Users' Adoption of a Digital Library System: A Case Study of East West University Library

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Declaration

I hereby declare that the thesis entitled "***Users' Adoption of a Digital Library System: A case study of East West University Library***" is an original work and has been written by me and to the best of my knowledge and belief. The materials borrowed from other sources and included in my thesis have been properly acknowledged.

Roll No. 3051

Signature: Mashiat Tabassum.

Date: March 06, 2014.

Dedicated to My Parents

Acknowledgement

I would like to express my deepest gratitude, sincere appreciation, and greatest admiration to my supervisor for his immense support and patience. Without his constant motivation, guidance, constructive criticism, instruction, advice, and suggestions, I would never have been able to finish my work. I owe my heartfelt thanks to all my teachers in the department for their tremendous support and insightful suggestions.

I have greatly benefitted from the help of library professionals and users of East West University library. I would like to thank all of my friends for their support, affection and devotion they have always shown to me. I also take the opportunity to express my heartiest thanks to my greatest friend Rafiqul Islam, Hosna Ara kolly for their persistent encouragement and assistance.

Finally, I owe my deepest gratitude to my family for their effort, inspiration, and guidance throughout my life. I have not been able to complete this study without the kind cooperation and motivation of my mother.

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List of Abbreviations/Acronyms

AIC	Agricultural Information Center
BANBEIS	Bangladesh Bureau of Educational Information & Statistic
BIDS	Bangladesh Institute of Development Studies
BIPC	Bangladesh INASP-PErii Consortium
BRAC	Bangladesh Rural Advancement Committee
BSMMU	Bangabandhu Sheikh Mujib Medical University
DFL	Digital Library Federation
DL	Digital Library
DLNETSA	Digital Library Network South Asia
EWU	East West University
EWULIBMIS	East West University Library Management Information System
HCI	Human Computer Interaction
ICDDR'B	International Centre for Diarrhoeal Disease Research, Bangladesh
IUB	Independent University, Bangladesh
INASP-PERii	International Network for the Availability of the Scientific Publication – Program for Enhancement of Research Information
IR	Institutional Repository
KOHA	Kalamazoo Optimist Hockey Association
OPAC	Online Public Access Catalogue
TAM	Technology Acceptance Model
TRA	Theory of Reasoned Action
TPB	Theory of Planned Behavior
PEOU	Perceived Ease of Use
PU	Perceived Usefulness
UDL	UGC Digital Library

UGC	University Grants Commission
UNESCO	United Nations Educational, Scientific and Cultural Organization
WWW	World Wide Web

Chapter 1

Introduction

1.1 Background of the study

1.1.1 Digital revolution and the changing context of libraries

The digital revolution of the nineties of the past century has made a profound impact on every sphere of human society including library and information sector. Libraries are always at the forefront of the adoption of latest technologies and innovations in order to find new ways to organize and manage information resources, and to provide user-centred information services. Internet and wide varieties of World Wide Web applications have revolutionized the pattern of library operations and services. Libraries have undergone a transformation from a manual system to a technologically- driven system. Traditional libraries are adopting automation system for their function and services which in turn has forced libraries to be digitized. Digital libraries significantly differ from traditional libraries as they allow users to gain access to and work with the electronic version of full text documents. Global changes particularly in information and communication technology (ICT) have had a tremendous impact on the functioning of academic libraries affecting all aspects of library operations, information resources and services and staff skill requirements.

Innovations in information technology have brought radical changes in the field of library system. In order to keep pace with the advancement of technology, library staff and users are tend to adopt the new innovations, compare with others and finally choose the one that fits the best with their desired usability, simplicity, and relative advantages. In the last half-century, movements such as the explosion of publishing, the swift expansion connected with education at all levels, globalization, and ever-growing funding for many kinds of research have influenced libraries to innovate and implement a great range of creations. For instance, the cost-effective, computer-based Online Computer Library Center (OCLC), was set up in the late 1960s, online databases produced for convenience of users to gather bibliographic information. Since library efforts continue to mature, there is a growing need for efficient and scalable methods to exemplify their uptake and adoption, their impact on student learning practices (Maull et al., 2011). As a result, a few research works has been done on

evaluating dimensions of usability, their applicability, significance and criteria integrating concepts and techniques of Human Computer Interaction (HCI) in order to verify users' necessities (Jeng, 2005; Ferreira and Pithan, 2005).

Digital library is a collection of digital documents and objects. Digital libraries are, at times, perceived as institution. The definition given by Digital Library Federation (DLF) represents that perception- "Digital libraries are organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and economically available for use by a defined community or set of communities." (Cited in Shiri, 2003). As technology is the inevitable part of digital library system, such essence is found in the definition provided by Larsen (1994) "A digital library as a global virtual library- the library of thousands of networked electronic library." In broad sense, digital library is a computerized system which enables users to get access to organized collection of digital objects irrespective of time, place, and number of users.

In fact, the availability of sophisticated and dynamic digital technologies has forced traditional library system to build digital library system. Digital library is such a form of information technology where social impact matters as much as technological advancement. Internet and WWW demonstrate that researchers, students of all ages and general public have endless appetite for millions of information. Digital libraries can change the context of people's work practices which, therefore, can restructure their relationships with each other and the task at hand. Thus, there is a significant interest among academics, researchers and professionals in both developed and developing countries to initiate different research projects on digital libraries and on the changing context of library systems.

1.1.2. Trends in digital libraries: Bangladesh perspectives

The rapid advancement of technological innovations has greatly influenced the socioeconomic condition, lifestyle, teaching and research approach both in developed and developing countries. The era of computer applications in libraries of Bangladesh began in 1980s. A number of strategies, plans, and approaches were taken during this decade. The situation of digitization of libraries of Bangladesh, however, is not pervasive. Some efforts are made by the professionals in public and private university libraries while a large portion

of other libraries are still in dark. The initiatives of the information professionals toward digital librarianship reveal some activities including the acquisition and subscription of e-books and e-resources, developing online databases and repositories, and providing searching and downloading facilities (Alam & Islam, 2011). Noticeably, International Center for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) and Agricultural Information Center (AIC) were the pioneers in creating and introducing bibliographic databases on specialized subject areas (Shuva, 2012). Later, a number of initiatives have been taken to digitize the collection of libraries. The digitization project of Bangladesh Bureau of Educational Information and Statistics (BANBEIS) digitized 400 books, reports, and statistical documents from April to June 2009 (Shuva, 2012). Bangladesh Rural Advancement Committee (BRAC) University is the first university in Bangladesh to establish a digital institutional repository started in June, 2008. The repository was funded by the International Network for the Availability of Scientific Publications (INASP) and has included 2069 items in its digital IR.[1] Furthermore, ICDDR,B has been a pioneer in creating and maintaining institutional repository. So far, 4814 items have been included in the digital repository of ICDDR,B including articles and research papers.[2] Bangladesh Institute of Development Studies (BIDS) also has an ongoing digitization project which is tend to digitize all its publications. Moreover, Eastern University (EU) has also integrated Greenstone and KOHA for integrated digital library system. It has included internship reports, thesis papers, news clippings and EU publications into its digital collection so far.

1.1.3 Theoretical background

Many studies have been conducted based on the theory of adoption (Rogers, 1962) and Technology Acceptance Model (TAM) of Davis (1989). The present research intends to develop a framework of users' adoption of a digital library system in Bangladesh. In order to learn what factors will influence intention to use digital library, the background theories of this study also utilized concept of diffusion of innovation and TAM. Adoption of innovation concerns the decision of an individual or organization whether to use an innovation or not (Rogers, 1995). The Technology Acceptance Model (TAM) is one of the most cited models in explaining the innovation adoption. TAM suggests that when any new innovation is appeared, a number of factors influence users on how and when to adopt it, which is

[1] **Source: http://dspace.bracu.ac.bd**.
[2] S**ource: http://dspace.icddrb.org/dspace/**.

referred to as intention to use. This, in turn is determined by perceived ease of use and perceived usefulness of the system. The background theories and related works have been reviewed in chapter 3.

1.2 Statement of the problem

To promote nation's vision of building "Digital Bangladesh", the library and information sectors can play a vital role. The libraries of higher academic institutions, especially the public and private university libraries in Bangladesh are now adopting new technologies and taking initiatives to digitize their systems, functions and services. Nowadays digital library has become an important area of education, research and professional practice. Nevertheless, no integrated effort of building digital libraries in Bangladesh has been made so far. The empirical evidence of users' adoption of digital library system is still limited, and therefore, the adoption process and the determinants of adoption of digital library have basically remained unknown in the dynamic socio-technical complex environment. In addition, there are different antecedents which influence digital library adoption among the users. It is necessary to understand how users feel about the digital library, and more important what are the factors that will influence the intention to use digital library (Hong, Thong & Tam, 2002).Thus, the present research problem has been formulated to explore the factors that influence users adoption of a digital library system based on a case study of East West University Library, a pioneer private university library in Bangladesh.

1.3 Objectives and research questions

The study is based on East West University Library (EWUL) of Bangladesh which examines users' perceived ease of use (PEOU) and perceived usefulness (PU) leading to intention to use and finally adoption of DL. The major objectives of this study are:

- Develop a model of users' adoption of a digital library system by testing a predefined set of hypotheses; and
- Suggest guidelines for promoting adoption, and acceptance of DL.

To attain the above objectives, the study formulated the following research questions:

Major Research Question (MRQ):

- What factors, to what extent, have influenced users to adopt digital library systems?

Subsidiary Research Questions (SRQs):

- SRQ1: How do users' knowledge of search domain influence PEOU and PU?
- SRQ2: How is DL content related to PEOU and PU?
- SRQ3: What is the effect of DL system characteristics on PEOU and PU?
- SRQ4: Is there any impact of DL service quality on PEOU and PU?
- SRQ5: How do PEOU and PU influence users' intention to use DL?
- SRQ6: What should be the guidelines for promoting the adoption and acceptance of DL system in Bangladesh?

1.4 Significance of study

The main objective of the study was to assess the user's perception of ease of use and usefulness of DL based on the framework developed. Thus it is significant in enabling LIS professionals in comparing the factors in the light of other determinants to ensure efficient and effective services. Moreover, the theoretical framework developed in the study would possibly expand the other related theory of adoption. The suggestive guidelines would help library professionals in policy developing and decision making in Bangladesh.

1.5 Research design and methodology

1.5.1 Case study as a research method

This study conducted a case study of EWU library in Bangladesh. Fidel (1984) stated that case study as research method seems to be appropriate for investigating phenomena when (a) a large variety of factors and relationships are included, (b) no basic law exist to determine which factors and relationships are important, and (c) when the factors and relationships can be directly observed. She also revealed this application of model in systematically developing comprehensive model describing factors and exploring relationships. Case study is an appropriate method to generalize research findings.

The whole research was conducted in the following way (Figure 1.1):

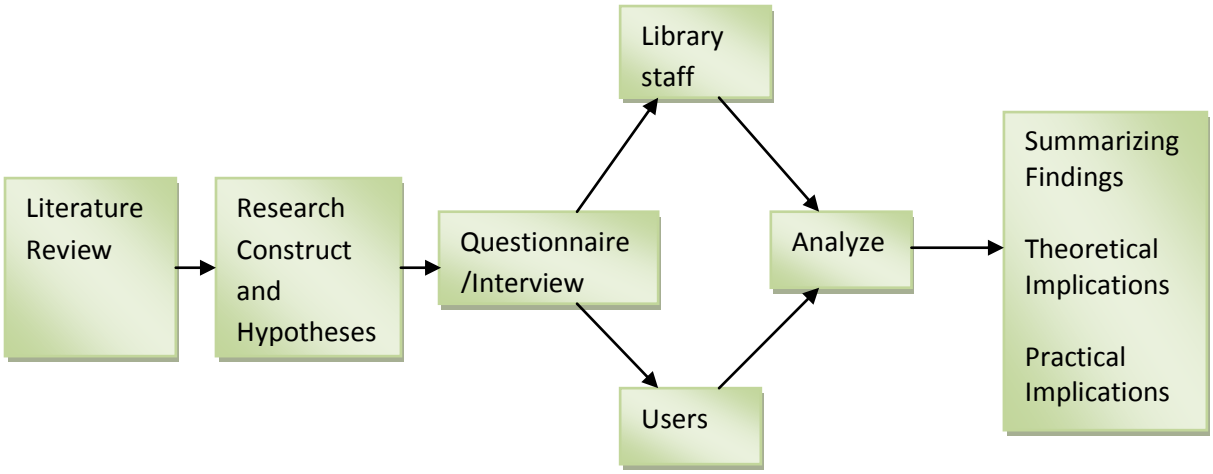

Figure 1.1: Steps in conducting research

1.5.2 Selection of the case and determination of the sample

Full-phased digital library can rarely be found in Bangladesh. Although some libraries claim to have digitized their entire collection, they used only some tools and technologies. In such a situation, a preliminary comprehensive search of the websites of some selected private university libraries were conducted to have an understanding of the functions, activities and services of these libraries. EWU library seems to be more organized as it is one of the pioneers in introducing digital library and other technologies by analyzing their library procedure, type of documents, requirements of staff, developing a project plan, and finally using Greenstone software. In addition, EWU has always been in front line in conducting workshop, seminars, and training on a range of aspects for library and information professionals.

Visiting the East West University Library of Bangladesh, data were collected from both library professionals and students. On the basis of observation of the EWU library use in a week, questionnaire was distributed to a total of 140 library users irrespective of their age, gender and academic qualification. 129 filled in the questionnaire were return with response rate of 94.14%.

1.5.3 Data collection techniques

Questionnaire survey of users

A survey was conducted for the study through a structured questionnaire. Kimani, Panizzi, Catarci, and Antona (2009) states that prospective or real digital library users, including stakeholders and users play a key role toward the successful design of digital library system, and the questionnaires can encourage them to remark their recommendations on the possible services and content offered by the DL. The questionnaire for the interview on "Users' adoption of a digital library system: A case study of East West University library, Bangladesh" was designed to collect data on adoption and overall satisfaction of users using the DL and consisted of the following elements:

- demographic and academic information, such as user category, gender, age, affiliated discipline, educational background;
- experience of using computer and internet, frequency of using internet;
- experience of using DL, duration and frequency of using EWU DL;
- nature of content of DL including its richness, currency, adequacy, completeness, clearness, relevance, usefulness;
- respondents' knowledge of search domain, such as if users have idea on searching under subject or author domain, and on required topic;
- DL system characteristics, i.e. whether the interface is well-designed, system is fast, easily accessible, and available;
- Service quality of EWU DL, such as availing technical and other services without breakdown, promptness in providing service, help massages on the screen and providing access to full text resources;
- Users' perceived ease of use, i.e. if users find learning and using DL and their interaction with it easy and understandable;
- Users' perceived usefulness, i.e. whether they consider DL useful in meeting information needs.
- Users' intention to use DL depending on their PEOU and PU;
- Overall satisfaction of users regarding DL.

From the category 4 mentioned above, participants' responses were measured on a 7-point Likert scale anchored by Strongly disagree (1) at one end, to Strongly agree (7) at the other, or insignificant to significant, or unsatisfied to satisfied.

Interview of selected library staff

In addition with responding to the questionnaire, librarian along with some other library administrators of East West University library was interviewed. The main focus of this interview was to identify the perception of library professionals regarding adoption of digital library system and services. Moreover, problems usually encountered during digitizing the entire collection, recommendations to overcome such problems, and their future plans to enhance the services for library users were also explored through the interview.

1.5.4 Data analysis

A large amount of data and information was derived through the interviews and closed ended questions. The questionnaire was mainly designed on the basis of factors of the proposed model developed in this work in order to facilitate quantitative analysis. Responses to closed-ended questions were analyzed using Statistical Package for Social Science (SPSS). Furthermore, qualitative analysis was conducted based on the interviews of library staff.

Mann-Whitney U-test

The most common nonparametric statistical test for unrelated samples of scores is the Mann-Whitney U-test. This test is used for similar research design as the independent t-test. In other words, it can be used on two groups of scores that are independent of each other. This test was conducted to determine the differences between the male and female users in terms of affecting their perceived ease of use.

Kruskal-Wallis test

The most common non-parametric statistical test for unrelated samples of scores is kruskal-Wallis test. This test is also used for similar research design as the independent t-test. In other words, it can be used on more than two groups of scores that are independent of each

other. This test was conducted to find out to find out the differences among gender and perceived ease of use, age groups and perceived ease of use, background discipline and perceived ease of use, and experience of using computer and perceived ease of use.

Chi square test

Chi-square is a statistical test commonly used to compare observed data with data expected to obtain according to a specific hypothesis. This study is conducted to analyze the significance of knowledge of search domain, quality of digital library content, system characteristics, and service quality on perceived ease of use and perceived usefulness of digital library adoption.

