

***“STATUS OF DIGITAL LIBRARIES IN MEDICAL
UNIVERSITY AND COLLEGES IN BANGLADESH”***

HOSNA ARA KOLLY

**“STATUS OF DIGITAL LIBRARIES IN MEDICAL UNIVERSITY
AND COLLEGES IN BANGLADESH”**



**Thesis submitted to the Department of Information Science and
Library Management, University of Dhaka, as a partial fulfillment of
the requirements for the Degree of Master of Arts.**

BY

HOSNA ARA KOLLY

EXAMINATION ROLL NO. 3058

REGISTRATION NO. HA-6352

EXAM SESSION 2011-2012.

Department of Information Science and Library Management

University of Dhaka

2014

Dedicated to My Beloved Parents

ABSTRACT

In this digital era of information explosion any library cannot meet the each and every demand of their patrons because of various constraints. The aim of the study was to explore the status of digital library initiatives in medical university and college libraries of Bangladesh. To meet this aim, the study analyzed the collection, staff, ICT, automation, e-resources and digitization status in medical university and college libraries of the country; explored the libraries readiness to carry out digitization activities; the researcher analyzed the prevailing digitization practices, projects, identified the major issues and hindrances affecting library digitization practices and suggested recommended activities to improve the medical college libraries poor condition and also suggests a Medical College Taskforce on Building Digital Library.

Keeping in view the purpose and objective of the study the study used the mixed method research design by using qualitative and quantitative techniques. For the demand of the study the researcher use the survey research by using interviews and semi structured questionnaire techniques for data collection. In order to collect the necessary information for research work, the researcher visit to the 27 number of interviewees from 23rd September to 22nd October.

The study has been discussed under six chapters which consists of background of the study with basic description of digital library, literatures tat reviewed, methodology that adopted to successfully complete the research, status of ICT, automation, e-resources and digitization in Bangladesh, data analysis and finding, problems faced by medical libraries, recommending suggestions and summery of the study.

The findings of the study revealed a very shocking library condition in medical university and college of Bangladesh. The study found that, very few libraries just take automation plans; even few libraries do not have any computers and librarian. Except BSMMU, no medical college library is members of any e-resource consortium. They have so many problems that impede the development of libraries, such as efficient staff, fund, e-resources, technologies, integrated library software, no digitization plan or initiatives etc. The findings of this study will be useful to library

planners at all levels in establishing more concrete collaborative plans for national digital library system in medical colleges. To remove the darkness the Government of Bangladesh along with medical university and colleges should take initiatives to develop “Digital Library” nationwide. The researcher has tried to find out every pro and cons of the medical university and college libraries, so that everyone who wants to know about this sector they will be able to get useful information.

ACKNOWLEDGEMENT

In this long journey of completing the research work the researcher had to depend on so many people and faced so many problems. First of the entire researcher is very grateful to ALLAH for blessing with the patience and knowledge and giving the opportunity to learn something new.

I am heartily thankful to my supervisor for his cordial support and admiration. Without his unyielding constructive criticism, guidelines, suggestions, advice, inspiration constructive criticism and constant encouragement it is not possible to do an inch of research work. Thanking him is a very little word for him, the researcher cordially from heart very grateful to respective supervisor.

I am also indebted to all my teachers at the department of Information Science and Library Management, University of Dhaka, for giving valuable suggestions and providing necessary information for the work. Without whom I could not also able to come to this stage.

In fulfilling the study, I had to depend on different medical college. I am grateful to all the librarians to help me with valuable information. I am also indebted to the professionals to provide me necessary information and extended all possible help for this work.

I wish to express sincere appreciation to my mother and my husband. Without their help and support this work might not have been completed and I would not be able to complete this long tiring journey.

HOSNA ARA KOLLY

TABLE OF CONTENTS

	Page
Abstract	iv
Acknowledgement	Vi
Table of Contents	vii
List of Tables	xi
List of Figures	xii
List of Acronym and Abbreviations	xiii
Chapter1 Introduction	
1.1 Background of the Study	2
1.2 Statement of the problems	4
1.3 Purpose of the Study:	5
1.4 Research Questions	5
1.5 Significance of the Study:	5
1.6 Scope Of The Study	6
1.7 Limitation of the Study	7
1.8 Operational Definitions of Digital Library	7
1.9 Importance of Digital Library	9
1.10 Challenges that impede the growth of digital libraries	12
1.12 Outline of Thesis	15
Chapter 2 Literature Review	
2.1 Introduction	16
2.2 Concept of Digital Library	17

2.3	Development of Digital Library	21
2.4	Status of Medical University and College Libraries Around the World and in Bangladesh	30
2.5	Conclusion	34
Chapter 3 Research Design and Methodology		
3.1	Research	35
3.2	Research Methodology	37
3.3	Research Method	37
3.4	Research Design	37
3.5	Conceptual Framework	38
3.6	Review of Relevant Literature	39
3.7	Survey Research Method	40
3.8	Population	42
3.9	Determination of Sample Size	42
3.10	Techniques of Data Collection	43
3.11	Conduct of Interviews	44
3.12	Questionnaire	46
3.13	Research Visit	50
3.14	Data Analysis	50
Chapter 4 Automation, Digitization and E-Resources Usage Scenario in Bangladesh		
4.2	Mobile Library Services in Bangladesh	55
4.3	Automation	55
4.4.	Digital Bangladesh	55
4.5	E-resource	59

4.6	Electronic Resource Consortium	59
4.7	Existing Digitization Projects	65
4.8	Digitization of Medical University and Colleges Libraries in Bangladesh	69
Chapter -5 Data Analysis And Findings		
5.1	Types of Library	72
5.2	Collection Information	73
5.3	Staff Information and Strength	74
5.4	ICT Information	76
5.5	Library Automation	77
5.6	Digitization Scenario	78
5.7	Respondent's Website Information	78
5.8	Category of Libraries	80
5.9	Budget Information	81
5.10	Problems Faced by Medical College Libraries	81
5.11	Situation Analysis of Participating Libraries	83
5.12	Problems Faced by the Participating Libraries	93
Chapter-6 Recommendations And Conclusion		
6.1	Summary of the Study through Research Questions	98
6.2	Recommendations	99
6.3	Medical College Taskforce on Digital library Development (MCTDLD)	101
6.4	Implementation of the Research	106
6.5	Conclusion	107

References	108
Appendix-1 Cover Letter For the Questionnaire	115
Appendix-2 The Questionnaire	116
Appendix – 3 List of Participants	127

LIST OF TABLES

List of Tables	Page number
Table 2.1: Definition of Digital Library through Concept wise	18
Table 2.2: Importance of Digital Library	19
Table 2.3: Challenges that Impede the Growth of Digital Libraries	20
Table 2.4: Journal of Medical library association	33
Table 3.1: Characteristics and Limitations of Qualitative and Quantitative Research	37
Table 3.2: Types of Surveys	40
Table 3.3: Advantages and Disadvantages of Survey Research	41
Table 3.4: Population the Study	42
Table 3.5: Sample Size of the Study	42
Table 3.6: Equipments for data collection	44
Table 3.6: Advantages and Disadvantages of Interviews	45
Table 3.7: Advantages and Disadvantages of Questionnaires	47
Table 3.8: Variables of Questionnaire	49
Table 4.1: ICT-related key education indicators	52
Table 4.2: Number of resources available through BIPC	61
Table 4.3: Existing Library Digitization projects in Bangladesh	65
Table 5.1: Types of libraries	73
Table 5.2: Collection information	74
Table 5.3: Staff Strength.	74
Table 5.4: ICT Information	76
Table 5.5: Automation scenario	77
Table 5.6: Digitization Scenarios.	78
Table 5.7: Website Information	79
Table 5.8: Distribution of libraries by category.	80
Table 5.9: Budget Information	81
Table 5.10: Problems faced by medical college libraries	81

LIST OF FIGURES

List of Figures	Page Number
Figure 1.1: Outline of the Thesis	15
Figure 3.1: The Research Design Applied for this Research	38
Figure 3.2: Conceptual Framework of the Study	39
Figure 3.3: Questionnaire Design.	47
Figure 4.1: E-Governance Model	57
Figure 4.2: National web portal of Bangladesh	58
Figure 4.3: Snapshot of Jatiyo e-Tathyakosh	59
Figure 4.4: Members of BIPC	61
Figure 4.5: No. of participant's growth	61
Figure 4.6: Key initiative in health care	70
Figure 5.1: Distribution of libraries by type	72
Figure 6.1: Steps to be followed by MCTBDL	102
Figure 6.2: Action Plan to develop the digital library in medical colleges.	104

LIST OF ACRONYM AND ABBREVIATIONS

A2I	Access to Information
BANBEIS	Bangladesh Bureau of Educational Information and statistics
BANSDOC	Bangladesh National Scientific Technical and Documentation Center
BAS	Bangladesh Academy of Science
BANSLINK	Bangladesh National Scientific and Technical Library Information Network
BERNET	Bangladesh Education and Research Network
BIPC	Bangladesh INASP-PERI Consortium
BIRDEM	Bangladesh Institute of Research and Rehabilitation for Diabetes, Endocrine and Metabolic Disorders
BSK	Biswa Shahitya Kendra
BMC	Bangladesh Medical Assosiation
BOU	Bangladesh Open University
BSMMU	Bangladesh Sheikh Mujib Medical University
BUET	Bangladesh University of Engineering & Technology
BUETL	Bangladesh University of Engineering & Technology Library
CAS	Current Awareness Service
CD	Compact Disc
CD-ROM	Compact Disc-Read Only Memory
CIRDAP	Comprehensive Irrigation Research and Development Umbrella Program
DU	Dhaka University
DUL	Dhaka University library

E-Book	Electronic book
E-Database	Electronic database
E-Journal	Electronic journal
E-Mail	Electronic Mail
E-Resources	Electronic resources
E-Theses	Electronic theses
EWU	East-West University
EWUL	East-West University library
GLAS	Graphical Library Automation System
HEQEP	Higher Education Quality Enhancement Project
IDA	International Development Association
ICDDR'B	International Center for Diarrhoeal Disease research,
ICT	Information, Communication and Technology
INASP	International Network for availability of Scientific Publications
ISRT	Institute of Statistical Research and Training
IT	Information Technology
IUB	Independent University, Bangladesh
LAN	Local Area Network
M. Phil.	Masters of Philosophy
NREN	National Research an Education Network
OPAC	Online Public Access Catalogue
PC	Personal Computer
PERI	Program for Enhancement of Research Information

Ph. D.	Doctor of Philosophy
RTI	Right to Information
SAARC	South Asian Association For Regional Cooperation
SDI	Selective Dissemination of Information
SDC	Software Development Centre
SPSS	Statistical Packages for Social Sciences
UGC	University Grants Commission
UDL	UGC Digital Library
UISC	Union Information and Service Center
UNDP	United Nation Development Programme
VSAT	Very Small Aperture Terminal
WSIS	World Summit on Information Society
WWW	World Wide Web

CHAPTER-1

INTRODUCTION

The library connects us with the insight and knowledge, painfully extracted from Nature, of the greatest minds that ever were, with the best teachers, drawn from the entire planet and from all our history, to instruct us without tiring, and to inspire us to make our own contribution to the collective knowledge of the human species. I think the health of our civilization, the depth of our awareness about the underpinnings of our culture and our concern for the future can all be tested by how well we support our libraries.— Sagan, Cosmos Carl.

The use of technology and particularly digital technology has affected nearly every aspect of library from the automation of internal cataloging and management systems to the digitization of physical collections, and from the acquisition of new “born digital” works of art and library publications to the use of technology to present collections and engage audiences.

The medical education aims at developing medical manpower suitable to the needs of the country. Medical college librarians are professionally committed to update a core, qualitative and need based collection for the optimum utilization of the resources for the greater satisfaction of the health care professional community. The medical college libraries have a crucial role to play directly in the promotion of medical education and health care and in directly in various healths welfare programmes of E-government’s A2I program. Medical college libraries have started using computers for its day-to-day activities and also many of them have introducing information technology along with library automation for making the library and information services faster and effective. The digitization of library operations facilitates the easy access to the information, saves the time of the professionals as well as the users and avoids duplication of processes of housekeeping operations. But the process of developing a digital library needs proper planning, selection of hardware/software, awareness of the use of IT among the professionals and users, trained manpower and willingness of the authorities for implementing successfully the digitization of library activities.

Moreover, rapid increase and fragmentation of research has led to unpredicted growth of information. At this important point of time the only ultimate solution is to use of information technology in library by library automation and to implements a practical development of “DIGITAL LIBRARY”.

Current study was conducted to find out whether these libraries are fully equipped, to serve the user community in this modern ICT age and it is also examine how ICT infrastructure facility is available in medical colleges of Bangladesh for betterment of user services, in a word to examine the status of digitization in medical college libraries of Bangladesh.

1.1 Background of the Study

The world has experienced three revolutions. First, when language came into a view before hundred of thousand years. Second, tens of thousands years ago the arrival of writing. Third, invention of printing press during 1500. Now the world has witnessed the fourth revolution of exclusive control of electronic publishing, internet and World Wide Web those have a strong influence on information storage, retrieval and information delivery system in our own millennium, 21st century.

Early 1970s, library systems and services were built around mainframe, mini computers with online search and retrieval facilities and even remote access to information by users. Various integrated library packages were launched to perform the automation task of in-house functions of the library, e.g. acquisition, circulation of books and online public access catalogue (OPAC).

During 1970s and 1980s, information technology for library management brought out another landmark which is the creation of online bibliographic databases. For the demand of high storage capacity and longevity there were availability of CD ROM during the late 1980s. 1,700 full-text sources in 16 online systems were available during 1989. In the late 1980s so many full-text databases were also started.

Early 1990s was the starting of digital era, where very few important full-text digital collections on CD-ROM were available, e.g. ADONIS, IEEE electronic library, ABI/INFORM, UMI's library, Espace world, US patents. Network-based digital library service with arrival of WWW was a true revolution of 1990s. Web server, browser, Netscape navigator, internet explorer are updated for more advanced applications such as e-mail, support JAVA etc. Total number of electronic journals, one of the corner stone of the digital library, available on the web has grown steadily from less than 10 in 1989 to 3634 in 1997 (ARL, 1997).

Digital library: the term digital library gained universal popularity in the last decade of 20th century. Since the past 30 years, this term has unfolded with the technological ladder.

The introduction of Online Public Access Catalog (OPAC) and later web OPAC was a proven fact that ICT had been vital in the development of digital libraries. Digital Libraries are being created today for diverse communities and in different fields e.g. education, science, culture, development, health, governance and so on.

Historical growth of digital library development:

- a. 1990s is the beginning of digital age or we can say that digital library had been under development from 1990s.
- b. H.G. Wells first invented the term “computerized library” with writings about “world brains”.
- c. Than Vannevar Bush wrote about his imaginary machine “Memex” in 1945.
- d. Later “Hypertext” developed by Douglas Engelbart and Ted Nelson coined the term hypertext in the mid 1960's.

- e. Tim Berners-Lee who proposed the global hypertext called World Wide Web (WWW)
- f. The first use of the term digital library in print may have been in a 1988 report to the Corporation for National Research Initiatives in 1994.

Development of Digital library:

- a. In 1971 Ohio Computer Library Center's WORLDCAT, now a union catalog of more than 1 billion items.
- b. In 1971, Project Gutenberg undertaken by the University of Illinois, digitize a large hypertext collection of materials on the ancient Greek world.
- c. Carnegie Mellon University in Pittsburgh and OCLC also initiated a project named "Pre-digital Mercury Electronic Library project from 1989 to 1992.
- d. The American Abstract Service on the other hand had successfully digitized 400,000 pages from chemistry journals published by the American Chemistry Society.
- e. First electronic library projects were Electronic Library Information Online Retrieval (ELINOR) and the E-Lib in the United Kingdom from 1992 to 1996.
- f. The New Zealand Digital Library project at the University of Waikato had developed the "Greenstone software".
- g. During 1990-1994 the Library of Congress completed the trial of the American Memory Project and had digitized 9 million items as of June 2007.

Medical Colleges in Bangladesh:

The nature of medical education in Bangladesh was inherited from the British and the then Pakistan period. In early nineteen sixties the Pakistan College of Physicians and Surgeons with its sister Institute of Postgraduate Medicine and research (IPGMR) and Bangladesh College of Physicians and Surgeons were established to offer UK based Postgraduate Degrees such as MRCP, FRCS in various discipline in Medical Science.

In Bangladesh, medical education at the graduate level is provided by medical Colleges. Medical colleges are under the jurisdiction of the Ministry of Health and are affiliated with a university on the respective region. Until the early 1990s, all the medical colleges were established by the government. Since then, several private medical colleges have been set up. In the year 1946 the first Public or Government medical college of Bangladesh named "Dhaka Medical College (DMC)" was established.

In 1984 some renowned people like sate Mr. M. Mahbuzaman, former cabinet secretary, former minister of agriculture, former advisor to the president; renowned surgeon professor C. H. kabir; professor Muhammad Yusuf ali, former physician to the president; professor Abu ahmed chowdhury, chairman BMDC; late professor K. A. A. Qumruddin former dean faculty of law.

Dhaka university, late prof. shamsul haque, former V. C. Dhaka university; former adviser of education & some other renowned people established the Bangladesh medical studies research institute (BMSRI). BMSRI played the pioneering role to start and establish the concept of private medical college in Bangladesh. Under the aegis of BMSRI, the first private medical college of Bangladesh “Bangladesh medical college (BMC)” started functioning from April 24, 1986 in Dhanmondi.

The medical education of the country has been constantly improving to keep pace with the worldwide progress of medical science. The medical science is advancing with the enrichment of educational science and technology. Global changes are happening in medical education in accordance and conformity to these advancement and changes. With the application of these knowledge and skill of medical science, future doctors should satisfy their patients with the changing need of the community. As a nation of third world countries, as have to keep pace with the latest development in Medicine.

1.2 Statement of the Problem

Keeping in view the digitization benefits and demand for digital access to local scholarship, there is a need to study the prospects of digitization by exploring the demand and assessing the readiness of libraries to undertake digital library attempt in medical university and college libraries to meet this demand.

- (i) Lack of digital library activities and the low level of development in medical college library sectors.
- (ii) Increasing demand of electronic and digital information resources.
- (iii) The rise of digital libraries could pose as a threat to the profession if not responded with the improved technologies.
- (iv) Lack of national digital library initiative projects in medical university and college libraries.
- (v) The situations, such as collections, knowledgeable staff, available technologies, supporting budget need to be addressed to enable us to know our standing compared to the other countries and specifically to know the problems and the perceived conditions required to rectify the conditions.
- (vi) It was crucial to ascertain their status through study the extent of library ICT facilities, automation, online services and digitization works that had so far been carried out by medical university and colleges.

1.3 Purpose of the Study

The prime object of the study are to identify the extent of the medical university and college libraries of Bangladesh in providing digital library operations and services, having embraced library automation, including problems faced and the perceived conditions for digital library future growth. The objectives of the study are as follows:

- (i) To explore university libraries' readiness to carry out digitization activities.
- (ii) To analyze the prevailing digitization practices in medical university and college libraries of Bangladesh.
- (iii) To identify the major issues and hindrances affecting digitization practices.
- (iv) To find out the potential collections strength for digitization in university libraries
- (v) To examine the infrastructural facilities required for digital information system
- (vi) To solicit and examine the perceived conditions for digital library future growth.
- (vii) To make recommendations to develop digitization practices in libraries

1.4 Research Questions

To achieve the above objectives, the following research questions are used:

- a) What is the present status of ICT in medical university college libraries?
- b) What made up the library holdings/collections?
- c) What library systems had been installed and the extent of library online services and digital library initiatives that had been introduced, including the provision of budget and training?
- d) Are they ready to be digital?
- e) What were the digital libraries issues/related problems and what kinds of digital library planning were in store?
- f) What were the library heads' opinions on digital library development in medical university and colleges regarding Bangladesh?

1.5 Significance of the Study

The rapid changing environment of information, communication and computer technology removes all the physical boundaries of libraries and also continuously improves the libraries and information centers and creating challenges for librarians. This wind of improved technologies also tossing the universities of Bangladesh and they are also witnessing the changing paradigm of education. The benefits of integrating technology into libraries are numerous and especially at this time when the country is implementing its development Vision 2021. It is undeniable that a

university library is the major research center for all educational levels and the gathering place of scholars and educators. In that regard medical university and college libraries should focus on the vision of 2021 and should implement “Digital library” in response equally to the modern world. In that regard, the study will inform students, academic staff, administrative staff, libraries and government about the importance of digital library implementation in medical colleges in Bangladesh:

1. The status of technology availability and accessibility for medical university and college libraries.
2. The skill level of library staff members and their assessment of the implementation of technology integration.
3. The study would ascertain the degree of dependency of the library profession on other professions especially the computer scientists.
4. To increase awareness among information professionals on the level of e-library and digital library development in medical college libraries.
5. This study will assess the need for digitization in medical university and college libraries by assessing the demand for electronic contents.
6. The nature and the effectiveness of professional development programs in technology and
7. How to make digital library plans for libraries using technology
8. This study will thoroughly explore the status of current digitization practices carried on in libraries.
9. The study will also find out the associated issues and hindrances associated with digitization activities in medical university and college libraries of the country.

1.6 Scope of the Study

In this age of information technology, the medical university and college libraries of Bangladesh are lagged behind because of their unawareness regarding the importance of digital libraries besides some private universities are very advanced in that case. The scenario of medical library digitization is very frustrating. It is assumed that, where even the ICT and automation scenario are at very elementary level, library digitization is still a dream in medical university and colleges.

To identify the present status of library digitization in medical university and colleges, the following issues are very important in this regard.

- a) To review the literature on digital library.
- b) To substantiate and consolidate the data collected through the questionnaire, qualitative data were also obtained through the interview sessions conducted with 27 librarians.
- c) These were the areas covered: digital library planning, budget for digitization projects, online services and operations, human resource/staffing, management support, external support, digital

library collaborative efforts, digital library related problems, digital library training, facilities, personal opinion on digital library development and the perceived conditions for digital library future growth in medical libraries in Bangladesh.

d) Providing some recommendations for the betterment of these libraries to adopt digitization system.

1.7 Limitation of the Study

The scope of the study spans over the public medical university and public and private medical colleges only in Dhaka which is a capital of Bangladesh recognized by education ministry. Limitations of the study are stated below:

- a) Limitation of the study includes the scarcity of local literature on the subject.
- b) The phenomenon of library digitization is just beginning to emerge in medical university and college libraries of Bangladesh.
- c) Because of time limits other type of medical college libraries (e.g. dental college, training institutes, and homeopathic college etc.) are not covered for the study.
- d) Because of cost and remote location other medical university and colleges are not surveyed.
- e) It would be better if all the medical university and college libraries can be observed for the study but that was not possible for time and cost constraints.

1.8 Operational Definitions of Digital Library and Related Terms

The term digital library emerged around 1990 and the Digital Library Initiatives (DLIs) was the result of a community-based process which began in the late 1980's. (Griffin, 1998), A digital library is a library in which collections are stored in digital formats (as opposed to print, microform, or other media) and accessible by computers. The content may be stored locally, or accessed remotely. The first published use of the term may have been in a 1988 report to the Corporation for National Research Initiatives. The term was first popularized by the NSF/DARPA/NASA Digital Libraries Initiative in 1994. Bush (1945) created a vision based on experience ("Digital library.")

One of the primary outcomes of the NSF- sponsored Social Aspects of Digital libraries was a definition of the term 'Digital Libraries'. We broadened the scope to encompass two complementary ideas (Borgman et.al. 1996)

1. Digital libraries are a set of electronic resources and associated technical capabilities for creating, searching and using information .In this sense they are extension and enhancement of information storage and retrieval systems that manipulate digital data in any medium (text, images, sounds, static or dynamic images) and exist in distributed networks. The content of digital libraries includes data, metadata that describe various aspects of data (e.g. representation, creator, owner, reproduction rights) and metadata that

consists of data and relationships to other data or metadata, whether internal or external to the digital library.

2. Digital libraries are constructed, collected and organized by (and for) a community of users and their functional capabilities support the information needs and uses of that community. They are a component of communities in which individuals and groups interact with each other and using data, information and knowledge resources and systems. In this sense they are an extension, enhancement and integration of a variety of information institutions as physical places where resources are selected, collected, organized, preserved and accessed in support of a user community. These information institutions include, among others, libraries, museums, archives and schools, but digital libraries also extend and serve other community settings, including classrooms, offices, laboratories, homes and public spaces.

Oppenheim and Smithson (1999) defined digital library as “an information service in which all the information resources are available in computer-processable form and the functions of acquisition, storage, retrieval, access and display are carried out through the use of digital technologies. (cited in Harun, 2010)

The Association of Research Libraries in 1995 signifies digital library broad diversity. According to ARL, the digital library was not a single entity as it requires technology to link the resources of many (technology driven) and universal access to a digital library and information services was the goal and that digital library collections were not limited to document surrogates as they extend to digital artifacts that could not be represented or distributed in printed formats (Borgman, 2000).

The National Science, Technology, Engineering, and Mathematics, US defined a digital library as a managed environment of 7 multimedia materials in digital form, designed for the benefits of its user population, structured to facilitate access to its contents, and equipped with aids to navigate the global network, with users and holdings totally distributed but managed as a coherent whole (Mischo, 2004).

McLean and Lynch (2004, p. 5) consider digital libraries as one of the components of the broader and so called "information environment" which also includes "records management, publishing, and scientific and scholarly data management".

Christine Borgman defined in her presentation at the LIDA conference "Libraries in the Digital Age" digital libraries as follows:

- Systems that support searching, use, creation of content
- Institutions with people, digital collections, and services.
- Repositories of digital data and documents, as a component of cyber-infrastructure, e-research, e-science, e-social science, e-learning... (Institutional repositories, open archives, data collections (Borgman, 2005)

Since 2006 the term has been generally used to refer to systems that are heterogeneous in scope and provide diverse types of functionality. These systems include digital object and metadata repositories, reference-linking systems. Archives, content administration systems (mainly developed by industry) and complex systems that integrate advanced digital library services (mainly developed in research environments). This ‘overloading’ of the term ‘Digital Library’

results in digital library services and systems that do not deliver interoperability and reuse of content and technologies. (Candela et al.)

According to E.A. Fox, 1999 the digital library may be defined as the “New way of carrying out the functions of libraries encompassing new types of information resources, new approaches to classification and cataloguing, intensive use of electronic systems and networks and dramatic shifts in intellectual, organizational and electronic practices”.

A digital library is not a single entity. It requires technology link the resources of many collections. The links between digital libraries and their resources are transparent to users. Digital library collections are not limited to document surrogates (bibliographic records). They are the actual digital objects such as images, texts, etc.

Despite the differences in definitions and terminologies, the extensive research and rapid developments in many parts of the world were a manifestation that digital libraries were gaining wide acceptance and the importance of which could not be disputed.

Digitization:

McMenemy & Poulter (2005) defined digitization is creating a digital copy of an analogue object and also refers to the process of converting, creating, and maintaining books, art works, historical documents, photos, journals, etc., in electronic representation so they can be viewed via computer and other devices.

Cathro (2007) referred digitization as the conversion of library materials such as books, pictures, maps, music scores, manuscript collections and audio and video files into digital form. It encompasses all of the processes that are necessary to create usable digital files, including scanning or digital photography, creation of digital files and transfer of these files into a suitable storage environment with appropriate metadata assigning.

Academic Digital library

Academic digital library is digital library designed for serving its specific purposes to academic community using institutional digitized repositories. The specific purposes are mainly covering the specific academic resources and services in meeting academic users’ needs. Academic resources that have been digitized have made a significant impact on how academic users do their research. Dependency on using online resources provided by institutions digital library is drastically increasing from time to time however the use of printed scholarly materials may still in existence. They emphasized in growing and enhancing knowledge, this community seeks current, fast, reliable and accurate information where digital libraries systems should meet these requirements. Further, the usefulness of digital library relates with the usability of the system – how the system is used and how it is usable to users.

Wallace et al. (1996) listed six main characteristics of digital library for education:

- i. The content is current.
- ii. The content can be from primary resources.
- iii. The content is comprehensive where the depth and breadth of many disciplines are provided.

- iv. The resources are presented in various formats.
- v. The content is readily accessible.
- vi. The student can publish online.
- vii. Reuse the teaching resources.

1.9 Importance of Digital Library

1. Library access from anywhere or, brings the library to users:

Digital libraries can be accessed virtually from anywhere through internet and CD ROM. They are not bound to the physical location and traditional library hours. Users can search the library collection and retrieve important information without physically visit the library from their home, office or anywhere by having a computer and internet connection. (Shuva, 2012)

2. Access 24/7 or, information is always available:

It has no time and space limit. It is available anytime, anywhere and any format. E.g. a user of Spain can access a digital library of Bangladesh at 9.00 p.m. in Spain which is late night in Bangladesh. (Shuva, 2012)

3. Broader access or, wider access:

A digital library can provide greater access to a wider range of users for a document by easily creating multiple instances or copies of the requested document. It can also meet the requirements of a larger population of users easily. (Shuva, 2012)

4. Improved access:

Digital library support full text searching and hypertext linking. Providing access facilities to users of distributed networks. (Shuva, 2012)

5. Improved information sharing:

Now it becomes very easy to share information among different libraries or information institutions through the blessings of digital library without physically visit the entity. Since the electronic documents are not prone to physical wear and tear, their exact copies can easily be made, the digital libraries facilitate preservation of special and rare documents and artifacts by providing access to digital versions of these entities. (Shuva, 2012)

6. More current information:

In a digital library, it is easy to keep information current. Information can be updated more easily without spending much more time and labor. It can provide information which is more updated. For example, it is difficult to update the information contained within traditional printed catalogue over the catalogue information on digital format. (Shuva, 2012)

7. Less time and labor:

Digital library system reduces the time effort of users spent for searching and locating accurate information with less effort than traditional library system. (Shuva, 2012)

8. Improved preservation:

Digital libraries helped to preserve rare and fragile objects. The conversion of cultural contents opened up new dimension of reaching traditional and new audiences by providing access to cultural heritage. That is to allow people to read older or unique documents without damage to the originals. (Shuva, 2012)

9. Vast storage facilities:

Digital libraries can store large amount of information in a limited space which is reducing physical space barrier and also reducing physical space barrier of traditional library.

