject wise: Department and subject wise collecting will be preserved in community and sub community.
- d) Copy mention: Community or all subject basis collection should be mention with number of copy.
- e) Multiple searching: searching option should be multiple like author, title, subject, time.
- f) Format: format should pdf, ms word, html, jpeg, image, audio, video etc.
- g) There should have login option for categorical users.

7.10.7 Operational Activities

The following options should be remained in operational activities:

- a) IR Policy: The university authority will make an IR policy. The following policy issues should be included during the early stage of planning of IR:
 - All IR collection totally open and accessible to all. If a faculty member wishes to restrict access to the document, it will not be accepted or will be accepted with some restriction.
 - Researchers will submit the hard copy of the paper giving permission to preserve it for users and repository administrator will take the initiative.
- b) Uninterrupted power supply: The authority will ensure the repository collection publicly accessible always. The users can be frustrated in getting his/her desired documents due to uninterrupted power supply.

- c) Active server: Most of the time the documents can be missed if the server no active properly. So the authority should make sure that the server is always active.
- d) Regular collection: Authority will make sure the regular basis collection.
- e) Continuous upload and update: The university collections will be collected regular basis and all collection will be uploaded and updated continuously.

7.10.8 Target

The following options will be targeted of this model plan:

- a) Ensure open access: One of the prime objectives of maintaining repository is to ensure open access to university publications and intellectual writings. For society it provides access to the world's research and activities.
- b) Open Data: The people have right to get right information in right time. To ensure this theme institutional repository can be a good media. Higher educational institutions can take necessary steps to ensure open access to its scholarly publications. All faculty members, students and researchers of institutions should stand to preserve publications and make it free accessible to all through IR.
- c) Open research: For society it provides access to the world's research and ensures the long term preservation of the research publications.
- d) Intellectual property right: Some of researchers are unaware of submitting their works in Repository. They have misunderstanding about open access. Actually it's their misapprehension. They don't know that OA ensures their work originality. It protects work from being plagiarism. IR administrator should make them understood.
- e) Remote access: The institutional repository acts as a central archive for the university works, representing an outlook that provides a complete list of their research over the years.
- f) Increasing the impact: Because it is open access, it increases the dissemination and impact of the work of the higher educational institutions. For institutions IR acts to preserve the university resources. It increases the visibility and prestige, and can act as an advertisement for funding sources and industrial sponsors.

- g) Ensure digital preservation: It ensures a means for institutions to create archives and make available their wealth of knowledge. It allows researchers to self-archive their own material and make sure the long term preservation of their research items through digital preservation.

7.10.9 IR section

University authority will create an IR section to ensure the total repository functions in the library atmosphere.

7.10.10 Monitoring by UGC wing

The aim and role of UGC in higher education is to coordinate, determine and maintain the ethics in higher educational institutions. The commission maintains the interpretation among the universities, government and the communities. UGC has also set some standards for the universities for being standard university. With the growth of higher educational institutions in Bangladesh, many top, medium, and small universities are being established day by day. For ensuring higher education universities should maintain the standard level. The University Grant Commission (UGC) can play the important role to keep repository standard in university level. Universities can be asked for accountability of their digital preservation activities or OA movement.

They perform their role observing the following activities:

- a) UGC can make a separate wing which will monitor the preservation activities of university publications through repository software;
- b) UGC may be right body to ensure OA. UGC authority can make a committee to observe the open access movement by the respected universities;
- c) They should give directions to the university authority and observe the condition occasionally;
- d) Make a repository standard for university; and
- e) They can ask annual report from the university authority about repository development of the respected university.

7.11 User satisfaction:

The key proposition of the model is that satisfaction/ dissatisfaction with the library is a function of a user-perceived gap between the user's expectations and actual outcomes of

a library. Furthermore, users' expectations are formed on the basis of adequate resources, services and facilities. Quality library resources, services and facilities can meet the satisfaction of the users. To meet up the needs and demands of university faculty member, researchers, research fellow, students and remote users the plan should be flexible and easy to access.