1.6 Definition of terms

Digital library: A networked collection of electronic resources which includes technological augmentation for creating, searching, and accessing information.

Diffusion: A process by which an innovation is communicated over time through communication channels among the members of a community or social system.

Digital library adoption: Acceptance of using digital library by students, faculty members, and library staff as a part of their research and other academic task.

Innovation: Objects, practices, or ideas recognized as new by individuals or other unit of adoption. (Rogers, 1995).

Knowledge of search domain: Domain knowledge refers to the knowledge on the respective discipline, domain or area which enables users to formulate accurate queries matching with the database, separate relevant information from the irrelevant ones.

Perceived ease of use: Perceived ease of use is the degree to which a particular system is believed to enhance one's job performance.

Perceived usefulness: Perceived usefulness is the degree to which the use of a particular system is considered as free of physical and mental effort.

System characteristics: Features of system design that ensures availability, accessibility, smooth navigation, and relevance of digital library content and services.

Service quality: Includes evaluating quality of services on the basis of support from library staff in helping users in finding resources or answering to their queries, promptness in providing services, getting smooth services without breakdown, etc.

Technology Acceptance Model: discusses the prediction of acceptability by users of any particular system, which is developed by Fred D. Davis.

1.7 Organization of the thesis

The present study design has been arranged in six chapters:

- *Chapter 1* represents the background and objectives of the study, research design and methodology selected.
- *Chapter 2* is owed for comprehensive review of related literature.
- *Chapter 3* deals with identifying and describing the factors designed for proposed model in the study which leads to formulation of hypotheses.
- *Chapter 4* covers the present condition of East West University Library of Bangladesh including the digital library initiatives taken and technologies and software used by them.
- *Chapter 5* provides findings of the study by analyzing responses gathered through the questionnaire.
- *Chapter 6* proposes a theoretical framework for promoting adoption of digital library. This chapter also discusses challenges and guidelines for stimulating digital library adoption.

Chapter 2

East West University Library System

2.1 Introduction

The East West University library, which started its journey with the university in 1996 with a collection of about 5000 books, is the backbone of the research and development activities if the university. The library is a corporate member of British Council, Dhaka, and the Archer K. Blood American Center Library, Dhaka. Books are arranged in open stacks for the convenience of library users. East West University library maintains open access shelves in order to provide users enough choices to select their desired resources. The library's mission is to enable and enrich the teaching, learning, and research endeavors of the university by delivering flexible access to relevant information resources and by providing quality services and facilities. To meet these needs the library provides access to an extensive range of information resources, both electronically and in print.

2.2 Objectives of East West University library

The primary objective of the East West university library is to support the university in emerging as a leading university in the country. Apart from that, East West University Library also poses the following objectives:

- To identify, acquire, organize, store, and provide on-demand access to the available intellectual and research products of scholars to support teaching, learning, research, and creative endeavors.
- To provide greater access to digital collections while continuing to build and improve access to collections in all formats to meet the research and teaching needs of the university.
- To foster information literacy and work involving the EWU community and to enable users to think critically, create knowledge, and be lifelong learners. To provide and ensure quality services and good professional practice in library activities.[1]

[1] Source: EWU website- http://lib.ewubd.edu/objectives

2.3 Collection of East West University library

East West university library which started its journey with 5000 books is now one of the premier university libraries with an enriched collection of books, printed journals and periodicals. It is confined not only to collect traditional books and journals, but subscribes many worlds' leading full-text e-journal databases. Table 2.1 shows EWU library's present collections.

Table 2.1 Collection statistics of East West University library[2]

Description of item	Quantity
E-books	5,000
E-journals	25,000
Audio-visual materials	1550
Atlases	15
Rare maps	06
Thesis	600
Journals and magazines	130
Books	29,000

2.4 Technology initiative in East West University library

The library launched a computer based library services effectively in 1996. To keep pace with modern IT based world, the library in assistance with SDC (Software Development Center) of EWU developed unique indigenous library software namely East West University Library Management Information System (EWULIBMIS) to support and manage various library activities. The library software included processing system, circulation system based on barcode, catalogue search as well as other useful features. In addition, the software could also generate different kinds of library reports like user's status, acquisition report, department wise report, subject wise report, overdue of books, fine circulation, etc. (Begum, 2009). Later EWU library transferred its bibliographic data to the integrated library system KOHA successfully in 2010. Finally, in 2011, EWU launched its digital library. Figure 2.1 shows the homepage of the EWU library.

[2] Data from the interview of library staff.

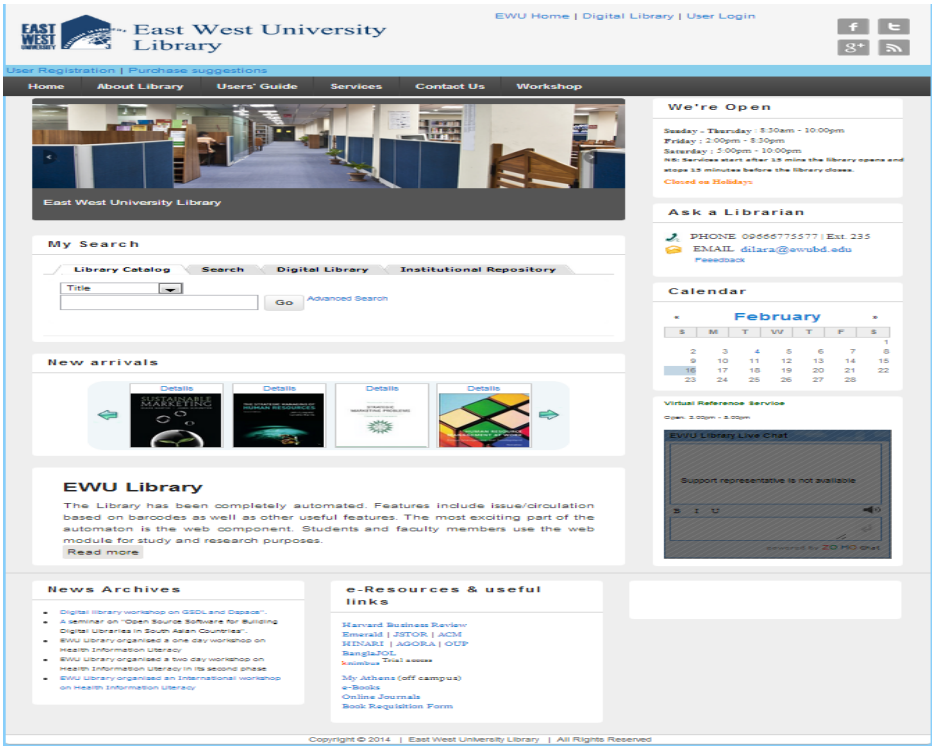

Fig 2.1 East West University Library home page

2.5 Digital Library Initiative at East West University

The automation of EWU library later was lead to the digitization of its resources by library authorities with the support of Digital Library Network in South Asia (DLNETSA). DLNETSA is a regional consortium of South Asia Region. The objective is to create operational and sustainable digital library network with focus on providing support for integrated library system and digital library activities. To reach this goal, DLNETSA is established with the support of UNESCO for spreading digital library in this sub-continent. As a result, EWU library took initiative to build a digital library which will be easy to preserve and publish the internally created documents, thesis, and dissertation, newspaper clippings, subscribed and fully owned publication in a flexible and a user friendly way. Some other objectives were:

- To create, acquire, and make available the electronic or digital resources to the research community of the university.
- To preserve rare and other owned documents to make the use of information easy and time saving to the EWU community.

- To enhance the resource sharing and networking among the digital libraries in the region and in this way make the information open for all. (Begum, Rashid, & Mahamud, 2012).

2.6 Planning for East West University Digital Library Project

- EWU decided to form a project plan in 2010 after analyzing needs, financial capacity, existing IT infrastructure, and supportive manpower. A comparative analysis by EWU library among e-print, DSpace and Greenstone digital library software resulted in the decision to use the GSDL considering its various strong features, simplicity, and friendliness both for staff client and end users.
- EWU submitted a project proposal to Waikato University for financial support.
- The Waikato University approved the proposal and the project was started in 2010. EWU library developed the digital library and established ILS KOHA with the help of IT wings of EWU and HealthNet, Nepal.
- EWU library started developing a collection of newspaper clippings related to Business, Economics, Health, Technology, Human rights, etc. Then started uploading other types of documents including thesis paper, dissertation, project report, and their own published journal articles, etc. (Begum et al., 2012).

The EWU digital library as shown in Figure 2.2 is available at the following website: http://gsdl.ewubd.edu/greenstone/cgi-bin/linux/ library.cgi

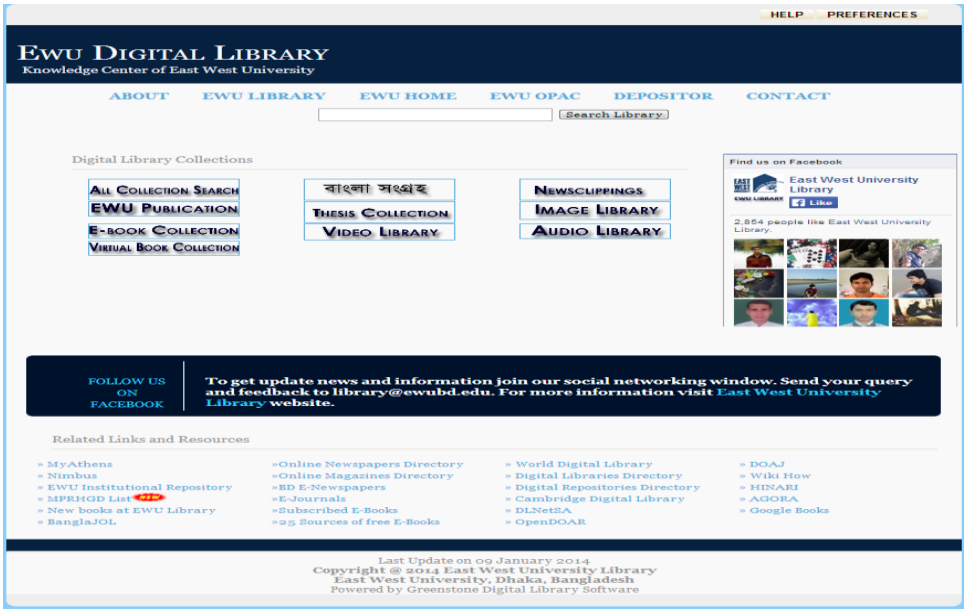

Fig 2.2 Interface of East West university digital library

2.7 Steps of digitization

EWU library is digitizing news clippings, and EWU publications in following steps:

- ***Selection:*** The library staff scans the contents of newspapers and selects only those articles containing information related to different subject field.
- ***Scanning:*** Selected articles are scanned and saved in a required format mentioning news title, DDC class number, the name of the newspaper and publication date.
- ***Creation of digital objects:*** The scanned clips and materials are saved in format like .jpg, .pdf, .tiff, .JPG, etc. Then metadata is added to add it into the collection. (Begum, Rashid, & Mahamud, 2012).

Figure 2.3 shows that newsclippings can be searched in title, subjects, dates, etc

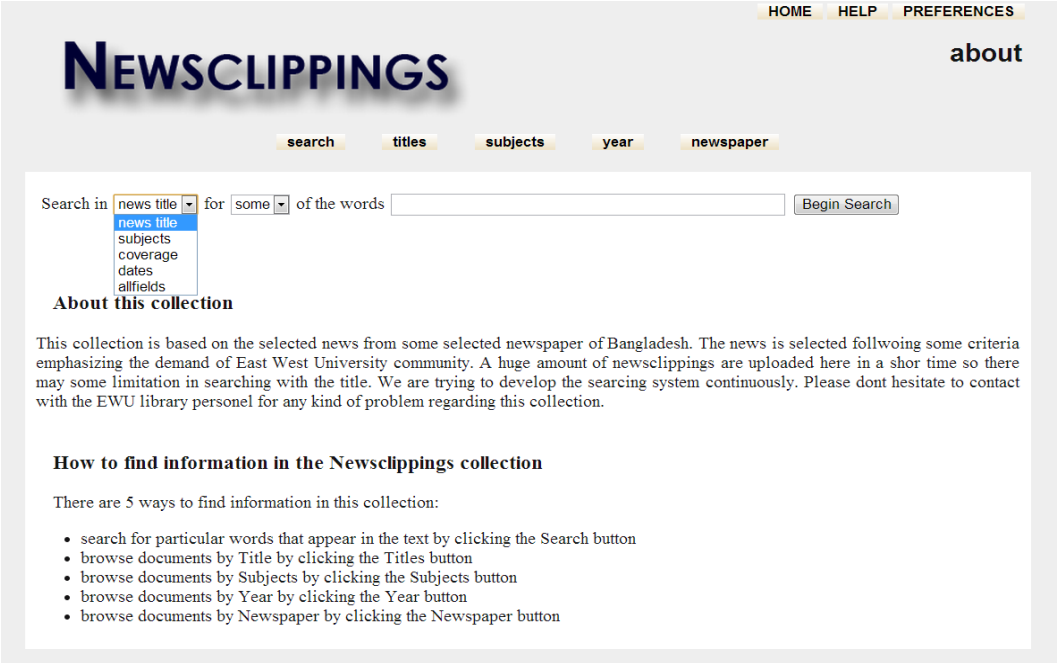

Fig 2.3 Search options for newsclippings

2.8 Access facilities to e-resources provided by East West University library

EWU library enables students and faculty to access a wide range of journal articles through BIPC (Bangladesh INASP-PERii Consortium) and UDL (UGC Digital Library) consortium. Through this consortium, the faculty, staff, and students of EWU can subscribe a number of journal databases and e-books. The users of this library can subscribe to resources of 30

well- known and reputed publishers of the world because of the consortium, such as JSTOR, Agora, HINARI, OARE, Springer, etc. Figure 2.4 illustrates the interface of e-book collection.

Fig 2.4: Search for e-book collection

However, very few e-books are being made available because of copyright issues. Most of these e-books are either subscribed through BIPC and UDL consortium or free e-books available on the Internet. In addition, EWU library has also digitized some of its old books and made it available to users online. Moreover, EWU library also provides access to their own published journal articles, which are scanned and included in their respective subject fields. Users are getting full text access to EWU publications including, yearly report, article, journal, thesis report, and news clippings. In order to retrieve thesis paper from the thesis collection, users should enter the title, keyword, report number, subject, or name of the creator. Figure 2.5 shows the interface of EWU publication with search options.

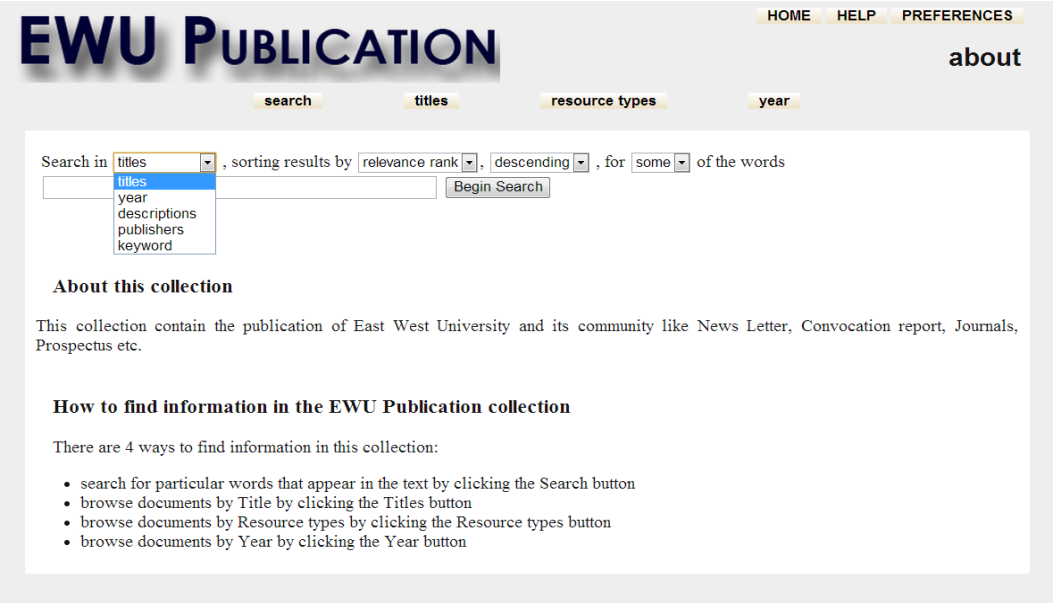

Fig 2.5 Search for East West university publication

In order to search for EWU newsletters or other publication of the university, users need to search using the options of titles, year, description, publishers, or keywords. The search option for thesis collection is shown in figure 2.6.