10. Improved collaboration:

Digital library facilitate collaboration and exchange of ideas and convergence of collaboration tools and technologies.

11. Digital library may be cost effective:

As such, the cost of maintaining a digital library is much lower than that of a traditional library. A traditional library must spend large sums of money paying for staff, book maintenance, rent, and additional books. Digital libraries may reduce or, in some instances, do away with these fees. Digital library may save time, labor and money and technology cost decline and improved cost become available, so it may eventually prove to be cost effective.

12. No physical boundary:

The user of a digital library need not to go to the library physically; people from all over the world can gain access to the same information, as long as an Internet connection is available.

13. Information retrieval:

The user is able to use any search term (word, phrase, title, name, subject) to search the entire collection. Digital libraries can provide very user-friendly interfaces, giving clickable access to its resources.

14. Added value:

Certain characteristics of objects, primarily the quality of images, may be improved. Digitization can enhance legibility and remove visible flaws such as stains and discoloration. <http://librarydigital1.blogspot.com/2011/02/digital-library.html>

15. Space:

Traditional libraries are limited by storage space; digital libraries have the potential to store much more information, simply because digital information requires very little physical space to contain it. <http://librarydigital1.blogspot.com/2011/02/digital-library.html>

1.10 Challenges that impede the growth of digital libraries

The staff of the National Digital Library Program at the Library of Congress has identified ten major challenges of digital library development.

1. Improved technology:

Digital content can be in two forms: born digital and conversion of existing materials. Develop improved technology to build comprehensive collections; we need to convert analog materials even we need to convert historical records for which advance technologies improved technology for conversion of existing materials is a major challenge.

2. Search and retrieval tools:

Design search and retrieval tools that compensate for abbreviated and incomplete cataloguing or descriptive information.

3. Incorporating the contribution of users:

Design tools that facilitate the enhancement of cataloguing or descriptive information by incorporating the contribution of users.

4. Interoperability:

Establish protocols and standards to facilitate the assembly of distributed digital library.

5. Intellectual property:

Address legal concerns associated with access, copying and dissemination of physical and digital materials.

6. Effective access:

Integrate access to both digital and physical materials.

7. Present heterogeneous resources:

Develop approaches that can present heterogeneous resources in a coherent way.

8. Make useful to different community:

Make the national digital library to be useful to different communities of users and for different purposes.

9. Transforming digital contents:

Provide more efficient and more flexible tools for transforming digital content to suit the needs of end users.

10. Sustaining the resources:

Develop economic models for the support of national digital library.

Beside the above discussed challenges other problems that impede the growth of digital library are:

11. Long term access to digital information:

The persistence of digital information remains an essential challenge for digital libraries. A few are poised to develop limited archival repositories. (Greenstein, 2001)

12. Mobilizing user community:

Some user communities are aware of the tools necessary to manipulate information and are mobilizing, sometimes on a large scale, to supply those tools-especially where they are unavailable from the commercial sector. (Greenstein, 2001)

13. Collection development or, building digital collection:

One of the biggest issues in creating digital libraries will be the building of digital collections. There are essentially three methods of building digital collections (Cleveland G: 1998, p.5):

- i. **Digitization:** converting paper and other media in existing collections to digital form.
- ii. **Acquisition of original digital works:** created by publishers and scholars. Example items would be electronic books, journals, and datasets.
- iii. **Access to external materials:** not held in-house by providing pointers to Websites, other library collections, or publishers' servers.

14. Network bandwidth:

As more and more computer are connected to the Internet its speed of access reasonably decreasing. If new technology will not evolve to solve the problem then in near future Internet will be full of error messages. Digital library will need high band for transfer of multimedia resources but the band width is decreasing day by day due to its over utilization.

15. Copyright or rights management:

The republication of material on the web by libraries may require permission from rights holders, and there is a conflict of interest between libraries and the publishers who may wish to create online versions of their acquired content for commercial purposes. Providing usage tracking, identifying authentic users, copyright status of each digital object, restriction and fees associated on the usage of the object are also impede the digital library development. Digitization violates the copy right law as the thought content of one author can be freely transfer by other without his acknowledgement. (Greenstein, 2001)

16. Digital preservation:

Digital preservation aims to ensure that digital media and information systems are still interpretable into the indefinite future. Each necessary component of this must be migrated, preserved which require more advanced technologies, skilled manpower and cost is also high. Fragile nature of storage media, technological obsolescence and migration of new system for accessibility are also very challenging in digital library.(Ajmal Khan, n.d.)

17. Metadata creation:

While full text search can be used for some items, there are many common catalog searches which cannot be performed using full text, including: finding texts which are translations of other texts and linking texts published under pseudonyms to the real authors and differentiating non-fiction from parody. (Greenstein, 2001)

18. Environment and reading:

Digital libraries cannot reproduce the environment of a traditional library. Many people also find reading printed material to be easier than reading material on a computer screen.

19. Naming, identifier and persistence:

Uniform Resource Locator (URL), Persistent Uniform Resource Locator (PURL), Uniform Resource Name (URN), Digital Object Identifier. (Ajmal Khan, n.d.)

20. Cost:

The infrastructure cost of digital library i.e. the cost of hardware, software; leasing communication circuit is generally very high. The creation and maintenance of digital library is very expensive which introduces new and uncertain economic realities into libraries.

21. Manpower:

It requires manpower giving knowledge and skills on digital technology, collection, management and providing digital library services.

1.12 Outline of Thesis

To discuss the whole research in a nice presentable way it is necessary to divide the study according to concept. The researcher also presents the study in a well presentable form so others can get a thorough idea about the study at a glance without wasting time. The research report consists of 6 chapters. Outline of this chapter with a brief summery is discussed below through demographic representation:

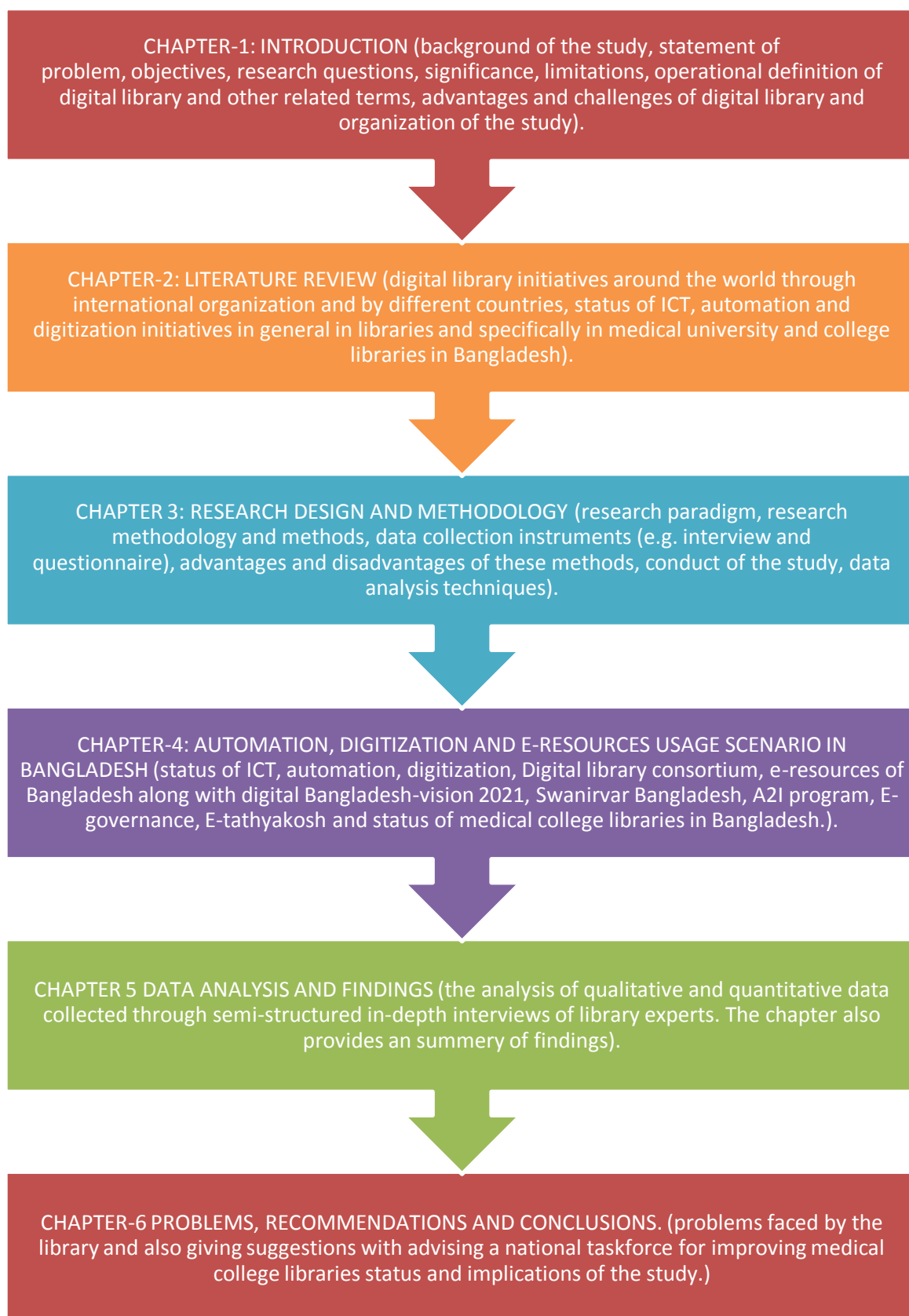


Figure 1.1: Outline of the Thesis

CHAPTER 2

LITERATURE REVIEW

2.1. Introduction:

A literature review was an account of what had been published on a topic by accredited scholars and researchers, a piece of discursive prose (Taylor, 2006) and explaining the intellectual progression of the field including major debates (Anson and Schwegler, 2000).

This chapter consists of literature review related to digital library initiatives and status of digitization worldwide, digitization of medical university and college library at national, regional and international levels. Secondary data were searched from print and online resources. Literatures on this topic were very limited, though foreign literatures on digitization of public or private universities were many but digital library status in medical colleges is very little and some of these had been highlighted for us.

This chapter highlights a body of knowledge and issues concerning the integration of technology in education from different perspectives and contexts. Although some of the ideas are drawn from countries in which technology is already in an advanced stage. This literature will help to establish a framework or guidelines for evaluating the status of library digitization at the medical university and colleges, in Bangladesh.

The Literature review in this chapter is used to establish the potential topics and suggest ideas for another research, reporting published materials on existing conceptual framework, theories, techniques, processes, styles, instruments of other researchers related to the topic under investigation and to identify why some of the 31 literature was noteworthy and which literature had made important theoretical contributions to the field being studied.

For literature review we browse method where print and electronic sources were looked at, read and digested, looking for some relevancy, appropriateness and usefulness of the topic at hand for research purpose used the information retrieval tools such as OPAC, abstracts, indexes and bibliographies allowed greater insight of the subject in a more organized manner. Among the online databases and e-

journals searched were LISA, Emerald, Ebsco Host, D-Lib Magazine, Libri, Ariadne and the websites/homepages of many foreign digital libraries.

For the study, several keywords used during the search were ICT, digital library, digital library initiatives, digital library problems, library automation, digital library software, medical university and colleges etc. The review of literatures is categorized into following areas:

- Concept of Digital library:

This is subdivided into several parts, they are:

- i. Definition of digital library
 - ii. Characteristics
 - iii. Benefits/why digital library is important.
 - iv. Challenges
- Development of digital library: this is also subdivided, which are:-
 - i. Digitization by international organizations
 - ii. Initiatives by several countries
 - iii. Automation Initiatives in Bangladesh
 - iv. Digitization initiatives in Bangladesh
 - Status of Medical university and college libraries around the world and in Bangladesh.

2.2. Concept of Digital Library

Digital library is a very complex and dynamic entity. It has brought phenomenal change in the information collection, preservation and dissemination scene of the world. There are many definitions and they are synonymously used as electronic library or virtual Library. Digital library is a collection of digital information that has to be manageable, that it includes services and activities needed for its functionality and that a universal access to digital libraries and information services is a goal.

i. **Digital Library Definitions Provided by Different Authors**

No.	Conceptual framework of digital library	Authors
1.	Networked electronic libraries.	Larson (1994)
2.	Set of electronic resources and technical capabilities	Borgman (1996)
3.	Information resources are available in computer-processable form.	Oppenheim and Smithson (1999)
4.	Technology to link the resources of many and universal access and were not limited to document surrogates	Borgman (2000)
5.	Organization that provides the resources and economically available for use.	Greenstein (2000)
6.	A managed collection of digital objects and allowed user to retrieve just as they would any other library materials.	Deegan and Tanner (2002)
7.	Electronic extension of functions	Sun Microsystems (2002)
8.	Integrating digitized materials and , delivered across a networked to authorized users.	Dodd and Andrews (2004)
9.	A managed environment of 7 multimedia materials in digital form.	Mischo (2004)
10.	Component of information environment	McLean and Lynch (2004)
11.	Federation of library service and collection	Sharifabadi (2006)
12.	Operational information systems with all types of digital content.	Joint Conference on Digital Libraries (2007)
13.	Important area of research and education for information science.	Sharma & Urs (2008)
14.	Significant advancement in network and computing technologies.	Razilan et al. (2009)

16.	Digital object and metadata repositories, reference-linking systems.	Candela et al., D-Lib Magazine, March-April 2007
-----	--	--

Table 2.1: Definition of Digital Library through Concept Wise.

ii. Importance of Digital Library:

The digital library extends the breadth and scale of scholarly and cultural evidence and supports innovative research and lifelong learning. Advantages which are associated digital libraries including:

No.	Why digital library is important/ Benefits/ Advantages	Authors
1.	Library access from anywhere or, brings the library to users	Shuva (2012)
2.	Access 24/7 or, information is always available	Shuva (2012)
3.	Broader access or, wider access	Usman Alhaji, Shuva (2012)
4.	Improved access	Usman Alhaji (n.d.)
5.	Improved information sharing	Usman Alhaji, Shuva (2012)
6.	More current information or, easier to keep information current	Shuva (2012)
7.	Less time and labor	Shuva (2012)
8.	New forms of access	Shuva (2012)
9.	Improved preservation or, Improve preservation	Usman Alhaji (n.d.) and Shuva (2012)
13.	No physical boundary	http://librarydigital1.blogspot.com/2011/02/digital-library.html
14.	Information retrieval	http://librarydigital1.blogspot.com/2011/02/digital-library.html

15.	Added value	http://librarydigital1.blogspot.com/2011/02/digital-library.html
16.	Space	http://librarydigital1.blogspot.com/2011/02/digital-library.html

Table 2.2: Importance of Digital Library

iii. **Challenges that Impede the Growth of Digital Libraries:**

The optimism and hype from the early 1990's has been replaced by a realization that building digital libraries will be a difficult, expensive, and long-term effort (Lynch and Garcia-Molina, 1995). The serious issues facing the development of digital libraries are outlined below:

No.	Challenges faced by digital libraries	Authors
1.	Improved technology	Library of Congress (2003)
2.	Search and retrieval tools	Library of Congress (2003)
3.	Incorporating the contribution of users	Library of Congress (2003)
4.	Interoperability	Library of Congress (2003) and Ajmal Khan(n.d.)
5.	Intellectual property	Library of Congress (2003)
6.	Effective access	Library of Congress (2003)
7.	Present heterogeneous resources	Library of Congress (2003)
8.	Make useful to different community	Library of Congress (2003)
9.	Transforming digital contents	Library of Congress (2003)
10.	Sustaining the resources	Library of Congress (2003)
11.	Long term access to digital information	Greenstein (2001)
12.	Mobilizing user community	Greenstein (2001)

13.	Collection development or, building digital collection	Cleveland (1998), Greenstein (2001) and Ajmal Khan (n.d.)
14.	Standard and best practices	Greenstein (2001)
16.	Copyright management	Dass and Yadav (2011) and Ajmal Khan (n.d.)
17.	Digital preservation	Ajmal Khan(n.d.)
20.	Metadata creation	Cleveland (1998), Ajmal Khan (n.d.)
21.	Environment and reading	Dass and Yadav (2011)
22.	Technical architecture	Cleveland (1998)
23.	Naming, identifier and persistence	Ajmal Khan (n.d.)

Table 2.3: Challenges that Impede the Growth of Digital Libraries

2.3. Development of Digital Library

Secker, 2004 stated that “Digital library developments that had resulted from automation because Online Public Access Catalogue (OPAC) was the earliest product of such development”. As we would see in the following segments, the progress was growing at an unprecedented rate, looking at the many digital library initiatives that were taking place in many countries around the world. However Borgman (2000) had cautioned that if global infrastructure could link together electronic resources, whether public or private, large or small, located around the world, it would serve as a global digital library.

The European digital library, Europeana, started in July 2007 had initially 2 million digital collections of texts, images, audio files and movies and the number was projected to reach 6 million items by 2010 (Landon, 2009).

The American Library Association had reported in its annual report 2007 that the investment in e-books at academic and research libraries rose an astonishing 68% from 2002 to 2004. (www.worlddigitallibrary.org)

An article in The Chronicle of Higher Education reported that Google too had signed a book digitization agreement with 25 universities with the Committee on Institutional Cooperation (Wilson, 2007). The climax to these developments was when UNESCO, Library of Congress and Google joined forces to build the World Digital Library (UNESCO, 2007) that was finally launched on 21 April 2009, offering information resources from all over the world, in 7 languages from 32 partner institutions.

i. Digital Library Initiative by International Organization:

Even with little funding, a large international digital library had emerged, grown and improved and National libraries of G7 countries had collaboratively created the Bibliotheca Universalis, thus establishing a global e-library system and the national libraries of 35 and Belgium, the Czech Republic, the Netherlands, Portugal, Spain and Switzerland had since joined the project (Raitt, 2000). Hewlett-Packard Digital Library was launched in 1992, thus expanding services for the 126,000 HP employees in more than 150 countries (Pack, 2000). During 2003 e library services established by world bank by making full text of its document available online. (Tedd and Large, 2005)

With many projects the for promoting digital library initiatives European Union too had taken several steps at European level with many projects such as Candle, Cecup, Debora,Decomateii, Dieper“S, Euler, Nedlib, Digicult and Miracle. Caspar was another European Union integrated project with cooperation from UNESCO, University of Leeds, University of Glasgow and International Business Machine (Collier, 2004; Liu, 2005; Giaretta, 2006). DSpace is an open source dynamic repository developed by MIT Libraries and FEDORA (Flexible Extensible Digital Object and Repository Architecture) project developed by Universities of Cornell and Virginia were examples. (Dunn, 2004)

ii. Status of Library Digitization Around the World:

Australia

Iannella, 1996 stated in his article, Australian libraries at the federal, state and university levels, together with commercial and research organizations were supporting diverse set of digital library projects. He also explored that, REDD – an Electronic Document Delivery Project, developed by the University of Queensland, Queensland University of Technology and Griffith University Libraries, had been used by staff and students of eight institutions. And revealed that, Sydney University had developed the Scholarly Electronic Text and Image Service (SETIS), a digital library of humanities databases and theses.

Harun, 2010 expressed that many notable digital library initiatives had been successful, some of which were spearheaded by the National Library of Australia as early as 1996. The National Library of Australia's digital library initiatives were done under five strategies, first, was the long-term access to digital information? Second, was the digitization program? Third, was providing digital access to the library's collection through various projects. Fourth was the Federated Resource Discovery. Fifth was facilitating a greater understanding of digital library issues. (<http://www.nla.gov.au/padi>)

The latest development that related to digital books as reported in the newspaper recently was that digital books would be available for purchase over the counter at bookstores from the first half of 2010 via participating bookstores, using new technology designed for Australian publishers and To monitor the country's digital library initiatives, a web site Australian Libraries Gateway: Australian Digitization Projects, containing information about its digitization initiatives (The West Australian, 2009, p.14).

Canada

CIDL News exposed that with a membership of more than 50 Canadian libraries of all types, Canadian Initiative on Digital Libraries (CIDL) promoted, coordinated and facilitated the development of Canadian digital collections and services in order to optimize national interoperability and long-term 45 accesses to Canadian digital library resources. Began in 2000 when they first did the CIDL Membership Survey, they had progressed steadily. (Tedd and Large, 2005).

Hareun 2010 told us that, Toronto Public Library, which is the largest public library system in Canada, had started the Virtual Reference Librarian, made possible through the collaborative efforts of TPL, the TPL Foundation, Telecommunications Access Partnerships, Ontario Ministry of Energy, Science and Technology, and the Ontario Ministry of Citizenship, Culture and Creation. Toronto Public Library loaned over 25 million items and answered 8 million reference questions a year. (<http://vrl.torontopubliclibrary.ca/vrl.portal>)

Newzealand

As illustrated by Witten (2005) The New Zealand Digital Library project, a research program at the Department of Computer Science, University of Waikato had developed in collaboration with UNESCO, Greenstone Digital Library Software and GSDL was in widespread use in many corners of the world and as of October 2006, there were 28 sites using it and as of November 2009, the latest Greenstone3 was still a research version. (Tedd and Large, 2005)

National Library of New Zealand had developed Papers Past web site containing 300,000 pages from the Alexander Turnbull Library, providing an insight into the social, political and economic happenings in the 19th century New Zealand. (<http://paperspast.natlib.gov.nz/>). New Zealand had contributed tremendously to world's digital library development through the Greenstone software.

Singapore

Chowdhury and Chowdhury, 2003 tried to establish on his article that, Singapore's digital library development was spearheaded by the Library 2000 Committee, comprising of librarians as well as the Singapore National Computer Board, to establish Singapore as 53 an international information hub. The plan included a detailed rework of 500 libraries and information centers that would enable access to information from anywhere, at any time, within the next 20 years. In 1999, iGEMS an Internet-based university portal was launched giving a number of digital library services to Nanyang Technological University. Tedd and Large, 2005 and Theng, 2005: following the above article also state that in April 2002, the e Library Hub service was launched as part of the National Library Board's Digital Library system, done in collaboration with Shanghai Library in China that included some 13,000 e-journals and online databases, 10,000 e-books and more than 700 CD-ROM and 900 video-on-demand titles.

United Kingdom

In the United Kingdom, early attempts towards library automation in the 1960's were the Birmingham Libraries Cooperative Mechanization Project (BLCMP) and South West Academic Libraries Cooperative Automation Project (SWALCAP) (Brophy, 2006). Secker, 2004 stated clearly that, digital library initiatives started in 2003 with the British Library's strategic objective which stated that by 2000 it would be a major center for the storage of and 57 accesses to the digital texts.

In September 2000, the British Library had completed a major procurement for the digital infrastructure environment, the Digital Library System – comprised two main elements – the Digital Storage Application and the Discovery and Retrieval Application and British Council, UK with branches all over the world had embarked on a massive virtual library concept through The Distance Learning Zones concept in 2000 (Louis, 2000).

United States

Mischo, 2004 summarized that, Digital library move in the United States began in 1989 by the Library of Congress when a consultant surveyed 101 members of the Association of Research

Libraries and the 51 state library agencies, disclosing genuine needs for online collections. Library of Congress, 1998 expressed that, The Library of Congress National Digital Library Program was launched in 1995, working with the National Science Foundation, universities, foundations, publishers, museums and educational bodies which began digitizing collections of Library of Congress archival materials. California Digital Library system developed in 1997 was a result of a 3-year planning process, which culminated in the establishment of Library Planning and Action Initiative (Chowdhury and Chowdhury, 2003)

Tedd and Large, 2005 found that, United States digital library development had gone beyond the normal boundary when the National Institutes of Health, the National Library of Medicine, the Department of Health and Human Services and the National Institute on Aging developed NIHSeniorHealth, a digital library of health information 63 sources to older people (60 plus) with a spoken word version also available. The conducive environments together with a strong leadership had led to many digitization projects at all levels that went beyond the local boundaries as manifested by the launching of yet another of Library of Congress's international collaborative effort i.e. the World Digital Library in 2009.

India

Shukla (2005) discussed content creation as a new trend in IT and stresses the need to develop digital libraries. The author emphasized that care should be taken to surround collections with appropriate metadata supplying context and interpretation to develop synergy and addressed issues of concern in content creation and following this Deb and Kar (2005) reaffirmed the evolutionary position of the electronic library as the predecessor of digital libraries. The concepts of a physical electronic library and a virtual electronic library are discussed including the setting up of the electronic library at The Energy and Resources Institute (TERI) and various resources and benefits of the TERI electronic library. (cited by Harun, 2010)

Mahesh and Mittal (2008): In the article, a review of Indian and foreign periodicals literature (63 studies) published on digital libraries in India had been reviewed to gain insight, assess and understand the growth, development and current status of digital library initiatives in India. The study reveals that most articles focus on developing digital libraries and digital collections except for a few studies on copyright issues and management of digital libraries. This article revealed the untouched areas such as digital rights management, security and digital library policies, digital divide, copyright, technology etc.

Dr. Jagdish Arora: Explored in his power point presentation, models for digital library, challenges and opportunities, funding for digital library, current status of digital library in India and at last he proposed a digital library model for India.

Brazil

Sergio Chaparro (2008), its purpose is to construct an exploratory case study of Brazil, considered the best case scenario, to suggest an academic library digitization model based on successful information policy-making as perceived through the lens of the Advocacy Coalition Framework theory. Three major pillars of the Brazilian case were studied: government agency officials, academic library leaders, and professional library association leaders. Findings support a model that improves and develops further academic library digitization through extensive use of advocacy and dialog on the part of all actors. The author proposed an advocacy model of digitization in developing countries.

Malaysia

Liu, 2005 told the history of automation of Malaysian libraries began in 1978 with the MALMARC Project, a centralized batch processing system for copy cataloging, initiated by the National Library of Malaysia with 5 other local universities and it finally brought to the culmination of the first initial national digital library initiative/pilot project PERDANA in 1999-2000; the National Library of Malaysia had collaborated with UNESCO in creating e-Library User Education Module, an interactive online user education program, launched in April 2003.

Harun, 2010 found that 55% of the libraries were still print based, 36% have become hybrid, and only 1% digital. Only 54% had installed library systems, led by ILMU but only 22% of the libraries had Internet access. The researcher realized that the topic on digital library development in Malaysia was still new, that libraries were still experimenting at the idea and was doing small scale digitization works. The first limitation was the sample for this study.

iii. Automation Initiatives in Bangladesh

Siddike, Munshi and Sayeed (2011): discussed in their article level of adoption of ICT in university libraries in Bangladesh and this article was the basic on this topic. This study explored that, through installation of IBM 1620 at Atomic Energy center, Bangladesh entered into the computer era and from 1980's automation introduced in Bangladesh. From the survey they found some problems in the adoption of ICT in Bangladesh according to their experiences they also recommended some suggestions.

Shuva and Akhter (2012): the aim of the paper was to explore present status of non government public libraries in Bangladesh. With the establishment of four public libraries in 1854, library movement in Bangladesh started, also the nongovernment public library movement and at present there are 972 non government public libraries. They found out through focused group discussion the establishment, membership, collection, financial status, ICT status to those libraries and the problems faced by those libraries.

Dilara Begum: This paper attempt to give a bird's eye view of the present scenario of library automation in the East West University and discusses the satisfaction level of its users after improving the automation system in this era of information technology.

Munshi: The main focus of this article is which was started in 19998 and funded by UNDP and UGC. Beside this also mention basic things about library automation, status of library automation in Bangladesh. In this respect role of DULAP, its features, objectives, technologies, facilities, browsing and main model of DULAP also stated in the article.

Shuva, Banerjee, Naningrum, Madrid, Agabirwe, Kulisooma (2011): The article discussed the importance to introduce ICT in libraries to satisfy the demand of customers, in this regard role of national libraries. The prime objective of this study was to explore the present status of ICTs in National Libraries of Bangladesh, Indonesia, Philippines and Uganda. The result of this survey was to, the National Libraries of Bangladesh and Uganda lag behind in providing ICT services than the National Library of Indonesia and the National Library of Philippines. Also stated digital library initiatives in these national libraries, problems that impede the growth of ICT development and suggest some issues that should be used by these national libraries.

iv. Status of Library Digitization in Bangladesh

K M Abdul Awwal: Conducted a comprehensive study where the research deeply focused on, to create a high speed state-of-the-art research and education network and a flagship digital library consortium for all public and private universities and research institutions of Bangladesh. The University Grants Commission of Bangladesh would like to invigorate the ICT infrastructure of the universities of Bangladesh befitting to the 21st century and to provide access to the latest ICT tools of education to all students, faculty and researchers in Bangladesh.

Shariful Islam: Attempted to investigate mainly the problems and prospects related to library digitization in Bangladesh. The findings of this paper are almost shocking, very few libraries of Bangladesh have been taken digitization programs successfully where most of the libraries are still far

behind from any sort of digitization efforts to their library. On the basis of the survey, the study ends up with some important suggestions which will definitely help the libraries of Bangladesh to overcome the problems and step forward to the digital world.