Users: There should be following users: faculty member, students, research fellow and remote users.

Purpose:

- a) To develop the research activities;
- b) to help teaching related education for faculty members;
- c) to acquire research knowledge related to his/her study; and
- d) to preserve the university publications and intellectual outputs of the researchers for long time.

Media:

- a) Adequate repository collection,
- b) Qualitative resource
- c) Library facilities
- d) Remote access

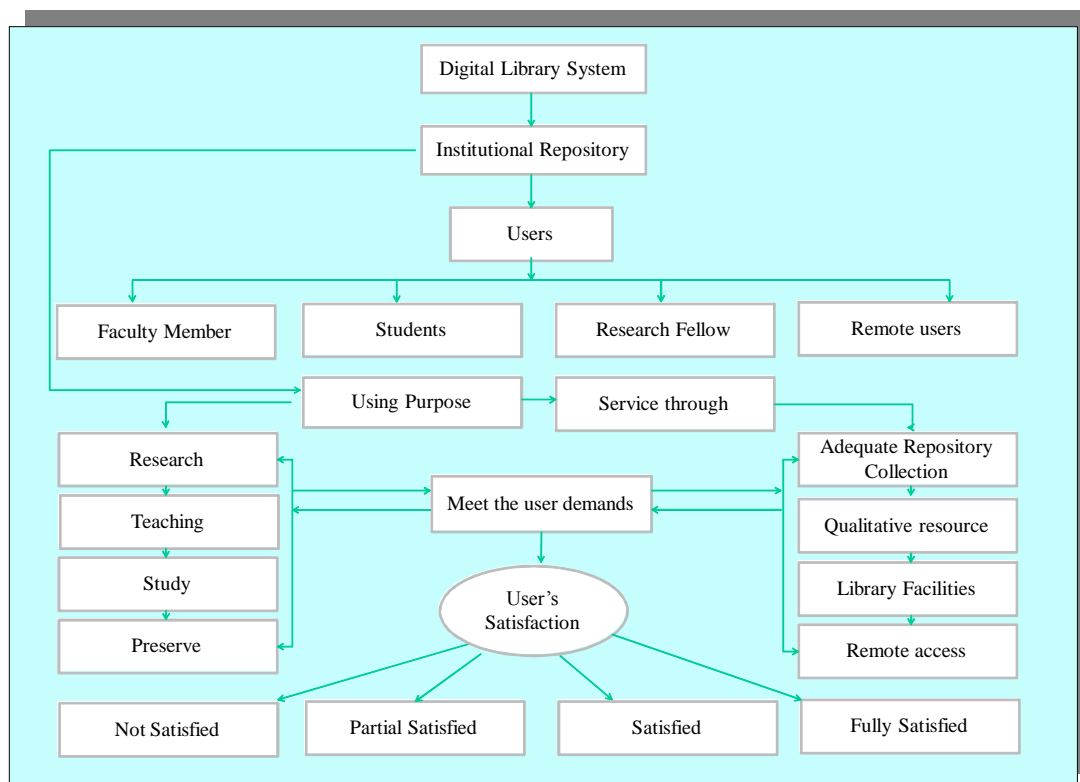


Figure 23: Proposed user's satisfaction model

Target:

The target is to meet the users' demand. So that the satisfaction level of the users will be high and standard level.

7.12 Conclusion

The success in implementation of a model plan mainly depends on the methodical approach, economical competency and administrative provision from the concerned authority. As libraries work to define their role in the constantly changing university environment, focusing on how research and scholarship is disseminated will provide unique and important opportunities. Libraries are well suited to support these efforts on both an individual researcher and university-wide basis. However as new tools and services develop, it will be important for library staff to focus on providing qualitative repository services while also meeting individualized needs. The models described in this paper will serve as valuable starting place for libraries wishing to accomplish these goals (Armstrong, 2014) . Users are the main focus of the library. The whole systems of the library are introduced for the users. The effectiveness and efficiency of the library totally depend on the satisfaction of users (Islam, 2014). Both Public and Private university libraries of Bangladesh are trying to meet the research needs and satisfaction. In this situation an organized system is very necessary. All university authorities can follow the mentioned model for establishment Institutional Repository.