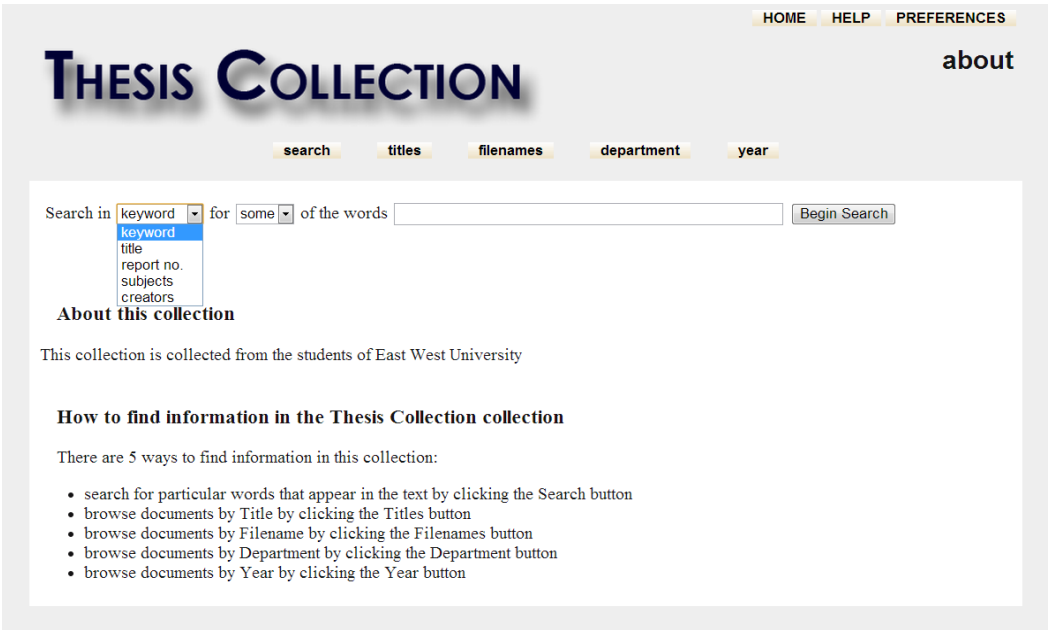

Fig 2.6 Search for thesis paper from thesis collection

2.9 Software and technologies integrated for digitization

By interviewing library personnel, it was found that EWU library has developed its digital collection with a number of software. GSDL software has been used to digitize all the resources of the library. EWU library formed a team to develop Bengali interface of GSDL for the first time which is running successfully. Figure 2.7 shows the interface of EWU Bangla collection.

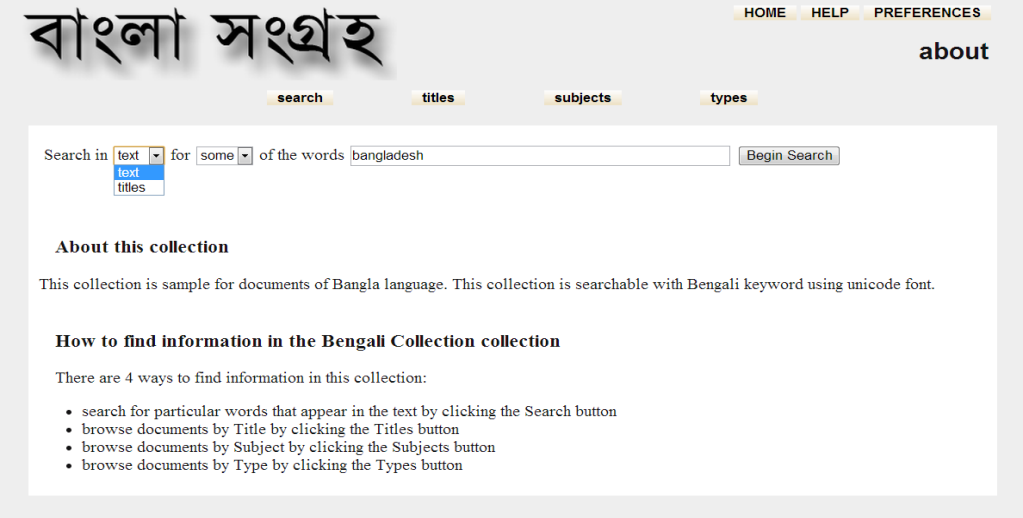

Fig 2.7 Interface of East West university digital library for Bengali collection

2.10 Institutional repository using DSpace

The library has used DSpace to build their institutional repository, where students, staff, or teachers can contribute their resources. But it will only be posted or displayed once the library authorities verify and approve it. Figure 2.8 represents options for searching in EWU institutional repository.

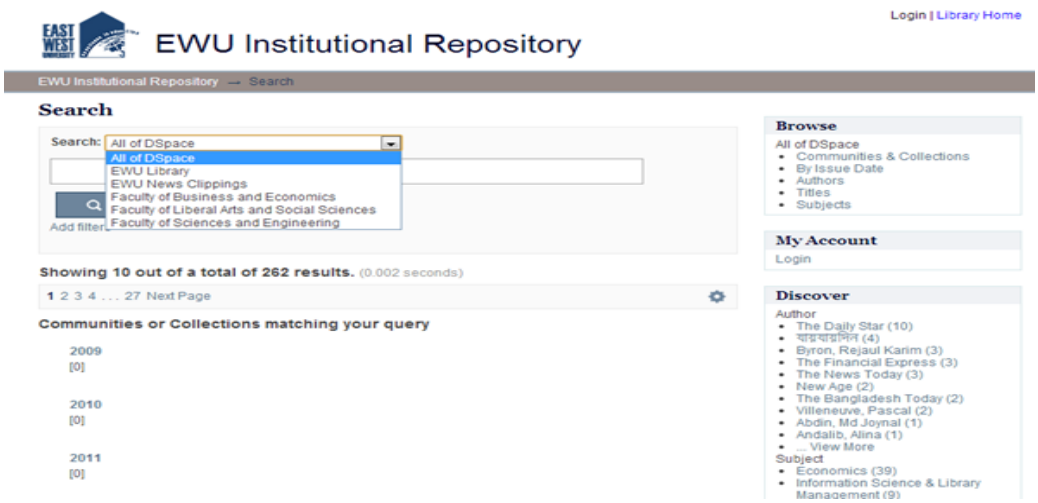

Fig 2.8 Interface of institutional repository of East West University with search options

2.11 Searching through OPAC and Vufind

The search facility has been developed with an integration of OPAC and Vufind. Vufind is such a library resource portal which enables users to search and browse through all of the library's resources, while OPAC is used only to search for books. Interface of searching through Vufind is shown in figure 2.9.

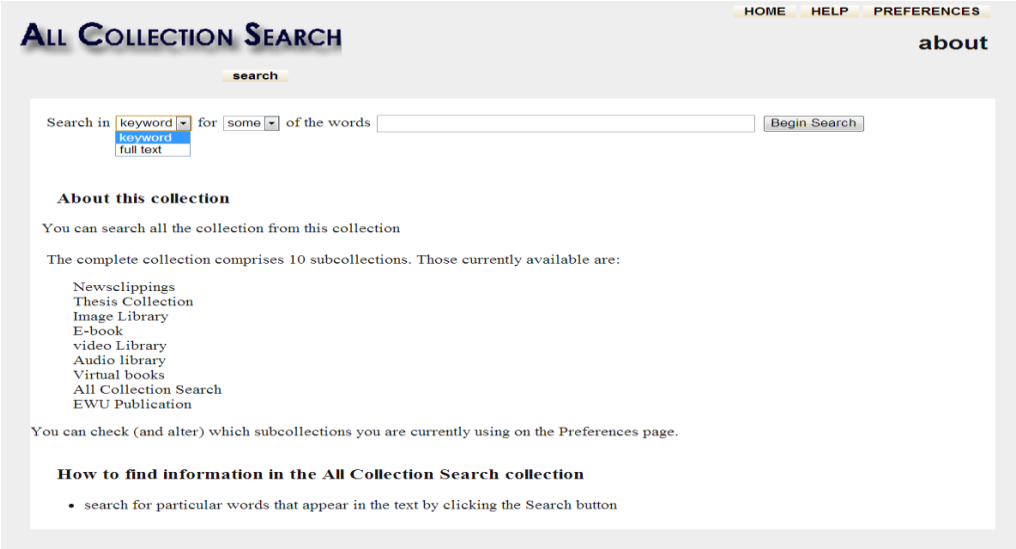

Fig 2.9 Search for all collection through Vufind

For searching a book, users should enter the title, author, ISBN, series, or call number in the search box.Figure 2.10 represents the OPAC interface of EWU DL.

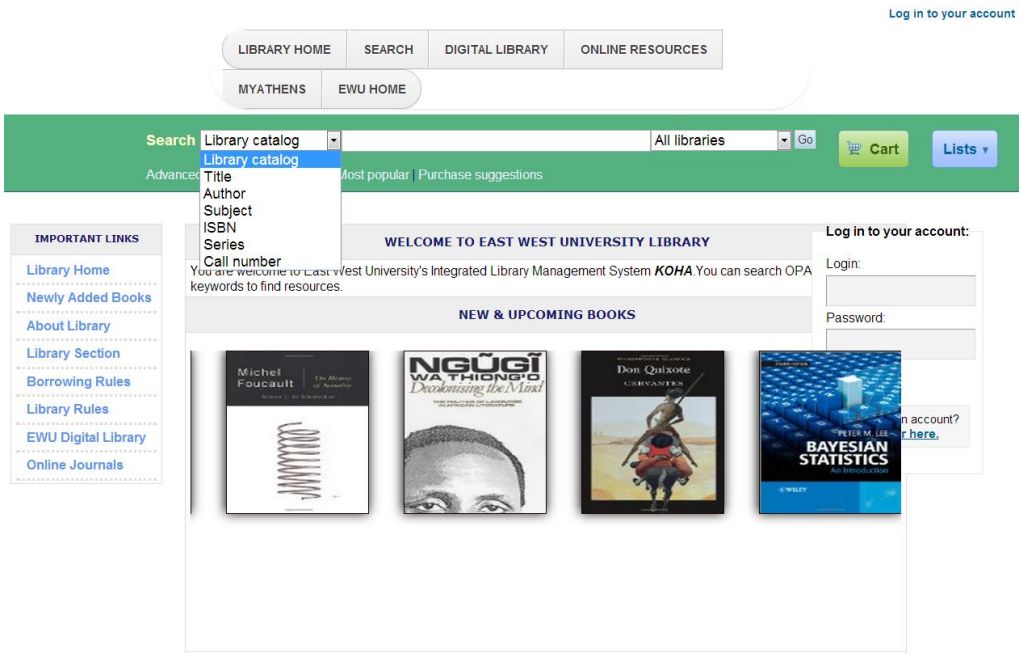

Fig 2.10 Online catalogue search with OPAC

2.12 Virtual reference service through ZOHO

Another excellent service offered by EWU library is the virtual reference service, where a reference librarian answers to users' queries online. This service runs with Zoho software.

2.13 MyAthens

EWU library also enables faculty and staff to remotely access to the subscribed online resources through MyAthens. It is world's most popular access management system with a simple interface which also allows users to search and browse electronic resources with user name and password. Figure 2.11 shows the interface of MyAthens.

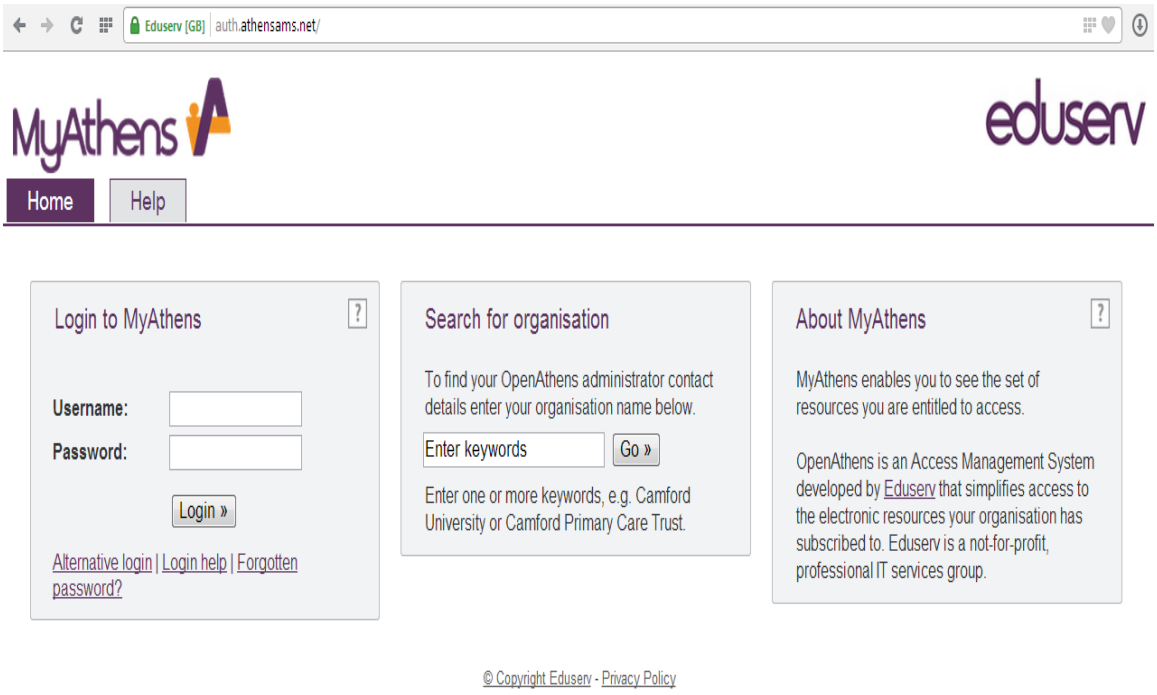

Fig 2.11 Interface for remote access through MyAthens

EWU added an option to read documents virtually which are presented in a shape of a physical book. Users should enter title, author, subject, or keyword in the search box for retrieving documents. Currently EWU has been including its own publications in this 'virtual collection' which is shown in figure 2.12.

Fig 2.12 Search options and result display of virtual collection

2.14 Conclusion

Recently, EWU jointly took an initiative with Bangladesh National Library (BNL) and Rajshahi University (RU) to digitize their collection. They are about to scan 30000 books of BNL through integrating Greenstone and KOHA, and develop their interface with Drupal (open source content management platform). This project is expected to be completed within July, 2014. Rajshahi University is also using Greenstone, KOHA, and Vufind in order to introduce their digital collection, which is likely to be finished within August, 2014. East West university library is providing them mainly with technological support, such as Greenstone software set up, software configuration and customization. In addition, library staff empowerment, and conducting training programs are one of the most important support offered by East West University library to succeed the various projects on digital library implementation and adoption.

Chapter 3

Literature Review

3.1 Introduction

The literature review is an essential part of any research work on which the framework and originality of the study are justified. In this particular study, relevant literature has been studied to represent various aspects of digital library, including its concept, system components, characteristics, benefits, and framework. Researches on digital library conducted nationally and internationally were reviewed to examine the current status of digital library systems and services. In addition, diffusion of adoption theory, and Technology Acceptance Model (TAM) were reviewed and applied in this study to investigate the different factors predicting adoption of a digital library system.

3.2 Digital library system: conceptual issues

Digital Library System is a critical point of contact between information provider and information seeker. The underlying technology of digital library systems allows a user to access any available document within the entire digital library system. In other words, digital library systems are software systems to help with the management of metadata and data, as well as provide end-user services for activities such as submission, discovery, and retrieval of digital objects. According to Candela et al. (2007) digital library system is a software system that is based on definition (possibly distributed) architecture and provides all functionality required by a particular digital library. More specifically, users interact with a digital library through the corresponding digital library system. From the users' perspective, a digital library system could be considered as a one-stop information-workstation, and a place to purchase a title, borrow resources, explore catalogues, search databases, cite bibliographic data, read articles and books, and collaborate with others. The digital library system also allows individual institutions to include their own materials in the digital library system as well as to take advantage of network based information and services offered by others.

3.2.1 The concept of digital library

The basic concept underlying the digital library is not new. In 1945, Dr. Vanneavar Bush of the U.S. Office of Scientific Research and Development discussed a device called a “memex”, which was a device based on microfilm technology and was found to offer scientists to search, gather, find, and retrieve both hypertext and personal information.