Md. Mukhlesur Rahman and Muhammad Mezbah-ul-Islam (2012): The prime objective of the study is to focus on the core concept of preserving information in the digital environment and present digital preservation practice in Bangladesh. Around the world archival institutions and research centers are actively planning and developing digital preservation policy for their resources but this practice is lagging behind in Bangladesh. In this regard this article also identified major issues and challenges of digital preservation practice in Bangladesh with some suggestions have been made.

Islam and Akhter(2013):mThe purpose of the study is to discuss the situation of open access in the developing world and also addresses why open access is important for developing countries with a focus on Bangladesh. Finally, they discuss some challenging issues of OA and suggestions on how to overcome these issues and reveal that developing countries have always faced a lack of research information and were unable to afford sufficient subscriptions to journals and in Bangladesh, only three organizations have their institutional repository.

Shariful Islam¹ & Sk. Mamun Mostofa: Purposes s of this paper is to explore the present status of digital resources in different types of libraries in Bangladesh. The survey in this article revealed that, some digital resources were found in case of special libraries and a notable number of resources were found in the academic and university libraries and in the collections of national and public libraries there were no digital or electronic resources available, though most of the libraries in Bangladesh have very limited resources. In that case, they suggest three ways to increase digital resource in Bangladesh: By Digitized Existing Materials, Through Institutional Repository, and Digital Collection Developed through Consortium.

Alom and Islam: The main objective of the study is to explore the digitization initiatives by the librarians and information professional in the private and public university libraries of Bangladesh. The study found that, the evolution of digitization and digital librarianship in Bangladesh is very much related to the initiatives of ICT adoption in libraries. According to survey, it has been evident that there exists neither digital library nor any integrated automated library system in the country and around 60% urban based libraries and information centers have brought computer and other ICT equipments in use.

Sarwat Masuda Reza: The prime focus of the study is the status of higher academic libraries of Bangladesh and the issues related to digital Libraries are also highlighted. The study explored that, the major problem of library digitization in Bangladeshi university libraries has been the lack financial support from the parent organizations, the university authority is not much aware about the library and its role in an academic environment. Most of the university libraries do not have minimum ICT facilities which reveal that full-fledged digital libraries in an academic environment have not yet been realized.

Md. Zillur Rahman: In The article, a holistic understanding of digital libraries including its present context and future directions and various technical issues related in the concept of digital library also has been analyzed. The results from the paper reveal that, Digital libraries have created tremendous opportunities for information and computer science researchers and practitioners and can meet the needs of user communities through a variety of services connected with complex collections and various structuring mechanisms for managing data and Every issue related to digital library concept needs to be handled in both local as well as global contexts.

Md. Saiful Alam conducted a survey to find out the, the problems and potential of ICT and digitization in context of the library and information sector of Bangladesh. This scenario entails that there exist a long gap between the vision 2021 and the reality of 2021. Considering these issues and socio-economic condition of Bangladesh, this paper explores existing policies, current scenario and professional challenges toward digitization and digital information systems development in Bangladesh.

Khan (2012): A nation can only then be digital when it's most important component that is, people will live in digital environment, will stay in digital mood, will be information rich and will be knowledgebase as a whole. Thus the National Library having been proper managed can play pivotal role in creating digital environment in the country and can help building the nation digital. In this respect, the author stated the present status of National Library of Bangladesh towards building information rich society in quest of Digital Bangladesh.

Kabej, Habib and Hossain (2012): the article, a proposal was prepared to establish an integrated library management system through a series of planned programs. The paper described, a total plan for preparing & implementing a complete proposal regarding the computerization or digitalization of a public university library or of an information institution. It is in fact focusing the objectives and work plans, prepared on the basis of the BUET Central Library which can be an example.

2.4. Status of Medical University and College Libraries Around the World and in Bangladesh.

Work on medical college libraries around the World:

Jena (2008): “Participative management in medical college libraries of Orissa: a comparative study”
The purpose of this paper is to examine the prevailing managerial situation in medical college libraries in Orissa, India related to participative management. The library as an organization is an open system; its members interact with one another and with an outside system, i.e. an external environment. The study focuses only on what could be defined as the basic characteristics of the organization. A total of 15 possible basic characteristics were identified and listed in the article.

Scherrer, Jacobson, Library of the Health Sciences (April, 2002): As librarians initiate new programs and services in response to developments in computer technology and user demands the prime objective of the study is to determine what new measures should be compiled. Three new categories of services to be measured are proposed by the author. The first, consultation, groups activities such as individual point-of-need instruction. The second, outreach, includes activities such as working as liaisons, providing continuing education. The third area, Web authoring, encompasses activities such as designing Web pages.

Rozic-Hristovski, Hristovski, Todorovski and University of Ljubljana (2002) revealed that, The Central Medical Library (CMK) at the Faculty of Medicine, University of Ljubljana, Slovenia, started to build a library Website that included a guide to library services and resources in 1997 and the evaluation of Website usage plays an important role in its maintenance and development. Authors developed solution for exploring and analyzing the Web logs based on data warehousing and online analytical processing technologies. The analytical solution they developed proved successful, so it may find further application in the field of Web log file analysis.

Wagner, Byrd (2004): The objective of the study was to determine if a systematic review of the evidence from thirty years of literature evaluating clinical medical librarian (CML) programs could help clarify the effectiveness of this outreach service model. The study found that, A weighted average of 89% of users in twelve studies found CML services useful and of high quality, and 65% of users in another overlapping, but not identical, twelve studies said these services contributed to improved patient care. Standards are needed to consistently evaluate CML or information’s programs in the future.

Sherwill-Navarro, Wallace and Halifax Medical Center (2004) evaluated the impact in the health care literature of research articles that provided evidence of the value of library services (including MEDLINE) as an element of quality health care. The survey of the article established that, Of the 146 citing articles written in English, 43% were written by librarians, 38% by physicians, 12% by librarians with physicians. The majority were published in medical journals, followed in order of decreasing frequency by the Bulletin of the Medical Library Association, information science journals, and health administration journals. The results of this study demonstrate that published research on the value of medical library services has an impact on the literature.

Chatopadhyay and Ghatak (2008) revealed the infrastructure, services in dental college libraries in Kolkata they conclude that library professionals should acquire IT related skills, academic and Professional qualities for providing good quality library services to user.

Wang, Gui-Zhi, et al. (2006) they described that, Medical Libraries should take the responsibility to provide medical information service for public health emergencies in the areas where they are located. Medical libraries can improve their selective information dissemination service for policy-makers, scientific worker, healthcare professionals, and the public by making use of the on-line update holdings with modern information technology.

Rathinasabapathy G. (2005) observed that the Internet gives access to a huge collection of health information to patients and professionals. Further, the training required for Librarians and Medical Professionals for evaluation of online healthcare information resources.

Bhatt (2012): The objective of the study is to find out the present status of library services, library resources, human and other infrastructural facility, IT infrastructure facilities as well as Automation status in library operations and services in Medical College Libraries of Gujarat. The results presented in article express that, majority of medical colleges have inadequate staffs for library services, medical college libraries in the Gujarat have taken a long period in starting library automation of their services, a considerable number of libraries 9(69.23%) have accessibility to server in central library.

Journal of the Medical library Association:

Issue no.	Objectives of the study.
Plutchack (January, 2012)	In the digital age, physical libraries are becoming less relevant to the communities that they serve. The potential dawning of “great age of librarians” requires that librarian seek new roles and skills and the librarians have the potential to develop the “digital culture” in ways that will serve the communities.
Speisser (April, 2012)	The article focuses on web 2.0 and libraries: impact, technologies and trends. It seems to be targeted more too academic medical libraries and web 2.0 helps readers and librarians to analyze the aspects and benefitted from web 2.0 technologies.
Tannery (April, 2012)	The role of medical librarians in medical education review articles. The result of this study suggests the involvement of librarians has slightly increased over time and librarians need to be more proactive in promoting their role as expert searcher.
Mairaj and Mustafa (July, 2012)	The article examines the current status of ICT applications in medical libraries in Pakistan. It evaluates the status of automation and the availability of Internet, Higher Education Commission (HEC) Digital Library resources, and websites in medical libraries in Lahore. The result reviewed that, 77.3% libraries have professional staff, 72.3% started automating which is at the preliminary stage.
McKinlay, James and Williamson (April, 2013)	The book is directed toward current library leaders and library staff or students who aspire to leadership positions. The authors provide a summary, tips that they call the “ART of People Management”. The book is organized into: the library business is changing, human resources, the system thinking approach, the framework for HR management, leadership in HR management, the people edge competencies. Master guide expands its scope to include databases and electronic resources.
Lasley (January,20 13)	The article provides an overview of the need for instructional design which is one of the newer educational trends in educational field and how librarian plays an important role in the process.
Miller (2013)	Understanding the metadata needs of digital collections may sound intimidating for the librarian who has little experience working with digital materials or with metadata or

	both. This book is intended for a beginner and focusing on only three schemes: Metadata Object Description Schema (MODS), Visual Resources Association (VRA) Core and Dublin Core.
Marshall, Gannett (January, 2013)	The research conducted a large-scale, multisite study on the value and impact of library and information services on patient care. Library and information resources were perceived as valuable, and the information obtained was seen as having an impact on and electronic access to information resources from multiple locations has increased the ability of health professionals to use these resources for improved patient care.
McClure (June, 2013)	New Roles for Health Sciences Librarians is to explore the work and responsibilities of the medical librarian as libraries moved from the manual to the digital environment over a period of seventy years. Much of what is described in 1943 is continued in health sciences libraries today. The major differences are the way that information and knowledge are created and delivered and the skills that practicing librarians need.
Cooper (October, 2013)	This paper identifies new health science librarian activities and new roles identified such as embedded librarians through job announcements were digital librarian, metadata librarian, scholarly communication librarian, and translational research librarian. New twists to old roles were also identified: clinical medical librarian, instruction librarian, outreach librarian, and consumer health librarian.

Table 2.4: Journal of Medical library association

Dismukes, 2009: In this digital age, medical libraries are undergoing changes to match with new technologies and to become health literate and the article recommend three practices: (1) bringing information to the user via social networks; (2) training practitioners throughout their careers; and (3) reaching out to all patients. In this regard, new roles of health librarians are: increasing financial pressure, to become health literate, cross pollination with others, understands accuracy of electronic culture etc. to make the medical librarian a valuable asset.

Khan, 1990 first publish a literature on the topic of Health sciences libraries and information services in Bangladesh which found that problems that impede the advancement of health sciences libraries and information centers in Bangladesh and also advised strategies for improving the country's health sciences information services. A survey of libraries is reported, the country's national science and

technology information policy is defined, and recommendations for action are proposed. Also revealed that, Bangladesh has 59 district hospitals, 9 medical colleges with hospitals, 1 dental college, 9 postgraduate and specialized medical institutes and hospitals, 15 colleges of nursing, and 22 specialized hospitals. There are also 397 upazila health complexes, 44 tuberculosis clinics, and 35 urban dispensaries that time.

2.5 Conclusion

Digital libraries were in the making around the world. The review of literature helped to establish a sound footing and suggesting possible answers to the research questions for a study, which is seeking to investigate and assess the implementation of digital library integration in medical college libraries in Bangladesh. From the review it is also found that, probably no document is available on the topic of digital library in medical colleges or health libraries digitization. the next chapter would be on research methodology. Chapter 3 elaborated the mechanism on research design and data collection methods to find answers to the set research objectives.

CHAPTER 3

RESEARCH DESIGN AND METHODOLOGY

This chapter describes the formulation of a research design and methodology adopted to achieve the goals for the study. After considering the objectives of the study, the level of digital library development in medical university and college libraries in Bangladesh, the research questions, the limitations and the scope, the researcher felt the appropriateness for adopting both the qualitative and quantitative data gathering techniques. Another reason for adopting both qualitative and quantitative data gathering techniques was that since there had been little documentation on the subject matter.

3.1 Research

Research is the art of scientific and systematic investigation for required information on a specific topic. Research is undertaken to explore an idea, probes an issue and solve a problem.

According to Kumar, 1992: “Research is a rational process aiming at discovery of the relationships among phenomena”

There are two major types of research approaches:

- a. Quantitative research
- b. Qualitative research

Quantitative Research:

Quantitative research refers to counts and measures of things. Quantitative Research options have been predetermined and a large number of respondents are involved. Generally end up with data reduced to numbers, which are analyzed using statistics. Frequently, quantitative research is used to support or expand a theory that already exists. Quantitative research is a study involving the use and analyses of numerical data using statistical techniques and they pose questions of who, what, when, where, how much, how many, and how.

Quantitative research is “Explaining phenomena by collecting numerical data that are analyzed using mathematically based methods (in particular statistics)”. (Aliaga and Gunderson, 2000)

Qualitative Research

Qualitative research is a method of inquiry that is normally contrasted with quantitative research, which is conducted by dealing with empirical data. Qualitative Research is collecting, analyzing, and interpreting data by observing what people do and say. Also qualitative research refers to the meanings, concepts, definitions, characteristics, metaphors, symbols, and descriptions of things. It doesn't end up with numbers. Instead, you will describe and analyze a phenomenon using words. Sometimes, qualitative research is used to develop new theory that didn't exist before.

According to Merriam (1998), qualitative research is an umbrella concept covering several forms of inquiry that help investigators understand and explain the meaning of social phenomena with as little disruption of the natural setting as possible.

The characteristics and limitation of qualitative and quantitative research are given below:

	Quantitative	Qualitative
Characteristics	<p>a. This research is objective type and it is hard science.</p> <p>b. It test theory and focus is concise and narrow.</p> <p>c. Facts are value free, unbiased and emphasize on reduction, control and precision.</p> <p>d. It is measurable, mechanistic and establishes relationships.</p> <p>e. Report statistical analysis in numbers.</p> <p>f. Context free and hypothesis.</p> <p>g. Reasoning is logistic and deductive.</p> <p>h. Highly controlled and experimental setting (outcome oriented)</p>	<p>a. This research is subjective type and it is soft science.</p> <p>b. Develop theory and focus is complex and broad.</p> <p>c. Facts are value-laden, narrow and emphasize on discovery, description and interpretation.</p> <p>d. It is interpretive, organismic and establishes meaning.</p> <p>e. Report rich narrative analysis in words.</p> <p>f. Context dependant and research questions.</p> <p>g. Reasoning is dialectic and inductive.</p> <p>h. Flexible approach: natural setting (process oriented)</p>

Limitations	<p>a. Results need to be calculated using Excel, Access, or data analysis software (such as SPSS).</p> <p>b. The larger the sample, the more time it takes to collect data, analyzes the data and analyzes results.</p> <p>c. Time consuming and quantitative data ignores a very important human element.</p>	<p>a. Because of the subjective nature of qualitative data and its origin in single contexts, it is difficult to apply conventional standards of reliability and validity.</p> <p>b. The time required for data collection, analysis and interpretation is lengthy.</p> <p>c. Researcher's presence has a profound effect on the subjects of study.</p> <p>d. Issues of anonymity and confidentiality present problems.</p>
-------------	--	---

Table 3.1: Characteristics and Limitations of Qualitative and Quantitative Research.

3.2 Research Methodology

Research methodology is a science of studying how the research is done scientifically and a way to systematically solve the research problem using various steps along with logic behind them. It specifies what methods to apply, how to measure progress and what constitutes success.

3.3 Research Method

It refers to those methods or techniques the researchers use for conducting the research. All those methods which is used by the researcher during the studying the problem are said as research methods. Research methods are concerned with the collection of data, those statistical techniques which are used for establishing relationships and used to evaluate the accuracy of results obtained.

3.4 Research Design

Mixed Method (MM) design of research (i.e. qualitative and quantitative) was followed to get the exact scenario of the present practices in medical university and college libraries and to collect opinion of the subjects under investigation.

Neuman (2003, p.172) stated that inductive research begins with empirical data, follows with abstract ideas, relates ideas and data, and ends with a mixture of ideas and data and theory develops from the ground up as the researchers gather and analyze the data, while deductive research begins with abstract ideas, follows with a measurement procedure (e.g. to test a theory or hypothesis) and ends with empirical data that represent the ideas, and theory is developed to guide

the design of a study and the interpretation of the results the researchers refute, extend or modify the theory on the basis of results.

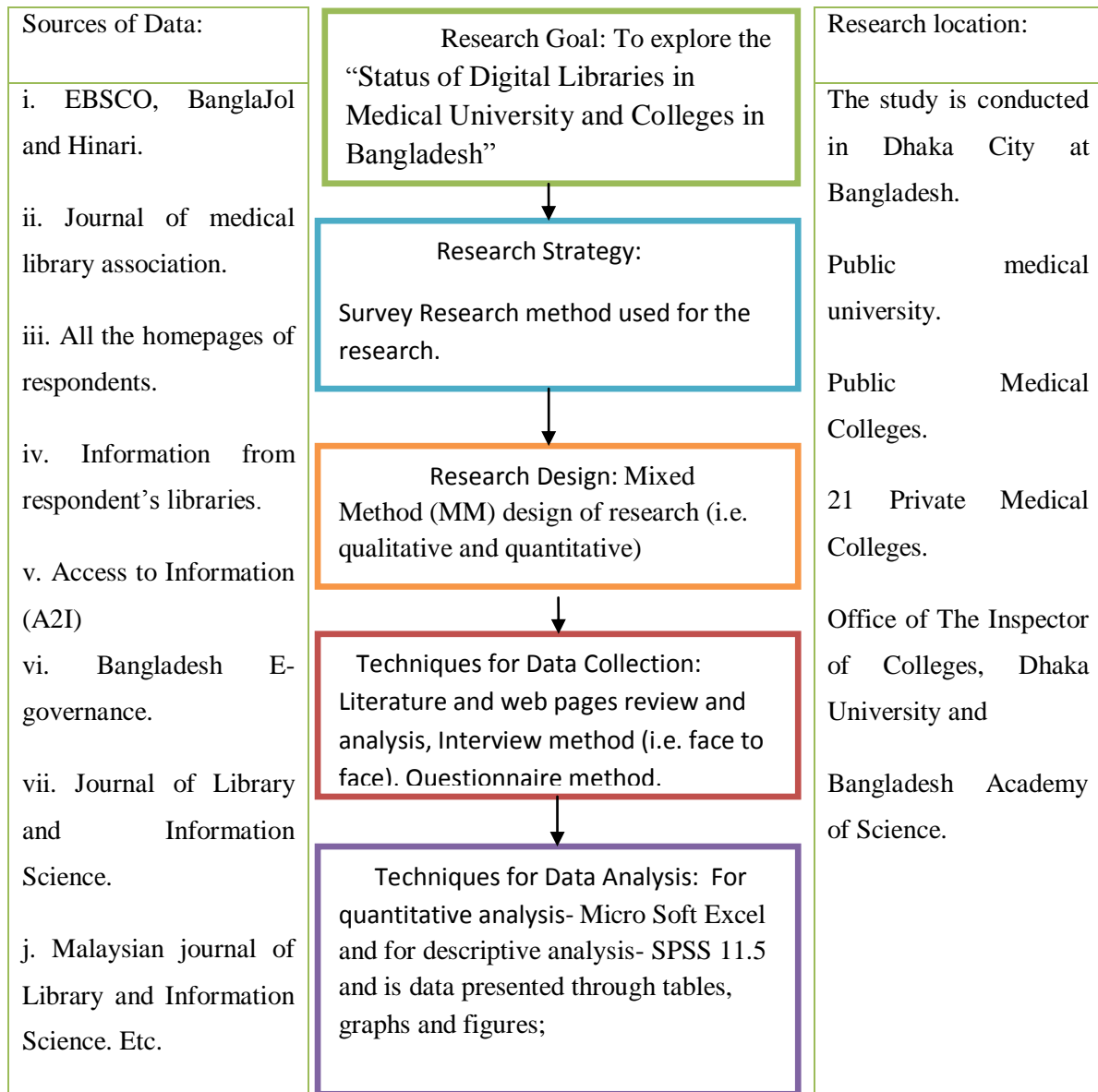


Figure 3.1: The Research Design Applied for this Research (Islam, 2012)

3.5 Conceptual Framework

A conceptual framework is used in research to outline possible courses of action. Shields and Tajalli (2006) have identified several types of conceptual frameworks (working hypotheses, descriptive categories, practical ideal type, models of operations research, and formal hypotheses) for the field of public administration. These may also be applied to the field of education.

The conceptual framework in this study is defined as the body of ideas that are viewed to be more ideal in explaining the status of medical university and college libraries against digitization. These ideas are drawn from a literature of literature from different scholars based on their research. These ideas are taken as the standards with which the study will make a determination of the quality. This means the presented ideas were the indicators that guided in determining the existence or the absence and the level or extent of the condition being looked at. The topic of the study and exploratory and explanatory nature of the research questions called for the use of mixed methods design by using quantitative and qualitative techniques. The existing practices were explored by self-completion questionnaire survey. The present study is presented as follows:

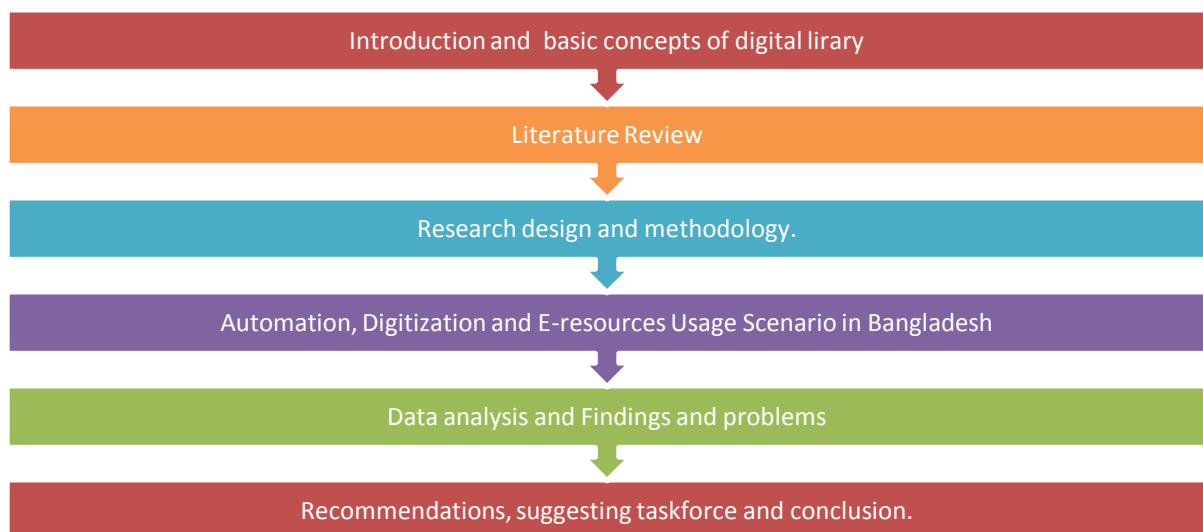


Figure 3.2: Conceptual Framework of the Study

3.6 Review of Relevant Literature

A comprehensive literature review was conducted to identify the relevant concepts, constructs, and variables for in-depth understanding of the phenomena. A large body of literature covers different aspects of digital library. Also identified, located, and searched out all relevant journals, articles and papers related to the study. The analysis of literature demonstrates that demand for d-contents, digitization policies and procedures, availability of financial resources, technological resources, and human resources are core aspects and fundamental prerequisites for digitization projects. The literature shows that structured questionnaires have been used in similar kind of studies.

3.7 Survey Research Method

In this study, the researcher used the methodology of survey research which is a method of descriptive research where a representative of sample from target population is used for data collection. Survey method should be quantitative, self-monitoring, contemporary, replicable, systematic, impartial, representative and theory-based. According Merriam Webster Dictionary: The word ‘survey’ is derived from Anglo-French word ‘surveer’ which means to look over and survey means:

- (a) To examine as to condition, situation, or value-appraise;
- (b) To query (someone) in order to collect data for the analysis of some aspect of a group or area;
- (c) To determine and delineate the form, extent, and position of (as a tract of land) by taking linear and angular measurements and by applying the principles of geometry and trigonometry;
- (d) To view or consider comprehensively.
- (e) To inspect, scrutinize. (Mathiyazhagan and Nandan, 2010)

Types of Surveys

There are different types of survey method can be categorized according to different author which are given in the following figure:

According to Hopkins, 2007:	According to Kumar, 1992:	Other types of survey:
i. Cross sectional	vi. Descriptive survey.	ix. Online
ii. Longitudinal	vii. Comparative survey.	x. Phone
iii. Trend	viii. Evaluative survey.	xi. Face to face
iv. Time cohort		xii. Mail
v. Panel		

Table 3.2: Types of Surveys

Advantages and Disadvantages of Survey research:

Advantages	Disadvantages
<ul style="list-style-type: none"> a. Data collection is faster. b. Relatively data collection is cost effective. c. More ethical than experiments. d. Wide range of participants can be accessed. e. It is the sole way of retrieving information about a respondent's past history. f. Data can be very accurate if sampling is probabilistic. g. Generalized information could be collected from almost any human population. h. Easy and cost effective. i. Rapid data collection. j. Flexibility and anonymity. k. Low cost and time. l. Automation and real time access and quality control. m. Good response rate achieved through longer interviews participants can be observed. 	<ul style="list-style-type: none"> a. Surveys may be affected by the characteristics of the respondents for example memory, knowledge, experience, motivation and personality. b. Data may not have internal validity and data may be superficial. c. Simple and straightforward approach to the study of attitudes, values, beliefs and motives. d. Survey research lacks dynamism and could also be bias. e. Can be expensive to ensure representative data and time constraints. f. It is an inappropriate tool for the study of multitudes. g. Response rates are typically low h. Not appropriate for low literacy respondent. i. In attentiveness and lack of visual elements. j. Limited sampling and respondent availability and cooperation problem.

Table 3.3: Advantages and Disadvantages of Survey Research

3.8 Population:

Selecting the population or universe and choosing the sample from the universe are important steps in survey research. The population for this study, for both the qualitative and quantitative methods, comprised of both the public and private medical university and college libraries that

were listed in the Directory of Ministry of Education in Bangladesh, 2012 (The detail of this paper is given on the Appendix-3). There were:

Types of libraries	Number
Public medical university	1
Govt. medical colleges	25
Private medical college libraries	57
Population, N	$1+25+57= 83$

Table 3.4: Population the Study

Therefore these 83 libraries (N = 83) were chosen to be the sample population and questionnaires were sent to the persons in charge, that could be professionals, semi professionals or non-professionals.

3.9 Determination of Sample Size

For sampling the researchers should choose sample that is definite and should collect limited respondent from population and after that the researcher deduce idea about the whole population. Sample design must be such that must result in, a truly representative sample, a minimum sampling error occur, viable in the context of funds availability, the systematic bias can be controlled easily and the result of the sample study can be applied for the universe with a reasonable level of confidence (Mathiyazhagan and Nandan, 2010). Choosing the sample which a subset of the population should be as large as possible and the sample size for descriptive research should be 10% of population. The respondents for the interviews were also derived from the same sampling list e.g. Directory of Ministry of Education in Bangladesh, 2012 and contacted for appointments. They were:

Types of libraries	Number
Public medical university	1
Govt. medical colleges	5
Private medical college libraries	21
Sample size, N	$1+5+21=27$

Table 3.5: Sample Size of the Study

For the interview sessions, 32.53% (N = 27) of the heads of libraries were interviewed. They must be senior librarians and of the professional group, representing four library types i.e. academic, special, state and public libraries. They were contacted by email or telephone.

3.10 Techniques of Data Collection

As explained, the study would adopt both quantitative and qualitative data gathering techniques. A survey research method was adopted to address the research questions, using the questionnaire as the main instrument. Techniques of data collection can be classified as follows:

(a) Interview: A survey instrument containing the questions asked by the interviewer in an in-person or phone survey.

(b) Questionnaire: A survey instrument containing the questions in a self-administered survey.

(c) Observation: It is especially used in studies relating to behavioral sciences. In a way, we all observe things around us, but this sort of observation is not scientific. Under observation method, the investigator himself is seeking information on his own direct observation without asking from the respondent

(d) Panel Survey: It is a method of direct extension of a questionnaire or interview survey. In a panel survey, data are collected from the same people at two or more points in time. Perhaps the most obvious use of panel data is to assess the stability of psychological constructs and to identify the determinants of stability (Mathiyazhagan and Nandan, 2010)

Among the above techniques interview and questionnaire are considered to be the most popular. For this methodology, the researcher adopted a flow plan to outline the whole thesis which begins with the objective of the research and ends with the final report of the research.

Survey data was thus obtained through pre-determined semi structured interviews through a pre-determined questionnaire consisting of 49 questions was used to gather primary information with the heads of libraries. These primary methods were guided by written interviews with semi structured questionnaire and document analysis. Secondary tools were telephone interviews of purposefully selected participants and e-mails.

Equipments for data collection are:

Sources	Channels
Interviews	Face to face interviews
Questionnaire	Semi structured questionnaire
Homepage survey	Online homepage review of Medical university and college libraries.
Document review	Reviewing articles, text and other papers on the research topic.

Table 3.6: Equipments for data collection

3.11 Conduct of Interviews

It is a type of survey research where a verbal communication is made between two people for collecting relevant information. Through this method the researcher is able to explore feelings, attitudes, and other contexts of respondents.

According to McNamara, 1999

- Interviews are particularly useful for getting the story behind a participant's experiences.
- The interviewer can pursue in-depth information around the topic.
- Interviews may be useful as follow-up to certain respondents. (Cited by Harish, n.d.)