CHAPTER: EIGHT

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PROBLEMS, RECOMMENDATIONS AND CONCLUSION

8.1 Introduction

The fundamental issue of this chapter is to identify the main problems to develop and enrich the IR activities in public and private university libraries of Bangladesh. The discussion is prepared completely based on the analysis of findings of the research and observations of the IR function of the selected university repository activities related to this study and research. Depending on the sources of information, literature review and observation of the repository website the present study is to find out the major problems of functioning Institutional Repository Systems in selected university libraries of Bangladesh. This chapter will present the actual problems, recommendations, further research with conclusion

The purpose of this study is to identify the development of Institutional Repository (IR) activities through Open Source Digital Library Software (OSDLS) in the university libraries of Bangladesh. In Bangladesh, providing the digital library services through IR Software in higher academic institutional libraries are achieving popularity in recent years. Currently, seventeen university libraries are using DSpace OSDLS. A good number of university libraries are in process to develop Digital Library system using DSpace. Some university libraries have planned for building Digital Library through Open Source Institutional Repository (IR) software. There are three types of universities in Bangladesh which are public, private, and international. At present, there are forty public, hundred two private, and three international universities in Bangladesh (“UGC,” 2018). Among them, seven public and nine private university libraries have been selected for this study whose libraries are currently using Open Source Digital Library Software. The researcher visited most of the selected libraries and distributed questionnaire booklet-1 among the Librarians or Heads of the library, other library professionals or repository administrator to collect the primary data regarding their current OSDLS.

The study also aimed to justify the present scenario of acceptance, significant factors, challenges and probable preparations for acceptance as well as evaluate the user

satisfaction of IR in the university libraries of Bangladesh. Primarily a survey was conducted among 145 public and private university librarians of Bangladesh. The survey found that digital library system as Institutional Repository used by only seven public and ten private university libraries of Bangladesh. So that, 24 academic librarians/repository administrators and 98 faculty member, academic scholars & students from the selected seven public and ten private universities were involved in this study and they were interviewed using two sets of structured questionnaires. Data were computed through multiple analyses.

The study revealed that cost-effectiveness, supporting community, easy systems, easy to integrate, and freedom from licensing fee significantly influenced university authorities to adopt OSDLS in the university libraries of Bangladesh. The model recommended that lack of consortium of OSDLS, the unwillingness of library professionals to take the initiative, inadequate funding, lack of IT infrastructure, and lack of training & retraining of library professionals were the significant cause of lower adoption of OSDLS in the university libraries of Bangladesh.

A pilot survey was conducted after managing two sets of structured questionnaires cautiously as per local arrangements. Moreover, an effort has been made to assess adoption and satisfaction of OSDLS in the University Libraries of Bangladesh for the first time that will trigger further study on OSDLS. The study revealed some major problems in adopting digital library system.

8.2 Major problems of the study

The study exposed the following problems:

8.2.1 Conceptual Problem

The concept of Institutional Repository System is not very well known in the Library and Information Science (LIS) education in Bangladesh. Most of the library professionals and authorities feel hesitation to take initiative regarding IR. Though the popularity of the concept is growing in Bangladesh, but it isn't enough for implementation rapidly.

8.2.2 Lack of skilled repository professionals

Skilled manpower can play a vital role to implement any system easily. There is huge lacking of skilled IR professionals in Bangladesh. Most of the university libraries of Bangladesh have limitations of skilled professionals.

8.2.3 Lack of repository collections

The repository collections of the selected university libraries are not adequate for the repository users. It has been found that 12.5% librarian/ repository administrator said the collections are almost adequate, 37% staff opined that their collections are poor and 12.5% administrators expressed that the collections are inadequate.