The concept of digital libraries is still developing and integrating a wide range of technical aspects with it. Consequently, digital libraries can be defined in various ways. Moreover, the increasing trend towards the adoption of technology in digital libraries making them to be used almost interchangeably and synonymously with various terms, such as ‘virtual library’, and ‘electronic library’ (Saunders 1999). Digital libraries can be viewed from a number of perspectives, as Nurnberg et al. (1995) mentions digital library

- From an information retrieval point of view, it is a large federated database.
- For people who work on hypertext technology, DLs could be seen as one particular hypertext method.
- From a wide area information service perspective, DLs could appear to be one use of the World Wide Web.
- From a library science perspective, DLs may be seen as continuing a trend toward library automation.

Marchionini et al. (2003) consider DL as the logical extension and augmentations of physical libraries in the electronic information society. Oppenheim and Smithson (1999) defined digital library as an information service in which all the information resources are available in a computer-processable form and the functions of acquisition, storage, retrieval, access, and display are carried out through the use of digital technologies. In order to broaden the scope of DL, two complementary ideas as mentioned by Borgman et al. (1996) include:

1. “Digital libraries are a set of electronic resources and associated technical capabilities for creating, searching, and using information. In this sense, they are an 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……”

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, 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….."

Lesk (2005) defines a digital library simply as a collection of information which is both digitized and organized. A digital library can be understood differently with different names. Terms such as electronic library, virtual library, hybrid library, gateway library, library of the future, and library without walls are used, sometimes synonymously with the digital library.

3.2.2 System components

Digital library is extending and integrating both the approaches of traditional library, and distributed information system, and user interfaces serving as a gateway. Kahn and Cerf (1988) examined eight major digital library system components. These include:

a) import/export server (which acts as a primary interface between the digital library system and the outside world),
b) registration server (which is responsible for receiving massages from or hosting new information to be added to the digital library, and registering new users, sources of information or other components newly added to the system),
c) indexing, cataloguing, and reference servers (whose principle function is to provide global cataloguing and indexing services for the retrieval of library content),
d) database servers (that bridge the gap between existing database services and digital library system),
e) accounting and statistics servers (where the function is to collect and store data relating to the use of the digital library system and to send the accounting portion of it to the billing server),
f) billing system (that generates invoices for use of the digital library system based on information it gets from the accounting and statistics server),
g) representation transformation servers (which can accept a standard library object and convert it into any of several output representations foe delivery to a user), and
h) personal library system (which tends to provide a basis for a completely standalone instance of a library system that can operate independently from the collection of

other digital library system and for interacting with the other distributed components of DLS).

Digital library may consist of five major component parts (Dennis, n.d.):

- Host server or computer to store digital objects and to establish communication between end-users and server.
- System and application software to support the functions of the digital library.
- End-user desktop workstations which enable users to access, display, download, and manipulate information.
- Interconnecting networks that provide users with access to collection stored in the database.
- Creation and conversion of digital information.

3.2.3 Features of digital library

Digital libraries differ from traditional libraries not only from the perspective of library collection, but also from some other aspects, which denote the prominent features of digital libraries:

- Digital libraries are digital face of traditional libraries, including both digital and traditional collections
- Enable users to access anytime and from anywhere as it is available 24 hours a day and 7 days a week.
- Based on a wide range of technologies (computer hardware and software, server, scanner, WWW, etc.) facilitating the storage, retrieval, use, and exchange of digital resources.
- Ideally provide a consistent and coherent view of all of the information contained within a library regardless of form and format.
- Require support of distributed network, communication and collaboration to ensure the global connectivity.
- Offer access to current and up-to-date information as there is little or no time lag between creation and availability of resources.

3.2.4 Digital library frameworks

Conceptual framework of digital library enables to visualize current existing research and practices, and to develop new ideas for the growth of digital library. Such expansion might be included from the perspective of content, organization, services, or community. Yates (1989) focuses on three crucial aspects that might be applied to understanding of both traditional and digital library: document, technology, and work.

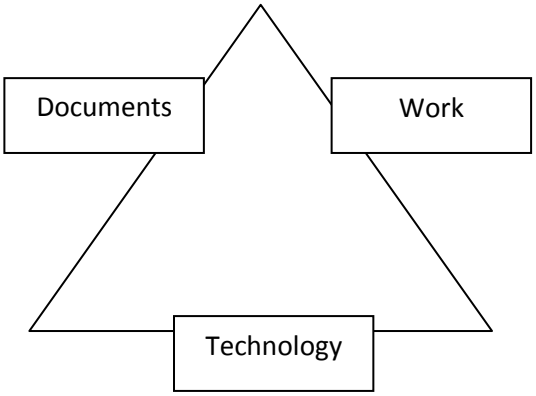

Figure 3.1 Yates' work-oriented library model

Arms, Blanchi and Overly (1997) described a digital library framework based on computer system which consists of four key components as shown in Figure 3.2. These components are: user interfaces, repository, handle system, and search system.

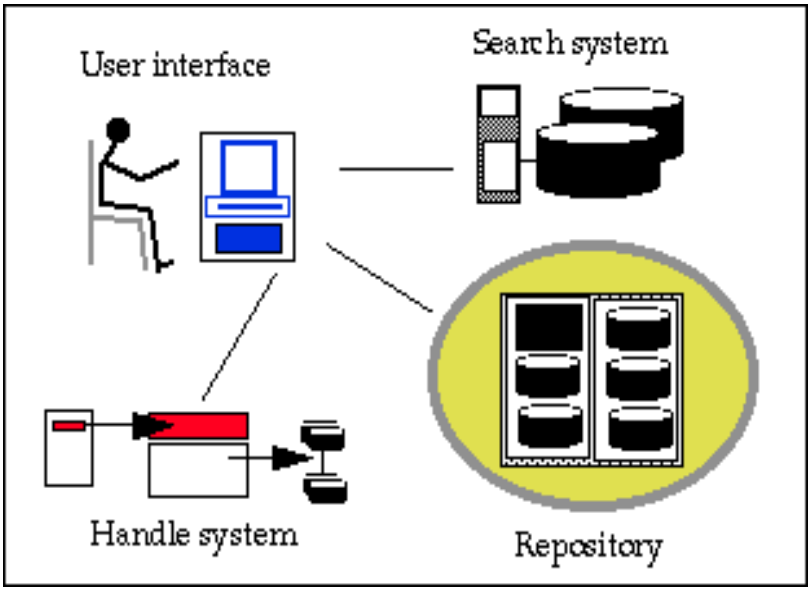

Figure 3.2: DL framework based on computer system

(Source: Arms, Blanchi and Overly, 1997).

Ian Rowlands and David Bawden (1999) re-labelled the three elements of the Yates model as informational (documents), the systems (technology), and the social (work) domains of the digital library. Social domain includes human factors, organizational factors, library management factors, information law and policy factors, etc. The Informational domain represents knowledge organization and discovery (e.g. metadata), impacts on the information transfer chain (e.g. supply). On the other hand, the two key issues that are discussed in the research and development in system domain are interoperability and scalability. These three domains are found to suggest four structural levels of a digital library which are likely to support five basic kinds of functionality. The four structural levels are: user interface, networks and communications, information resources, and reference service system. While the functionality includes: digitization, large repositories, fast data transfer, privilege, and management.

The Cornell Reference Architecture for Distributed Digital Libraries (CRADDL) model includes five basic services such as the repository service, the naming service, the index service, the collection service, and the interface services or gateways (Lagoze & Fielding, 1998). From the perspective of digital library design space, Marchionini and Fox (1999) identified four dimensions to shape a complex design space of digital library, namely: technology, community, content, and services. Since libraries have evolved to help communities of humans to communicate information, one key dimension of digital library design space is known as “community”, which reflects social, economic, political, legal, and cultural issues. Technical progress have influenced networking, storage and retrieval, multimedia representation, and user interface design to link people to digital libraries and digital libraries to others. Services reflect the functionality offered by systems to serve the community. Content is what one thinks of a library first- books, journals, maps and numerous other forms of resources that might have been represented inside computers, outside them, or both version.

Recognizing the difficulties in understanding, defining, describing and modeling, Goncalves et al. (2004) have formalized 5s framework of digital library. These include Streams, Structures, Spaces, Scenarios, and Societies.

Choi and Rasmussen (2006) provided a digital library model based on a practice community. As shown in Figure 3.3, from a traditional librarian's point of view, digital libraries present a transformative model of a large-scale, user-centric organization that is moving towards an integrated form with various components

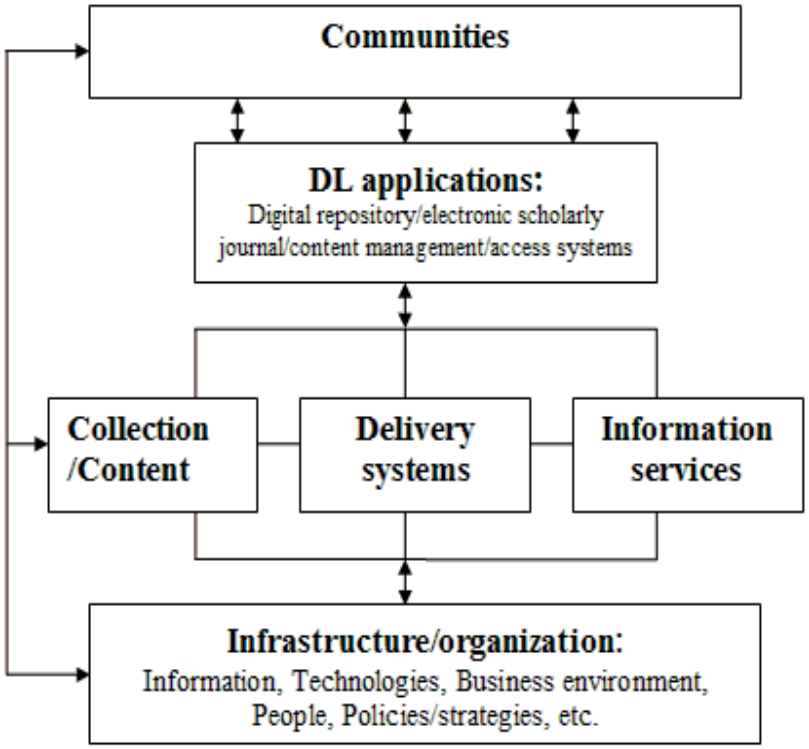

Figure 3.3: Digital library based on a practice community

3.2.5 Advantages of digital library

Digital libraries offer a number of benefits to users as well as patrons of the library. Some of the major features of digital library include the followings:

- Digital library includes no physical boundary. In other words, users of digital library do not need to visit the library physically.
- Digital libraries offer improved access as they can be accessed through Internet at any time and from anywhere.
- Provide users with multiple accesses to resources which enable users to access the same resource simultaneously.
- Enable users to search with any search term (title, name of author, subject, phrase, etc.) from the total collection. Moreover, digital libraries can share information

resources with other digital libraries through metadata and information exchange protocol.

- Facilitate improved preservation by providing access to digital version of rare and special documents.
- Require little physical space to store digital information than traditional libraries.
- Come up with wide range of resources in a variety of formats.

3.3 Research on digital libraries: national and international perspectives

Since digital library expands its proliferation, researchers have been focusing on the issues underlying the design, development, and usability of digital library. Understanding of problems and possible solutions while managing digital library system are widening the doors of potentiality of digital libraries. Coleman (2002) discussed about the uses and users of interactive digital libraries in terms of interactivity, information behavior, and language. She found that modeling information behavior and generating requirements based on these models is more effective to develop uses of interactive digital library. In such modeling, three types of information behaviors were distinguished: information seeking, information searching, and information use.

Chowdhury (2002) enunciated the need for, and provision of, personalized information services in the next generation digital libraries as the Web and digital libraries are meant to provide direct access to information sources and services without human intermediaries. Ferreira and Pithan (2005) evaluated the usability of the InfoHab (the Center of Reference and Information in Habitation) digital library using usability criteria established by Jacob Nielsen and the Constructivist model of user study proposed by Carol Kuhlthau. The emphasis was on to integrate the concept of Human-Computer-Interaction or usability and Information Science (IS). The study used five usability variables such as easy to learn, efficiency and effectiveness of digital library, memorability, errors, and users' satisfaction. The study found the synergy between the areas of Human-Computer-Interaction and Information Science.

While focusing on the needs of the digital library, Zhang (2007) emphasized that in terms of the technologies used in digital libraries, the evaluation should include the novelty, innovativeness, usability, usefulness, and the access mode. In order to keep pace with the

advancement of technology and diversity of user needs, library professionals are integrating latest, convenient, and fast yet quality services with the librarianship on a continuous basis. Arif and Mahmood (2012) examined the extent of the adoption of Web 2.0 technologies by Pakistani librarians. In this study, perceived skill level of internet use and perceived ease of Web 2.0 use were found to have a significant impact on the frequency of using Web 2.0 technologies instead of gender, length of professional experience, and place of work. Similarly, the increasing online environment or Web technology resulting in users who have more technology know-how and are demanding and expecting their library on the internet able to meet their information needs not only on demand, but also in anticipation of demand, (Panda & Mahapatra, 2012)**.**

Although digitization of libraries is still in its birth place, few initiatives have been found to digitize the materials and services of libraries around Bangladesh. Islam (2013) mentioned some of these initiatives. This study found that BANBEIS took Library and Documentation center automation and digitization project in December 2008 and first phase of this project has been completed in December 2009. ICDDR,B, Bangladesh Institute of Development Studies (BIDS), and Ayesha Abed Library have ongoing digitization project. Islam (2012) identified that BRAC University Library, East West University Library, ICDDR,B Library, Islamic University of Technology Library and North South University Library have established the digital library in order to provide full-text information resources of their own throughout the world. Earlier, Shoeb (2010) focused on setting up an IR at the Independent University, Bangladesh (IUB) and identifying suitable IR tools. Among a number of IR software packages available, 32 students of The School of Engineering and Computer Science(SECS) of IUB preffered DSpace the most as the best practice to both administrative and technical infrastructure, and access to valuable repository collections.

Noticeably, initiatives have also been taken to preserve digital content along with building digital libraries in Bangladesh. Chowdhury et al. (2011) found ICDDR,B and BRAC University library working on building Institutional Repository (IR) using DSpace. Independent University, Bangladesh (IUB) is about to digitize their materials which would help build an IR. Bangabandhu Sheikh Mujib Medical University (BSMMU) is also working on building their IR. In addition, East West University library has been using Greenstone and DSpace to build and maintain their digital collection and institutional repository respectively.

3.4 Review of theories related to adoption studies

3.4.1 Theory of adoption

The adoption of technology in digital libraries has already spread in the developed countries as well as some of the developing countries. The theory of adoption or diffusion of innovation theory, developed by E.M. Rogers in 1962, explains how an idea or innovation gains velocity and dispersal (diffusion) over time through a specific population or social system. The diffusion of innovation or innovation adoption research focuses on five elements: (a) The characteristics of innovation which may influence its adoption; (b) The decision making process that occurs when individuals consider adopting a new idea; (c) The characteristics of individuals that make them likely to adopt an innovation; (d) The consequences or individuals and society of adopting an innovation; and (e) Communication channels used in the adoption process. However, user acceptance is an inevitable factor for the success and full utilization of a digital library. Adoption theory is aimed at understanding, explaining, and predicting how, why, and to what extent individuals or organizations will adopt or purchase new offerings (including products and services and even ideas). Diffusion is such a process by which an innovation is adopted by the members of a certain community. In other words, diffusion of innovation is a theory that is intended to explain how, why, and at what rate new ideas, innovation and technology spread through culture, knowledge and awareness.

Everett Rogers popularized the theory in his book 'Diffusion of Innovation'. According to Rogers (2003) "Diffusion is the process by which an innovation is communicated through certain channels over time among the members of social system". In order to be sustained in the long run, an innovation must be well-adopted. The categories of adopters are: innovators, early adopters, early majority, late majority, and laggards (Rogers 1962). Rogers further identified five factors that can explain the variation in the rate and likelihood of an individual's decision to adopt or reject an innovation. These factors include: relative advantage, compatibility, complexity or simplicity, triability, and observability (Rogers, 1962). Since the diffusion of innovation mainly focuses on how, why, and what rate new ideas and technology spread through cultures, norms, and customs, Rogers goes on to state that there are four main elements of diffusion.