There are five types of interview method, such as:

1. Personal Interview: it is also known as "Structured interview". It is a type of face to face two way communication between the researcher and the respondent which is carried out in a planned way. It is a face to face interview where an interviewer can read facial expressions and body language and respond accordingly.
2. Telephone Interview: The information is collected from the respondent by asking him questions on the phone. Now a day the combination of telephone and computer has made this method even more popular. It is appropriate when the researcher does not otherwise have access to the respondents.
3. Focus Group Interview: It is referred to as "unstructured interview" which involves a moderator leading a discussion between small groups of respondents on a specific topic.

4. Depth Interview: Depth interview is nondirective in nature where the respondent is given freedom to answer within the boundaries of the topic of interest.
5. Projective Techniques: The respondents are asked to interpret the behavior of others and this way they indirectly reveal their own behavior in the same situation. Some of these techniques are discussed below.

Advantages and Disadvantages of Interviews:

Advantages	Disadvantages
More information in a detailed manner can be collected.	Very expensive and time consuming method.
Personal or delicate information can easily be obtained.	Bias can operate at both interviewer and interviewee levels.
Non response rate is very low.	Sometimes difficult to get the selected sample.
Instant or spontaneous response of the interviewee can be gathered.	Train the manpower is a difficult processes
Misinterpretation of questions by the interviewee can be controlled.	Interviewer's presence on the spot may over-stimulate the respondent.
Supplementary information about the respondent's can be collected.	Questions leading to ambiguous answers pose a limitation of giving imaginary information.
It has the flexibility as the interviewer has the opportunity to restructure the questions if needed	The interviewer may have made unrecognized answers.

Table 3.7: Advantages and Disadvantages of Interviews

Semi-structured interviews were conducted in order to remain focused, given a limited time for administering the questions, yet to also allow for flexibility. Because the researcher was not able to meet the entire population face-to-face, researcher used the telephone and written interviews which were sent through e-mail. The researchers mainly used face to face interviews specifically in the area of Dhaka because telephone interviews have some shortfalls compared to face-to-face interviews. In this case the actors are: head librarians of medical university and college libraries in Bangladesh.

After the respondents were identified, the researcher called the respondents to make appointments for the day and time of the interviews. Sometimes the respondents asked the researcher to conduct the interview there and then without setting up appointments. Although the interviews were conducted based on the set of prepared questions, the researcher provided room for open-ended expressions through additional probing questions to facilitate clarifications and elicit additional opinions from respondents based on the real-life situation. Telephonic and email contacts were used to fix appointments with the interviewees outside Dhaka in Bangladesh. Personal emails were sent to the subjects in mid September till last week of November. However, the response rate was zero.

3.12 Questionnaire

A questionnaire is simply a 'tool' for collecting data about a particular issue of interest and related to the objectives of the research which a list of questions and also include clear instructions and space for answers or administrative details.

Powell & Connaway (2004) considered that questionnaire encourages frank answers, eliminate interviewer bias, fixed format questionnaire tends to eliminate variation in questioning process; provide ease to respondents to answer as per his/her time; relatively easy to collect and analyze, facilitates the collection of data in short span of time, and usually relatively inexpensive to administer.

Questionnaire can Fall into Two Categories:

- a. Self-completion questionnaires: Where respondents complete them by themselves in their own time which is also referred to as postal and electronic questionnaires.
- b. Interview schedules: Also known as face-to-face (F2F) and telephone questionnaires that are used by interviewers to ask a standard set of questions and record the responses that people give them.

Questionnaires are Commonly Used:

- To collect factual information.
- To gather straightforward information.
- To look at the basic attitudes/opinions of a group of people relating to a particular issue
- To measure the satisfaction of customers
- To collect 'baseline' information this can then be tracked over time to examine changes.

Advantages and Disadvantages of Questionnaires:

Advantages	Disadvantages
Easy tabulation of answers	Investigator may make unrecognized recognition.
It is cheaper and can contact many people.	It can only be used with educated respondents.
Easy to prepare and distribute.	Biased sample is a major problem.
Very faster and also ensures anonymity.	Ambiguous replies and omission can happen.
Provides freedom to respondents to prepare and revise the answers.	Poorly phrased questions can be serious drawbacks.
Easy to reach remote people through postal or phone	Cannot be used where spontaneous responses are needed.

Table 3.8: Advantages and Disadvantages of Questionnaires

Questionnaire Development

The questionnaire is a well established data collection instrument and offers certain advantages. The questionnaire was the main research instrument in this study, with the objective to elicit as much related information as possible from the respondents. It would contain enough questions to be able to meet survey objectives but not so many as to be off-putting to respondents. The researcher developed the questionnaire in a number of stages which are as follows-

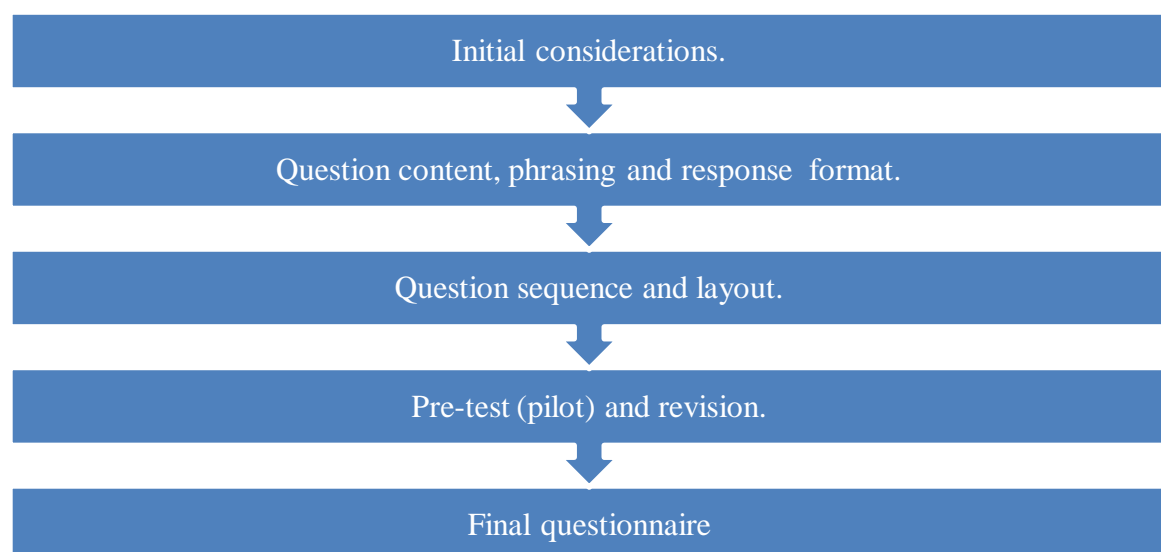


Figure 3.3: Questionnaire Design. (Oppenheim, 1992)

1. Initial considerations:

The researcher needs to decide target population, most appropriate method for administering the questionnaire (e.g. postal) and approach to sampling.

2. Question content, phrasing and response format:

The researcher needs to make sure that each question adds value, clear and easy to understand and does not cause confusion.

3. Question sequence and layout:

Questions should be numbered and ordered in a way that is logical to the respondent, with similarly themed questions grouped together.

4. Piloting the questionnaire:

It is good practice to ‘pilot’ or pre-test the questionnaire with a small sample of respondents before use.

Bearing the research objectives in mind and equipped with an extensive literature review, meetings and discussions with the library community were conducted prior to the conceptualization of the possible questionnaire items.

The questionnaire, 8 pages long, was divided into seven sections and it included open-ended question and those had been asked, covering the aspects that would meet the set objectives. Upon trial, the questionnaire could be answered within 30 - 35 minutes.

Variables of Questionnaire:

Data for analysis would result from measurement of one or more variables that had been included in the questionnaire. The seven sections were:

Seven categories	Variables
Part A: Demography had 9 variables:	(1) Name of the library (2) Web address (3) Year of establishment (4) Name of the head of the librarian (5) Email(6) Telephone number (7) Library type(8)Staff (9) Collection
Part B: ICT and Automation had 5	(1) year ICT introduced (2)automation status (3) automation software (4) automation services (5) human resources

variables	
Part C: Digitization project had 15 variables:	(1)DL status (2)Year introduced (3)DL project (4) DL policy (5)DL software (6)DL services (7)IR software (8)Collections (9)Equipments (10) Storage facilities (11)Access (12) Trainings (13)Updating (14) E-resource consortium (15) Metadata standards
Part D: Budgets had 2 variables:	(1)Source of funding (2) Amount of budget
Part E: Problems had 8 variables:	(1)Lack of professional staff (2)Lack of IT staff (3)Lack of adequate staff (4)Lack of training(5)Lack of Integrated library software(6)Lack of local vendor(7)Lack of budget(8)Lack of sufficient fund(9)Lack or digital library initiatives(10)Utilization of digital resources(11)Concern about cost (12)Infrastructural facilities(13)Speed of internet connections (14)Coordination(15)Copyright issues(16)Subscribe digital resources (17)equipments(18)Not up to date(19)National digitization policy (20)Bureaucracy(21)Inadequate salaries(23)Less concern of university management (24)Government concentration etc.
Part F:DL development in future had 8 variables	(1)Plan(2)Preference of DL work(3)DL software (4)Methodology(5)Trainings(6)Proposal(7)Fund (8)DL services.
Part G:Valuable suggestions for DL development	

Table 3.9: Variables of Questionnaire

3.13 Research Visit

The researcher visited almost all of the medical university and colleges in Dhaka city and makes on the spot observation and study. The researcher physically examined and checked the overall scenario and ICT, automation and digitization status of those libraries. The duration of data collection was from 23rd September to 22nd October.

3.14 Data Analysis

Data analysis is the process of qualitative research of studying the documents to get deep understanding of the topics which is being researched. Researcher used the both qualitative and quantitative methods for data analysis.

Patton (2002) indicates that document analysis includes studying excerpts, quotations, or entire passages from organizational, clinical, or program records, memoranda and correspondences, official publications and reports, personal diaries, and open-ended responses to questionnaires and surveys.

Thematic principle had been applied in the process of qualitative data analysis. The efforts resulted in the receipt of 27 self- completed questionnaires. Only two libraries refused to respond with the information as a policy matter. The response rate was 32.53% which was considered appropriate to do quantitative analysis of the collected data. The data was numerical and presented nominal, ordinal, interval, and ratio scales of measurement.

All the questionnaires were consequently coded after editing for computer input. Data are analyzed using the following applications:

- (1) The collected information had to be sieved, sorted, grouped and assembled.
- (2) In accordance with the question numbers that acted as the coding system in order to solicit the emerging issues/points and to establish certain patterns in all the answers.
- (3) Presenting them on output tables.
- (4) Micro Soft Excel and the Statistical Package for Social Sciences (SPSS), ver. 16.0 were used for data analysis purposes.
- (5) Presented through Micro Soft Word.
- (6) Tables, graphs, charts also have been used.

The findings of the study are described in a separate chapter. The methodology helps the researcher to successfully complete the objective of the study and present the information in a well organized way and retrieve the relevant information for the study.

CHAPTER 4

AUTOMATION, DIGITIZATION AND E-RESOURCES USAGE SCENARIO IN BANGLADESH”

Now a days, quality and success of any activity including management, teaching, learning and research depends on effective use of Internet, which enable retrieve, and incorporation of relevant up-to-date information existing in any part of the world. Website can provide useful and most necessary information for any kind of research.

Libraries are the storehouse of knowledge as they maintain the book and other knowledge resource available - mostly in printed form. However, with the advent of digital technology and Internet connectivity, the library scenario is changing very fast. Digital technology, Internet connectivity and physical content can be dovetailed resulting in Digital Library. Data available in physical form has been preserved digitally in Digital Library. Digital Libraries have the ability to enhance access to information and knowledge. They also Bridge barriers of time and space.

4.1 ICT-BANGLADESH:

As a key element of success or development information and communication technologies (ICTs) were recognized by World Summit on Information Society (WSIS) in Geneva in 2003 and in Tunis in 2005 (Tunis Commitment). Digital Bangladesh by 2021 vision of present government proposed that, to develop quality education, healthcare and to remove poverty ICTs must be used as main tool.

Bangladesh has a relatively long experience in the use of computers – the first “second generation” computer was installed in 1964 at Dhaka by Atomic Energy Center with the installation of an IBM 1620. Subsequently, the use of the computer was established at the Institute of Statistical Research and Training (ISRT) followed by the Bangladesh University of Engineering and Technology (BUET), Janata Bank in 1969, Adamjee Jute Mills Ltd in 1970 and Bureau of Statistics in 1973.

During 1990, Ministry set up the Bangladesh Computer Council which is an autonomous body responsible for encouraging and providing support for ICT-related activities in Bangladesh. More than 600 Million people worldwide have some sort of access to the Internet. That is an astonishing number and reflects the rapid growth of the network since it was invented in 1970s. The Internet came late in Bangladesh, with UUCP e-mail beginning in 1993 by Pradesta Ltd and IP connectivity in 1996. In mid 1996, the Very Small Aperture Terminal (VSAT) base

data circuit was commissioned and after that Internet connectivity was established and available to public. There were an estimated 5,500 Internet provider (IP) and UUCP accounts. Some of the ICT-related key education indicators for the country are shown in Table.

ICT parameters	Value	Year
Internet users (per 100)	0.3	2008
Internet subscriber (per 100)	0.1	2008
Broadband subscriber (per 100)	0.03	2008
Mobile coverage (%)	90	2007
Mobile subscriber (per 100)	21.7	2007
Personal computer (per 100)	2.42	2006-2007
Internet affordability	22.1	2007
Mobile affordability	2.6	2007
Radio subscriber (per 1000)	42.6	
Household with TV	22.9	

Table 4.1: ICT-related key education indicators (www.itu.int; www.mdgs.un.org ;)

4.1.1 Use of ICT in Libraries:

Information technologies have revolutionized the whole world which also blows out on Bangladesh to move toward paperless society. Computer technology has opened a new dimension for information dissemination from various types of computerized databases and online resources. It has reduced operating cost and time, generated various types of report on library activities, send overdue notice to the clients etc. So the libraries are now become data, information and knowledge banks. Technologies are making our life very easy from the advent of computers to the present time of digital Bangladesh. Though, since 1964 government departments begun using computers but in libraries the use of computers started by the beginning of 1980s and there has been made very little progress from 1964-1997. Up to this time around 50-60% urban based libraries and information centers have started using computer and related technologies in

their activities. Except a few, these activities are basically confined in official works in-house database maintenance and sometimes in static website maintenance.

4.1.2 National ICT Policy:

To effectively harness the power of ICTs, Bangladesh formulated its first National ICT Policy in 2002 which is known as “National ICT policy 2002” but could not reach the professed levels of success due to lack of appropriate infrastructure plans to achieve the goals set in the policy. The second ICT Policy has been released in 2008 with a aim at “Bangladesh is expected to become a ‘knowledge society’ within one generation” (MoSICT, National ICT Policy -2008, p.3) and was passed in 2009.

The National ICT policy 2008 document is structured as a hierarchical pyramid having three layers on its vision statements. The first layer includes 10 broader objectives- (1) Social equity (2) Productivity (3) Integrity (4) Education and research (5) Employment (6) Strengthening exports (7) Healthcare (8) Universal access (9) Environment, climate and disaster management (10) Support to ICTs. The second and third layer includes 56 strategic themes and 306 action items. Unfortunately, library system could not take its position neither in the 10 broader objectives nor in the 56 strategic themes.

However, digital library systems and its different aspects of ICT applications in libraries have been reflected in different action items in the strategic themes shown below (National ICT Policy 2008: proposed).

- a. In the long range planning, Central Public Library and divisional branches and all district branches are to be included gradually. There is a special argument for building a National Research and Educational Network. The action plan 152 urges to bring all universities including Open University under a National Research and Education Network (NREN) and in 153 to bring all colleges under National University under this network.
- b. Upon implementation the government targets to reduce 75% costs particularly for ICT industry.
- c. May create opportunity to enter into e-governance and paperless society.
- d. Action plan 281, 291-94 will help all students access to knowledge of ICT; get connected to internet at an affordable price and to reduce digital divide between rural and urban. There is scope for taking necessary action steps for digitization, e-books, e-journals production and promotion but unfortunately nothing is found.

- e. Open source software has been encouraged in all educational institutes to enhance learning and knowledge creation in the ICT policy 2008 (Alam, n.d).

The Government of Bangladesh also issued the Right to Information (RTI) Act 2009 in the Bangladesh Gazette on April 6, 2009, encouraging digital libraries, open access and information centers.

Category of libraries:

Currently there are 972 Non-Government public libraries running in Bangladesh, also BD has 34 public universities, 54 private universities and 2 international universities including their libraries. (UGC, 2009). According to Bangladesh bureau of educational information and statistics, 2010 there is 251 public and 2899 private colleges; 15 public and 27 private medical college; 1 public and 8 private dental college, 1 public nursing institute; 1 public and 1 private homeopathic college; 37 public and 97 polytechnic institutes.

Automation Section of National Library was set up in 1996 with 6 computers. Users are not fully satisfied with the traditional services provided by National Library of Bangladesh. ICT status in National Health Library and Documentation is better than National Library of Bangladesh there are not any kind of digital resources available in the national library of Bangladesh which can be fall in the following categories; E-journals, Electronic books, E-Dictionaries, E-Reference books and Reference databases. Among the 68 government public libraries only 14 public libraries have computers for administrative use. Bangladesh Central Public Library has 18 computers and the other 13 libraries have one computer each and with no internet connection

According to the rule of the government for affiliation, any college must have a library with minimum 500 collections. ICT statuses of some private university libraries are quite satisfactory. They are offering time befitting services to its users. ICT status in public university libraries in-comparison with some private university libraries is not satisfactory. There are around 1000 special libraries in Bangladesh. The exact number of special libraries functioning is not known since no one has taken this initiative up to now. Notable special libraries includes: ICDDR-B Library, BIRDEM, SAARC Agricultural Information Center, CIRDAP Library, Community Development Library etc. Special libraries of Bangladesh offer good number of ICT based services to its users. Special libraries based in Dhaka offer time befitting, up to- date library services to its users (According to Shuva, 2012).

4.2 Mobile Library Services in Bangladesh:

Mobile library or book mobile is the use of vehicle which is equipped with library materials most probably the books and operated to provide services, which is just like portable brunch library. The first Bookmobile in the United States was developed by Mary Lemist Titcomb (1857-1932).

According to the report of 1979, in several parts of Bangladesh 49 public libraries were granted to make mobile library by the ministry of religious and Cultural affairs and Sports. BISWA SHAHITYA KENDRA (BSK) started the mobile library program with the help of Norwegian funds in 1998. (Cited in the document of Chowdhury and Islam, 2007)

4.3 Automation:

The era of library automation in Bangladesh is 1980s. The pioneer of creating bibliographic database by using microcomputers is The International Center for Diarrhoeal Disease Research, Bangladesh (ICDDR, B) library (Cited in Computerisation of libraries in Bangladesh: Ahmed, Munshi and Ahmed, 1997). In 1998, the library started its automation program named as Dhaka University Automation Project (DULAP) which is the largest and first automation project in Bangladesh with the fund of United Nations Development Programme (UNDP) and UGC (University of Grants Commission). The university library used world prominent software Graphical Library Automation System (GLAS). But after more than five years the authority launched the program without completing the project. To date, barcode levels have been transplanted to only 1, 05,700 books out of total 6,00,000 books at two libraries. The project needs 31,400 digitized borrower's cards, but the authorities could provide only 700 such cards (Hasan, 2006).

The East West University library is completely automated by the Software Development Centre (SDC) of the institution. It provides the service of online catalogue search and it is open to all. Ayesha Abed Library, BRAC University library is a fully automated library, which provides an OPAC and few other digital library facilities like subscription of internationally published e-journals such as HINARI, AGORA, JSTOR, DOAJ, PUBMED; in-house publications such as CSE, RED, BU-IED, BRAC, SPH. Library website also provides links to several online national daily newspapers.

4.4. Digital Bangladesh:

One of the campaign promises of the interim Awami League government was a "Digital Bangladesh" by 2021 which was used in December 29, 2008 election. The philosophy of "Digital Bangladesh" comprises ensuring people's democracy and rights, transparency, accountability,

establishing justice and ensuring delivery of government services in each door through maximum use of technology-with the ultimate goal to improve the daily lifestyle of general people. The scope of “Digital Bangladesh” assumes that: the government wants to make Bangladesh fully digitized by 2021 through application of third generation information and communication technology (ICT). It is assumed that by 2021 Bangladesh will have a countrywide application of 3G ICT to institutionalize the best management practices in every sector and sub-sector. This means digitization should start simultaneously with the education and health sectors(Bairagi, Rajon and Roy, 2011).Scenarios of digital Bangladesh are discussed in the following passages:

4.4.1 Access to Information (A2I) Programme:

The Access to Information (A2I) Programme with technical assistance from UNDP was initiated in September 2006 to support the e-Governance cell at the Prime Minister's Office with the vision of creating a digital Bangladesh by 2021. The National ICT Policy of 2002 gives importance to the issues of e-Governance, declaring that "the Government shall use ICT systems within the public administration to improve efficiency, reduce wastage of resources, enhance planning and raise the quality of services." The Government of the People's Republic of Bangladesh further approved a National ICT Policy 2009 on 1st April, 2009 which is a revised version of National ICT policy 2002. The project aims:

- a. To ensure the appropriateness of new initiatives and programmes for e-Governance within the national priorities.
- b. To support the development of new projects and programmes for ICT for Development and provides technical assistance for monitoring and evaluation of these projects.
- c. To prioritize and mainstream ICT into the national development policies and to assist in the development of a national e-Governance Vision and strategy that can harness digital opportunities.

4.4.2 Swanirvar Bangladesh:

For creating self-employment for learners and jobless youths through online outsourcing training all over the country a memorandum of understanding (MoU) was signed at Prime Minister's Office between Support to Digital Bangladesh (A2I) Programme and Swanirvar Bangladesh with the financial support of UNDP, on 4 April 2012. Already under the purview of MoU, Swanirvar Bangladesh and A2I are jointly organizing and conducting Earning and Learning Programme's online outsourcing training nationwide at Zilla, Upazilla and Union Levels as well

as formulating new development plans like the development of ICT's and other IT and online related services which will yield a prosperous E- Generation. (www.Swanirvar Bangladesh and A2I.htm)

4.4.3 E-Governance and E-Citizens:

So, the term e-Governance is the effective and efficient use of modern information and communication technologies (ICTs) such as Internet, LANs and Mobile Phones to improve the activities of public sector organizations with a view to establish good and transparent governance and to promote democracy for any country. The Programme A2I was being designed as a follow up of the third recommendation of the 'e-Governance Plan of Action'. The government, citizen and business concerns are the three main actors in the e-governance. Such as: Citizens, central or local govt. and business or NGOs.

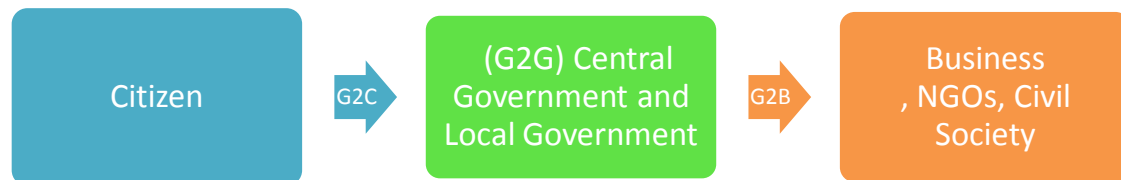


Figure 4.1: E-Governance Model

Each and every citizen able to contact with the government through a website where all forms, news and other information will be available 24/7. Also introduced e-citizens service through a portal which is designed in Bengali to ensure maximum use and also contains digitized version of different forms, so local people can download government forms. Now anyone from anywhere can download the form and fill up it at home and submit it to the respective office. (Bangladesh enterprise institute, 2010)

4.4.4.National web portal of Bangladesh:

Under the awarded project, Millennium Information Solution Ltd (Millennium) developed Bangladesh National web portal and portal for five ministries and divisions in the first phase sponsored by A2I Project PMO office. Millennium is one of the global pioneers in adopting open source technologies to build enterprise web applications, websites and portals. The present government chose to use open source technology named Joomla 1.5 CMS to develop the National Web Portal.



Figure 4.2: National web portal of Bangladesh

Through the portal, the visitor can get required information about Bangladesh government and its various organs at a glance, information related to law, agriculture, education, market prices of products, passports, health system, rules and procedures, citizen charters, statistics, important alerts and updates, different public examinations' results, parliaments and is the central access point of all ministries' and divisions' websites and can download government forms. (Bairagi, Rajon and Roy, 2011).

4.4.5 The District Web Portal:

Prime Minister Sheikh Hasina launched web portals of the country's 64 districts from her office on Jan 06, 2010 which will play a significant role in the implementation of the government's pledge to build a digital Bangladesh. UNDP Cabinet Division and Access to Information (a2i) provided the assistance in preparing the web portals. It offers information on socio economic development, history and culture of each district. (GURUMIA.COM.htm)

4.4.6 Jatiyo E-Tathyakosh:

Access to Information (A2I) programme has taken the initiative to provide a one-stop solution for sharing livelihood-related information, With the establishment of UISCs all over the country, through an online knowledge bank, the Jatiyo e-Tathyakosh (www.infokosh.bangladesh.gov.bd) which was planned in May 2010 to provide information & services to entrepreneurs. This is a national e-Content repository having the largest pool of livelihood contents in Bangla delivered through audio-visual, text and animation formats. Almost all government institutions along with NGO's and private organizations started to participate in e-Tathyakosh with their contents. Within one year, e-Tathyakosh has become a national gateway for Bangla e-content. (Jatiyo e-Tathyakosh Access to Information (a2i) Programme.htm)



Figure 4.3: Snapshot of Jatiyo e-Tathyakosh

4.5 E-resource:

The popularity of electronic resources has been gain importance for usage in Bangladesh. At present libraries of Dhaka University, Independent University, Bangladesh (IUB), Jahangirnagar University, Rajshahi University, Chittagong University, North South University, East West University, BRAC University (BU), South East University, Bangladesh Council of Scientific and Industrial Research, Bangladesh Atomic Energy Commission are subscribing to electronic resources. Probably BU showed the courage first to go for pay electronic journals by subscribing Jstor in 2002. (Awal, 2008)

4.6 Electronic resource consortium:

The libraries all over the world are developing consortia at all levels with an objective to take advantage of current global network to promote better, faster and more cost-effective ways of providing electronic information resources to the respective users. Consortium of libraries is well known for sharing of resources all over the world.

Many initiatives had taken by different universities or by intuitions for sharing information for the betterment or success of universities. Such as, In 1998, there were a networking attempt called Bangladesh National Scientific and Library Information Network (BANSLINK) initiated by the Bangladesh National Scientific Technical and Documentation Center (BANSDOC) which aim was to connect libraries across the country by setting up a network with 15 libraries 6 out of Dhaka and 9 in Dhaka via dial up links which failed due to administrative reorganization at the top and subsequent lack of appreciation. However, another attempt has been taken to build e-catalogue for university library entitled 'A Networked E-Union Catalog for Public University Libraries'. (Awal, 2008)

4.6.1 BIPC:

At last in 2006 a door was opened for Bangladesh to share resources through consortium a through International Network for availability of Scientific Publications (INASP) with a view to develop consortium for electronic resources subscription. INASP is a UK based Charity Organization funded by international organizations like UNDP, ICSU etc. Bangladesh Academy of Sciences is the focal point of the ICSU in Bangladesh Following a workshop named **BAS-INASP Workshop, 2006-** A Participatory Discussion Meeting which was held at Academy on 13 May 2006 and on that workshop they made some important recommendations and took initiatives for the INASP programme in Bangladesh. A Mou was signed between BAS and INASP. (Islam, n.d) (Habiba and Chowdhury, 2012)

As a first step, Bangladesh became a member of the network. Through this network a large number of journals of world renowned publishers are made available to the Bangladesh stakeholders who can down-load all these information at their work places at any time. (Shuva, 2010)

Second, Later on, all the public and private universities, research institutes, laboratories in the country were informed of this services & benefit of the network and they were invited to join the network. Consequently, a good number of universities & research organizations participated to the network. (Shuva, 2010)

Bangladesh-INASP-PERI Consortium (BIPC), 2007

Consequently, Bangladesh INASP-PERI Consortium (BIPC) was formed with the Primary Contact Officers of the participating organizations. The BIPC is being operated by a National Coordination Committee with Dr. M A Mazed, Director, BAS, as coordinator with all Primary Contact Officers as members. An Advisory Committee was formed during a meeting when the Vice Chancellors of the public and private universities, Chairman/Director Generals/ Directors of R&D organizations were present. Prof. Dr. M Shamsher Ali, President, BAS, became Chairman of the Advisory Committee and Prof. Dr. Naiyyum Choudhury, Secretary; BAS became the Member-Secretary of the Advisory Committee for BIPC in Bangladesh. An on-line journal network under the Program for Enhancement of Research Information (PERI) started in 2006, on trial basis free of subscription. (Awal, 2008)

From January 2007, Bangladesh started subscribing PERI/INASP and 13 organizations paid subscription for the network for an amount of US\$ 67,000. In 2008, the number of members rose to 22 and the network paid US\$ 87000 to INASP. The subscription paid to INASP by now is in the tune of US\$ 1, 60,000. Under this program, three training programmes of the IT staff, librarians, and Primary Contact Officers have been offered and more are being organized with

international and national resource persons. Every year a Steering Committee Meeting is held with the Country Coordinators and the INASP officials. Under this program, three training programs of the IT staff, librarians, and Primary Contact Officers have been offered and more are being organized with an international and national resource person. Every year a Steering Committee Meeting is held with the Country Coordinators and the INASP officials. (<http://www.bas.org.bd/bangladesh-inasp-peri-consortium.html>).