8.2.4 Lower standard satisfaction level

Due to inadequate collection the satisfaction level of repository users is very low. The maximum repository users are dissatisfied with the repository collections of the selected institutional repository services. This study shows that 21.4% of repository users are satisfied regarding their institutional repository collection & services and 42.9% of repository users are not satisfied to fulfill their needed information. The situation is not satisfactory for the repository users.

8.2.5 Lack of awareness

Most of the faculty members, research fellow and students of the university level are unaware about institutional repository. They are either unaware or don't know their universities are using repository software. Low level awareness of the library users regarding IR affects the digital preservation condition in higher educational institution.

8.2.6 Reluctance of faculty member

Study revealed that some researchers and faculty members are reluctant to submit their research work due to fear of their work will be copied.

8.2.7 Lack of adequate training program

Study showed that 29.2 percent university organized training program on IR for the research scholars, repository users and 70.8 percent university authority didn't organize any training for the users.

8.2.8 Absence of IR policy

Study revealed that 79.2 percent university has no IR policy and 8.3 percent have IR policy and the rest 12.5 percent don't have any IR policy. Library authority and depositors of research work feel unwillingness to play role due to absence of IR policy.

8.2.9 Insufficient ICT facilities

Most of the libraries are not capable to provide sufficient modern technical/ICT facilities for better digital library services for faculty members, researchers, students. Study revealed that 58.3 percent university authorities have computer lab facility to use institutional repository and 41.7 percent university authority haven't computer facility.

8.2.10 Inadequate budget for Digital Preservation

Observation found that most librarians/repository administrators are not satisfied with the university authority for not allotting appropriate budget to implement digital library software. The authority of the university do not allow adequate budget so that they face trouble to maintain the digital library standard. Sufficient funds are not available to maintain digital library system.

8.2.11 No supervision from higher authority

The observation felt that there are no supervision activities on institutional repository in the higher educational institution of Bangladesh from the higher authority like Government or UGC.

8.2.12 Lack of proper maintenance

The observation found that some repository softwares weren't maintained properly in existing university libraries those are using IR. The resources aren't being collecting and uploading regularly basis.

8.2.13 No provision of public access

The study got that some institutional repositories are not publicly accessible. Some are only restricted for institutional members, some has limited access in Local Area Network (LAN). Some has no opportunity of remote access for remote users.

8.2.14 Interrupted power supply

It is found that most of the time the repository link of some universities IRs are temporarily unavailable on the network. Interrupted power supply and server hang are the main problems of this happening.

8.3 Recommendations

Considering the findings and observation the study suggested some recommendations for the enhancement of Institutional Repository in university libraries of Bangladesh. This study recommended the following recommendations for the enhancement of adoption and use of OSILS in the university libraries of Bangladesh. Actually, based on the literature review, conversation with the librarians, library professionals, repository users and authority of the universities and observation through ground visit and data analysis, we would like to point out following recommendations for confirming effective implementation of the IR and develop the digital preservation activities to promote the research work in higher educational institutions of Bangladesh.

8.3.1 Making separate wing of UGC

UGC can make a separate wing for supervising the preservation activities of digital scholarly publications in all universities of Bangladesh. The separate wing will make policy or standard of IR and observe the condition of IR activities in universities.

8.3.2 Make sure IR policy by University authority

Standard is the important part of any system. All university should have IR policy to maintain the IR activities.

8.3.3 Introducing Institutional Repository education

OSDLS and Institutional Repository (IR) education or course ought to be included in the department of Information Science and Library Management of Bangladeshi universities. All LIS educational institutions should have included the IR education in their course outline.

8.3.4 Recruitment of skilled repository professionals

Libraries should employ skilled manpower. Authority can appoint minimum one IT professional for the maintenance the repository.

8.3.5 Creating awareness regarding Institutional Repository

Awareness among the users towards repository should be made introducing various activities. Library science departments, university authority and professionals body can play important role to create awareness towards institutional repository.