1. *Innovation:* Rogers defines an innovation as “an idea, practice, or object that is perceived as new by an individual or other unit of adoption”(Rogers, 2003). An innovation may have been invented a long time ago, but if the people perceive it as a new innovation, then it may be still new to them. In this case, the innovation-decision process involves the steps taking us through the decision of whether to adopt an entity or not. The innovation process consists of five steps: Knowledge, persuasion, decision, implementation, and confirmation.
2. *Communication channels:* Rogres defines a communication channel as “the means by which messages get from one individual to another” (Rogers, 1983, p. 17). The adoption of an innovation is greatly influenced by the understanding of communication channels and the social network involved.
3. *Time:* According to Rogers, “The innovation-decision period is the length of time required to pass through the innovation-decision process” (Rogers, 1983).
4. *Social system:* Rogers (2003) defined social system as “a set of interrelated units that are engaged in joint problem solving to accomplish a common goal”.

3.4.2 Theory of Reasoned Action (TRA)

Theory of Reasoned Action (TRA) explains a person’s behavior through his/her behavioral intention, which indicates a person’s readiness and attitude to perform the given behavior, and subjective norms regarding the behavior (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). The theory posits that individuals think about the implications of their actions before engaging in a behavior (Crosby & Muehling, 1983). The intention of individuals is jointly influenced by his/her attitude to perform the behavior, and subjective norm. Subjective norm refers to the social influence of people that individuals perceive important in taking behavior. Although TRA was related to voluntary behavior, behavior appeared not to be 100% voluntary and under control. Explicit variables encompass all the factors that influence and form the behavioral intention, such as individual characteristics.

3.4.3 Theory of Planned Behavior (TPB)

Theory of Planned Behavior (TPB) includes the notion of perceived behavioral control which refers to a person’s perceptions of their ability to perform a given behavior. There are some

determinants which drive the acceptance or rejection of any system. There are two factors that mainly influence how people come to accept and use a new technology, namely:

- Perceived usefulness (PU): This is defined by Davis (1989) as “the extent to which a person believes that using a particular system will enhance his/her job performance.” Therefore, people will tend to use an application when they find it useful and significant to improve their skills and performance.
- Perceived ease- of- use (PEOU): Davis (1989) defined it as “the degree to which a person believes that using a particular system would be free from effort.” This factor plays an important role as potential people may not accept a system favorably if they find it too difficult to use. In other words, a particular technology could be rejected if potential people believe that the benefits of using it are outweighed by the complexity of the system and the effort to use it.

Research on the adoption of innovations also indicates a prominent role of perceived ease of use (Davis, 1989). Tornatzky and Klein (1982) find that compatibility, relative advantage, and complexity have the most significant relationships across a wide range of innovation types. As mentioned earlier, according to the definition of compatibility given by Rogers , it can be said that people intend to use a system when they find it consistent with their experience, value, and needs. Similarly, the benefits and simplicity or complexity associated with using a system also influence people to receive or ignore the system.

3.4.4 Technology Acceptance Model (TAM)

Understanding the various factors behind why people accept or reject a technology has become one of the most challenging issues. Among the various efforts to understand or predict the process of user acceptance of information systems, Technology Acceptance Model (TAM) is one of the most cited theoretical frameworks (Figure 3.4). Technology acceptance model is a theory, developed by Fred Davis and Richard Bagozzi (Davis 1989; Bagozzi, Davis & Warshaw, 1992) which mainly deals with the prediction of acceptability and adaptability of an information system or a new technology. The TAM is based on the social cognitive theory of reasoned action (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) and the theory of planned behavior (Ajzen, 1985).When a system is introduced, some people are likely to adopt it, while others might refuse it.

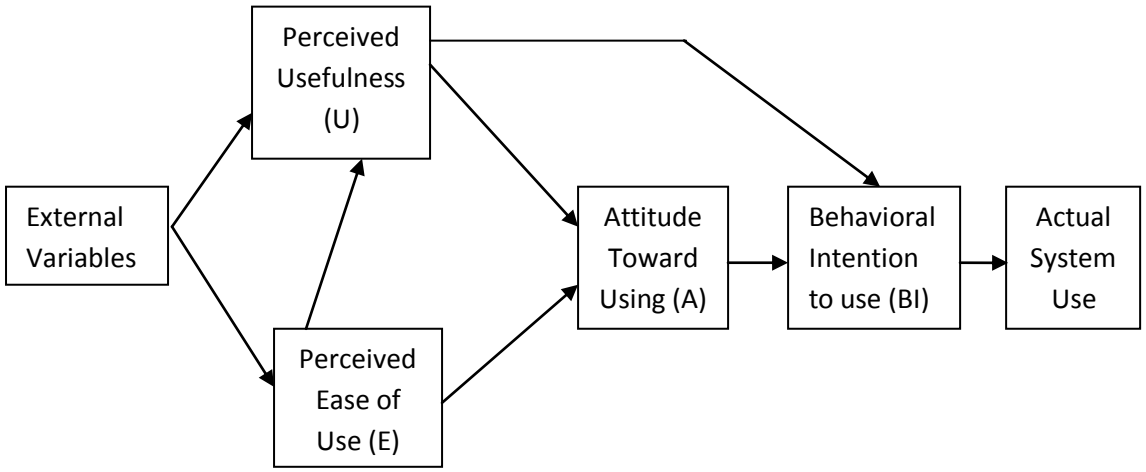

Figure 3.4 Technology Acceptance Model

(Cited from Davis, Bagozzi, and Warshaw (1989)

3.5 Adoption of digital library system

Assessing the importance of digital library has become complicated by the expansion of technology associated with it. It is essential to identify the factors which influence adoption or migration to digital library, or those which inhibit the progress of adoption. A number of researches have been conducted in identifying constructs and investigating their impact on digital library adoption. Park et al.'s model (2009) examined the factors that have significant impact on peoples' adoption and use of digital library systems in the context of developing countries. Domain knowledge and experience in computer use were found to influence perceived ease of use. They added three new categories namely English literacy, users' interest in publishing and conducting research, and library assistance through technical support. The study found that English literacy along with library assistance had a direct effect both on perceived ease of use and perceived usefulness. But interest in publishing was only had positive effect on perceived usefulness. Among the system characteristics of this proposed model, visibility of the system did not have any significant impact on perceived usefulness, while ease of access and relevance of system have impact both on PEOU and PU. Moreover, PEOU was significant in influencing PU which was later culminated into behavioral intention to use digital library.

According to Lee et al. (2005), perceived ease of use has a direct influence on perceived usefulness of digital library. Likewise, terminology clarity also has positively influenced perceived ease of using the digital library. On the other hand, screen design and navigation were not found to have much impact on perceived ease of using digital library. However, there are many other significant aspects of digital library system which were not discussed in this study.

Thong, Hong, and Tam (2002) included three system characteristics (terminology, screen design, navigation), three organizational variables (relevance, system accessibility, system visibility), and three individual differences (computer self-efficacy, computer experience, domain knowledge) as critical external variables that have impact on adoption intention through perceived usefulness and perceived ease of use. In another study, Hong, Thong and Tam (2002) mentioned that in order to encourage users to accept and continually use digital libraries, library professionals, designers and managers need good understanding of the factors that influence users' adoption. Perceived ease of use and perceived usefulness were found to be significant antecedents of the intention to use a digital library. Individual differences, such as computer self-efficacy and knowledge of search domain were found to have positive effect on perceived ease of use of digital libraries. As one of the system characteristics, relevance had a significant impact on both perceived ease of use and perceived usefulness, while the other two system characteristics (screen design and terminology) were found to have significant effect on perceived ease of use only. However, there may be other individual and system factors that have not been incorporated into the proposed model.

While examining perception of students towards digital library services, Bagudu and Sadiq (2013) identified that university students are aware of and satisfied with digital library services, although their usage appeared to be weak due to up-to-datedness of some materials. On the other hand, Alajmi (2013) focused on identifying factors influencing digital library adoption. The study revealed that perceived relative advantage, visibility, result demonstrability, trialability and awareness of users have significant positive impact on the rate of digital library adoption. However, perceived ease of use, compatibility, and perceived image had insignificant effect on the users' adoption.

3.6 Conclusion

Researches on digital libraries are no longer confined to the development and maintenance of collection and services. These studies range from technological aspect, socio-economic, and educational aspect to complex context regarding user acceptance and interaction between digital library system and users. However, there has been no comprehensive research on users' adoption and acceptance of digital libraries. This adds to the limitation of research on digital library system. Finally, this literature review concludes that more research needs to be encouraged on digital library adoption to fill the apparent gap and explore the role of other variables influencing its actual usage.

Chapter 4

Research Constructs and Hypotheses

4.1 Introduction

This chapter discusses different factors of different theories related to technology adoption in diverse sectors. Based on these factors, the present study develops 10 null hypotheses which will be tested in Chapter 5.

4.2 Variables used in previous studies

Venkatesh and Davis (1996) focused on understanding the antecedents of the perceived ease of use. They concluded that computer self-efficacy acts as a determinant of perceived ease of use both before and after hands-on use and that the objective usability was found to be a determinant of ease of use only after direct experience with a system. Earlier, the TAM had been evaluated not only to be a powerful and parsimonious model for representing the determinants of system usage, but also a valuable tool for system planning, as the system designers have some degree of control over easiness and usefulness (Taylor and Todd,1995). Lederer et al. (2000) analyzed two factors that have effect on web usage. One examined the Web-specific ease of use antecedent items and the other analyzed the Web-specific usefulness antecedent items. It was demonstrated that ease of understanding and ease of finding predict ease of use, and that information quality predicts usefulness for revised sites. Consequently, this investigation applies TAM to help web researchers, developers, and managers to understand antecedents to users' decisions to revisit sites relevant to their tasks.

Nov and Ye (2009) confirmed Resistance to Change (RTC) as a direct antecedent of effort expectancy (EE or perceived ease of use). They developed their model with individual differences (i.e. computer self-efficacy, computer anxiety, and resistance to use), system characteristics (i.e. screen design, relevance, and terminology, along with result demonstrability or tangibility of results), perceived ease of use (EE), perceived usefulness (PE or performance expectancy). It was identified that users with high RTC were more likely unease at using technologies. In addition, RTC was found to be positively related to

computer anxiety, while negatively related to result demonstrability for digital library users. Screen design, relevance, and terminology clarity have positive impact on perceived ease of use. But the effect of computer self efficacy was not found to support perceived ease of use.

Noticeably, TAM has also been studied as a model to explain behavioral intention of people to use e-learning system. Selim (2003) stated that there was a need to investigate TAM with web-based learning. Lee, Cheung, and Chen (2005) did similar work to investigate university students' adoption behavior towards an Internet based learning medium using TAM. Meanwhile, Pituch and Lee (2006) added system and learner characteristics as external variables which were hypothesized to influence perceived ease of use, perceived usefulness, and use of an e-learning system. In another study, Tibenderana, Ogao, Ikoja-Odongo, and Wokadala (2010) stated that the factors which promote or hinder the usage of ICT in digital libraries include: benefits/usefulness (Bar-IIan, Pertiz & Wolman 2003; Entlich, Garson, Lesk, Normor, Olsen, & Weibel 1996; Marchonini 2000, and others), awareness (Bar-IIan, Pertiz & Wolman 2003; Bishop 2002, Nicholson 2004, and others); relevance (Kwak, Jun, Gruenwald, & Hong 2002; Nicholson 2004; and Nov and Ye 2008), and ease of use (Buttenfield 1999; Nov and Ye 2008, and many others).

Karahanna, Straub, and Chervany (1999) combined innovation diffusion and attitude theories in a theoretical framework to examine differences in pre-adoption and post-adoption beliefs and attitude. The study indicates that users and potential adopters of information technology differ on their determinants of behavioral intention, attitude, and subjective norm. The study further indicates that pre-adoption attitude is based on perceptions of usefulness, ease of use, result demonstrability, visibility, and trialability, whereas post-adoption attitude is only based on instrumentality beliefs of the usefulness and perceptions of image enhancements. In the education sector, Ramayah and Aafaqi (2004) examined that self-efficacy has a significant direct impact on perceived usefulness and perceived ease of use when predicting e-library usage. Self-efficacy, perceived usefulness and perceived ease of use are also found to have direct significant impact on e-library usage. The results also suggest that perceived ease of use fully mediates self-efficacy when perceived usefulness positively influence the electronic library usage.

TAM theorizes that perceived usefulness has a direct and positive effect on perceived intention to use a technology, while perceived ease of use directly effects perceived usefulness, and therefore, perceived ease of use has both direct and indirect impacts on

behavioral intention to use a system (Thong, Hong, & Tam, 2002). Taking into account the developing country context, perceived usefulness is not expected to influence usage, amplifying the role of perceived usefulness as positive influence both on usage and perceived ease of use (Anandarajan et al., 2002). Earlier, Jackson, Chow, and Leitch (1997) conducted a study on factors influencing behavioral intention to use an information system. The results indicate that the direct effect of situational involvement on behavioral intention as well as attitude is significant in negative direction, attitude is found to play a mediating role, and finally intrinsic involvement plays a significant role in shaping perceptions. The summary of the factors of adoption related studies are given in Table 4.1.

Table 4.1: The summary of the factors of adoption related studies

Author(s) of works	Methodology used	Variables
Brown (2002).	Survey of students who had recently been introduced to web-based learning technology.	Ease of finding, ease of understanding, self-efficacy, computer anxiety, perceived usefulness, perceived ease of use, usage.
Iqbal & Qureshi (2012).	A survey based study conducted through standard questionnaire.	PEOU, PU, resources, knowledge, Internet speed, support personnel; perceived playfulness and social influence.
Miller & Khera (2010).	User survey at 16 institutions in Africa, Latin America, and Asia.	PU (visibility, social norm, domain knowledge, trust in content, relevance); PEOU (computer literacy, level of infrastructure, librarian assistance, ease of access, English literacy, self-efficacy); Perceived intent to use.
Ramayah & Aafaqi (2004).	A questionnaire –based survey	Self-efficacy, perceived ease of use, perceived usefulness, usage.
Porter & Donthu (2006).	A survey in a major Southeastern US metropolitan area.	Age, education, income, race, perceived ease of use, perceived usefulness.
Park, S.Y. (2009).	Questionnaire –based survey	Individual factor i.e. e-learning self-efficacy, social factor i.e. subjective norm, organizational factor i.e. system accessibility.
Nazari et al (2013)	Analytical survey of faculty members of eighth zone of Islamic Azad University, Iran.	Five factors of innovation described by Rogers (i.e. relative advantage, compatibility, complexity, trialability, and observability), and adoption of online databases.
Venkatesh, et al (2003).	A questionnaire –based survey	Performance expectancy, effort, expectancy, social influence, and facilitating conditions.

4.3 Study variables and hypotheses

From prior research and literature review, we use the following factors that may influence users to adopt digital libraries. Based on the factors, the study develops the following null hypotheses which will be tested in Chapter 5.

4.3.1 Individual characteristics

Previous studies have examined various individual differences, such as computer self-efficacy (Chau, 2001; Hong et al., 2002; Ramayah & Aafaqi, 2004; Thong, Hong et al., 2004; Ramayah, 2006), knowledge of search domain (Hong et al., 2002; Thong et al. 2004; Ramayah, 2006), computer experience (Thong et al., 2004, Ramayah, 2006), and demographic variables (Lu, Yu, Liu, & Yao,2003) on technology acceptance. Similarly, Nelson (1990) also identified individual difference variables as affecting new technology acceptance. It has been claimed that successful diffusion of information systems largely depends on individuals along with technological systems themselves (Borgman, 1989; Chen, Czerwinski, & Macredie, 2000;). This study will examine gender, age, discipline, experience of using computer, experience of using internet, experience of using digital library, and knowledge of search domain. The acceptance of digital library may vary individual to individual depending on their characteristics.

4.3.1.1 Gender

Venkatesh and Morris (2000) investigated gender differences in the context of adoption of and sustainable usage of technology. The results show that the decisions of men towards using technology were strongly influenced by perceived usefulness compared to women, while women's decisions were determined by perceived usefulness and subjective norm.

4.3.1.2 Age

Previous researchers found that old end users are likely to find an information system, such as digital library, more difficult to use and fine less useful while completing their task. Morris and Venkatesh (2000) found that older end users find difficulties and uncomfortable when retrieving information from information system such as digital libraries.

4.3.1.3 Background discipline

Discipline is considered as one the influential antecedents affecting adoption and usage of a technology. Torma and Vakkari (2004) found that regardless of discipline a perceived availability and provision of resources led to more frequent use of electronic resources and services.

4.3.1.4 Experience of using computer and Internet

Experience of using computer and internet can play a significant role towards adopting and using digital libraries as digital library services can hardly be imagined without one of these core aspects of ICTs. Prior research has shown that prior experience is a determinant of users' behavior (Ajzen & Fishbein, 1980). Igbaria, Guimaraes, & Davis (1995) found that users' computer experience directly and indirectly affect usage through belief (perceived ease of use and perceived usefulness) and individual skills and expertise are related to belief, usage and variety of use. Omolayole (2002) identified three factors that affect the use of technology. These are: low level of computer culture, poor telecommunications infrastructure, and general lack of awareness. According to Koohang (2004), students with more prior experience of using the internet were found to have significantly higher positive perceptions toward using the digital library.