Members of BIPC:

Now, BIPC has 44 members. Among 33 public universities, 17 has access to BIPC resources; among 54 private universities, 14 universities; 11 special libraries and 2 international universities have access to BIPC resources. The following figure shows the category of members of BIPC.

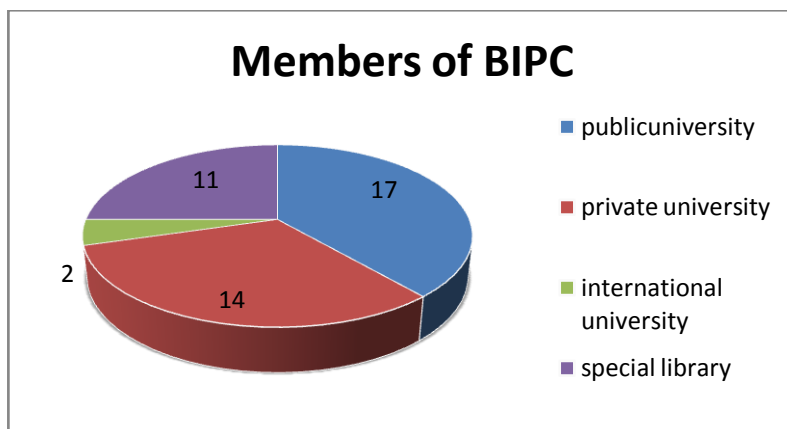


Figure 4.4: Members of BIPC. (Shuva, 2012, p. 138)

Every year the members of BIPC are growing which is shown in the following figure:

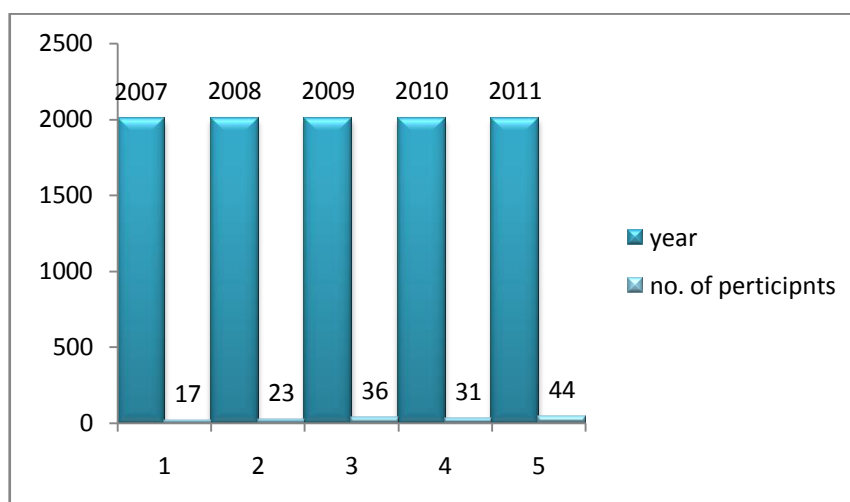


Figure 4.5: No. of participant's growth (Shuva, 2012, p. 138).

Resources available through BIPC: BIPC continuously adds new resources to its list which is shown in following table 4.6:

Year	No. of resources
2007	11
2008	15
2009	16
2010	23
2011	41

Table 4.2: Number of resources available through BIPC (Shuva, 2012, p. 138).

E-resources are selected by INASP who sends a list of resources offered for Bangladesh. The BIPC's Coordination Committee then selects resources from this list. BIPC offers technical support to the participating libraries.

4.6.2 Other consortiums:

Presently an initiative for digital resources consortium for university libraries in Bangladesh is peeping at the door. Limited access to e-resources by the users of universities due to not up to date infrastructural and ICT facilities with inadequate bandwidth and fund are major constraints in any digital library development. Another initiative to provide high quality electronic resources is the formation of UGC Digital library in June, 2012. UDL is hosted by the University Grants Commission (UGC) of Bangladesh and is largely funded by the World Bank's Higher Education Quality Enhancement Project (HEQEP). HEQEP, UGC and UDL are discussed in following section:

HEQEP:

To overcome the above obstacles the Government of the Peoples Republic of Bangladesh has undertaken the Higher Education Quality Enhancement Project (HEQEP) with the support of the International Development Association (IDA). The University Grants Commission of Bangladesh is the implementing agency of the Project.

Key Responsibilities:

(a) Review the extent and capacity of the existing Digital Library facilities utilized by universities and research institutions in Bangladesh;

- (b) Review previous assessment/studies done on Digital Library facilities in Bangladesh;
- (c) Review the extent of need and demand for Digital Library/electronic subscription by the public and private universities and research institutions;
- (d) Prepare an inventory of electronic journals and book publishers, database/knowledge resources firms, publishing houses, and peer-reviewed literature available on the web and identify the tools to track them and how those can be accessed;
- (e) Identify the international Digital Libraries that can be accessed from Bangladesh and find out the processes for accessing them;
- (f) Assess the existing IT infrastructure in public and private universities for meaningful use of the proposed digital library and propose the infrastructural improvements needed;
- (g) Review and propose the modes of Digital Library subscription by public and private universities including the mechanism for cost recovery;
- (h) Prepare an implementation plan to establish Digital Library and assess its future needs in the higher education sector and research institutions;
- (i) Produce a draft policy on Digital Library for UGC to guide future actions;
- (j) Prepare a draft institutional structure of the consortium for managing the Digital Library;
- (k) Identify the training needs and prepare a detailed training plan for the stakeholders of proposed Digital Library.

UGC Digital Library Consortium:

A. Historical background of UGC:

In 1973 University Grants Commission Library was established. The main objective of the library was to establish “Central Reference Library” of the University Libraries of Bangladesh through cooperative acquisition, stores & retrieval of information. To fulfill that objective two projects were initiated: The ‘Union Catalogue Project’ of 1984 and ‘Central Journal Library Project’ of 1989 but not implemented. The other objectives of UGC were:

- a. To establish a Central Reference Library.
- b. To collect, analyze, preserve and disseminate information of higher education.
- c. To co-ordinate and strengthen the library services among the university libraries of Bangladesh.

- d. To create library network on university education.
- e. To consolidate participation in the national and international information system.

In 1998, there were a networking attempt called Bangladesh National Scientific and Technical Library Information Network (BANSLINK). It ventured to connect libraries across the country by setting up a network with 15 libraries- 6 out of Dhaka and 9 in Dhaka via dial-up links. The initiative fell apart due to administrative reorganization at the top and subsequent lack of support. Since 1999 UGC initiated Bangladesh Education and Research Network (BERNET) and University Resources Center (URC). BERNET is an important component, it is providing Internet Services to the universities, open-up a database for all to use and maintain UGC website.

B. Establishment of UDL:

This scenario of access to electronic information resources by public and private universities of Bangladesh has improved dramatically with the formation of UGC Digital Library (UDL) in June 2012. UDL is hosted by the University Grants Commission (UGC) of Bangladesh and is largely funded by the World Bank's Higher Education Quality Enhancement Project (HEQEP). The major objectives of UDL are to:

1. Provide access to a high-quality and scholarly electronic resources to all member universities at substantially lower rates of subscription;
2. Promote rapid and efficient access to online information to the users and to promote the use of ICT in teaching and learning in the member universities;
3. Promote interaction and inter-library cooperation among the participating universities;
4. Evaluate the usage of the subscribed resources regularly and to identify new resources that are required to be subscribed under the programme;
5. Bring qualitative change in teaching, learning and research in the member institutions;
6. Increase the research productivity of the institutions both in terms of quality and quantity of peer-reviewed publications.
7. Organize training for the librarians, researchers and faculty members of the participating institutions to optimize the use of e-resources.

C. From 1 July 2012, UDL is offering access to three major online information resources: ACM Digital Library, Emerald and JSTOR. JSTOR agreed a zero annual price increase

until June 2016 and granted UDL 15% discount on its Annual Access Fee (AAF) for 2012-2016.

- D. In order to encourage participation by the public and private universities in Bangladesh, UDL has been offering subsidy on the subscription fee from the HEQEP fund. Thirty-four universities in the country, including 28 public and six private universities, are currently the members of UGC Digital Library and are accessing online resources through UDL. UDL is currently evaluating proposals for subscribing/purchasing e-books from a number of world-leading publishers/providers like Oxford Scholarship Online, ebrary, Emerald e-books and journal archives, Pearson, Sage, IEEE, Wiley, Springer, etc. It is expected that the access to e-books will be launched very soon. (Shuva, 2012)
- E. UGC Digital Library, in the near future, is also planning to develop a shared union catalogue for its member university libraries and to help them in building institutional repositories for self-archiving of university resources.

4.7 Existing Digitization Projects:

Projects information	Purpose	Document digitized
1. Library & Documentation Center Automation & Digitalization Project		
<p>From December 2008 to December 2009.</p> <p>Cost: 1, 30,000 taka.</p>	<p>The objective of the project was to ensure modern facilities to the user of the BANBEIS by digitizing the important & rare materials and available them in the online environment Library building repairing, modern library equipments purchase and also make certain modern library facilities such as digitization.</p>	<p>396 titles, 42,000 pages which were in 68 different subjects, such as research reports, educational statistics, National education survey, and education commission reports up to 1905-2009.</p>
2. Bangladesh National Library renovation, accessories and equipment purchasing project		
<p>Time: 1995-1997</p> <p>Cost: 2, 27, 00000</p>	<p>Library building repairing, modern library equipments purchase and also make certain modern library facilities such as digitization. The</p>	<p>A total number of 54,000 books consists of Personal collections of “Tangail dhonbari”, “Vaoal Raja” and “Dr. Muhammad</p>

<p>taka.</p> <p>Accomplished by: Directorate of archives & Libraries.</p>	<p>objective of the project was to make further move from traditional library to modern library as a whole.</p>	<p>Sahidullah".Secretariat library collections were also digitized during the project from 1972-1982.</p>
<p>3. IR (Institutional Repository)</p>		
<p>An ongoing project which started in 2004. Taking help from IT department of the same institution with the additional help from DEVNET for scanning purpose.</p>	<p>Preserve the own publications and disseminate them properly.</p>	<p>A total number of 2605 title of 1,60,000 page has been digitized including own publications, such as journal article, annual report, news letter, research monograph, research briefs, scientific reports, special bibliography, special publications, working papers etc.</p>
<p>4. BIDS Publication Digitization Programme</p>		
<p>2010 to continue</p>	<p>To disseminate the BIDS publication among the people of Bangladesh and abroad.</p>	<p>All BIDS publications are digitizing.</p>
<p>5. BRAC University Institutional Repository.</p>		
<p>April, 2007 to ongoing project. Funded by INASP</p>	<p>Make the library capable for promoting e-library services with the e-resources of the library and ensure access to these e-resources for the teachers, students and researchers of BRAC University and other institutes.</p>	<p>430 document of annual report, Research report, Internship report, BRAC University journal, Thesis.</p>
<p>6. Dhaka University library (DUL) Digitization project</p>		
<p>From 2000</p>	<p>To convert some selective and rare</p>	<p>Digitizing its 30,000</p>

	materials from printed to electronic form by scanning and provides a wide range of scholarly e-resources (about 35 publishers, 20,000 online journals). Very recently they have initiated to develop an institutional repository	handwritten manuscripts, 20,000 rare books, 5,000 microfilms and many special materials.
7. East West University Library (EWUL)		
June 2010, Funded by Waikato, NZ and UNESCO	Initiated a digital library program by using the Greenstone Software	digitized 1200 of their collections as of April 2012
8. E-Parliament		
Accomplished By: The Parliament Secretariat and UNDP	To turn the National Parliament of Bangladesh into e-Parliament.	Documents in the Parliament library will be digitized
8. Implementing ICT in Government Public Libraries		
July 2010 to June 2012. Cost: 51 million taka. Supported by: Ministry of Cultural Affairs.	to develop digital public libraries by providing ICT support to 64 government public libraries in Bangladesh	Already 3.75 lakh pages of old newspaper have been digitized also a number of donated books have been digitized
9. Modernization of Central Library and Establishment of E-resource Center at CVASU:		
Cost: 9 million Supported by: (HEQEP) of UGC	Modernization of Central Library and Establishment of E-resource Center at CVASU	Users will have access to e-resources center and e-library facilities and Central Library will be enriched by the logistic and digital devices

Table 4.3: Existing Library Digitization projects in Bangladesh (Shuva, 2012 and Islam, 2010)

Two very recent digitization programs in Bangladesh:

Digitization of Central library of BUET:

Bangladesh university of Engineering and Technology (BUET) received a grant from the Higher Education Quality Enhancement Project (HEQEP) of UGC for the project “Digitization of Central library of BUET” from April 2012 to March 2014 with ten objectives to be completed. The objectives are as follows:

- a. Develop digital library management software for providing access to information efficiently according to an international standard.
- b. Build a sustainable digital collection of publications, dissertations and audio-visual materials of BUET.
- c. Ensure instant remote access to digital resources from on and off campus.
- d. Connect the BUET Central library to the knowledge sharing network of the globe.
- e. Enhance the teaching and learning environments through a web based library system.
- f. Build facilities to share the resources of BUET among the growing number of universities of Bangladesh.
- g. Develop integrated library management systems using radio frequency identification (RFID).
- h. Build library security system using Closed Circuit Television to observe service quality or monitor illegal activities centrally.
- i. Maintain the library materials and information and communication technology equipment in a controlled environment using air conditioning systems.
- j. Offer orientation, presentation and training activities to improve the productivity of personnel involved in the library management. (Shuva, 2012)

The Head of the State or Head of the Government Office Library:

It came into being in the present form in 1991 after parliamentary system of government was formed. 1st February 2014 Honorable Prime Minister Sheikh Hasina inaugurated Prime Minister's Office E-library. It has more than 31 thousand reading materials. The library materials are arranged under Dewey Decimal Classification System. More than 16 thousand books have been entered in the online library management system. It is the first Administrative e-Library in

Bangladesh. This library has started web based database for bibliographic record retrieval and book lending activities. Book lending system is fully automated. The bibliographic records are being included in database day to day as per the capacity of the library personnel. Legal Matter Repository System is a repository system, which has been included published acts and ordinances, and other legal matters. (<http://lib.pmo.gov.bd/>)

4.8 Digitization of Medical University and Colleges Libraries in Bangladesh:

National science and technology information policy, 1998:

In 1986 a National Science and Technology Policy was adopted by the government of Bangladesh, and a National Science and Technology Information Policy (NASTIP) was prepared, proposed, and submitted to the government in 1988. NASTIP, which is now under governmental review, proposed that:

- a. Minimal standards for libraries and information centers and appropriate standards relating to the status of information service personnel shall be formulated, and a promotion policy shall be prepared for them.
- b. A staff development plan shall be prepared to match the appropriate information requirements of the users with the knowledge and skill necessary to meet them. To achieve this, a national institute of library and information science education, training, and research shall be maintained.
- c. Professionally qualified librarians and information specialists shall be accorded similar rank and status and conditions of service as those accorded to the professionals of equivalent educational level in other fields. Provision shall be made to attract the best talents to the profession.
- d. Libraries and information centers shall be assured adequate support for development and shall be organized according to the standards established by a national committee for science and technology information; such standards will be designed to achieve an acceptable level of service, efficiency, and competence.
- e. Sufficient money and necessary infrastructural facilities shall be made available, i.e., libraries and information centers attached to institutions shall receive 10% of the total institutional budget, and national libraries and information systems shall receive funding from the research and development budget to adequately meet the requirements.

f. Resource sharing through ILL arrangements shall be pursued to avoid duplicated effort and wasted resources.

g. All national libraries and information centers, university libraries, and resource libraries shall be linked through a telecommunication system.

i. Use and application of new information technology shall be promoted and sustained.

j. National databases of Bangladeshi scientific and technical literature shall be developed and maintained.

k. A four-tier information network consisting of a national coordinating body and focal point, national

Recently, Key initiative of E-Government in Health Care:

Area	Projects
Citizen E Services	Mobile phone based medical advice from qualified doctors (from 64 district hospitals and 418 Upazila hospital) free of charge on 24/7 basis.
	Remote online telemedicine from Community clinics to Upazila Hospitals.
	Dissemination of health care information via SMS to citizens.
	Remote phone consultation with doctors provided by all telecom operators.
Internal Automation	Logistics Management information systems
	Service statistics
	Personnel information management system

Figure 4.6: Key initiative in health care.

An analysis of the ICT in health sector reveals the following gaps which require attention from both the government and donors:

- a. Lack of coordination between departments under Ministry of Health and Family Welfare
- b. Dissemination of health content
- c. Development of a national Electronic Medical Record (EMR) Database

Digitization Projects for medical colleges:

This study is probably the first work on “**The Status of Digital Library in Medical University and Colleges Libraries**”. Even it is probably the first study on medical college libraries digitization around the world. The research found very little document on health science libraries but those are not recent and did not cover ICT, automation or digitization perspectives of health science libraries and in Bangladesh there was may be few research on medical college libraries, one of those few is “Health sciences libraries and information services in Bangladesh” but it was very old during 1990.

To achieve the Bangladesh government's efforts to provide Health for All by the Year 2021 health sciences libraries and information centers will need to provide efficient and effective information services and access to both indigenous information and the international literature. Libraries will need to develop appropriate facilities and infrastructures, improve collections, strengthen resource-sharing and networking programs and develop digital libraries in medical university and colleges.

CHAPTER -5

DATA ANALYSIS AND FINDINGS

This chapter consists of the final discussions based on results of the data analysis. The main purpose of the study was to explore the extent of ICT, library automation, online services and status of digital library in medical university and college libraries, digital library initiatives that had been done, including the problems faced in progressing to a greater height in Bangladesh. The study also wished to explore and solicit the perceived conditions for digital library future growth. The need for this study arose because studies on digital library initiatives and status of digitization of medical college libraries in Bangladesh at national level had not been done despite the fact that digital library initiatives had been extensively taking shaped worldwide. Since this research had been designed to be explorative, the digital library developments worldwide might be used as a benchmark to know where we were. These might be emulated and served as guidelines for future undertakings.

Out of 83 public and private medical university/ colleges (population N=83) the interview was conducted with 27 respondent libraries (sample size n=27). Which means that 27 questionnaire were received. Due to remote place and time limit others cannot be reached and because of valid telephone numbers and nonexistence the researcher could not reach other respondents. Findings from survey based on questionnaire are discussed on following sections:

5.1 Types of Libraries:

The respondent libraries of the study can be divided into 3 types:

Types of libraries	Population	Sample
Public medical university	1	1
Public medical colleges	25	5
Private medical colleges	57	21
Total	83	27

Table 5.1: Types of libraries

Following figure shows the percentages of respondents which consist of private medical colleges made up the largest number 78% (21) followed by public medical colleges 18% (5) and then public medical university 4% (1).

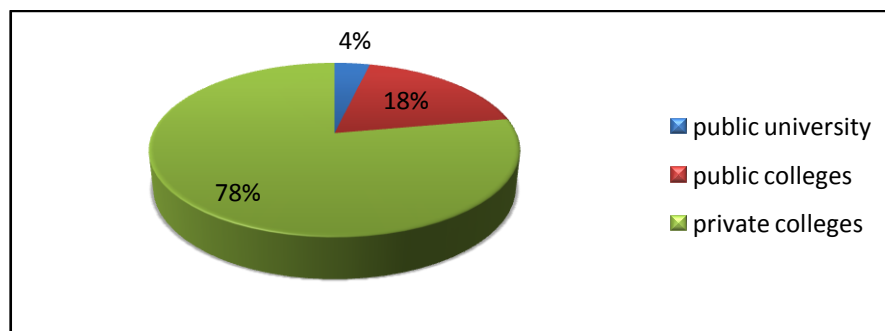


Figure 5.1: Distribution of libraries by type

Information of the participating libraries are given to the Appendix-2.

* To ensure anonymity university information on public medical university will be included under public medical colleges.

5.2 Collection Information:

This part presents data about availability of books and handbooks /reference books in different medical college libraries. It is also observed considerable numbers of resources available to serve health science professionals.

Collection amount	Public medical university/colleges		Private medical colleges	
	No. of respondents	Percentages	No. of respondents	Percentages
(A)				
No journal collection	2	33.333%	0	0%
Less than equal 100	0	0%	8	38.09%
101-500	3	50%	5	23.81%
501-2000	0	0%	6	28.57%
More than 2000	1	16.667%	2	9.52%%
Total	6	100%	21	100%
(B) Journal by your college				
journal published by your institution	5	83.33%	14	66.67%
No journal published by your institution	1	16.67%	7	33.33%
Total	6	100%	100%	100%
(C) Book collections				
Less than equal 2,000	0	0%	8	38.09%

2,001-3,000	0	0%	3	14.29%
3,001-4,000	0	0%	5	23.81%
4,001-10,000	3	50%	5	23.81%
10,000-30,500	3	50%	0	0%
Total	6	100%	21	100%

Table 5.2: Collection information.

(A) In the public medical college libraries the data pointed out those 33.333% respondents (2) have no journal collection, 50% respondents (3) have 101-500 journals and 16.667% have more than 2000 journal in their library. In the private medical college 38.09% (8) respondents have less than equal 100 journals, 23.81% (5) respondents have 101-500 journals, 28.57% (6) respondents have 501-2000 journals and 9.52% (1) respondents have more than 2000 journals in their libraries.

(B) The data found that in public medical colleges 83.33% respondents (5) published their own journal yearly 2 times and only 1 respondent does not publish journal from their own institution. The data revealed that in public medical colleges 66.67% respondents (14) published their own journal yearly 2 times and only 7 respondents (33.33%) do not publish journal from their own institution.

(C) The data found that in public medical colleges 50% respondents (3) have 4001-10000 printed books and the rest 50% respondents (3) have 10000-30500 printed books in their library. In private medical university libraries 38.09% respondent libraries (8) have less than or equal 2000 books, 14.29% (3) have 2001-3000 books, 23.81% have 3001-4000 the last 23.81% have 4001-10000 books.

5.3 Staff Information and Strength:

Staff type	Category	Public medical university/colleges		Private medical colleges	
		No. of respondents	Percentages	No. of respondents	Percentages
(A) Total Staff Number	1-3	3	50%	9	42.857%
	4-5	1	16.667%	9	42.857%
	6-10	1	16.667%	3	14.286%
	More than 10	1	16.667%	0	0%
	Total	6	100%	21	100%
(B) Professional	0-1	4	66.667%	6	28.571%

staff	2-3	0	0%	15	71.429%
	4-10	2	33.333%	0	0%
	Total	6	100%	21	100%
(C)Non professional staff	0	0	0%	2	9.524%
	1-2	1	16.667%	13	61.905%
	3-5	3	50%	6	28.571%
	More than 5	2	33.333%	0	0%
	Total	6	100%	21	100%
(D)ICT knowledgeable staff	0	5	83.333%	16	76.190%
	1-2	0	0%	5	23.81%
	More than 2	1	16.667%	0	0%
	Total	6	100%	21	100%
(E)DL knowledgeable staff	0	5	83.333%	19	90.476%
	1-2	1	16.667%	2	9.524%
	Total	6	100%	21	100%

Table 5.3: Staff Strength.

The research found that,

- (A) In public medical university/ college libraries 50% have one to three library staffs, whereas one third (16.67%) have four to five staffs and the last one third have six to ten library staff and only one respondent has more than 10 staff.
- (B) In private medical college libraries number of library staff s range from mainly 1to 10. We could say that, 42.857% respondents have only 1-3 library staffs, another 42.857% respondents have 4/5 staffs and only one respondents 6-10 library staffs.
- (C) Public medical university/ college libraries there are, two third have one professional library staff and one third has 4-10 one professional library staff. In private medical college libraries: there are, only one professional staff working in 28.571% libraries and the rest respondents (71.429%) have 2-3 professional staffs.
- (D) Public medical university/ college libraries: half of the respondents have 3-5 non professional staff in their library committee, whereas 16.667% respondents have ½ non professional staffs one third (33.333%) has more than 5 non professional staffs. In private medical college libraries: two respondents have no professional library staffs which are 9.524%, where 61.905% have 1-2 and even 28.571% have 3-5 non professional library staffs in their library team.

(E) Public medical university/ college libraries: more than two third respondents which is (83.333%) have no ICT knowledgeable staffs and only 1 respondent (16.667%) has more than 2 ICT knowledgeable staffs. In private medical college libraries: 76.190% respondents have no ICT knowledgeable staffs and only 23.81% have 1/2 ICT knowledgeable staffs in the library.

(F) Public medical university/ only one respondent have digital library knowledgeable staffs and the rest (83.3333%) have no digital library knowledgeable staffs in the library. In private medical college libraries: only two respondents (9.542%) have digital library knowledgeable staffs and 90.476% have no digital library knowledgeable staffs in their libraries.

5.4 ICT Information:

The ideal situation for a library is that they must have enough computers, printers and photocopy according users ratio and is to be connected to a campus backbone, so that library resources can be accessed not only from within the library but from anywhere on the campus.

ICT Profile	Category	Public medical university/ colleges		Private medical university/ colleges	
		No. of respondents	Percentages	No. of respondents	Percentages
(A)Number of Computer available for library use	Less than 03	3	50%	7	33.33%
	03-05	2	33.333%	12	57.14%
	06-10	0	0%	1	4.76%
	More than 10	1	16.667%	0	0%
	No computers	0	0%	1	4.76%
	Total	6	100%	21	100%
(B)Number of printers	Only 1	6	100%	20	95.24%
	More than 1	0	0%	1	4.76%
	Total	6	100%	21	100%
(C)Number of photocopy machine	Only 1	5	83.33%	14	66.67%
	No machine	1	16.67%	7	33.33%
	Total	6	100%	21	100%
(D)Scanners	1-3	6	100%	20	95.24%

	No scanner	0	0%	1	4.76%
	Total	6	100%	21	100%

Table 5.4: ICT Information

By making the category according to number of computers, printers and photocopier machines the data was analyzed.

- (A) The data (table 3-A) points out that, in public medical college libraries 3 respondent libraries (50%) have less than 3 computers, 2 respondents (33.333%) have 3-5 computers and only one respondent library (16.667%) has more than 10 computers. For Private medical college libraries the data revealed that, 7 respondent libraries (33.33%) have less than 3 computers, 12 respondents (57.14%) have 3-5 computers, only one respondent (4.76%) has 6-10 computers and even one respondent has no computer.
- (B) Table 3-B revealed that in public medical colleges all the 6 respondent libraries have one printer each. In the case of private medical colleges 20 respondent libraries (95.24%) have one printer each and only one respondent has more than one printer.
- (C) Table 3-C found that 5 respondents (83.33%) of public medical college libraries have one photocopier machines and one respondent (16.67%) has no machine. In private medical college libraries two third respondents (66.67%) have one and 7 respondents (33.33%) have no photocopier machines.
- (D) All the public medical college libraries (100%) and 20 private medical college (95.24%) libraries have one printer and one private medical library (4.76%) has no printer.

5.5 Library Automation:

Hence, librarians were asked about the status of automation in their libraries the response of librarians is mentioned in frequencies.

Automation scenario	Public medical university/colleges		Private medical colleges	
	No. of respondents	Percentages	No. of respondents	Percentages
(1) Fully Automated	1	16.67%	11	52.38%
(2) Planning to Automate	0	0%	3	14.29%
(3) NO plan so far	5	83.33%	7	33.33%
Total	6	100%	21	100%

Table 5.5: Automation scenario

Automation scenario:

In the case of public medical college only one medical university library (16.67%) is fully automated using the open source software KOHA. The others which is 83.33% have no plan for automation so far.

The scenario of private medical college is different 11 respondent libraries (52.38%) are fully automated, 14.29% (3) respondents are planning to automate their library where one third respondent libraries (33.33%) have no plan so far.

Among who are fully automated, 4 respondent libraries are using open source software, other for are using commercial software and the rest 3 are using in house developed software. But most of the librarians do not know even the name of the software they are using in their libraries.

5.6 Digitization Scenario

A. Digitization scenario		Public medical university/colleges		Private medical colleges	
		No. of respondents	Percentages	No. of respondents	Percentages
Digital library	Digitized	1	16.67%	1	4.76%
	To be introduced soon	0		9	42.86%
	No plan so far	5	83.33%	11	52.38%
	Total	6	100%	21	100%

Table 5.6: Digitization Scenarios.

Here the condition of public medical college library is same as of automation. 16.67% respondent library is fully automated and 83.33% respondents have no plan for digital library development.

In the private medical colleges one respondent (4.76%) is fully digitized, 42.86% respondent libraries have plan to introduce digital library very soon and another 83.33% (11) respondents have no plan so far.

5.7 Respondent's Website Information

The website quality of medical collages and their library's information on their website and whether their libraries have separate websites are showing in following table:

Website scenario		Public medical university/colleges		Private medical colleges	
		No. of respondents	Percentages	No. of respondents	Percentages
A. Availability of website	Total	6	100%	21	100%
B. Types of website	Static	4	66.67%	19	90.48%
	Dynamic	2	33.33%	2	9.52%
	Total	6	100%	21	100%
C. availability of library information	Through separate link	3	50%	7	33.33%
	With other site	0	0%	5	23.81%
	No library information	2	33.33%	8	38.09%
	Under construction	1	16.67%	1	4.76%
	Total	6	100%	21	100%
D. Availability of separate library webpage	Yes	2	33.33%	0	0%
	No	4	66.67%	21	100%
	Total	6	100%	21	100%
E. Availability of journal information	With other link	0	0%	1	4.76%
	Through separate link	2	33.33%	3	14.29%
	No information	4	66.67%	14	66.67%
	Under construction	0	0%	3	14.29%
	Total	6	100%	21	100%

Table 5.7: Website Information

A. Availability of website:

All the public and private medical colleges (100%) have their own website.