8.3.6 Creating awareness of research student about IR

Institutional Repository program should be implemented in university libraries as a medium for user education and awareness. Research work is much important for research students. They should increase their knowledge about IR to use properly.

8.3.7 Encourage the Faculty member

For increasing the collection of digital resources the faculty members, researchers of the university should be encouraged to deposit their research work continuously. Authority should make sure of their intellectual property right.

8.3.8 Develop the resource collections

Institutional publications and intellectual resource collection should be developed. All types of research works, papers and university publications should be collected with softcopy and hardcopy. For fulfillment this purpose all technical barriers and limitations should be eradicated. A common standard for collecting digital materials should have in the university library. It would be a combination of in house products such as thesis, reports, research and term papers as well as scholarly articles of others that have preservation rights. Besides repositories, digital photo galleries, archives of the precious old materials and CD-Rom database should be created and maintained.

8.3.9 Organize the training program

Repository administrators and users may be delivered proper direction on the use and benefits of OSDLS. University libraries and Professional bodies can arrange training programs on Institutional Repository for the library professionals and library users. They can act as support hub of the library professionals and users. In this respect LAB and BALID can play great role for the development of digital libraries and library professionals of Bangladesh. Training for librarian/repository administrator in the

application and use of digital library system in university libraries need to be provided. Professionally skilled human resources are very much required for successful implementation of the proposed model plan and digital library initiative.

8.3.10 Increase ICT facilities

The findings of this research indicate that the library requires integration of ICT but encountered many barriers. Library modernization requires an integrated library software and digital library software. The selection of an open source software and creation of new software both are tough tasks. Pedagogical selection of software for library would be a blessing. So, if it is customized software, should follow all the technical aspects during analysis to implement it. If it is open source free software the best one should be selected which will be suitable for the university's aims and objectives. As an example, DSpace, Greenstone, Pedora, Invenio can serve the purposes of the university libraries. Among them DSpace is the best repository software in perspective of Bangladeshi universities.

8.3.11 Adequate allocation of budget

University authority should allocate more funds for support of the library digitization. Sufficient library budget, monitoring and evaluation in every step are keys of successful implementation of the Model Plan. A comprehensive and strategic development plan should be taken by the authority each year so that the library can ensure the standard of IR.

8.3.12 Enhance the consciousness of higher authority

University authority should be aware of preserving their institutional publications and intellectual outputs through IR software. Actually it is need for university authority which can be maintained by university library. So that parent body should be more conscious regarding digital preservation.

8.3.13 Properly maintenance

Repositories should be maintained properly by higher educational institutions. Regular collection, updates and proper maintenance can make a repository resourceful, fruitful and helpful for its all kinds of users.

8.3.14 Provision for public access

This is the age of open access, open education and open research. So that repository should be publicly accessible to encourage Open Access movement. If there is no broad problem of the institution, the resources should be open for all. To ensure the open access to the intellectual output of the institutional publications through IR software it should be more flexible.

8.3.15 Uninterrupted power supply

Authority should ensure uninterrupted power supply so that repository site is properly reachable always.

8.3.16 Use of effective IR Software

Digital institutional repositories should be implemented instead of traditional ones for ensuring the better security of the university materials. Since most of the university libraries are using DSpace as repository, other university libraries of Bangladesh those are decided to use IR can customize DSpace as their institutional repository.

8.3.17 Copyright permission

Copyright permission and preservation of digital materials should be acquired from subscription level. Other hard, copies which are going to be digitized should be taken prior permission from the author or publisher.

8.3.18 Formulate a National Consortium:

Formation of national consortium for sharing resources with minimum cost should be encouraged. Consortium may be formed among public universities only or in private universities only or in collaboration with public and private university libraries. Consortium not only saves national reserve of foreign currencies but also forms the platform for international collaborations.