4.3.1.5 Experience of using digital library

Szajna (1994) identified that as more an individual has prior experience in using information technology, usefulness directly influences behavior intention and usage behavior. Venkatesh and Morris (2000) found that individuals tend to have better assessment of benefits associated with technology as time of experiencing that technology increases over time. The experience can largely affect interaction with World Wide Web and information retrieval systems in digital libraries.

4.3.2 Knowledge of search domain

Knowledge of search domain is another individual difference that affects PEOU of digital library. Knowledge of search domain is defined as the person's knowledge of the respective discipline, subject, domain, or area that is relevant to the database search (Miller & Khera, 2010). Prior studies (Hong et al., 2002; Thong et al., 2004; Ramayah, 2006) have shown that

knowledge of search domain has significant and positive impact on perceived ease of use. It was also demonstrated that persons with higher level of domain knowledge were able to conduct more focused searches and make database queries efficiently and rapidly, possibly without errors (Marchionini, Dwiggins, Katz , & Lin, 1993; Thong et al., 2002).

Based on the relationship between individual characteristics and adoption of digital library, this study hypothesizes that:

H1a: *There is no significant relationship between users' knowledge of search domain and perceived ease of use (PEOU)*

H1b: *There is no significant relationship between users' knowledge of search domain and perceived usefulness (PU)*

4.3.3 Quality of digital library content

Definition of quality content differs from researchers to researchers. According to Bailey and Pearson (1983), information or content quality represents users' reaction towards output content and thereby enables them to differentiate the characteristics of the output information and the users' required information. Meanwhile Bovee (2004) developed an information quality model where content quality is defined as the criteria of perceived accuracy, completeness, consistency, accessibility, relevance, interpretability and integrity of information. On the other hand, Wand and Strong (1996) developed a hierarchical framework that organizes data quality according to dimension of intrinsic, contextual, representational, and accessibility data quality. According to DeLone and McLean (1992, 2003), information or content quality has the potential to directly affect both behavioral intention and perceived usefulness of information system. Earlier as discussed by Davis (1989), usefulness and ease of use were found to be potential as important determinants of a system. Similarly, Adam, Nelson, and Todd (1992) found that usefulness is indeed related to usage but that ease of use is relatively less important in determining system use**.** Hence the study hypothesizes that:

H2a: *There is no significant relationship between digital library content and perceived ease of use (PEOU)*

H2b: *There is no significant relationship between digital library content and perceived usefulness (PU)*

4.3.4 Digital library system characteristics

System characteristics was found to have direct impact both on perceived usefulness and perceived ease of use of an information system (Davis & Bagozzi, 1989). According to Davis (1993), user acceptance of information systems is affected by system design features. The characteristics that influence users may differ both from system to system and users to users. Relevance can be defined as the degree to which digital information or resources can be integrated into users' actual work or applied to research areas (Kling & Elliott, 1994; Thong et al., 2002).Computer system matches the task the users need to carry out in the current environment. Yao (1995) linked usefulness with relevance arguing that a document is considered to be useful by users only when they find it useful. Study revealed that relevance of the system's content to users' information need is positively related to both perceived ease of use and perceived usefulness of digital library (Hong et al., 2002). Similarly, it was also found that greater accessibility leads to more frequent use of digital libraries, while low accessibility works as a barrier to the usage of digital libraries (Graham, 1995; Harter & Kim, 1996; O'Reilly, 1982). On top of it, interface plays a vital role in digital library system as it is the medium between the user and the system (Thong et al., 2002). Such as, navigation is such an aid which makes easy for users to move around the system, understand the menu options, and recognize where they are and where they are going in a sequence of screens (Lindgaard, 1994). It was explored that interface design of digital library to some certain extent has impact on users' perceived ease of use (Brown, 2002; Lee et al., 2005). As a result, navigation helps users to find relevant information from digital library and prevents them from getting lost in it. Since system characteristic identified to have impact on PU and PEOU, this study hypothesizes that:

H3a: *There is no significant relationship between system characteristics and perceived ease of use (PEOU).*

H3b: *There is no significant relationship between system characteristics and perceived usefulness (PU).*

4.3.5 Service quality of digital library

Studies have shown that adoption and usage of technology is dependent largely on support environment available for the technology, and the help from others (Igbaria, 1994; Westcott, 1985). Generally, service quality is an evaluation of how well digital library provides its resources, services, and program to users. Previous research has found that service quality has positive relation with behavioral intention to use an information system (Venkatesh et al., 2003). Besides, Zeithaml, Parasuraman, and Berry (1990) identified five core dimensions that users enroll while evaluating service quality. These include- tangibles, reliability, responsiveness, assurance, and empathy. On the basis of content analysis, Yang, Peterson, and Cai (2003) identified 14 service quality dimensions:

1. Responsiveness
2. Credibility
3. Ease of use
4. Reliability
5. Convenience
6. Communication
7. 13. Aesthetics.
7. Access
8. Competence
9. Courtesy
10. Personalization
11. Continuous improvement
12. Collaboration

According to Park et al. (2009), the availability of technical support may increase the rate of computer acceptance. Moreover, getting full text access to resources, smooth library services without interruption can also have positive impact on users to use digital library. The availability of such help is precondition to influence PEOU and PU of digital library. Hence, this study hypothesizes:

H4a: *There is no significant relationship between service quality and perceived ease of use (PEOU)*

H4b: *There is no significant relationship between service quality and perceived usefulness (PU)*

4.3.6 Perceived ease of use

Perceived Ease of Use (PEOU) is defined as “the degree to which a user believes that a particular system would be free of effort” (Davis, 1989). Perceived ease of use is considered to be a determinant of perceived usefulness, because, assuming all other things being equal, users perceive a system to be useful if it is comparatively more effort-free (Yi & Hwang,

2003). The more a system is easy to use, the more users tend to adopt and use a system. There is substantial empirical support for this view (Chau, 2001; Hong et al., 2002; Thong et al., 2004; Ramayah & Aafaqi, 2004). From the digital library perspective, Hong et al. (2002) claimed that digital libraries need to be easy to learn and easy to use.

Many studies also suggest that perceived ease of use has a significant positive impact on behavioral intention to use, both directly and indirectly (Davis, 1989; Jackson et al., 1997; Venkatesh, 1999). While ease of use might not be important to the level of use of a system, it may influence the initial decision to adopt a system (Adams, Nelson, & Todd, 1992). Extensive research over the past decade has also found that perceived ease of use significantly influence intention to use a system, either directly or indirectly through perceived usefulness (Davis et al., 1989; Jackson et al. 1997; Venkatesh, 1999; Venkatesh, 2000; Venkatesh & Davis, 1996; Venkatesh & Morris, 2000). Based on the evidence that link perceived ease of use with the behavior intention to use digital library, it can be hypothesized that:

H5: *There is no significant relationship between perceived ease of use (PEOU) and users' behavioral intention to use DL.*

4.3.7 Perceived usefulness

Perceived Usefulness (PU) is defined as "the degree of which a user believes that using a particular system would enhance his or her job performance" (Davis, 1989). PU has been validated to positively influence the intent to use a particular system in numerous studies (Adams et al., 1992; Segars & Grover, 1993; Jackson, Chow, & Leitch, 1997; Agarwal & Prasad, 1999; Ramayah & Aafaqi, 2004;). Hong et al. (2002) claims the ultimate reason that users exploit digital libraries is that they find the systems useful to their information need and search tasks. Therefore, it can be hypothesized that:

H6: *There is no significant relationship between perceived usefulness (PU) and users' behavioral intention to use DL.*

4.3.8 Behavioral intention

Behavioral intention to use digital library refers to the measure of strength of users' intensity to use digital library to obtain digital library resources for his/her study and

research (Rahman, Jamaludin, & Mahmud, 2011). Behavioral intention is found to be a good predictor of using a particular technology which has received numerous empirical supports from prior studies (Davis, et al., 1989; Taylor & Todd, 1995; Venkatesh & Davis, 2000).

4.3.9 Adoption of digital library

Having all the factors positively influencing users to use digital library, users are finally intend to use digital library system and services.

4.4 Conclusion

The concept of digital library adoption is gaining concerns of LIS professionals more and more. Among a wide range of factors, system characteristics, user characteristics, quality of content are tend to affect designing, implementing, and operating digital library system.

Chapter 5

Data Analysis and Discussion

5.1 Introduction

This chapter discusses the result of the survey, which is a part of the research. Data analysis has largely been conducted on the responses of the questionnaire distributed to the users of East West University library. The frequency distribution was used to reveal the percentage of the category of respondents, their gender, age, education level, discipline, experience of using computer, experience and frequency of using internet, and the duration of using EWU DL. The mean and standard deviation used for constructs such as digital library content, knowledge of search domain, service quality, system characteristics, perceived ease of use, perceived usefulness, intention to use digital library, and overall satisfaction towards EWU DL were determined and are displayed from Table 5.7-5.15.

Considering the nature of the data, users' individual characteristics such as gender, age, background discipline, experience of using computer and Internet are tested from Table 5.16 to Table 5.20 using Mann-Whitney *U* test and Kruskal-Wallis test where appropriate. These individual factors are tested just to know the differences between the variables and the perceived ease of use (PEOU) of digital library. Besides users' individual characteristics, a set of factors such as knowledge of search domain, digital library content, system characteristics, service quality, perceived ease of use and perceived usefulness are tested in section 5.17 (Table 5.21- Table 5.26) using Pearson Chi-Square method to explore their influences towards users' behavioral intention to adopt digital library. These factors are discussed in terms of testing hypotheses formulated in Chapter 4.

5.2 Demographic profile of the respondents

Data on demographic characteristics is gathered about the respondents' category, gender, age, background discipline, and education. The demographic data are analysed using descriptive statistics.

5.2.1 Category of the respondents

Target population in this study consisted of students, teachers, and administrative staff of EWU library. As shown in Table 5.1, majority percent (77.5%) of respondents came from the category of students, followed by teachers (14%) and administrative staff (8.5%) of the EWU library.

Table 5.1 Category of the respondents

User Category	Frequency	Percent	Cumulative Percent
Student	100	77.5	77.5
Teacher	18	14.0	91.5
Administrative staff	11	8.5	100.0
Total	129	100.0	

5.2.2 Gender of the respondents

Figure 5.1 shows that among 129 respondents, more than three-quarters (75.2%) of the respondents consist of male, while 24.8% are female. This suggests that there is a huge difference between the ratio of male and female users.

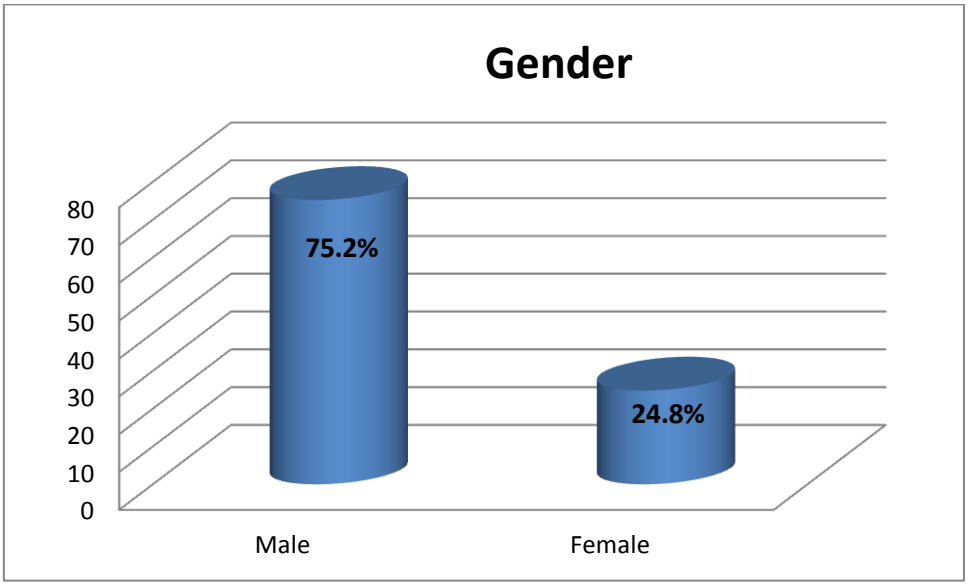

Figure 5.1: Gender of respondents

5.2.3 Age of the respondents

Table 5.2 shows that the more than half of the respondents (52.7%) are aged between 20-24 years, while 21.7% respondents are between 25-29 years, and 14% range from 30-34 years.

Table 5.2: Age of the respondents

User Category	Frequency	Percent	Cumulative Percent
Less than 20 years	11	8.5	8.5
20-24 years	68	52.7	61.2
25-29 years	28	21.7	82.9
30-34 years	18	14.0	96.9
More than 34 years	4	3.1	100.0
Total	129	100.0	

5.2.4 Discipline of respondents

In respect of discipline, 38.8% of the respondents came from Science and Engineering discipline, while one-third belongs to Business discipline, followed by 20.2% Humanities and 6.2% Social Science discipline (Table 5.3).

Table 5.3: Discipline of respondents

Background discipline	Frequency	Percent	Cumulative Percent
Humanities	26	20.2	20.2
Science & Engineering	50	38.8	58.9
Business	45	34.9	93.8
Social Science	8	6.2	100.0
Total	129	100.0	

5.2.5 Education level of users

From Figure 5.2 it can be seen that the majority of the respondents (58.1%) are enrolled in the under graduation program, whereas 40.3% of them are enrolled in post graduation.

However, since doctoral program is not conducted in any of the private university of Bangladesh, two respondents having doctoral degree were faculty members.

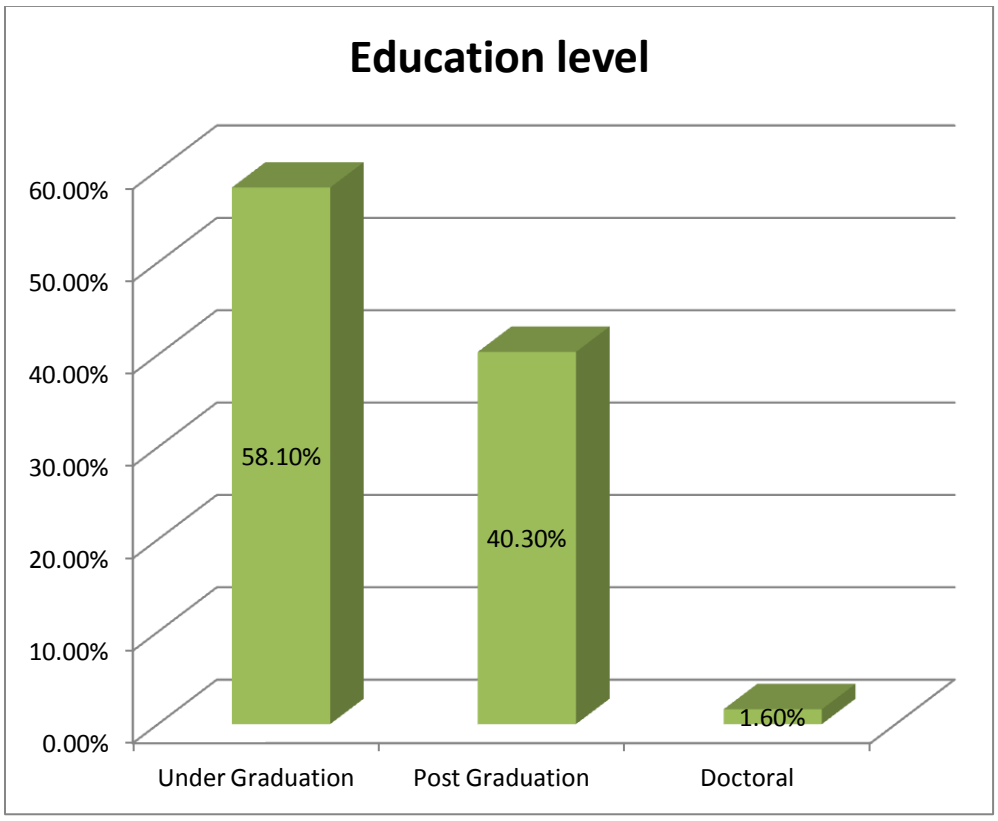

Figure 5.2 Education of users

5.3 Experience of using computer

Users have more or less experience in using computer and internet. Figure 5.3 represents that majority of the respondents (35.7 %) have 5-7 years of experience in using computer, while 23 (17.8 %) users have 2-4 years and 39 (30.2%) have 8-10 years of experience. However, 15% were found to be experienced for more than 10 years in computer usage.