B. Types of website:

66.67% of public medical college libraries have static website and the rest 33.33% (2) respondents have dynamic website. 90.48% (19) of private medical college library have static website and the rest 9.52% libraries have dynamic website.

C. Availability of library information:

On the public medical college's website through separate link 50% have provided library information, no library information is provided by 33.33% (2) respondent's website and the rest 26.67% have separate library links which are under construction. On the other hand, one third (33.33%) of private medical colleges websites are provided information of libraries through separate links, little bit of information about the library is given with other links by 5 respondents (23.82%), no library information is provided by 38.09% (8) respondent's website and the rest 4.76% (1) have separate library links which are under construction.

D. Availability of separate library webpage:

Only 2 respondent libraries of public medical colleges have their own library webpage. Any of private medical college libraries do not have library website.

E. Availability of journal information:

One third (33.33%) of public medical colleges websites are provided information of journals through separate links, no journal information is provided by 66.67% (4) respondent's website. And three (14.29%) of private medical colleges websites are provided information of journals through separate links, little bit of information about the library is given with other links by 1 respondents (4.76%), no journal information is provided by 66.67% (14) respondent's website

5.8 Category of Libraries

About 8% of the libraries were perceived to be digital, while 46% were considered print-based. A rather substantial 8% of the respondents did not answer this question, and another 38% considered fully automated libraries (Table-).

Category	No. of libraries	Percentages
Digital	2	8%
Fully automated	10	38%
Print based	12	46%
No response	2	8%
Total respondents	26	100%

Table 5.8: Distribution of libraries by category.

5.9 Budget Information

Because of army rules and regulation, armed forces medical college's information could not be collected and from the conversation their budget is assumed. For the fiscal year 2012-1013 the budget was collected and for ethical rules and other regulation the librarians could not give previous years and upcoming year's budget.

Budget profile	Public medical university/ colleges		Private medical colleges	
	No. of respondents	Percentages	No. of respondents	Percentages
1-5 Lakh	2	33.333%	11	52.381%
6-10 lakh	2	33.333%	5	23.81%
11-20 lakh	0	0%	4	19.05%
21-30 lakh	1	16.667%	1	4.76%
More than 30 lakh	1	16.667%	0	0%
Total	6	100%	21	100%

Table 5.9: Budget Information

The research data pointed out that,

One third public medical university (33.33%) libraries have 1-5 lakh BD taka and another one third respondent (33.333%) libraries have budget of 6-10 lakh, 16.667% (1) have 21-30 lakh budget and 16.667% (1) have more than 30 lakhs budget for library maintenance.

In the private medical university 11 respondent libraries (52.381%) have budget of 1-5 lakh, 23.81% (5) have 6-10 lakh, 19.05% (4) have 11-20 lakh and the last one respondent (4.76%) has 21-30 lakh budget for library maintenance.

5.10 Problems Faced by Medical College Libraries

The problems are analyzed through descriptive statistics:

	N	Minimum	Maximum	Mean	Std. Deviation
Lack of professional staff	27	1.00	5.00	3.1481	1.68029
Lack of IT staff	27	1.00	5.00	3.1481	1.72546
Lack of adequate staff to help user	27	1.00	5.00	2.8148	1.49453

Lack of training to make staff efficient	27	3.00	5.00	4.9259	.38490
Lack of Integrated library software	27	1.00	5.00	3.8889	1.55250
Lack of staff to customize and maintain digital library software	27	1.00	5.00	4.5926	1.00992
Lack of local vendor support	27	1.00	5.00	2.2593	1.58339
Lack of budget	27	1.00	5.00	2.6667	1.30089
Lack of sufficient fund from govt., administrator, foreign agencies	27	1.00	5.00	3.0000	1.33012
Lack of digital library initiatives	27	2.00	5.00	4.5556	.93370
Lack of infrastructural facilities	27	1.00	5.00	3.0000	1.27098
Low speed of internet connections	27	1.00	5.00	2.2593	1.53404
Lack of coordination among departments	27	1.00	5.00	2.6667	1.24035
Lack of fund to subscribe digital resources	27	1.00	5.00	3.8148	1.07550
Not up to date holdings	27	1.00	5.00	1.9259	1.10683
Overall connectivity at affordable cost	27	1.00	5.00	3.0370	1.22416
Lack of national digitization policy	27	5.00	5.00	5.0000	.00000
Administrative bureaucracy complexity	27	1.00	5.00	3.2222	1.33973
Inadequate salaries for library personnel	27	1.00	5.00	3.4444	1.36814
Less concern of university management	27	1.00	5.00	2.9259	1.54237

Lack of government concentration	27	1.00	5.00	4.7037	.91209
Valid N (list wise)	27				

Table 5.10: Problems faced by medical college libraries

The first highest mean score is 5.00 for the statement lack of national digitization policy which men that it is a great problem for libraries, second large problem is lack of training to make staff efficient for which mean is 4.9259, third highest problem in the rank is lack of government concentration whose mean score is 4.7037 followed by 4.5926 for the problem of lack of staff to customize and maintain digital library software, then the mean score 4.5556 represent problem of lack of digital library initiatives, than 3.8148 for lack of fund to subscribe digital resources, 3.89 mean for lack of integrated library software, in the rank next problem inadequate salaries for library personnel whose is mean is 3.444, then the problem is administrative bureaucracy complexity for mean 3.2222, than mean 3.1481 is for both the problems lack of professional staff and lack of it staff , mean 2.9259 is for less concern of university management, mean 2.841 is for lack of adequate staff to help user, 2.667 is for both the problems lack of budget and lack of coordination among departments and one good of medical libraries is they have up to date collections which means that lowest mean score 1.9529 is for the problem not up to date holdings.

5.11 Situation Analysis of Participating Libraries

The advent of Information and Communication Technologies and influence of Information explosion have brought many advances in the field of knowledge, especially in medical sciences which had profound impact on medical professionals, practitioners, students in pursuing their research and patient care. The medical professionals require accurate and speedy information for updating their knowledge. Due to the elasticity of budgets and increases in journal and book prices every year, keeping in view of user needs, libraries are forced to join a consortium. Medical education aims at developing medical manpower suitable to the needs of the country.

The researcher represents the information of every respondent library which was not still documented by other articles in Bangladesh.

5.11.A Bangabandhu Sheikh Mujib Medical University (BSMMU):

- i. BSMMU is the first and only medical university in Bangladesh. It is a public university, established in 1999. Establishment of the Bangabandhu Sheikh Mujib Medical University was an upgrade of the **Institute of Postgraduate Medicine and Research (IPGMR)**. IPGMR was established in East Pakistan (now Bangladesh) by the then Government of Pakistan in December 1965, as a Government-controlled

postgraduate institute for medical research and studies. It was renamed as Bangabandhu Sheikh Mujib Medical University by the Act 1, 1998 of Jatiyo Sangshad after the first President of Bangladesh, Bangabandhu Sheikh Mujibur Rahman.

- ii. **Central Library:** Bangabandhu Sheikh Mujib Medical University (BSMMU) has a well equipped modern academic library known as Central Library. The Central Library can accommodate over 750 users at a time in its well furnished reading area. On an average 1000 doctors/ members/ teachers use the library every day. Collection consists of over 26,551 volumes of books; 5,201 volumes of bound local and international journals; 2,731 copies of thesis; 329 copies of CDs/DVDs; 1583 copies of WHO publications; 690 copies of news clippings and 652 copies of other reports.
- iii. They introduced ICT from 2005 and they have 13 computers.
- iv. All collection of the Central Library is possible to search by library management software system which is named as Library Management System "LMS" and they are currently using open source automation software named "KOHA".
- v. Its website is dynamic containing all the important information including explain the library in an organized way through a separate link.
- vi. They have a separate webpage for their institutional journal named Bangabandhu Sheikh Mujib Medical University Journal which is a double blind peer reviewed journal. It starts publishing afresh from July 2008. It is published biannually in January and July each year by Bangabandhu Sheikh Mujib Medical University. It publishes original articles based on laboratory work, field work, clinical trials and various other studies by scientific means related to the disciplines of biomedical science and health science conducted in this university and other institutes in Bangladesh and other countries.
- vii. They are the member UGC Digital Library (UDL) consortium.
- viii. Librarian-Dr. Md. Moniruzzaman Khan, also there are 7 officers, 18 staffs working in the library and 2 security personnel at the entrance.
- ix. **Digital Library:** Bangabandhu Sheikh Mujib Medical University (BSMMU) also has a modern electronic library known as Digital Library which is located at the 5th floor of "A" block. The project proposal of digitization was taken in 2010 and started digitization work from August, 2011.

They are using DSpace for their library digitization. They have digitization policy to select and acquire digital collections. So their digital library chooses and has born digital materials. At present the digital library has 86 new DELL brand computers with internet browsing facilities. The internet and e-mail facility uses 10 Mbps dedicated bandwidth. Through university LAN connection all department has access with the BSMMU Central Library and Digital Library. Other faculty members, students & staffs of BSMMU can use the following services provided by digital library.

- a. Internet browsing, e-mail check.

- b. More than 10,000 medical electronic journal's full text using many publishers like as HINARI, PERI, Medline/Pubmed, Blackwell, Springerlink, and Wiley inter sciences and many more.
- c. 2,300 medical related free online journals has link with BSMMU webpage.
- d. They have laser printer, scanner and CD/DVD writing facilities.
- e. Digital Library arranges some training program such as:
 - Basic Computer Fundamental, Microsoft Office (Word, Power point, Excel etc.) and Internet Browsing for section officers, online Journal surfing & e-Books browsing techniques for faculty members, KOHA, MARC 21 & Ubuntu for library professionals.
- f. Drawbacks:
 - IT professionals who are doing the work of digitization they do not understand clearly the term digitization; they even do not understand the difference between library automation and digital library.
 - There is so much gathering in the library ground floor.
 - For this library's huge collection there is no institutional repository.
 - Still even the users of BSMMU do not access full text document on the digital library
 - Though the project begins from 2010, the input of collection to DSpace is not completed yet.

5.11. B. Public Medical Colleges in Bangladesh

(1) Armed Forces Medical College Library

The academic activities of AFMC commenced through intake of 56 medical cadets on 20 June 1999. Initially the college was affiliated to Dhaka University. After the inception of Bangladesh University of Professionals (BUP), this college has been affiliated to it. So far, 15 batches of total 996 students have been inducted. Its Website is dynamic contains every information about its library through separate links. From its publications link by downloading its prospectus we can also get information about its library. AFMC has a well spacious library. It is enriched with different types of books and journals. The library possesses a good collection of training video films/audio cassettes and professional slides. Enrichment of library is a continuous process. Every year new and latest books are added in the collection. Armed Forces Medical Institute (AFMI) which has a stock of more than 12 thousand books covering all aspects of medical professions. The library has 3 computers, 1 printer and 1 photocopy machine. AFMC publishes Journal of Armed Forces Medical College biannually. The Journal is approved by BMDC and enlisted in HINARI as well as INASP. The journal is available at college web site as well as at www.banglajol.info/index.php/JAFMC. **Other Publications:** Magazine: AFMC Magazine (Unmesh) and News Letter: AFMC News Letter (Quarterly)

(2) Dhaka Medical College and Hospital (DMCH) Library

Established in 1946 during the British colonial rule. Since its establishment, Dhaka Medical College is continuously playing a pioneering role in dispersing medical education among young pupils. In its website, all the information about the college including library site are under construction. DMC has a well decorated library which has a collection of 30,735 books, 1205 monographs and 1 own institutional journal. Still the library follows manual processes for all services. It has no internet facilities at all. The library is very big in which it has only one computer and one photocopy machine. It is planning to automate the library system till 2015 but due to all the decisions are made by the college administration which software either the commercial or open source will be used and other decisions are not planned yet.

(3) Homoeopathic Medical College and Hospital Library

World Health Organization declared Homoeopathy as an alternative medicine. Government of Bangladesh moved for development of Homoeopathy. As a result "Govt. Homoeopathic Medical College and Hospital" established in 1984. It is the only one government reorganization institution in Bangladesh to get bachelor degree in Homoeopathy. Its official name is Govt. Homoeopathic Degree College. On their website beside this there is no information about their college, facilities and most importantly about the library. The library is situated on the 3rd floor of the college building which is big enough. It has a collection of only 7,500 books. It has only one computer which was brought in 2012. It is still an old traditional library which has 1 professional and 3 non professional staffs only.

(4) Shaheed Suhrawardy Medical College Library

Was inaugurated on 6th May, 2006. It is the 14th Government Medical College in Bangladesh. There is no information about the college, its facilities, publications and its library. The library is situated on the academic building which is well accommodated and big enough with a collection of 10,000 books, 200 journals and 1 institutional journal. It has 1 professional staff with 6 non professional staffs to help the librarian and users. Library holds every latest collection medical books but no electronic resources. It introduces ICT very recently with 3 computers, 1 photocopy and 1 printer.

(5) Sir Salimullah Medical College Library

Mitford Hospital Started its journey on 1st May, 1858. On 1st July 1875, Dhaka Medical School Started its Journey and on the 2nd April 1887, foundation stone. In 1963 the college was named after Nawab Sir Salimullah (1871-1915) "Sir Salimullah Medical College" to acknowledge the contributions of the Nawabs. In 1972 Bangabandhu Sheikh Mujibur Rahman, Father of the Nation, Upgraded it as a full-fledge medical college and the first batch student of MBBS degree enrolled in 1973. The library is situated on the ground floor of new academic building with a large collection of medical resources which consists of more than 150 Journals, 1 own journal, more than 23000 medical books and 114 thesis, PhD and research papers. SSMC has a fast developing special library section with books on educational innovations, educational psychology, instructional techniques, curriculum development, curriculum evaluation etc. Many WHO and other publications on Human Resource Development for Health are also available. 1 professional librarian and 5 non professional staffs are involved with this library. They have introduced ICT from 2006 and from then it have 1 computer, 1 photocopy and 1 printer.

5.11.C Private Medical College in Bangladesh

(1) Ad-din medical college Library

Ad-din is a non-profit private voluntary organization operates in Bangladesh since 1985. Ad-din aims to improve the health, educational, social and financial status of underprivileged people.

The college library is well stocked with books from all branches of medicine, located in 6th & 7th floor of the college building. The reading rooms at the library can accommodate up to 100 students at a time. The college library has a collection of over 5000 textbooks, references, monographs and current journals in various subjects. The library also subscribes national and foreign journals on medical and allied subjects. The library also has facilities for video cassette and CDs.

The 8800 sq. ft. library has wireless internet connectivity, and there is a separate internet browsing room equipped with computers. The library has a 30 seated computer lab. Most importantly it has virtual library site. In which it has 430 medical journals are available on this site in which: Dental 31, Medicine- 240, Nursing- 18, Public health-90. Medical books and some medical researches' are available. It also provide access to some renowned publishers site, such as: medical journals, pubmed, medlineplus, NLM gateway, Health education Assets Library, combined health information database, diseases database, merckmedicus, e-medicine, free medical books journals, atlases etc.

It has the metadata standard of national library of medicine (NLM). It newly started library automation from 2014 using open source software KOHA. It has a future plan to digitize the library through the use of open source digital library software DSpace. It has also a plan to become a member of BIPC (Bangladesh INASP-PERII) consortium

(2) Anwer Khan Modern Medical College Library

The college was established in 2008 by businessman Anwer Hossain Khan present chairman of Shahjalal Islami Bank Ltd. The college library is spacious, well furnished with comfortable sitting arrangement, located in the academic building. It has a good collection of 2000 medical textbooks, reference, monographs and 340 journals in various subjects who can provide up to date information to the students and teachers. They are also subscribing journals from HINARI and AGORA publishers. Anwar Khan Modern Medical College Journal is published twice a year (January & July issue).

They are planning to automate the library till 2014 and so they are discussing with a organization for commercial software of automation. The library is also equipped with computers. It has user-friendly access system. But here is Wi-Fi connection within the library premise and through Wi-Fi and LAN users can access the library catalogue and subscribed journals.

(3) Ashiyan Medical College & Hospital Library

Has been designed to provide broad based education and professional development for the medical students. This library started its journey from 2012. As per their objective they design their library. Fully air conditioned college library is situated at the 1st Floor of college administration building. The library is a spacious hall, well furnished with comfortable seating arrangement and silent atmosphere. It provides seating arrangement of 300 students at a time.

There is a separate reading room for the faculty members with internet facilities of its. It is run by the chief librarian with two assistant librarians & two staffs. The library is fairly enriched with collection of 1200 common textbooks, reference books and 100 important National and International Journals. They also introduced ICT from 2012 and now it has 5 computers, 1 printers and 1 photocopy. They have broadband internet connection within their library. They are using CDs/ISIS open source software for their library.

Future plan: a. plan to build a digital library within 2015 using DSpace.

b. plan to become part of BIPC.

(4) Bangladesh Medical College (BMC) Library

The first private medical college in Bangladesh. It was established in 1986 by a group of dedicated people. The website of this college does not contain any information of its library, collection or resources but it has a separate link about its journal and the volumes can be accessed on this link. The print version of Bangladesh medical college (BMCJ), published continuously since 1995, is a national peer-reviewed general medical journal published two (2) times a year. It is accepted by BMDC and has the unique eight-digit number International Standard Serial Number (ISSN) and NLM ID. The online version of this journal is made freely available to institutions and medical scholars throughout the world. All the BMCJ's original papers are published in full on the Bangladesh medical college journal website from 2010. BMC library is big enough with collection of 7,000 books and 3000-4000 journals. They follow MESH metadata standard. They introduced ICT from 1995 and now it has only 1 computer, 1 printer and 1 photocopy. They have a plan to automate their library within 1-2 years.

(5) Dhaka Central International Medical College Library

Year of establishment of this college was October, 2011. The college library is spacious, well furnished with comfortable sitting arrangement, located in the academic building. It has a good collection of 2000 medical textbooks, reference, monographs, and 1500 journals in various subjects which can provide up to date information to the students and teachers. Only 1 librarian and 2 staffs are working in this library. The library is also equipped with 3 computers, 1 printer and 1 photocopy. ICT Introduced from November, 2011. It has Wi-Fi connection within the library and user-friendly access system, the library is provided with separate reading area for students as well as teachers. It automates its library partially using commercial software through contracting other organization and through this software now only book issue and book entry have been done.

(6) Dhaka Community Medical College Library

It was established in 2008. The course is approved by Ministry of Health & Family Welfare, Govt. of the Peoples Republic of Bangladesh. The website of this medical college does not contain any information of its library, collections and journals. It has a very small library which consists of collections of 1500 books and only 21 journals. Also publishes their own journal by 2 times yearly. Library team consists of only 3 members where the librarian is only professional staff. They follow the national library of medicine (NLM) metadata standard ICT introduced from 2008. Now it has 2 computers and 1 printer and broadband internet connection is available.

(7) Dhaka National Medical College Library

Inherits her glorious predecessor the Dhaka National Medical Institute, which was established in 1925 as a part of Non-Cooperation Movement of the Indian Sub-continent against the British Colonial Rule organized jointly by the Indian National Congress and the Indian Muslim League under the Leadership of Mahatma Gandhi, Mawlana Muhammad Ali and Mawlana Sawkat Ali. From this Dhaka National Medical College (DNMC) was established in 1994. The library is located in the 6th floor of the academic building and has a collection of over 5000 bound Volume of text books, references and around 30 journals in various subjects and provides up to date information to the students & teachers. Also publishes their own journal by 2 times yearly. It has user-friendly access system. The library is provided with separate reading area for the students as well as teachers. The students can also borrow Textbooks for reading at college and home. 3 library personnel are working there. Introduced ICT in 2001. The Library is also equipped with 4 computers, 1 printer and 1 photocopy and internet access. Planning to automate within 2014 and will be using in house software. Planning to digitize within 2015 and will be using DSpace

(8) East-West Medical College Library

This medical college was established at 2002. The website of this college is of static nature and does not contain important information of libraries. Library has been set up with excellent collection of 3500 text books, reference books and 1000 Journals in various subjects and provides up-to date information to students and teachers. 1 librarian, 1 assistant librarian and 2 staff working in this library. It has 3 computers, 1 printer and 1 photocopy with computer guided different programs which provide online access to Internet.

(9) Enam Medical College Library

This college was established in 2003, fulfilling all the guidelines and criteria set up by the Ministry of Health and Family Welfare, Bangladesh Medical & Dental Council and University of Dhaka. The college library is a spacious hall, well furnished with comfortable seating arrangement and surrounding tinted glass with cool and silent atmosphere. The library is fairly enriched with collection of 4152 common textbooks, reference books, 77 important journals in various subjects which can provide up to date information to student and teachers. Also publishes their own journal by 2 times yearly. It has friendly open stack and easy access system. 1 librarian, 1 assistant librarian and 2 staffs are working in that library. Journal of Enam Medical College is a peer-reviewed journal published twice a year in January and July. Full text articles are available on the site. The year ICT introduced was 2004 and now it has 6 computers. There is WIFI connection within the library premise. The library is fully automated using in house developed software through contract with a company named Grammen.

(10) Holy Family Red Crescent Medical College

This college has come a long way in last 12 years and achieved great reputation amongst the medical colleges in the country, since its establishment in the year 2000. This medical college has a full fledged library with 2383 text and reference books and 1000 journals. Among the library personnel 3 are from LIS background and 2 are non professional staff. The librarian follows AACR2 for maintaining their collection information. The library introduced ICT from 2003 with 1 computer and 1 printer and Wi-Fi connections are available for users. The library has high speed internet facilities with HINARI access. This institute is listed in database of AVICENNA (Former WHO medical directory). The Journal of Medical Science & Research is a regular

biannual official publication of Holy Family Red Crescent Medical College published with the aim to encourage, promote and increase knowledge in the wide field of medical science through original articles, review articles, case-reports and short communications. Fully fledged automated library which used the “Library Management Software” by bringing engineers from outside. Through the automation they are providing web OPAC, automated circulation, acquisition etc.

(11) Ibn Sina Medical College

The academic activities of Ibn Sina Medical College commenced through admission of 50 students in 2004-05 academic session. Ibn Sina Medical College Library has got 3715 Books; Reference Books & 8 Journals are also there. There are 2 International Journals and also publishes their own journal by 2 times yearly.. One floor of the Academic building is dedicated for the Library which is not yet ready for use. 5 personnel are working in this library. The year ICT introduced in the library is 2005. Now it has 5 computers, 1 printer and 1 photocopy with wifi in the library premises. It is now a partially automated library which is developed through in house developed software. They are currently using Library management software. Through this they are providing only shelf checked list and RFID. They are subscribing journals from HINARI. They are using AACR2 for their cataloguing of collections. They are planning to become a digital library within.

(12) Ibrahim Medical College:

Ibrahim Medical College, established in the year 2002, is a non-profit institution of the Diabetic Association of Bangladesh. It is named after Late National Prof. Md. Ibrahim, a legendry medical scientist, teacher, physician and social reformer of Bangladesh. The Library on the 6th floor has a collection of over 4225 textbooks, references, monographs and 173 titles of journals in various subjects and provides up to date information to students and teachers. It is based on a user-friendly open-stack easy access system. The Library reading room can accommodate about 80 students at a time; students and teachers can also borrow Textbooks for use at home. Also publishes their own journal by 2 times yearly. 3 professional and 2 non professional staffs are working in this. The library is using AACR2 and DDC for respectively cataloguing and classification. Faculty and students also have access to BIRDEM LIBRARY located at the Hospital building, which has over 6000 books & monographs; and regularly subscribe over 73 medical journals.

(13) Marks medical college:

In November 2008, MARKS Medical College & Hospital starts its journey as a 250- bed hospital and this College came into existence in 2012 with a big vision to present highly qualified doctors to our country. On the website there is separate library link for library and their journal's cover page only which cannot be found because they are under construction and will be coming in few month. It has a Central Library for students and teachers at the 3rd floor of the campus with sufficient books, journals, computers etc. has a collection of over 5000 bound Volume of text books, references and 300 journals in various subjects and provides up to date information to the students & teachers. Also publishes their own journal by 2 times yearly. It has user-friendly access system. The library is provided with separate reading area for the students as well as teachers. The students can also borrow Textbooks for reading at college and home. The library is using MESH for cataloguing and NLM for classification. 1 librarian with great IT and digital library knowledge, 1 asst. librarian and 3 staffs are working.

ICT introduced from 2007 and now it has 3 computers and 1 printer only. The Library is also equipped with internet access. The librarian by his own effort and deliberation start the library automation and digitization. The library is fully automated using the open source software “KOHA” and providing the service of Web OPAC, online circulation, acquisition, hypermedia, shelf check list and RFID. Started their digitization project from April, 2013 with the budget of 7 lakh and digitize the library by using open source software “DSpace”. They have digitization policy of “Central library (MMC and MDC) automation and digitization project with CMS web design technology”. The DL software is using for library acquisition, processing, circulation and reference. The digital library has both the born digital and digitized from other materials. It has already 2000 digital resources consists of journals (e-journals-700), books and CD/DVD. They are using 1 scanner, 3 computers and 2 printers for digitizing their materials. Digital collections are accessed only through college’s Local Area Network (LAN). It requires in some cases charge to use the collections and also all materials are not made full text available. They are planning to become a member of Bangladesh academy of science (BAS).

(14) Medical Collage for Women & Hospital (301 beded General Hospital)

A project of the Medical & Health welfare trust which was established in 1992. Library has collections of Books -3523, journals-1420, slides-44, audio visual cassates- 44 & 5. Also publishes their own journal by 2 times yearly. Three personnel are from LIS background and 1 peon are working in the library. The library has been introducing ICT from 2000 and now it has 4 computers, no photocopy and 1 printer. It is also providing user access to internet through wifi.

They already fully automated their library through making contract with a company. In few days they will start providing automated library services. Library website: they have a website covering mainly hospital’s information. There is little bit of information about collection and library personnel’s name and qualification. There is no separate link for library collection, services, background etc. There is a separate link of their journals but it does not exist. They have a plan to be a digital library by 2015. They want to give responsibility to other company or use open source digital library software Greenstone.

(15) Nightingale Medical College & Hospital Library

Founded in the academic year 2005-06, the college acquired recognition & approval of the Govt. of Bangladesh & won affiliation of Dhaka University in the same year. The website is static but the entire link there is provide the same information e.g. facilities link provide the same information of glimpses of the hospital and as same as other medical college there is no information of their library, resources, publication and services.

The library has only 450 books and 400 journals in their collection. Only 1 staff is maintaining this library. A small school library is better than this library.

(16) Northern International Medical College:

Northern International Medical College Hospital was established in 2005 to provide quality medical education, research and services to people of Bangladesh at reasonable cost. It has a rich Library to serve its students, staffs and faculty members. It has over 3000 printed text as well as reference books. Besides, a large number of national and international medical related journals are also available here and Also publishes their own journal by 2 times yearly. Over 100 students can sit at a time in the Library. The Library also contains a teacher’s study corner as well as a

computer Lab. 2 non professional staffs are maintaining the library. Librarian resigned a few days ago from the research interview. Because the staffs cannot give any information, the researcher calls the previous librarian and meets with him to get answers of research questions in order to fulfill his research. ICT is available from the college's establishment. There are 5 computers for users and WI-Fi & Broad band Internet faculties are also available in the campus building of the Library. There is also a photocopy machine in the Library to serve the students. Two personnel and one Library officer is engaged to serve the students from 8.00 am to 8.00 pm

(17) Popular Medical College Library:

Year of the Establishment: 2010. Their website is static and most of the important information about this college is not provided, instead there are unnecessary things and there is not a single line about their library, collections, publication. Popular Medical College has a big library with 1500 Books & Resources, 550 journals and also publishes their own journal by 2 times yearly. 1 attendant, 1 student in charged and 1 head of the library are working in this library. It has 3 computers and 1 photocopy and no internet connection.

(18) Shahabuddin Medical College Library:

Shahabuddin Medical College was established in 2002. The College has also been affiliated with University of Dhaka and also recognized by Bangladesh Medical and Dental Council (BMDC).

Library which is air cooled and all modern facilities with all recommended 1500 Text books, Reference books, 352 Journals including 2 International journals, 50 atlas and 40 CD/DVDs are provided. Also publishes their own journal by 2 times yearly. Now they are maintaining the library by following manual library systems. In the library team there are 1 librarian, 1 asst. librarian and 1 clerk. ICT was introduced during 2005. The library has 3 computers, 1 printer and 1 photocopy with Wi-Fi connection within the library. They have a plan to automate their library very soon may be within 2014 and will use open source software "KOHA" or commercial software but they will do this by themselves. What service they will provide, required budget for automation still not decided. They also have planned to become digital library by 2015 and they will be using "DSpace". But the digital library budget and other decisions are not made yet.

(19) Shaheed Monsur Ali Medical College Library:

The College is approved by the government of Bangladesh in 1995. The college's website contains no information of its library. The college library is very big but not well decorated and organized with the good collection of 3500 books, 35 local and 6 international journals and 40 CD/DVDs are there. One librarian and 5 non professional staffs are working in that library. The library introduced ICT from 2010 and now it has only 3 computers with access to internet by Wi-Fi connection. They have attempted to automate their library by 2014 and 1.5 lakh budget is funded for that. They will be using commercial library automation software and partially they will provide OPAC, acquisition; circulation; SDI services will be performed by this.