8.3.19 Registration in OpenDOAR:

OpenDOAR is a platform of digital libraries situated in different parts of the world. The repository of all public and private universities of Bangladesh should be registered in OpenDOAR platform. So that remote users and all information seekers will be able to get access to the repository of university.

8.4 Future research

The digitization program of academic libraries in general and university libraries in particular is a wide field of study. This research was conducted based on the repository activities of university libraries of Bangladesh. To ensure digital preservation the universities libraries of Bangladesh should be modernized and restructured. All modern facilities should be introduced in the libraries. Resource development struggle should be run and monitored by the university authority as well governmental body. A nonstop research collection activity should be undertaken throughout the higher study for better research. Based on the findings and result of this study, the following zones are recommended for further research.

- a) Digital Library Management practice in university libraries of Bangladesh: A study of some selected private and public universities;
- b) Digital preservation activities through IR software in Medical college libraries of Bangladesh: problem and prospects;
- c) Digital Library movement in Bangladesh: an evaluation of university libraries;
- d) Problems and prospects of forming digital library consortium for university libraries of Bangladesh;
- e) Education and Training on digital library management system in Bangladesh: A study;
- f) Professional development for digital preservation: A study on university Libraries of the country;
- g) Attitude of faculty members, researchers and students towards Digital preservation of research work through IRs: a study;
- h) Impact of Institutional Repository (IR) system for preserving the institutional publications;
- i) Study on development of Institutional Repository system in Higher educational institutions of Bangladesh;
- j) How to develop resource collection and ensure resources dissemination through repository software: a study;
- k) Use of open source digital library software: packages and features; and
- l) Evaluation of digital library software and user satisfaction in university libraries of Bangladesh.

8.5 Conclusion

This study emphasized on the overall digital preservation activities on some selected public and private university libraries of Bangladesh. The university libraries provide digitization facilities giving free access to digital preservation for the students, faculty members, researchers and other specialized users. Since Bangladesh Government has taken immense initiatives to build up digital Bangladesh within 2021. To fulfill this vision, Government, UGC and Respectable University authority need to take necessary steps on digital preservation of the higher educational institution. Though the overall digital preservation status is not satisfactory and more than half of the universities did not use OSDLS, even a large number of university authorities were not aware of the digital preservation; an initiative should be taken by the concerned authority to orient the OSDLS and facilities of OSDLS to the authorities and users. The administrations of both public university and public libraries should consider the promotional activities of the services and facilities provided by OSDLS for their professionals and users. The lack of consortium of OSDLS was the most significant cause of lower acceptance of OSDLS in the university libraries of Bangladesh, so libraries need to form a consortium to discuss encountered problems and possible solutions for acceptance and maintenance of OSDLS. For this purpose, UGC Digital Library (UDL) should be act properly as a platform and productive consortium organized by UGC.

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AFFENDICES

Questionnaire booklet-1

Confidential

Sample No.:

Research Questionnaire (Academic Librarian/Repository Administrator)

‘Use of digital library software for building institutional repository in public and private university libraries of Bangladesh’

[Digital Library Software (DLS): Digital library Software is a system which is constructed to manage the library functions and collections digitally and designed to operate electronic resources accessible and reachable through the online or world wide web. It may be open source or customized software.

Institutional Repository (IR): An institutional repository is an archive for collecting, preserving and disseminating digital copies of the intellectual output of an institution, particularly a research institution. Academic Scholars can deposit their article/thesis in the Repository, subject to copyright agreement].

Dear Respondent,

I am a student of University of Dhaka (DU) pursuing M. Phil on the topic “Use of Digital Library Software for Building Institutional Repository in Public and Private University Libraries of Bangladesh” under the supervision of Dr. Md. Nasir Uddin Munshi, Professor, Department of Information Science and Library Management, University of Dhaka.

In order to get a comprehensive understanding of the present scenario of IR in the university libraries of Bangladesh, I am here by submitting a set of questionnaire to you. This survey is strictly confidential and will be used only for the purpose of academic research. I would appreciate while you could kindly spare your valuable time to fill up the questionnaire.