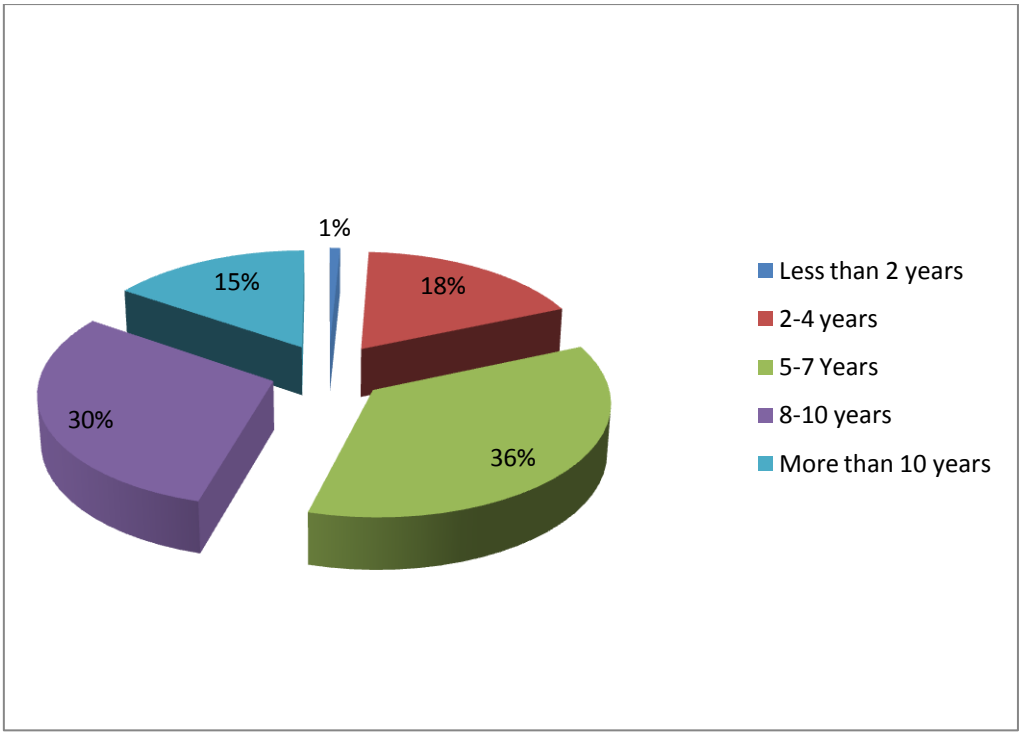

Figure 5.3 Experience of using computer

5.4 Experience of using Internet

Table 5.4 represents that 41.1% respondents reported to have 2-4 years of experience in using internet, followed by 36.4% with 5-7 years. There was a minimal difference between respondents having less than 2 years (8.5%) and 8-10 years (10.1%) of experience, while only 3.9% were found with more than 10 years of experience in using internet.

Table 5.4: Experience of using internet

Experience of using Internet	Frequency	Percent	Cumulative Percent
Less than 2 years	11	8.5	8.5
2-4 years	53	41.1	49.6
5-7 years	47	36.4	86.0
8-10 years	13	10.1	96.1
More than 10 years	5	3.9	100.0
Total	129	100.0	

5.5 Frequency of using Internet

Table 5.5 shows that more than two-thirds of the respondents (66.7%) use internet frequently, whereas 28.7% and 4.7% of the users use Internet more frequently and frequently respectively.

Table 5.5 Frequency of using internet

Frequency of using Internet	Frequency	Percent	Cumulative Percent
More frequently	37	28.7	28.7
Frequently	86	66.7	95.3
Occasionally	6	4.7	100.0
Total	129	100.0	

5.6 Experience of using East West University Digital Library

Table 5.6 shows that percentage of respondents using East West university digital library is close to half (48.8%). On the other hand, 27 (20.9%) and 39 (30.2%) respondents reported to use digital library for less than 1 year, and 3-4 years respectively.

Table 5.6 Experience of using East West University Digital Library

Experience of using EWU DL	Frequency	Percent	Cumulative Percent
Less than 1 year	27	20.9	20.9
1-2 years	63	48.8	69.8
3-4 years	39	30.2	100.0
Total	129	100.0	

5.7 Frequency of using East West University Digital Library

Table 5.7 shows the frequency of using east West University Digital Library. Of the total respondents, more than two-thirds (64.3%) are found to use the library frequently, while the percentage of respondents using the digital library occasionally is just above a quarter

(27.1%). The proportion of respondents use the digital library more frequently and rarely is the same, i.e 3.9%.

Table 5.7 Frequency of using EWU DL

Frequency of using EWU DL	Frequency	Percent	Cumulative Percent
More frequently	5	3.9	3.9
Frequently	83	64.3	68.2
Occasionally	35	27.1	95.3
Rarely	5	3.9	99.2
Don't know	1	0.8	100.0
Total	129	100.0	

5.8 Quality of digital library content

Table 5.8 represents the perception of users regarding the nature or quality of East West University digital library content. Users are more or less positive about the nature of content. The mean score 6.09 indicates that clearness of the content receives the most positive response from the users, followed by relevance and usefulness of content with a mean score of 5.62 and 5.68 respectively. Furthermore, contents have been considered as rich, updated, adequate, and complete with mean score of 5.26, 5.51, 5.44, and 5.72 respectively.

Table 5.8: Quality of digital library content

Quality	Minimum	Maximum	Mean	Std. Deviation
Richness	2.00	7.00	5.26	1.25
Up-to-datedness	2.00	7.00	5.51	1.22
Adequacy	2.00	7.00	5.44	1.24
Completeness	3.00	7.00	5.72	1.13
Clarity	3.00	7.00	6.09	.90
Relevance	2.00	7.00	5.62	1.20
Usefulness	2.00	7.00	5.68	1.17
Valid *n* = 129				

5.9 Knowledge of search domain

Table 5.9 illustrates users agree that they have knowledge on searching under subject or author domain, and on the topic they need to search for with mean score of 5.64 and 6.06 respectively. Similarly respondents seem to agree (mean 6.06) about finding search mechanism easy to discover information before retrieving it.

Table 5.9: Knowledge of search domain

Statement	Minimum	Maximum	Mean	Std. Deviation
I know how to search under subject or author	1.00	7.00	5.64	1.05
I have knowledge on the topic, I need to search for DL	3.00	7.00	6.06	.87
Search mechanism is easy to discover information	2.00	7.00	5.62	.95
Valid *n* = 129				

Scale: *1.00- 1.49= Strongly disagree, 1.50- 2.49= Disagree, 2.50- 3.49= Disagree to some extent, 3.50- 4.49= Neutral, 4.50- 5.49= Agree to some extent, 5.50- 6.49= Agree, 6.50- 7.00= Strongly agree.*

5.10 System characteristics of East West University Digital Library

On the basis of mean score, Table 5.10 indicates that users agree about the availability of system and easy accessibility of content. Moreover, participants also agree about the statement that the user interface is well-designed and that the system is fast enough to access and retrieve resources. However, users reported to agree to some extent regarding the relevance of documents and services from the system with a mean score of 5.33.

Table 5.10: System characteristics of East West University Digital Library

Statement	Minimum	Maximum	Mean	Std. Deviation
The EWU DL is available when I need to use it	3.00	7.00	5.67	.76
The user interface on the screen is well-designed	2.00	7.00	6.06	.92
The system provides easy accessibility to its content and services	3.00	7.00	5.83	.87
I usually get documents and services of high relevance from the system	2.00	7.00	5.33	1.20
The system is fast enough to access, retrieve, and download files	3.00	7.00	6.06	.88
Valid *n* = 129				

Scale: *1.00- 1.49= Strongly disagree, 1.50- 2.49= Disagree, 2.50- 3.49= Disagree to some extent, 3.50- 4.49= Neutral, 4.50- 5.49= Agree to some extent, 5.50- 6.49= Agree, 6.50- 7.00= Strongly agree.*

5.11 Service quality of East West University Digital Library

Table 5.11 shows that in terms of service quality, respondents reported to agree about the promptness and smoothness of getting services with mean score of 5.73 and 5.95 respectively. On the other hand, participants agreed to some extent when they were asked about getting technical and other support from library staff instantly. Similarly, they were found to agree to some extent in response to getting full text access to resources and help massages on screen.

5.12 Perceived ease of use

Table 5.12 represents the respondents' perception of ease of use of EWU digital library. Respondents perceive learning to use and using of digital library easy with the mean score of 6.13. According to the mean score obtained (mean 6.08), users agree that their interaction with the library is easy in terms of its clarity, consistency and understanding.

Table 5.11: Service quality of East West University Digital Library

Statement	Minimum	Maximum	Mean	Std. Deviation
I get instant technical support from library staff when required	2.00	7.00	5.18	1.19
The dl is prompt in providing services	2.00	7.00	5.73	.96
The dl provides full text access to its resources	2.00	7.00	5.11	1.25
Help massages on the screen is very useful	3.00	7.00	5.28	1.09
I can get smooth service without breakdown	5.00	7.00	5.95	.81
Valid *n* = 129				

Scale: *1.00- 1.49= Strongly disagree, 1.50- 2.49= Disagree, 2.50- 3.49= Disagree to some extent, 3.50- 4.49= Neutral, 4.50- 5.49= Agree to some extent, 5.50- 6.49= Agree, 6.50- 7.00= Strongly agree.*

Table 5.12 Perceived ease of use

Statement	Minimum	Maximum	Mean	Std. Deviation
Learning to use dl is easy	3.00	7.00	6.13	.89
The use of dl seems to me easy	3.00	7.00	6.13	.92
My interaction with library is easy	3.00	7.00	6.08	.91
Valid *n* = 129				

Scale: *1.00- 1.49= Extremely difficult, 1.50- 2.49= Difficult, 2.50- 3.49= Difficult to some extent, 3.50- 4.49= Neutral, 4.50- 5.49= Easy to some extent, 5.50- 6.49= Easy, 6.50- 7.00= Extremely easy.*

5.13 Perceived usefulness

According to mean scores obtained, table 5.13 shows that respondents agree to some extent regarding the perceived usefulness of digital library system to meet their information needs, in conducting their study and research, and in overall performance.

Table 5.13: Perceived usefulness

Statement	Minimum	Maximum	Mean	Std. Deviation
I find the system very useful	2.00	7.00	5.43	1.26
The role of DL in conducting my study/research is effective	2.00	7.00	5.30	1.32
The contribution of DL is satisfactory	2.00	7.00	5.41	1.23
Valid *n* = 129				

Scale: *1.00- 1.49= Strongly disagree, 1.50- 2.49= Disagree, 2.50- 3.49= Disagree to some extent, 3.50- 4.49= Neutral, 4.50- 5.49= Agree to some extent, 5.50- 6.49= Agree, 6.50- 7.00= Strongly agree.*

5.14 Intention to use digital library

Table 5.14 demonstrates the intention of users to use digital library in terms of perceived ease of use and perceived usefulness. Respondents reported to agree that they are intended to use digital library due to perceived ease of use (mean 5.59). However, users strongly agree that they tend to use digital library for their perceived usefulness with a mean score of 6.58.

Table 5.14 Intention to use Digital library

Statement	Minimum	Maximum	Mean	Std. Deviation
I intend to use the DL due to PEOU	3.00	7.00	5.59	.69
I intend to increase my use of DL due to PU	5.00	7.00	6.58	.51
Valid *n* = 129				

Scale: *1.00- 1.49= Strongly disagree, 1.50- 2.49= Disagree, 2.50- 3.49= Disagree to some extent, 3.50- 4.49= Neutral, 4.50- 5.49= Agree to some extent, 5.50- 6.49= Agree, 6.50- 7.00= Strongly agree.*

5.15 Overall satisfaction

Table 5.15 shows that majority of users (42.6%) ware satisfied with EWU DL. 31% were satisfied to some extent followed by 10.9% with extremely satisfied users. However 18

respondents (14.0%) reported to be dissatisfied to some extent and 1.6% were neutral. Overall the mean score reveals that users are satisfied with EWU DL to some extent.

Table 5.15: Level of users' satisfaction about DL

Level of satisfaction	Frequency	Percent	Overall mean
Extremely satisfied	14	10.9	5.34
Satisfied	55	42.6	
Satisfied to some extent	40	31.0	
Neutral	2	1.6	
Dissatisfied to some extent	18	14.0	
Dissatisfied	0	0	
Extremely Dissatisfied	0	0	
Valid *n* = 129			

Scale: *1.00- 1.49= Strongly dissatisfied, 1.50- 2.49= Dissatisfied, 2.50- 3.49= Dissatisfied to some extent, 3.50- 4.49= Neutral, 4.50- 5.49= Satisfied to some extent, 5.50- 6.49= Satisfied, 6.50- 7.00= Strongly satisfied.*

5.16 Individual factors influencing the adoption

Although no hypothesis and subsidiary research question (SRQ) were formulated based on users' individual factors (gender, age, discipline, experience of using computer, and experience of using Internet), Mann-Whitney *U* test and Kruskal-Wallis test were used to determine whether there is any significant difference between any factor and users' perceived ease of use (PEOU). Such factors will help us to answer the major research question (MRQ) in the Conclusion Chapter.

Gender

Mann-Whitney *U* test was carried out to determine the differences between gender and perceived ease of use. Table 5.16 shows that there are significant differences in terms of male and female respondents' opinions on all aspects of perceived ease of use of the East West University Digital Library.

Table 5.16: Mann-Whitney test for difference between gender and PEOU

Perceived ease of use	Mann-Whitney U	Wilcoxon W	Z	Asymp. Sig. (2-tailed)
Learning to use digital library	1137.500	1665.500	-2.413	0.016**
The use of digital library	984.500	1665.500	-3.314	0.001*
My interaction with digital library	1069.000	1597.000	-2.800	0.005*

Notes: *Significant at *P*<0.01 and **significant at *p*<0.05

Age

To determine the differences among age groups and perceived ease of use of the library, Kruskal-Wallis test was carried out. As shown in Table 5.17, the result shows that there are significant differences on all aspects of perceived ease of use of the East West University Digital Library.

Table 5.17: Kruskal-Wallis test for difference among age groups and perceived ease of use

Perceived ease of use	Chi-Square	df	Asymp. Sig.
Learning to use digital library	14.261	4	0.007*
The use of digital library	24.930	4	0.000*
My interaction with digital library	22.551	4	0.000*

Notes: *significant at *p*<0.01

Background discipline

As shown in Table 5.18, the Kruskal-Wallis test was carried out to determine the differences among background discipline in terms of their opinions on perceived ease of use.

Table 5.18: Kruskal-Wallis test for difference between background discipline and PEOU

Perceived ease of use	Chi-Square	df	Asymp. Sig.
Learning to use digital library	1.042	3	.791*
The use of digital library	1.029	3	.794*
My interaction with digital library	.929	3	.819*

Notes: * Significant at *p*>0.05

The result shows that all values exceed standard significant range of p<0.05, which indicates that there are no significant differences between background disciplines of the users and the perceived ease of use of the library.

Experience of using computer

In Table 5.19, the Kruskal-Wallis test was carried out to determine the differences among experience of using computers in terms of their opinions on perceived ease of use. The result shows that there are significant differences between users' experience of using computer and the perceived ease of use of the library.

Table 5.19: Kruskal-Wallis test for difference between experience of using computer and PEOU

Perceived ease of use	Chi-Square	df	Asymp. Sig.
Learning to use digital library	14.393	4	.006*
The use of digital library	27.353	4	.000*
My interaction with digital library	18.651	4	.001*

Notes: * Significant at *p*<0.01

Experience of using Internet

In Table 5.20, the Kruskal-Wallis test was carried out to determine the differences among experience of using Internet in terms of their opinions on perceived ease of use. The result shows that there are significant differences between users' experience of using Internet and the perceived ease of use of the library.

Table 5.20: Kruskal-Wallis test for difference between experience of using Internet and PEOU

Perceived ease of use	Chi-Square	df	Asymp. Sig.
Learning to use digital library	15.872	4	.003*
The use of digital library	19.351	4	.001*
My interaction with digital library	18.990	4	.001*

Notes: * Significant at *p*<0.01

5.17 Test of hypotheses

In order to analyze the factors influencing users' intention to adopt digital library, ten null hypotheses (e.g. H1a, H1b, H2a, H2b, H3a, H3b, H4a, H4b, H5 and H6) were tested. The test results will help us to develop the theoretical model of users' adoption of DL system in the final chapter.