(20) UTTARA ADHUNIK MEDICAL COLLEGE Library:

This hospital started with outdoor facility on 12th. March, 2003. Dhaka University granted affiliation to Uttara Adhunik Medical College in 2008. The website of this medical college has separate library link but which has very little information about the library. The College has a modern fully air-conditioned library with excellent collection of latest books of 2192 copies, 1554

copies of journals, magazines & newspapers and also publishes their own journal by 2 times yearly. There is a separate room for Teachers' reading room. In the library there is 1 librarian, 1 asst. librarian, 1 cataloguer and 1 clerk. In Medical Education Unit with multiple modern computers, printer, scanner, internet and a student database and also plan to provide digital camera, web cam and other modern IT related teaching materials but the library has only 2 computers, 1 printer and photocopying facility.

(21) Z. H. Sikder Women's Medical College & Hospital (Pvt) Ltd Library

The college has been established since 1992 as per permission of the Government of Bangladesh. The Medical College is affiliated with Dhaka University and recognized by the Bangladesh Medical & Dental Council. The website of this medical has information about their hospitals, doctors, history, college, curriculum, admission and even about campus life which is about their surrounding scenarios, moonlight night etc. but with great regret it has no single information about their college library. The library is very big with good infrastructural facilities and having collection of 4000 medical text books and 3500 journals including international journals. 1 librarian and 1 staff are running this library. The year ICT introduced was 2013 with 5 computers. Library is automated fully with in house developed software and they are providing OPAC, circulation, SDI services to their respective users within the library premises. They also have a future plan to develop their digital library system. The university authority has so much interest and concentration to library.

5.12 Problems Faced by the Participating Libraries

There is a clear lack of e-resources in self financed colleges due to non availability of financial aid, more stress need to be given on human resource management. Hence, there is an urgent to plan, implement and develop ICT infrastructure, automation and digitization policy that must be fit in facing the challenges ahead of them.

A. Staff Problems:

- Lack of professional staff:

Three of the respondent libraries do not have professional librarian, even in the first automated and digital medical college library BSMMU, the head of the library is a Doctor. Other respondent libraries have one or two professional library staff which a great obstacle to develop digital library system.

- Lack of IT/ technical Staff:

New tools of information technology have absolutely changed the role & responsibilities of librarians. It would be almost impossible to venture into digital library set up without the assistance of technical expertise and this had been the problem that was severely lacking.

- Lack of adequate staff to help user:

In respondent libraries, there is very few staff which is not more than 3 in libraries to help users. So the users are not provided their demandable services within short time.

- Lack of staff skills and expertise:

In the public and private medical college libraries, there is a significant number of staff members who do not have ICT skills and library software knowledge. Without Staff skills and expertise it is not possible develop digital library systems.

- Lack of local vendor support:

Subscription cost of medical books, journals and even e-resources are very costly, vendors do not support or reduce cost of resources. Beside the so much cost, vendors even do not provide subscribed resources within time limit and according to agreement between libraries and vendors.

B. Inadequate Budgets

- Lack of budget:

Constant and sustainable funding is required to maintain ICT based library system, automation and for digitization. Because of lack of budget medical college libraries cannot even afford to keep at least 5 computers. So it is seem impossible to step forward for automated digital library. Very few medical college libraries have separate budget for library digitization, so it is very hard for the libraries to undertake any sort of digitization project for lack of money.

- Lack of sufficient fund from govt., administrator, and foreign agencies:

Without sufficient fund no library can run successfully. The main funding source of public medical colleges is the Government of Bangladesh which is enough only for buying books. At the end of the day nothing is left to maintain libraries modern faculties. Because of lack of funds, several ICT based projects are nonexistent, e.g. DULAP project funded by UNDP in 1998 dropped the use of GLAS automation system because the authority is unable to pay maintenance charges. Due to the shortage of fund, private medical college libraries are still unable to establish ICT division within their organizations. Without ICT facilities it is not possible to implement digital library and having e-resources.

C. ICT and Modern facilities

- Lack of ICT infrastructural facilities:

Maximum of the respondent libraries has only one computer, even some have no computers, printers, internet connections etc. within the library. In this digital era it is matter of great sorrow. As a whole the available infrastructural facilities of the libraries of Bangladesh are not in the satisfactory level. ICT conditions of these respondents libraries is so bad that automation and digitization are beyond their capacity which made these libraries old and traditional.

- Electricity failure:

Huge load shading of electricity failure is a major challenge for Bangladesh. For which electricity dependant section of the library cannot run due to four to five hours load shedding of electricity everyday which impede the smooth growth of ICT infrastructure along with “Digital library development”.

- Low speed of internet connections:

Internet came late in Bangladesh, Wi-Fi connectivity in 1996, SEA-ME-WE-4 submarine cable connectivity 21 May 2006. World Stats as of September, 2009 there are currently 556,000 internet users in Bangladesh and the internet penetration is 0.4%. (Source: Shuva, 2010). Also the connections bandwidth available in medical libraries is very slow to use. Even to retrieve a single document or sent an important email take a long loading time which also impede the growth of their digitization.

- Overall connectivity at affordable cost: Access to ICT in Bangladesh is very poor which is shown in following figure:

ICT Access	Year	Percentage
Urban areas	2005	4.88%
	2010	8.58%
Rural areas	2005	0.17%
	2010	0.97

Table 5.11: Access to ICT in Bangladesh (Source: Shuva, 2010)

The cost of computers and internet bandwidth and subscription rate is still beyond the reach and capacity of low economic conditioned peoples or institutions. It is a major challenge for any library as well as for “Digital Bangladesh- Vision 2021” to ensure overall connectivity at affordable cost.

D. Not up to date holdings:

Because of medical books, journals and other resources are very costly; most of the medical college libraries cannot keep up to date their collection. We now that, every moment medical issues are changing with the new researches, so it is important to keep medical collections besides students cannot update themselves to provide accurate treatment to their patient.

E. Software

- Lack of Integrated library software: In the respondent libraries, they cannot afford commercial software, so they require integrated open source library software but which lacks in these libraries. Without a proper integrated library software library cannot move toward digitization.
- Lack of staff to customize and maintain digital library software: In the medical college libraries there is lack of staffs to run and maintain digital library project successfully.

F. Administrative problems

- Administrative bureaucracy complexity:

In the government supported medical colleges, library functions are managed very slowly, e.g. for acquisition of medical books, the library first call tender, then form a committee, then select one or more companies and then purchase, all this take a long time till then a new edition of books already come into market. This process of longevity also same in private medical college libraries due to the fact that all things depend on doctors without recommending librarians.

- Less concern of university management:

Most of the respondent libraries library does not get proper help and assistance regarding provides ICT based library facilities and taking digitization project. Maximum top level personnel are not have library and information science background, so they are unable to understand modern library activities like library digitization.

- Lack of government concentration:

As the government of Bangladesh do not have proper idea about digitization, so they are unable to realize the benefits of library digitization to their vision 2021 of digital Bangladesh and usually not interested to take any kind of initiative regarding library digitization.

- Lack of coordination among departments:

Lack of co-ordination of other departments with the library, even conflicts of libraries with ICT departments in building digital library.

- Lack of digital library initiatives:

Because of administration's disinterest in building digital library, they are not undertaking any initiatives for digitization. Even the government of Bangladesh is still not taking any initiative or projects to develop digitization of medical college libraries, although medical colleges need to be digitized to provide health care at root level.

- Lack of national digitization policy:

There was no government agency to control, monitor and evaluate the medical college libraries activities. There was ICT policy in 2008 but in which library cannot make better position, still no better ICT policy for libraries and even digitization policies to make the library an important part of "Digital Bangladesh" are undertaken by the government.

- Far behind from the modern library trends:

Most of the libraries of Bangladesh do not have any sort of connection with the other libraries of the world, as a result they are unaware about the library development and modern library trends across the world. More over libraries of Bangladesh generally does not encourage its employees to go abroad and gain knowledge from the world renowned libraries. As a whole library of Bangladesh is always remain far behind from the modern library trends.

G. Lack of knowledge on digital library

Librarians of medical colleges do not have traditional skills and sufficient background knowledge to meet the changing needs of their customers. Most of them do not have any idea of the term automation and digitization. Because most of the medical college libraries of Bangladesh are still not digitized, few libraries only taken library automation attempts and most of the libraries are proceed in manual system at every means. Without adequate information and knowledge they cannot be able to develop digital library.

H. Copyright issues

Facing problems with copyright issues. Copy right is another important issue which prevent the medical college libraries of Bangladesh from taking any sort of digitization project.

I. Lack of Standard and Uniformity

Medical college libraries of Bangladesh do not maintain any sort of standard and here is no competition among the libraries to better serve the user. They still believe and practice traditional library activities and services and isolated from the modern library activities around the world.

J. Training

- Training on building DL:

In the medical colleges, there is no arrangement of providing training for library staffs on practical digital library system development.

- Lack of training to make staff efficient:

With the changing library environment ant every moment innovation of ICT facilities makes the most challenging issue for library staffs. So they need to update themselves with the new technologies but there are no initiatives to conduct training in order make the staff efficient so they can keep peace with modern world.

K. Local Experts

There is a lack of local experts in medical college libraries to build, run and maintain digital library. Experts are ICT, technologies and digitization knowledgeable persons who are the key actors for digital library development.

From the study, it is evident that IT infrastructure in the medical college libraries of Bangladesh is still in different stage of development, the status of library automation and digitization in these libraries is not encouraging. Date that are analyze above clearly reveals that there are so many problems in medical college libraries they need to work on this factors to step equally with other modern universities of Bangladesh and become great resource center for medical students, teachers and to support governments vision 2021.

CHAPTER-6

RECOMMENDATIONS AND CONCLUSION

Digital library is a new area to many of the respondents interviewed and the fact that they were still learning the modern library applications and taking initial steps in planning digital library initiatives. Some were in the early planning stage, some do not have any bother of their libraries poor condition and some were contemplating what would be the best possible way to approach the matter.

This chapter consists of the final discussions based on results of the data analysis that were derived from Chapter 5. Key findings were discussed and finally, conclusions were made to wrap up the study. Therefore what this research had found reflected a gap that existed between medical college library's digital library initiatives with other digital libraries of Bangladesh and also with other countries, specifically those that had been covered in the literature review. Since this research had been designed to be explorative, the digital library developments worldwide might be used as a benchmark to know where we were. These might be emulated and served as guidelines for future undertakings. Therefore the need to study the local scenario of medical college libraries was even more felt.

6.1 Summary of the Study through Research Questions:

Thus the summary of findings based on both kinds of data obtained is presented to address the research questions:

Research Question-a) what is the present status of ICT in medical university college libraries?

The findings of the analysis revealed the availability of ICT facilities in respondent libraries. The quantitative data revealed that, only one respondent library has 18 computers; otherwise 50% public and one third of private medical college libraries have less than three computers. Even among respondents there were libraries that do not have any computers. These situations highlights the unplanned approach towards ICT facilitate modern library, automation and digitization.

Research Question-b) what made up the library holdings/collections and overall library scenario and services?

Books still formed the main holdings of this libraries followed by journals but 38.09% private medical college libraries have less than two thousand collection of books. Beside this very few respondent libraries have CDs, DVDs and only one library has atlases. 5 public and 66.67% private medical college libraries publish their own journal biannually. 90% Medical college libraries do not have adequate staff to help users and enough skills to run and maintain modern ICT technologies. Even some of the respondents having no LIS professionals and in some cases, librarians are from professors or doctors of the college. Maximum medical college libraries are following National library of medicine (NLM), AACR2 cataloguing rules and DDC but also some

do not follow any standards they only maintain their register book for their collections. Maximum libraries are conducting acquisition, processing and only reading services.

Research Question-c) what library systems had been installed and the extent of library online services and digital library initiatives that had been introduced, including the provision of budget and training?

Researcher found that, only one public medical college library is fully automated and digitized using the open source software respectively “KOHA” and “DSpace” and other public medical college libraries still have no plan for library automation. Among the private medicals four are using open source software “Koha” and another four are using commercial automation software and other three respondents are using in house developed software; 14.29% are planning to automate and the rest have no plan.

Research Question-d) Are they ready to be digital?

Only one public and one private medical college libraries are digitized. 42.86% private sectors have planning to build digital library but rest of the respondents have no initiative to build digital library. They are not even ready to be digital because digital library is technology dependent and their ICT infrastructural condition is very poor, most importantly they are not willingly interested in digital library development.

Research Question-e) what were the digital libraries issues/related problems and what kinds of digital library planning were in store?

The study found that, maximum libraries are not planning to being digital because of so many reasons. The major problems that impede the development of digital library are: inadequate budget, disinterest of administrations and librarians, illiteracy or unawareness about digital library, lack of ICT infrastructural facilities, professional and ICT knowledgeable staffs lacking, proper digital library initiatives and policies, integrated software, lack of training on practical digital library development etc.

Research Question-f) what were the library heads’ opinions on digital library development in medical university and colleges regarding Bangladesh?

6.2 Recommendations

Libraries will need to develop appropriate facilities and infrastructures, improve collections, strengthen resource-sharing and networking programs, develop an abstracting service, and participate in regional and international programs of networking and resource sharing and develop digital libraries. It is true that the initiative for digital library development in Bangladesh is still in the infancy level. In this era of the Internet and distributed, multimedia computing, new and emerging classes of information systems applications have swept into the lives of office workers and everyday people. Without overcoming the hindrances that was discussed in chapter 5 we cannot move toward “Digital Bangladesh”.

Government Concentration to Build Digital Library

Government should reformulate their “National ICT Policy” for libraries and also “National digitization Policies for libraries” and should formulate a National Taskforce Digital library development for Medical Universities and Colleges. To provide digital health service government

should involve medical college libraries in their digitization vision and A2I programmes. It is hoped that the government has already initiated a National Infra–Network Project for Bangladesh Government (BanglaGovNet) to connect the ministries/divisions, departments, districts and Upazilas to establish the public network for the effective implementation of e-Governance in the country (Planning Commission, 2010, p.117).

Develop ICT Infrastructure

It is clear that most of libraries do not have adequate infrastructural facilities, so ICT infrastructure should have to increase as soon as possible because digital library is technology dependent.

Allocate Sufficient Fund

The government and the respective authority have to co-operate with the libraries and have to allocate them adequate fund so that they can increase digital information resources.

Update the Diploma Course Curriculum:

Most of the medical college librarian's background is Diploma in LIS in which they cannot learn everything of library technologies, software, automation and digitization for which they suffer a setback on their professional career. Practical digital library management course should be integrated in the LIS curriculum at the Diploma level as well as at university level, so that the upcoming library professionals of Bangladesh gain some practical knowledge to handle and manage digital library.

Practical Digital Library Course

Into LIS course curriculum Practical Digital library development courses should be integrated at different levels of education. (Shuva, 2012)

Arrange Training for Medical College Librarians

They are so much lag behind even from other public and private universities professionals, so library and information science teaching and training institutions should introduce different types of training programs for these unskilled library professionals. So that they can gain knowledge about digital library and overcome their fear about digital resources and can enjoy the blessing of modern science.

Conduct Survey to Present Status of Medical College Libraries

An exhaustive survey should be carried out to analyze existing resources; infrastructural facilities and users needs regarding digital library services and electronic information resources among the medical college libraries of Bangladesh, from the findings action plan should be formulated.

Digitized Existing Materials

Digitization is primarily the process of converting written and printed records into electronic form. To increase digital collections /digital information resources/electronic resources among the libraries of Bangladesh, digitized existing materials can be a good idea. The library has to collect the necessary equipments for digitizing materials and they also have to be making sure the

necessary finance available. Established a written selection policy about what kinds of materials they want to digitize and the libraries must have to develop a collection development policy for digital resources

Institutional Repository

A digital Institutional repository can be any collection of digital material hosted, owned or controlled or disseminated by an academic institution possible solution for the medical college libraries of Bangladesh.

Cooperation from International Organizations:

International cooperation is a must in the library field and international agencies like UNDP, UNESCO and World Bank should offer funds for developing digital libraries in medical colleges. Without these fund and support medical college library in Bangladesh will be far behind from the modern services and facilities. (Shuva, 2012)

Cooperation from Local Organizations

Different library associations of Bangladesh, such as LAB, BALID have to come forward and should organize seminars, workshops, etc. to create awareness among medical college librarians about current developments in technology. (Shuva, 2012)

Join Digital Library Consortium

A Consortium could be described as a group of organizations who come together to fulfill a combined objective that usefully requires co-operation and the sharing of resources. And need to have a clear mutual goal in order to ensure their success. Medical college Libraries have to join the existing e-resource and digital library consortium such as BIPC, UDL etc. and also should join larger international, multi-national, regional and Trans –Continental digital library federations to further obtain leverage in gaining access to content.

Develop Consortium of Medical College Libraries

All the medical college libraries of Bangladesh should be united and should have to create digital resources consortium among them which will be give them unbound freedom to collect digital resources.

Managing Library Administration

Medical college librarians should influence administrators at the higher level of the importance of the use of computers and other related technologies in libraries in Bangladesh and convince them that digital resources will improve the effectiveness of information services and access to information which they need for decision making.

6.3 Medical College Taskforce on Digital library Development (MCTDLD)

National digital information resource task force should be created immediately; they will be monitoring the improvement in regarding the digital information resources collections improvement among the libraries. Though many digital library projects initiated and consortiums

(e.g. BIPC & UDL) are trying to develop digital library, but no efforts are made in the field of medical colleges. There is no central coordination to build digital libraries in medical colleges by the government or even the renowned organizations of library and information science. They all should come together and make an effective team to eradicate the problems of medical libraries and should present the nation digital medical library.

The researcher cordially suggests that, in order to improve worst situation medical college libraries a centralized taskforce must be developed, just as “Medical College Taskforce on Digital library Development” with the support of Government’s A2I program and local and international LIS organizations. (Shuva, 2012)

6.3.1 Objectives

1. Create awareness among medical colleges about digital library.
2. Evaluate ICT status of medical college libraries.
3. Develop standards for digital library development
4. Provide support to medical college libraries to build digital library.

6.3.2 Steps to be Followed by Medical College Taskforce on Digital Library Development (MCTDL):

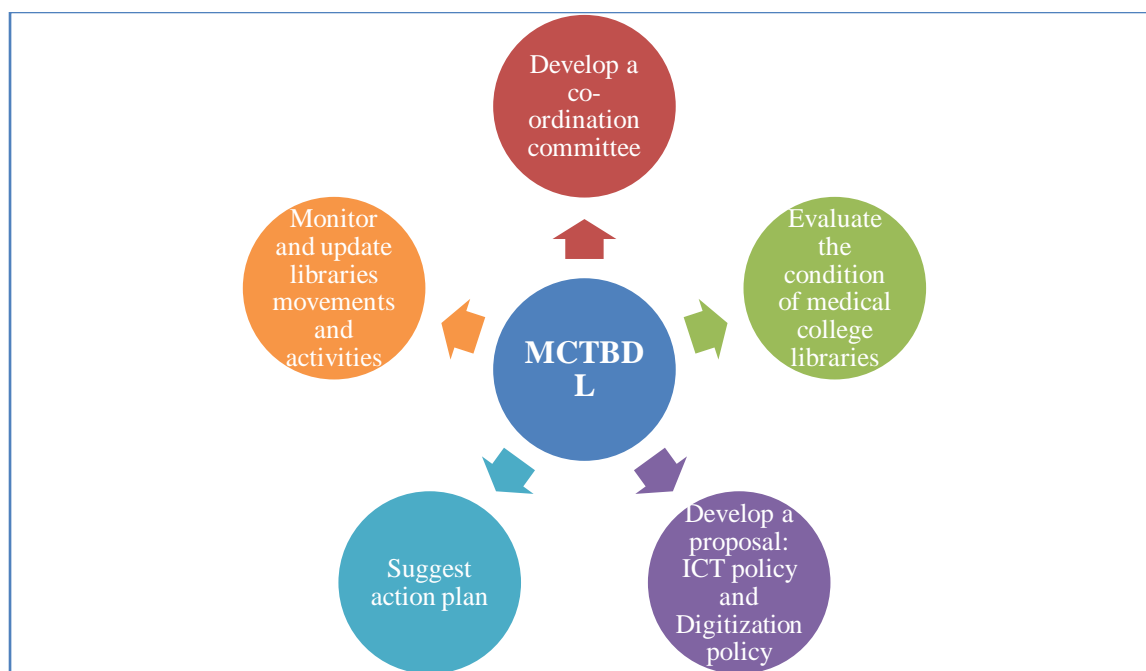


Figure 6.1: Steps to be followed by MCTBDL

A. Develop a Co-Ordination Committee

Coordination committee should be developed which includes:

- Prime Minister of Bangladesh due to the fact that, to fulfill her vision of “Digital Bangladesh-Vision 2021” in which she also included e-health services for all citizens.

So medical college should develop digital library which play a key role in providing e-health services successfully.

- A representative from A2I program because of its main objective is to provide technical assistance to e-governance and promotes ICT development programmes.
- Secretary from Ministry of Science, Information and Communication Technology: they are officially involved in providing ICT facilities nationwide and also responsible for ICT development and proposing ICT policies.
- Secretary from Ministry of Education: all the educational institutions including medical colleges are monitored by them. Library and education are part and parcel to each other. Without library quality citizen are not also possible. They should enforce medical colleges to enrich their libraries.
- Secretary from Ministry of Health and Family Planning: overall health field of Bangladesh is monitored and maintained by them. They should concentrate on libraries of medical colleges so much before. They should not approve those medical colleges where library collections are not up to date and no modern library exist and advice the existing medical colleges to develop ICT facilities and digitization in their libraries because librarians can help to promote unique health care system.
- Representative from Computer Council should be included because they can promote ICTs on low expenses and train the librarians for successfully maintain library computers.
- Representative from Library Association of Bangladesh (LAB): they are responsible for advancement of library and they are also arranging training programs to teach librarians about modern technologies.
- Representative from UGC: they take the responsibility of building digital library through consortium.
- Representative from Bangladesh academy of science: they are the first who take initiative to share electronic resources among public and private universities and now they also can play a vital role for medical college libraries.
- Representative from Department of information science and library management.
- Representative from Bangladesh Medical Association: they can play an important role to convince medical colleges about importance of digital library.
- Representative from medical college's libraries: they are must in the committee because they are the sailor of the ship.

B. Evaluate the condition of medical college libraries

At first, the taskforce should conduct a survey through selecting representative team from the coordination committee to assess the overall library conditions of medical colleges. So they can get idea about what extent they should begin the digitization initiatives.

C. Develop a proposal:

After analyzing the study it is must to develop a proposal for medical college libraries including ICT policies and digitization policies which consists of following:

- Appropriate National health information policy.
- Each library must have at least 10 computers in which 3 is for library personnel's and the rest is for patrons.
- Must have at least 2 printers and 1 photocopy machine.
- Must have high speed internet facilities in the library.
- Must have online public access catalogue.
- Must have integrated library software whether open source or commercial.
- Must have at least two ICT digital library knowledgeable staff.
- Must plan for digital library development if they are not digitized.

D. Suggest action plan

According to the situation analysis than time to take action plan: Shuva, 2012 mentioned the action plan for digital libraries in universities in Bangladesh which are equally suitable for building digital libraries in medical colleges. The action plan is discussed in the upcoming section.

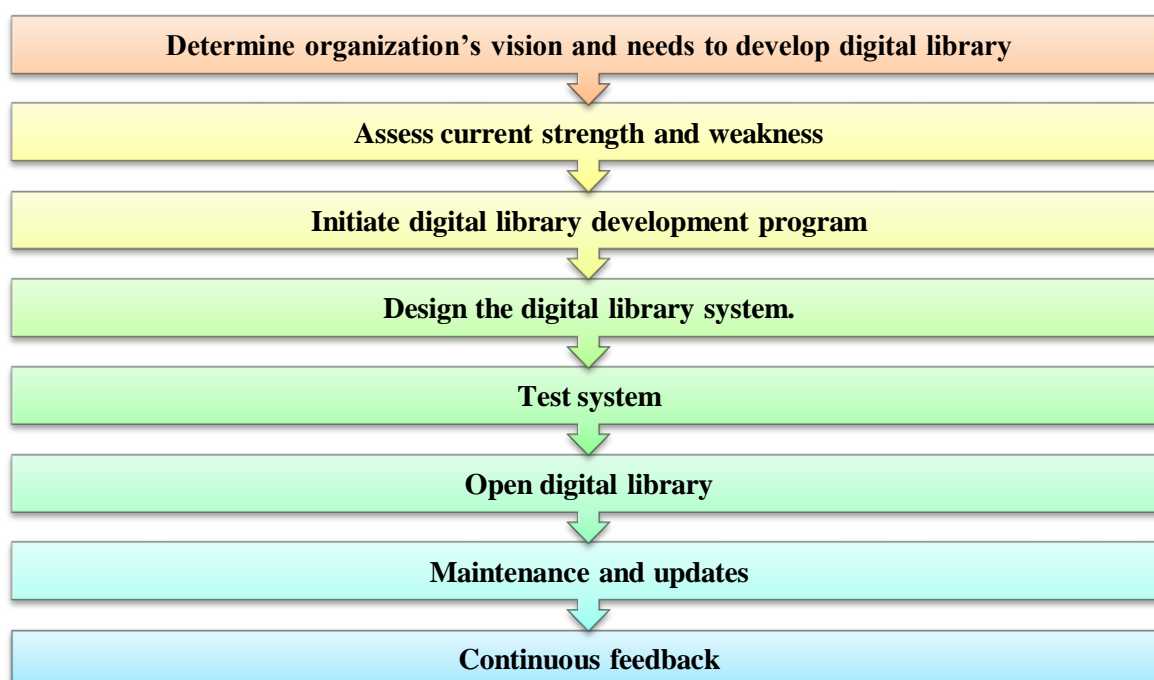


Figure 6.2: Action Plan to develop the digital library in medical colleges.

- **Determine organization's vision and needs to develop digital library:**

Without knowing their requirements we cannot determine what type of digital library should be appropriate and what digital library models should be implemented.

- **Assess current strength and weakness:**

Should determine their strength, such as: if the library is financially strong but staffs are not well qualified then the committee should concentrate on staff's qualification by arranging training or practical workshop by using their financial strength.

- **Initiate digital library development program:**

a. The medical association should convince the medical college authorities to take digital library development program by creating awareness about the benefits of digital library.

b. LAB, ISLM department should also arrange seminars, conference, workshops and practical education program for librarians to make them ICT and digital library knowledgeable.

c. Include universities who can help them in digitizing their libraries.

d. Includes at least one faculty member in the digital library development program from ISLM dept.

e. UDL and BIPC should convince medical colleges to become member of consortium and subscribe digital resource at cheaper rate in installment or offers discount on digital resources so that they can get interest in consortiums.

f. Should develop medical college's digital library association and consortiums.

g. Government should provide funds for digitization.

- **Design the digital library system:**

If the above preliminary steps are completed successfully, then the digital library development begins. The design and plans for content, layout, software, metadata standard, protocol, copyright etc. are than considered. Digital library system's performances fully depend on the success of this stage.

a. Content: contents might be included from in house developed software or from external sources.

b. Layout: patrons may be involved in making the interface user friendly during the design process of digital library.

c. Software selection: appropriate software selection according to the organization's infrastructure, needs is very important. There are three types of software: open source (e.g. Greenstone, DSpace, Keystone, Eprint etc.), commercial and in house developed software. When a medical college library requires digital repository for research publications by its researchers or faculty members, than DSpace is most appropriate for that library. If one wants to create a digital library in a simple manner within short time, Keystone or Eprint is good option. For an organization responsible for digitizing collections from medicals, libraries and hosting them in a

digital library system, Fedora is the most suitable. Finally, Greenstone is suitable for publishing books in electronic form and customizing digital library. (Source: Shuva, 2010)

d. Test system:

After designing the digital library system, the organization should test the system by the experts and coordination committee. If it is successfully meet the needs of the library, then it is ready for its patrons.

e. Open digital library:

After system testing, open the digital library for its users to provide them accurate information services. Bringing information to the user via social networks

- **Maintenance and updates:**

IT staffs should check the system regularly and update according to the demand and needs and improved technologies which is crucial for the digital library system.

- **Continuous Feedback:**

User's feedback is imperative to maintain a user friendly digital library system and reaching out to all patients, regardless of health literacy level.

E. Monitor library's movement

Then the committee should regularly observe the libraries services provided to the users and also arrange regularly training programs to update the library professional about new technologies and also who already set the digital library, involving them with those libraries that have no digitized.

6.4 Implementation of the Research

The need for this study arose because studies on digital library initiatives in Bangladesh at national level had not been done despite the fact that digital library initiatives had been extensively taking shaped worldwide. The study has opened up different avenues of future research. The following are some suggested areas of future research in this regard:

- This study may be replicated to explore the prospects of digitization in medical college libraries of Bangladesh.
- Studies may be conducted to propose a framework for digitization activities in medical college libraries.
- Studies may be conducted to comprehensively ascertain the numbers of valuable information resources available in medical college libraries that need to be digitized.
- Studies may be conducted to comprehensively ascertain the staff strength of medical college libraries.
- Studies may be conducted to propose an action plan for a national digitization strategy
- Studies may be conducted to develop a model for a networked digital library of medical college libraries of Bangladesh.
- Study on the importance of national collaborative digitization program for medical college libraries in Bangladesh.

6.5 Conclusion

It is well recognized that libraries all over the world are undergoing transformation, especially owing to the development in information and communication technologies. Traditional libraries are changing to digital libraries and new libraries that are being set up are increasingly of the digital kind. As a result, there is widespread interest and consequently, a lot of research and development activities are being carried out in this area world over.

Digital library is a new area to many of the respondents interviewed and the fact that they were still learning the modern library applications and taking initial steps in planning digital library initiatives. Some were in the early planning stage, some do not have any bother of their libraries poor condition and some were contemplating what would be the best possible way to approach the matter.