Md. Monirul Islam

M. Phil Research Fellow

University of Dhaka

Cell: 01920792193

Email: mislamdu193@gmail.com

1. Demographic Information

1.1 Name of the University:

1.2 Category of university: Public Private International

1.3 Gender: Female Male

1.4 Designation: Librarian Library In-charge Deputy Librarian
 Sr. Asst Librarian Asst. Librarian Library/IT Officer

1.5 Age group: Under 20 years 20 - 29 years 30 - 39 years
 40 - 49 years 50 -59 years 60 and above years

1.6 The number of library staff:

2. Institutional Repository

2.1 Does your university library maintain institutional repository software for digital preservation of research output?

Yes No Don't Know

2.2 If yes, please mention the name of the repository software.

DSpace Greenstone Fedora Invenio Eprints
 SLiMS Customize

2.3 If no, what is your present status about implementing of institutional repository?

(Please keep continue and skip which is not relevant to you)

in process taken initiative have plan have no plan

2.4 What is your repository's URL?

.....

2.5 Please, mention the establishment year of IR in your library.

.....

2.6 Had the IR been implemented by own library team?

Yes No

2.7 Is the IR being upgraded with updated versions?

Yes No Don't Know

2.8 The current version of your IR is:

.....

2.9 Which type of operating system is being used for IR server?

- Linux-Debian
 Linux-Ubantu
 Linux-RedHat
 Linux-CentOS
 Windows
 Mac

Resources on IR

3.1 Which types of collection are available in your repository?

- M. Phil thesis
 PhD thesis
 Research Report
 Research Book
 Dissertation
 Thesis paper
 MA thesis
 Research Article
 Audio, Video, Image
 Others:.....

3.2 How much collections are available in your institutional repository?

- Below 50
 50 to 100
 100 to 500
 500 to 1000
 Above 1000

4. What was the motivation for your university to establish a repository?

A 5 point Likert scale is considered as 1 = Not at all important; 2 = Not very important; 3 = Neutral; 4 = Important; 5 = Very important. Please put tick mark the number which most closely matches your feelings about the following services and facilities of Koha OSILS.

SL	Statements	NAI	NVI	N	I	VI
1.	to enhance the visibility of university research output	1	2	3	4	5
2.	to provide free access to university research output	1	2	3	4	5
3.	to preserve the university research output	1	2	3	4	5
4.	to evaluate researchers and departments	1	2	3	4	5

5. Facilities and policy

5.1 Do you have computer lab/facility in library for using the institutional repository?

- Yes
 No
 Don't Know

5.2 Does your university organize in-house training on IR for the library staff?

- Yes
 No
 Don't Know

5.3 Does you university organize any training on IR for the research scholars?

- Yes
 No
 Don't Know

5.4 Does your library have any policy on Institutional Repository?

- Yes
 No
 Don't Know

6. Satisfaction

6.1 How do you rate your university present collection?

- Adequate Slightly adequate Almost adequate Poor Inadequate

6.2 Your overall satisfaction level in existing repository software of your university library is-

- Not Satisfied Less Satisfied Satisfied Very Satisfied Highly Satisfied

7. Recommendation and comment

7.1 Why IR is important in 21st century?

- ensures open access contributes to preserve digital materials enhances open education, open data protects intellectual property

7.2 Do you think that institutional repository should immediately be introduced in all public and private university libraries of Bangladesh?

- Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

7.3 If yes, what initiatives should be taken to introduce this repository?

- to make a committee to appoint IT expert request faculty to submit hard or softcopy make sure repository act

8. Which repository software will be recommended by you for other university libraries of Bangladesh?

- DSpace Greenstone Fedora Invenio Eprints
 SLiMS Customize

9. Which problem have you faced in building IR in university library?

- Lacking of IT skilled professionals Lacking of instruments
 Negligence of faculty/researchers Insufficient publications
 Negligence from university authority Others:

10. Do you think it is necessary to establish a separate unit of UGC for supervising the preservation of digital and scholarly publications in university libraries of Bangladesh?

- Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

11. What steps should be taken by UGC?

- Should form a committee should give direction to university
 should observe the university occasionally ask annual report from university
 to ensure accountability Others:.....

Thank you for your nice co-operation

Questionnaire booklet-2

Confidential

Sample No.:

Research Questionnaire (Academic Scholar/Repository Users)

‘Use of digital library software for building institutional repository in public and private university libraries of Bangladesh’

[Digital Library Software (DLS): Digital library Software is a system which is constructed to manage the library functions and collections digitally and designed to operate electronic resources accessible and reachable through the online or world wide web. It may be open source or customized software.

Institutional Repository (IR): An institutional repository is an archive for collecting, preserving and disseminating digital copies of the intellectual output of an institution, particularly a research institution. Academic Scholars can deposit their article/thesis in the Repository, subject to copyright agreement].

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Md. Monirul Islam

M. Phil Research Fellow

University of Dhaka

Cell: 01920792193

Email: mislamdu193@gmail.com

1. Demographic Information

1.1 Name of the university:

1.2 Category of Public Private International

1.3 Gender: Female Male

1.4 Type of users: Teacher Student Researcher

1.5 Status: Professor Associate Professor Asst. Professor Sr. Lecturer
 Lecturer MPhil/PhD Researcher Master's Student Hon's Student

1.6 Age group: Under 20 years 20 - 29 years 30 - 39 years
 40 - 49 years 50 -59 years 60 and above years

2. Institutional Repository

2.1 Does your university library maintain institutional repository software for digital preservation of research output?

Yes No Don't Know

2.2 if yes please mention the name of the repository software (if no, please keep continue and skip which is not relevant to you).

DSpace Green Stone Fedora
 Invenio SLiMS Customized

2.3 How do you know about Institutional Repository?

Know little about this Know and Understand Expert Understanding Heard but don't know Know nothing about this

2.4 How did you learnt about Institutional Repository?

Through Internet Through Journal Through Library Through Faculty Others Media

2.5 What's your stand to preserve research publication and make it free accessible to all through IR?

Strongly Agree Agree Undecided Disagree Strongly Disagree

2.6 Have you deposited any of your work in Institutional Repository?

Yes No

2.7 What type of materials should be deposited in an institutional repository?

M. Phil thesis PhD thesis Research report Research books Dissertation
 Thesis paper MA thesis Research article Audio, video, image

2.8 Which file formats do you use and therefore might wish to deposit in Repository?

PDF MS-Word HTML Image (.GIP, JPG, PNG) Sound (.WAV, MP3, AIFF)

3. What was the motivation for your university to establish a repository?

A 5 point Likert scale is considered as 1 = Not at all important; 2 = Not very important; 3 = Neutral; 4 = Important; 5 = Very important. Please put tick mark the number which most closely matches your feelings about the following services and facilities of Koha OSILS.

SL	Statements	NAI	NVI	N	I	VI
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2.	to provide free access to university research output	1	2	3	4	5
3.	to preserve the university research output	1	2	3	4	5
4.	to evaluate researchers and departments	1	2	3	4	5

4. Facilities and policy

4.1 Do you have computer lab/facility in library for using the institutional repository?

Yes No Don't Know

4.2 Does you university organize any training on IR for the research scholars?

Yes No Don't Know

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5.1 How do you rate your university present collection?

Adequate Slightly adequate Almost adequate Poor Inadequate

5.2 Your overall satisfaction level in existing repository software of your university library is-

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6.2 Do you think that institutional repository should immediately be introduced in all public and private university libraries of Bangladesh?

Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

6.3 If agree, what initiatives should be taken to introduce this repository?

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7. Do you think it is necessary to establish a separate unit of UGC for supervising the preservation of digital and scholarly publications in university libraries of Bangladesh?

Strongly disagree Disagree Neither agree or disagree Agree Strongly agree

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Thank you for your nice co-operation