The need for this study arose because studies on digital library initiatives in Bangladesh at medical college libraries had not been done despite the fact that digital library initiatives had been extensively taking shaped worldwide. By discussing with librarians, the problems that impede the digital library development have been identified.

Both the government and the private medical college libraries should play an equally important role in making the transformation from print to digital libraries possible, an area that was extremely lacking in Bangladesh. The digital library development worldwide had somehow enforced medical college librarians to change their course of actions into becoming more receptive to the provision of online and digital services. Libraries were no longer playing the role as intermediaries as they were no longer the one stop information center that they used to be. The disintermediation of function must be dealt with seriously in the context of digital library perspective; otherwise libraries position would be at stake. The information produced by this research would be useful to libraries and would serve as a contribution to the body of knowledge. Future research in these areas will not only advance advocacy, but also digitization at a time when it is crucial for any library determined to serve well at the country level

REFERENCES

1. Access to Information (A2I). (November 2011a). Jatiyo e-Tathyakosh: online platform for livelihood information. Retrieved from. <http://www.a2i.pmo.gov.bd/index.php>.
2. Access to Information (A2I). (November 2011b). ICT facilitate education: 21st century schools. Retrieved from. <http://www.a2i.pmo.gov.bd/index.php>.
3. Ahmed, S.M.Z., Munshi M.N. and Ahmed M. (1997). Computerization of libraries in Bangladesh, *Malaysian journal of library and information science*, 2(2): 1-8.
4. Ahmed, S.M.Z. (1998). Library automation in Bangladesh: problems and prospects, *Bangladesh journal of library and information science*, 1(1): 39-46.
5. Ahmed, S. M. Z. (2010). Investment studies on digital library. HEQEP, UGC.
6. Alam, M. S. (1998). Automation trends in special libraries of Bangladesh, *Bangladesh journal of library and information science*, 1(1): 47-63.
7. Alam, M. S. and Islam, Md. Shariful .(2011).Digital library initiatives in Bangladesh: Current status and future challenges. *International Seminar "Vision 2021"*, 50-65.
8. Alam, M.J. (2012). E-Governance in Bangladesh: Present Problems and Possible Suggestions for Future Development. *International Journal of Applied Information Systems*,4(8), 21-25.
9. Alhaji , I. U. (2000). Digitization of library resources and the formation of digital libraries: A practical approach. 1-17.
10. Arms, W. (2000) Automated digital libraries: how effectively can computers be used for the skilled tasks of professional librarianship? *D-lib Magazine*, 6(7/8)
11. Aswal, R. S. (2006). *Library Automation for 21st century*. New Delhi: Ess Ess, p.163.
12. Awwal, K. M. Abdul (2008). An initiative for digital resources consortium for university libraries in Bangladesh. *Planner*, 430-435.
13. Bangladesh Academy of Sciences. (2009). Bangladesh INASP-PERI Consortium. Retrieved from. <http://www.bas.org.bd/about/inasp-peri-consortium.html>.
14. Bangladesh Research and Education Network (BdREN). (2012).Background. Retrieved from. <http://www.bdren.net.bd/background.php>.
15. Baohua, W. and Xiaoyan, M. and Fei, Gao. (n.d.).On the Characteristics of the Digital Library and the Influence to the Work of Reader Service, 529-532.
16. Bairagi, A.K., Rajon, S.A. and Roy, T. (2011). Status and role of ict in educational institution to build digital society in bangladesh: perspective of a divisional city, Khulna. *International Journal of Advances in Engineering & Technology*, 1(4), 373-384.
17. Bhatt, R. K. (2009). Academic libraries in India: a historical study. *ICAL-2009-Visions and Roles of the Future Academic Libraries*, 55-67.

18. Borgman, C. L. (2000). From Gutenberg to the global information infrastructure: Access to information in the networked world. Cambridge, MA: MIT Press.
19. Borgman, C. L. (1999). Why are digital libraries? Competing vision, *Information Processing and Management*. 35. 227-243.
20. Brophy, P. (2006). Projects Into Services: the UK Experience. *Ariadne*, 46.
21. Cathro, W. S. (1999). Digital Libraries: a National Perspective. *Paper presented at Information Online & Disc Conference, Sydney, Australia, 19-21 January*.
22. Chowdhury, G. G. and Chowdhury, S.. 2003. *Introduction to digital libraries*. Facet, University of Michigan.
23. Chowdhury, G. G. and Chowdhury, S. (2004). *Introduction to digital libraries*. London: Facet Publishing.
24. Chowdhury, S. and Islam, A. (2007). Concept, Issues and Effectiveness of Mobile Library Services in Bangladesh: A Case Study of Bishwa Shahitya Kendra (BSK). *The CDR Journal*, 3, 37-50.
25. Cleveland, G. (1998). Digital Libraries: Definitions, Issues and Challenges. *INFLAET*.
26. Collier, M. (2004). After the Digital Library Decade: Where are the Next Frontiers for Library Innovation *In* Andrews, Judith and Law, Derek (eds.) *Digital Libraries: Policy, Planning and Practice*. Hants, England: Ashgate.
27. Cooper, I. D. (2011, October). New activities and changing roles of health sciences librarians: a systematic review, 1990–2012. *Journal of Medical Library Association*. 101(4), 268-277. Available at: <http://dx.doi.org/10.3163/1536-5050.101.4.008>
28. Digital library. (2011). Available: <http://librarydigital1.blogspot.com/2011/02/digital-library.html>.
29. Dollah, W. A. K. W. and Kadir, R. A. (2010). Academic digital library in Malaysia : A Case study on the status of digital reference services. *National Seminar On Information Technology*.
30. Dunn, J. W., Davidson, M. W., Holloway, J. R. and Bernbom, G. (2004). The Variations and Variations² Digital Music Library Projects at Indiana University *In* Andrews, Judith and Law, Derek (eds.) *Digital Libraries: Policy, Planning and Practice*. Hants, England: Ashgate.
31. Edwards, J. and Ritchie, A. Worth every cent and more: An independent assessment of the return on investment of health libraries in Australia.
32. Farmer, L. S. J. (2011). Instructional design for librarians and information professionals. *Journal of Medical Library Association*. 101(1), 77-78.
33. Federer, L. (2013, October). The librarian as research informationist: a case study. *Journal of Medical Library Association*. 101(4), 298-302. Available at: <http://dx.doi.org/10.3163/1536-5050.101.4.011>

34. Fox, E. A. (1999). Digital Libraries Initiative: Update and Discussion. *Bulletin of the American Society for Information Science*, 26(1), 7-11.
35. Genilo, J., Islam, M. S. and Akther, M.. Narratives on Digital Bangladesh: Shared Meanings, Shared Concerns.
36. Greenstein, D. (2000). Digital libraries and their challenges. *Library Trends*. 49(2). 290-303.
37. Griffin, S.M. (1998). NSF / DARPA / NASA Digital Library Initiatives: a Program Manager's Perspective. *D-Lib Magazine*.
38. Harun, N. H. (2010). Digital libraries initiatives in Malaysia: Readiness and perceived conditions for future growth. PhD paper.
39. Habiba, U. and Chowdhury, S.. (2012). Use of electronic resources and its impact: A study of dhaka university library users. *The Eastern Librarian*, 23(1), 74-90. Available at: <http://www.banglajol.info/index.php/EL>.
40. Hughes, L. M. (2004). *Digitizing Collections: Strategic Issues for the Information Manager*. London: Facet Publishing.
41. Ianella, R. (1996). Australian Digital Library Initiatives. *D-Lib Magazine*, December.
42. Islam, M. A. (n.d.). Concept, issues and importance of library consortium: Problems and prospects of university library consortium in Bangladesh. M.Phil.
43. Islam, S. (2011). Towards digitization: problems and prospects for the libraries of Bangladesh. *World Congress of Muslim Librarians and Information Scientists 2011 (WCOMLIS 2011)*.
44. Islam, S. (2010). "Present status of digital resources and users perceptions towards them among the university libraries of Bangladesh: an exploratory study," M.A. thesis, University of Dhaka.
45. Islam, M. S. (2012). An Analysis of e-learning in academia from the viewpoint of knowlwdge management: A Case study of Library and Information Science Schools. PhD paper.
46. Islam, S. and Mostofa, S. K. M.. (2013). A Review of digital resources among different types of libraries in bangladesh. *International Journal of Humanities and Social Sciences (IJHSS)*, 2(1): 109-120.
47. Jena, P. (2010). Participative management in medical college libraries of Orissa: a comparative study. *Library Reviews*, 59(3), 213-225.
48. Khan, M. S. I. (1990, October). Health sciences libraries and information services in Bangladesh. *Bull Med Libr Assoc*. 78(4), 370-375.
49. Kumar, P. (2011). Information and communication technology in textile engineering college libraries of Haryana. *Information and Knowledge Management*. 1 (3). 7-17.

50. Landon, G. V. (2009). Towards Digitizing All Forms of Documentation. *D-Lib Magazine*, March/April, 15(3/4).
51. Lesk, M. (2005). *Understanding digital libraries*. San Francisco: Morgan Kaufmann.
52. Library of Congress (1998). *National Digital Library Annual Review*. Washington DC: Library of Congress.
53. Louis, C. (2002, November 25) Virtual Library in Your Palm. *Computimes, NewStraits Times*, p.25.
54. Mahesh, G and Mittal, R. (2008). Digital libraries in India: A Review. *National Institute of Science Communication and Information Resources*, 58 (0024-2667), 15-24.
55. McMenemy, D. and Poulter, A. (2005). *Delivering Digital Services: a Handbook for Public Libraries and Learning Centers*. London: Facet Publishing.
56. Miller, S. J. (2011). Metadata for Digital Collections: A How-to-Do-It Manual. Instructional design for librarians and information professionals. *Journal of Medical Library Association*. 101(1), 78-79.
57. Mischo, W. H. (2004). United States Federal Support for Digital Library Research and its Implications for Digital Library Development. *In* Andrews, Judith and Law, Derek (eds.) *Digital Libraries: Policy, Planning and Practice*. Hants, England: Ashgate.
58. Munshi, M. N. & Ahmed, S.M.Z. (2000). Status of library automation in Bangladesh: an overview of some existing problems and solutions, *Social Science Review*, 17(2).
59. Munshi, M. N. (2003). Library automation in Bangladesh: The Dhaka University Library Experiences, *information Science Today*, 1-3.
60. Ministry of Sciences, Information and Communication Technologies. National ICT Policy 2008 Dhaka : MoSICT, 2008.
61. National Science and Technology Information Policy. In: Proceedings of the Seminar on the Impact of National Science and Technology Information Policy on Socio-Economic Development, 23-24 Jun 1988. Dhaka: Bangladesh National Scientific and Technical Documentation Center, 1988:17-33.
62. Oppenheim, A. N. (1992) Questionnaire design, interviewing and attitude measurement (2nd edition). London: St Martins Press.
63. Rafiq, M. (2011). Prospects of digitization in university libraries of Pakistan. M.A. Thesis paper.
64. Reza, S. M. (2006). Problems and prospects of digital library and library digitization in bangladeshi institutes of higher education. *PLANNER -2006*, 103-108.
65. Raitt, D. (2000). Digital libraries across Europe. *Computers in Libraries*, 20(10), November/December.
66. Rozic-Hristovski, A., Hristovski, D. Todorovski, L. (2002). Users' information-seeking behavior on a medical library Website. *J Med Libr Assoc*, 90(2), 210-217.

67. Saracevic, T. and Covi, L. (2000). Challenges for Digital Library Evaluation. *Annual Meeting 2000 of the American Society for Information Science*.
68. Scherrer, C.S. (2002). New measures for new roles: defining and measuring the current practices of health sciences librarians. *J Med Libr Assoc*, 90(2), 164-172.
69. Sherwill-Navarro, P.J. (). Research on the value of medical library services: does it make an impact in the health care literature. *J Med Libr Assoc*, 92(1), 34-45.
70. Secker, J. (2004). *Electronic resources in the virtual learning environment: a guide for librarians*. Oxford: Chandos Publishing.
71. Sergio C. (2008). Digitization of The Academic Library In Brazil: A Proposed Advocacy Model For Successful Formulation Of Information Legislation And Policy In Developing Countries.
72. Sharma, R. N (2009). Technology and academic libraries in developing nations. *ICAL-2009- Technology, Policy and Innovation*, 229-238.
73. Shuva, N. Z. (2005). Implementing information and communication technology in public libraries of Bangladesh. *The International Information & Library Review*, 37: 161-162.
74. Shuva, N. Z. (2010). Promoting Use of Electronic Resources in Libraries of Bangladesh: A Developing Country Perspective. *Paper presented at the Electronic Resources Librarians Conference held from February 1-3, 2010 at the Austin University, Texas, USA*.
75. Shuva, N. Z. and Akter, R. (2012). Status of non-government public libraries in Bangladesh. *The Eastern Librarian*, 23(1), 91-104.
76. Shuva, N. Z. (2012). Building digital libraries in Bangladesh: A developing country perspective. *The International Information & Library Review*, 44, 132-146.
77. Singh, K. and Rao, B. (2008). An Overview of the library consortia in India. *6th Convention PLANNER – 2008*. 140-149.
78. Tedd, L. A. and Large, A. (2005). *Digital Libraries: Principles and Practice in a Global Environment*. Munchen: K.G. Saur.
79. UNESCO and the Library of Congress would joint forces to build world digital library. (2007).
80. University Grants Commission (UGC). (2009a). List of public universities. Retrieved from. <http://www.ugc.gov.bd/university/?actionZpublic>.
81. University Grants Commission (UGC). (2009b). List of private universities. Retrieved from. <http://www.ugc.gov.bd/university/?actionZprivate>.
82. University Grants Commission (UGC). (2009c). List of international universities. Retrieved from. <http://www.ugc.gov.bd/university/?actionZinternational>.
83. Wagner, K.C. (2004). Evaluating the effectiveness of clinical medical librarian programs: a systematic review of the literature. *J Med Libr Assoc*, 92(1), 14-33.

84. Witten, I. H. (2005). Digital Libraries and Society: New Perspective on Information Dissemination In Theng, Yin-Leng and Foo, Schubert (eds.) *Design and Usability of Digital Libraries: Case Studies in the Asia Pacific*. Hershey, PA: Information Science Publishing.
85. <http://dx.doi.org/10.3163/1536-5050.101.1.007>
86. <http://dx.doi.org/10.3163/1536-5050.101.2.001>
87. <http://a2i.pmo.gov.bd/content/jatiyo-e-tathyakosh>
88. http://www.eaward.org.bd/index.php?option=com_content&view=article&id=44&Itemid=16
89. http://www.swanirvarbangladesh.org/index.php?option=com_content&view=article&id=76:o
90. <http://IFLA/UNESCO> Manifesto for Digital Libraries | IFLA
91. <http://www>. Chapter 2: Digital vs. Traditional Libraries
92. http://www.tlu.ee/~sirvir/Information%20and%20Knowledge%20%20Management/Integration%20of%20digital%20libraries%20in%20e-learning/study_guide.html.
93. <http://gurumia.com/2010/02/05/bangladesh-lounged-64-district-web-portal-digital-bangladesh/>

APPENDICES

APPENDIX-1

COVER LETTER FOR THE QUESTIONNAIRE

[It is purely for academic purpose]

Thesis Title: “*Status of Digital Libraries in Medical University and Colleges in Bangladesh*”

Chief Librarian/Librarian/Head/Director

Dear Sir/Madam,

In partial fulfillment of the requirement of my M.A. studies at the department of Information Science and Library Management, University of Dhaka, I am conducting a research study entitled “*Status of Digital Libraries in Medical University and Colleges in Bangladesh*”.

The core objective of this research is to explore the current status of digital libraries in medical colleges and university in Bangladesh. Other purposes include: to find out the automation status of medical college libraries, to find out the problems that hinder the development of digital libraries in medical libraries and to offer some suggestions to implement DL system at medical college/libraries in Bangladesh.

In order to collect the necessary information for my research work, I need to conduct a survey of medical university and colleges in both public and private sector. Your response to the questionnaire is vital to the successful completion of my research.

I would be very grateful if you kindly spend your busy schedule to fill up this questionnaire. I assure you that the information would be used for academic purposes following research ethics.

Thanking you very much in anticipation for your time and cooperation.

Yours sincerely,

HOSNA ARA KOLLY

M.A (Session: 2011-12)

Exam roll: 3058

Department of Library and Information Science

University of Dhaka, Dhaka-1000

E-mail: Hosna.ara.kolly@gmail.com

APPENDIX-2

QUESTIONNAIRE

“STATUS OF DIGITAL LIBRARIES IN MEDICAL UNIVERSITIES
AND COLLEGES IN BANGLADESH”

PART A: INSTITUTIONAL INFORMATION

i. Name of the library:

Web address:

Year of Establishment:

ii. Name of the head of the librarian:

Email:

Telephone number:

iii. Library type:

Public Medical College	Private Medical College	Public Medical University

iv. Library Staff Information:

	Number
Total number of library staff	
Non professional staff	
Number of staffs with Library and Information Science background	
Number of staffs with Computer Science background	
Number of staffs with integrated library software knowledge	
Number of staffs having digital library knowledge	

v. Collection Information:

Collection type	Amount
Books	

Monographs(Thesis, PhD paper, Research reports)	
Journal and periodicals (published by your institution)	
Journal and periodicals (published by others)	
Audio/Video tapes	
Photographs	
Maps	
Microfiche	
CD-ROM/DVD	

PART b: ICT and Automation facilities

1. Write the year ICT introduced in your library:
2. Is the library automated?

▪ Fully	
▪ Partially	
▪ Not yet	
▪ To be automated soon	

3. Type of automation software you are using: (please tick)

▪ In house developed software	
▪ Commercial software	
▪ Open source software	

4. Name of the automation software you are currently using :
5. ICT facilities in the library which are operational (You may tick more than one)?

Services	YES	NO
OPAC		
Web OPAC		
Automated circulation		

Automated acquisition		
Online SDI service		
Online reservation		
Online reference query		
Multimedia/Hypermedia		
Shelf checked list		
Web site services		
RFID		
Wifi in the library premises		

6. Who provides the technical supports for ICT or automation services?

IT staff within the organization	
IT staff from outside (Outsourcing)	
Library staff	

PART C: DIGITIZATION PROJECT

1. Do you have digital library or Institutional repository?

- YES
- NO

If yes please write the web address of your digital library/institutional repository-

2. Has your library ever carried out any digitization project?

YES		If yes please proceed to Q-2
NO		If no please proceed to Part-F

3. When the library started their digitization work:

4. Do you have any written digitization policy for your digitization activities?

- YES
- NO

5. What type of software is used for your digitization work?

▪ Customized software	
▪ Open source software	
▪ Both	

6. What software is used for library digitization? (please tick)

Greenstone		Fedora	
Dspace		Eprint	
WinISIS		Content DM	

7. DI software used in different section of the library:

Areas	Greenstone	DSpace	Fedora	Eprint
Acquisition				
Processing				
Circulation				
Reference				
Administration				

8. Name of Institutional repository software:

9. Who provides the technical supports for digital library software and maintenance services?

IT staff within the organization	
Library staff	
Separate team for digitization	
Outsourcing	
Others (please specify)	

10. Total number of digital collections your institution have:

11. What type of materials the digital library have?(You may tick more than one)

<input type="checkbox"/> Born digital	
<input type="checkbox"/> Digitized from another format	
<input type="checkbox"/> Both	

12. Do you have any selection policy to digitize your materials?

- YES
- NO

13. Digital collections:-

Digital collections	Amount	Digital collections	Amount
Journals and periodicals		Minutes of meetings	
Book		Photo collection	
Manuscripts		Rare collections	
Thesis and Dissertations		Archival materials	
Organization's report(annual/special)		Patent and specifications	

14. What equipments are used for the digitization work?(You may tick more than one)

<input type="checkbox"/> Scanner	
<input type="checkbox"/> Camera	
<input type="checkbox"/> Printer	
<input type="checkbox"/> Other(please specify)	

15. Who does the digitization work?(You may tick more than one)

<input type="checkbox"/> Library Staffs	
<input type="checkbox"/> ICT Staff	
<input type="checkbox"/> Outsourcing	

16. What are the common storage devices for digitization resources?(You may tick more than one)

CD/ DVD	
Hard disc	
PC Card	
Enterprise Storage system	
On the website	
On the cloud	

17. How does your library provide access to digital collection to the users?

- Access through CD-ROM
- Access through library's local area network(LAN)
- Access through university's local area network(LAN)
- Access through World wide web
- Others (please specify)

18. Is there any charge for users to access your digital collections?

- YES
 - For all
 - For some
- NO

19. If world wide access is available, what proportion of the digital resources is made available online through their websites?

All materials are made available	
Some of the materials are made available	
Some portion of all materials(e.g. abstract/bibliographic item)are made available	

20. Do you arrange programs to enhance skills for staffs?(you may tick more than one)

Training	Workshops	Seminars	Conference	No provision at this moment

21. Frequency of digital library updating: (please tick)

Frequently	
Occasionally	
Rarely	

22. Library consortium/co-operation

a. Are you a member of any e-resource consortium?

- YES
- NO

If yes please write the name of e-resources consortium-

b. Have you heard of any of the following e-resource consortium?:

- BIPC(Bangladesh INASP-PERii Consortium)
- UDL(UGC Digital Library)

c. Do you have any plan to become a member of the e-resource consortium?

- YES

d. NO

Please list 5 core subject areas your library users usually ask for-

23. Have your library following any metadata standards? (MARC, Dublin Core etc.)

- YES
- NO

24. If yes please specify the name:

PART D: ANNUAL BUDGET FOR DIGITAL LIBRARY MAINTENANCE AND CUSTOMIZATION?

1. What is the source of funding for your digitization activities?

- Government
- Internal funding

2. Please, fill in the blanks

Budget	2012	2013	2014
Total library budget			
Allocation for e-resources			
ICT budget			
Digital library/institutional repository maintenance			
Library software development, updation, maintenance budget			

PART E: PROBLEMS (Importance level: 5-extreme, 3-medium, 1-less problems.)

Problems	1	2	3	4	5
1.Lack of professional staff					
2.Lack of IT staff					
3.Lack of adequate staff to help user					
4.Lack of training to make staff efficient					
5.Lack of Integrated library software					
6.Lack of staff to customize and maintain digital library software					
7.Lack of local vendor support					
8.Lack of budget					
9.Lack of sufficient fund from govt., administrator, foreign agencies.					
10.Lack of digital library initiatives					
11.Lack of scalability on the digital library software					
12.Lack of interoperability on the digital library software					
13.Lack of content management					
14.Utilization of digital resources					
15. Concern about cost of preservation and management					

of digital content.					
16.Lack of infrastructural facilities					
17.Low speed of internet connections					
18.Lack of coordination among departments					
19.Facing problems with copyright issues					
20.Lack of fund to subscribe digital resources					
21.Lack of equipments to digitize library resources					
22.Not up to date holdings					
23.Overall connectivity at affordable cost					
24.Lack of national digitization policy					
25.Administrative bureaucracy complexity					
26.Inadequate salaries for library personnel					
27.Less concern of university management					
28.Lack of government concentration					
29.Others (please specify)					

PART F: DIGITAL LIBRARY DEVELOPMENT IN FUTURE

1. When you plan to digitize your library?
 - 2014
 - 2015
 - Do not know
2. Preference of digitization work:
 - Library staff
 - Outsourcing
 - Separate department attached with library for digitization work.
3. Preference of digital library/institutional software-
 - In-housed developed
 - Open Source

- Commercial
4. If open source please indicate your preference :
- Greenstone
 - Dspace
 - Fedora
 - Other (please write)
5. Methodology you are going to apply before your implement digital library system:
- Contact other libraries successfully implemented DL system
 - Survey to gather information on libraries working with DL system
 - Meeting
 - Attending seminar, symposium, training on DL system
 - Other(please specify)
6. Will you arrange or perform seminars, workshops, training for your staff or for yourself to know about digital library system?
- YES
 - NO
7. Have you ever submitted any DL library development proposal to your institution?
- YES
 - NO
8. Who should fund your digital library project?
- My institution
 - Government
 - International organization(please specify)
9. Any plan to be a member of e-resource consortium?
- YES
 - NO

(if yes, please specify in which consortium)

- BIPC(Bangladesh INASP-Perii)

- UDL(UGC digital library)

10. Preference of your digital library services:

- All types of materials will be digitized, preserved
- Provide online access to collection
- Help user to access from remote place
- Save space in the library
- E-resource collection
- Digitize everything (books, Journals, periodicals, rare collection etc.)
- Others (please specify)

PART G: PLEASE PROVIDE YOUR VALUABLE SUGGESTION TO IMPLEMENT DIGITAL LIBRARY SYSTEM/INSTITUTIONAL REPOSITORY at MEDICAL COLLEGES IN BANGLADESH:

“END OF QUESTIONNAIRE”

“THANK YOU VERY MUCH FOR YOUR TIME, SUPPORT AND KIND COOPERATION”

Signature of the user:

.....

APPENDIX – 3

LIST OF PARTICIPANTS

No.	Name of Public Medical university/ colleges	Phone number	Web link	Year	Name of the librarian.
1	Bangabandhu Sheikh Mujib Medical University	02-8613845; 01718327494-i	http://www.bsmmu.edu.bd/	1965	Professor Md. Moniruzzaman Khan Hosna Ara Akhter-circulation officer.
2	Armed forces Medical College	01775021519; 01670848938-i	info@afmcbd.com http://www.afmcbd.com/	1999	Md. Hanif
3	Dhaka Medical College	8626812-6 01674646187-i	http://www.dmc.edu.bd/ (the website is under construction)	1970	Krishna Singh
4	Shaheed Suhrawardy Medical college (SHSMC)	9130800-19, 01914972801-i	http://www.shsmc.edu.bd/	2006	Md. Shafiqul Islam
5	Sir Salimullah Medical College	7315076, 7314786; 01720414063-i	http://www.ssmc.edu/ info@ssmc.edu	1858	A. K. M. Fazlul Haque
6	Bangladesh Homeopathic Medical College and Hospital	02-8959281, 02-8959282; 01747227997-i	http://www.ghmc.5u.com/	1970	Shamima Sultana

			ghmc_bd@yahoo.com		
No.	Name of private medical colleges	Phone number	Web link	Year	Name of the librarian.
1	Ad-din medical college	+880-2-9353391-93; 01199514660-i	info@ad-din.org	2008	Jabunnesa Akhter
2	Anwer Khan Modern Medical College	8614927, 8616074, 01552351520-i	No web link Email:akmmcbd@yahoo.com	2008	Mohammad Zakir Hossain
3	Ashian Medical College	02-8999580-81, 01841-133529; 01754901127-i	No web link	1986	Rabeya Khatun
4	Bangladesh Medical College	9120792-93, 9118202,9124619,8115843, 8116699; 9118202-131-i	Email:bmcffic.09@gmail.com Website: bmch@bangla.net bmc-bd.org	1986	Farida Begum
5	Dhaka Central International Medical College	01764044098; 01714527209-i	http://www.dcimch.com	2011	Ayesha Siddika

6	Dhaka Community medical college	9351190-1, 01715967096; 01762670232-i	dch@bangla.net www.dchtrust.org	2006	Md. Muzammal Haq
7	Dhaka National Medical College	02 7118272, 7163853-4,; 01711020756-i	info@dnmc.edu.bd http://www.dnmc.edu.bd/	1994	Md. Mostafizur Rahman- asst. librarian
8	East West Medical College	02-8919897, 01712-010 787; 01714095758-i	info@ewmch.com http://medical-colleges.org/east-west-medical-college-hospital.html aichi@bdonline.com	2006	Moshiur Rahman
9	Enam Medical College	7712424, 01714293334; 01717645028-i	Email:nazimemch@yahoo.com www.emcbd.com	2003	Honofa Yasmin (Panna)
10	Holy Family Red Crescent Medical College [HFRCMC]	9353031, 01711520909; 01712779412-i	http://www.hfrcmc.edu.bd/	2010	Mashrufa Rahman
11	Ibn Sina Medical College	02-9010396, 02-9005617; 01717171890-i	http://www.ismc.ac.bd /	2005	Md. Abdul Jalil
12	Ibrahim Medical College	9663560, 9663563; 01811649694-i	http://www.imc-bd.net/ info@imc-bd.net	2002	Morsheda Jahan
13	Markas Medical college	0191390363	http://www.marksgrou		Md.Zakirul

			pbd.com/mmch/index		Islam
14	Medical College for Women and Hospital	088-02-8913939; 01911308274-i	info@mcwh.org http://www.mcwh.org/	1992	Mazwda akter
15	Nightingale Medical College & Hospital	8961628, 01713-014970; 01911853598-i	http://www.nmchdhaka.com/	2006	Chinmay Halder
16	Northern International Medical College	02-9668028;	info@nimch.com.bd http://www.nimch.com.bd/	2005	Muhammad Burhan Uddin
17	Popular medical college	01726969972-i	http://pmch-bd.org/	2011	Rebeka Sultana
18	Shahabuddin Medical College	9863387-8; 01916759280-i	info@shahabuddinmedical.org info@shahabuddinmedical.org	2003	Shamshad Musfari
19	Shaheed Monsur-udidin Medical College	01557340400-i	http://www.smamedicalcollege-bd.com/	1995	Md. Harun Ur Rashid
20	Uttara Adhunik Medical College	8911600, 8932343; 01913496537-i	Email: uamcoffice08@yahoo.com Weblink: http://www.uamc.edu.com/	2008	Zahedha Sultana
21	Z. H. Sikder Women's Medical College	02-811-5951, 02-8113313; 01818388737-i	Admission@SikderHospital.com http://www.sikderhospital.com/MedicalCollege.htm	1992	Selina Akhter