5.17.1 Search domain vs PEOU and Search domain vs PU

To examine H1a and H1b, Pearson Chi-Square test was carried out. The result presented in Table 5.21 indicates that the p value is less than 0.01. Thus, there is a significant relationship between users' knowledge of search domain and perceived ease of use. Similarly, a significant relationship exists between search domain and perceived usefulness.

Therefore, the null hypotheses H1a and H1b are rejected. The test results of both the hypotheses address the answer of SRQ1.

Table 5.21: Chi-Square Test for knowledge of search domain with PEOU and PU

Hypotheses	Relationship	Value	Asymp. Sig. (2-sided)	Decision
H1a	Knowledge of search domain * PEOU	143.829	.000*	Rejected
H1b	Knowledge of search domain * PU	203.532	.008*	Rejected

Notes: * Significant at $p<0.01$,

5.17.2 DL content vs PEOU and DL content vs PU

Table 5.22 shows that the *p* value is less than 0.01 which indicates a significant relationship between quality of digital library content and PEOU. Likewise, a significant relationship is found between quality of digital library content and PU.

This test result provides the answer of SRQ2. Hence, the null hypotheses H2a and H2b are rejected.

Table 5.22: Chi-Square Test for DL content with PEOU and PU

Hypotheses	Relationship	Value	Asymp. Sig. (2-sided)	Decision
H2a	DL content * PEOU	301.498	.006*	Rejected
H2b	DL content * PU	587.642	.000*	Rejected

Notes: * Significant at $p<0.01$

5.17.3 DL System characteristics vs PEOU and DL System characteristics vs PU

As can be seen in Table 5.23, Pearson Chi-Square value *p* is less than 0.01, which indicates the answer of SRQ3 exploring a significant relationship between DL system characteristics and PEOU. Similarly, a significant relationship exists between system characteristics and PU. Thus, null hypotheses H3a and H3b are not accepted.

Table 5.23: Chi-Square Test for DL system characteristics with PEOU and PU

Hypotheses	Relationship	Value	Asymp. Sig. (2-sided)	Decision
H3a	DL system characteristics * PEOU	213.691	.000*	Rejected
H3b	DL system characteristics * PU	415.839	.005*	Rejected

Notes: * Significant at $p<0.01$

5.17.4 DL service quality vs PEOU and DL service quality vs PU

Pearson Chi-Square test result ($p<0.01$) in Table 5.24 shows that there is a significant relationship between the variables DL service quality and PEOU. The result also shows the significant relationship between DL service quality and PU. Thus, the null hypotheses H4a and H4b are rejected. This addresses the SRQ4.

Table 5.24: Chi-Square Test for DL service quality with PEOU and PU

Hypotheses	Relationship	Value	Asymp. Sig. (2-sided)	Decision
H4a	DL service quality* PEOU	231.318	.008*	Rejected
H4b	DL service quality * PU	374.756	.000*	Rejected

Notes: * Significant at $p<0.01$

5.17.5 PEOU vs intention to use

Pearson Chi-Square test was conducted to explore the relationship between perceived ease of use (PEOU) and users' intention to use DL. Table 5.25 shows that the *p* value is less .01 which indicates the significant association between PEOU and intention to use. This indicates the answer of SRQ 5. Thus, the null hypothesis H5 is not accepted.

Table 5.25: Chi-Square Test for Perceived Ease of Use (PEOU)

Hypothesis	Relationship	Value	Asymp. Sig. (2-sided)	Decision
H5	PEOU*Intention to use	103.958	.005*	Rejected

Notes: * Significant at $p<0.01$

5.17.6 PU vs intention to use

The result of the *p* value in Table 5.26 ($p<0.01$) shows a significant relationship between perceived usefulness and users' intention to use DL providing the answer of SRQ6. So, the null hypothesis H6 is rejected.

Table 5.26: Chi-Square Test for Perceived Usefulness (PU)

Hypothesis	Relationship	Value	Asymp. Sig. (2-sided)	Decision
H6	PU*Intention to use	189.604	.003*	Rejected

Notes: * Significant at $p<0.01$

5.18 Conclusion

The analysis of the responses of users to questionnaire reveals that majority of respondents have been using EWU DL for 1-2 years. The individual characteristics of respondents (gender, age, discipline, experience of using computer, and internet) were found to have significant difference with the perceived ease of use of digital library. Moreover, hypotheses testing suggest that factors, such as knowledge of search domain, content of digital library, system characteristics, and service quality of digital library were identified to have significant relationship with both perceived ease of use and perceived usefulness. This association leads to intention toward adoption of digital library.

Chapter 6

Conclusion

6.1 Introduction

The final chapter summarizes the overall findings of the study through answering the research questions and the test results of hypotheses. The study identified some challenges of the adoption of digital library in Bangladesh based on the interview data of the library staff. The theoretical implications of the research are discussed by proposing a theoretical model of users' adoption of digital library, and the practical implications are discussed by suggesting some guidelines for the promotion of users' adoption and acceptance of digital libraries in Bangladesh. Finally, the study provides certain directions for future research considering its limitation.

6.2 Summary of findings

6.2.1 Answering to the research questions

- ***MRQ: What factors, to what extent, influenced users to adopt digital library systems?***

A number of factors were identified that influenced users to adopt digital library system. These factors are users' individual characteristics (e.g. gender, age, discipline, experience in using computer and Internet), knowledge of search domain, quality of digital library content, digital library systems characteristics, digital library service quality, perceived ease of use of the system, perceived usefulness and behavioural intention of the users to adopt digital library. In regard to individual factors of the users, the result of Mann-Whitney test for gender difference shows that there were significant differences in terms of perceived ease of use of digital library. Similarly there were differences between respondents' age groups and their perceived ease of use. The result of experience of using computer also shows differences among their opinions on ease of learning, using, and interacting digital library. However, there were no significant differences between background discipline and perceived ease of use. Pearson Chi-square test shows that other factors like search domain, DL content, DL system, DL service, etc. were significantly related to the adoption of digital library with $p<0.01$ in all cases.

- ***SRQ1: How users' knowledge of search domain influenced PEOU and PU?***

Users' knowledge of search domain significantly and positively influenced perceived ease of use (PEOU) with p =.000, i.e. (p<.01) and perceived usefulness of the system with p =.008, i.e. (p<0.01). In both cases, H1a and H1b were rejected.

- ***SRQ2: How was DL content related to PEOU and PU?***

The quality of digital library content was found to have significant relationship with PEOU (p=.006) and with PU (p=.000). Both H2a and H2b were not accepted.

- ***SRQ3: What was the effect of DL system characteristics on PEOU and PU?***

DL system characteristics had positive effect on PEOU and PU with significant p value .000 and .005 respectively. In both relationships, p value is less than 0.01, and the null hypotheses H3a and H3b were rejected.

- ***SRQ4: How was DL service quality related to PEOU and PU?***

DL service quality was significantly related to both PEOU and PU. The relationship between DL service quality and PEOU was significant with p=.008, while the relationship with PU was significant with p=.000. In such situation, H4a and H4b were not accepted.

- ***SRQ5: How PEOU and PU influenced users' intention to use DL?***

Both PEOU and PU served as a strong predictor in significantly influencing intention to use and adoption of digital library with p= .005 and p=.003 respectively. Null hypotheses H5 and H6 were rejected. These findings confirmed many previous studies with similar nature.

- ***SRQ6: What should be the guidelines for promoting the adoption and acceptance of DL system in Bangladesh?***

The guidelines for promoting the adoption and acceptance of DL system in Bangladesh are discussed in terms of practical implications of the research in section ...

6.2.2 Challenges for the adoption of digital libraries in Bangladesh

Although digital library has been in the front line of current innovations and initiatives, a number of issues need to be resolved regarding the adoption and maintenance of digital libraries. The analysis of interview data of selected library staff of EWU Library indicates that there exists a number of challenges for the adoption of digital libraries in Bangladesh.

- *Lack of awareness*

  Users are not aware of using digital libraries, even some of the users do not know how to use digital library. Perception of many library professionals towards technology and innovation acceptance is still not clear and positive, which hinders the adoption of digital library system.

- *Lack of adequate manpower*

  Library professionals in Bangladesh are still quite behind in technological issues. There is a significant number of library staff who does not possess strong knowledge and skills in ICT. As a result they are not likely to adopt changes in library sector.

- *Lack of infrastructural facilities*

  The availability of infrastructural facilities in the libraries of Bangladesh is still at unsatisfactory level. Though many of the libraries have initiated to digitize collection, internet facilities, digitization software, and required computer hardware could make these initiatives faster and more advanced. Such initiatives would also inspire to adopt digitization of library system.

- *Problems with intellectual property*

  One of the major objectives of digital library is to ensure recognition and protection of legal rights such as copyright, privacy and publicity, defamation of Intellectual Property (IP) right. This often creates conflicts among library professionals on providing access, copying, and disseminating as well as preserving privacy of digital content. A common platform should be established to resolve this critical issue.

- *Lack of government concentration*

  Recently a number of government initiatives have been taken and implemented which represents the awareness of adopting ICT among the government and people. The National ICT Policy integrates all the components of ICT Policy 2002 in a more structured manner (Bairagi, Rajon, and Roy, 2011). However government initiatives in building digital libraries are still in the infancy level in Bangladesh which has a negative impact on the adoption of digital libraries in the country.

- *Psychological problems*

  The reluctance of library staff to adopt new changes in library systems and services can inhibit the growth of digitization process. However scenario has been changing gradually as library professionals are trying continuously to keep pace with the advanced information technology and incorporate into library system.

6.3 Theoretical implication

Past research on digital library with technology acceptance model (TAM) focused on system features, subjective norm, e-learning self efficacy, and other internal and external factors influencing perceived ease of use and perceived usefulness , (Hong et al., 2002; Park et al., 2009; Miller & Khera, 2010). Based on the review of literature and the study results, especially the test results of hypotheses, this research proposes a *Theoretical Model of Users' Adoption of Digital Library System* (Figure 6.1).

As shown in Figure 6.1, the present model four major factors e.g. Knowledge of Search Domain, DL Content, DL System Characteristics, and DL Service Quality have positive influence on both Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) of digital library. Both PEOU and PU positively influence the Intention to Use and Adoption of digital library. Thus, the theoretical model derived from this study support adoption of innovations and technology acceptance model related studies.

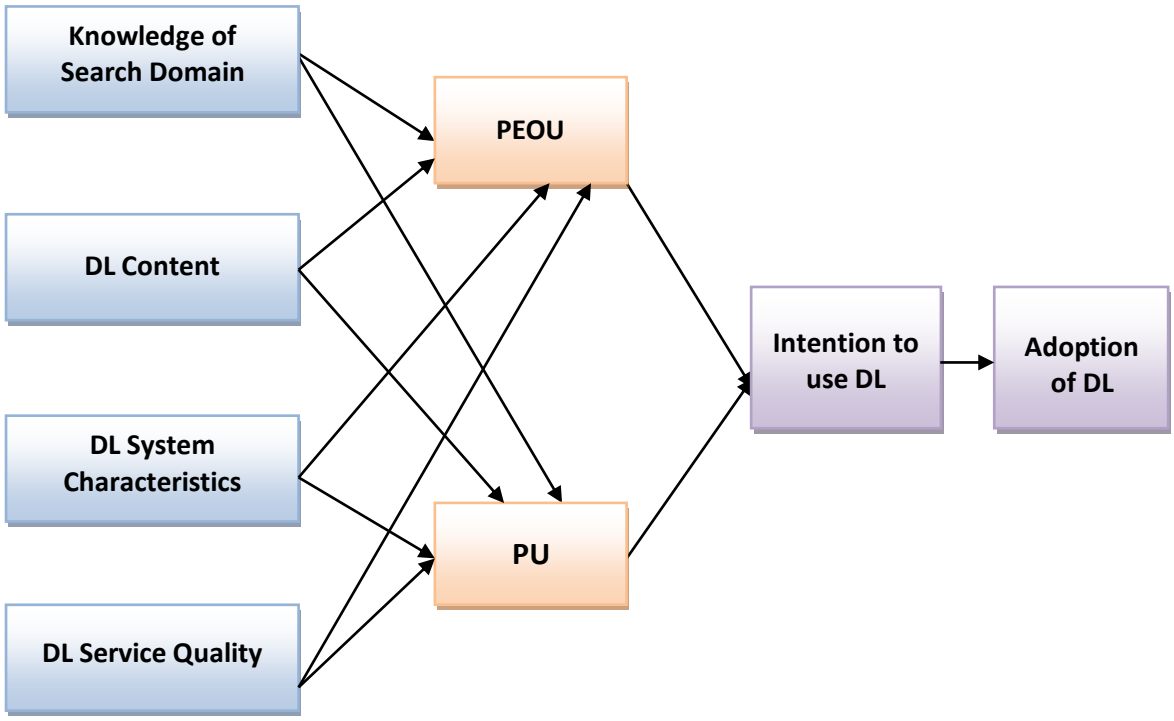

Figure 6.1 Theoretical Model of Users' Adoption of Digital Library System

6.4 Practical implication

The study has a potential for practical application in the development and management of digital library. Fundamentally, library professionals need to take appropriate measures to identify and assess factors contributing to adoption of digital library. In order to facilitate digital library adoption, user-centered system must be designed ensuring availability, clear navigation flow, and easy accessibility to retrieve and download files. At the same time, library professionals must keep in mind these user-centered system features can appeal users towards digital library only at primary stages. But their final decision on whether or not to use digital library depends on the quality of content in terms of its richness, up-to-dateness, adequacy, completeness, clarity, relevance and usefulness. In addition, the study will create awareness among library professionals to develop quality of digital library services along with its content. The findings of this study will contribute to sustainable adoption of digital library by enabling library academics and professionals to explore and analyze many other factors.

The following strategies might be followed in order to increase adoption and to guide the actual usage of digital library:

1. Library personnel, information professionals and users should be made aware and responsiveness towards using digital library.
2. Libraries should organize orientation program for users on how to use, search, and retrieve resources in digital library. Such initiative would encourage users to be familiar with potentiality of using digital library.
3. Library authorities should arrange in-house training facilities for library staff and promote knowledge sharing culture to increase skills and knowledge of them regarding digital library system and services.
4. The government should allocate sufficient fund to initiate digital library projects and develop digital library software.
5. More user-friendly interface should be developed.
6. Sophisticated search techniques should be introduced to facilitate electronic access to information content and services.

6.5 Limitation of the study and future research direction

This study has some limitations. First, the study was limited to only an academic digital library and the results may not be generalized. Second, a limited sample was analyzed as many of the library users were not used to accessing and retrieving information from EWU DL. Next, shortage of time was another challenge to reach a large number of samples. Finally, some factors like users' individual characteristics that might influence the adoption of innovations have not been considered in the theoretical model. Future research can also incorporate such factors in the model.

However, this research could be used for further studies. Future researchers can develop regression model by applying advanced statistical technique. In addition, many other libraries can be incorporated to identify factors influencing adoption of professionals, managers, and users toward digital library. Future research can focus on identifying additional factors leading to digital library adoption.

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Appendix

The questionnaire

Users' Adoption of a Digital Library System: A Case Study of East West University Library.

1. Demographic and Academic Information

1.1 Name of the respondent: .....

1.2 User category: ☐ Student ☐ Teacher ☐ Researcher ☐ Administrative Staff ☐ Others (Please specify) .....

1.3 Gender: ☐ Male ☐ Female

1.4 Age: ☐ Less than 20 years ☐ 20 – 24 years ☐ 25 – 29 years ☐ 30-34 years ☐ More than 34 years

1.5 Department: .....

1.6 Discipline: ☐ Humanities ☐ Science & Engineering ☐ Business ☐ Social Science ☐ Others (please specify) .....

1.7 Education: ☐ Diploma ☐ Undergraduation ☐ Postgraduation ☐ Doctoral ☐ Others (Please specify).....

2. Experience of Using Computer and Internet:

2.1 Experience of using computer

☐ Less than 2 years ☐ 2 – 4 years ☐ 5–7 years ☐ 8–10 years ☐ More than 10 years

2.2 Experience of using Internet

☐ Less than 2 years ☐ 2 – 4 years ☐ 5–7 years ☐ 8–10 years ☐ More than 10 years

2.3 Frequency of using Internet

☐ More Frequently ☐ Frequently ☐ Occasionally ☐ Rarely ☐ Never

3. Experience of Using Digital Library

3.1 Do you use East West University digital library system? ☐ Yes ☐ No

3.1.1 If no, please specify your reason (s) for why you do not use the digital library.

_____
_____
_____

3.1.2 Do you have any plan to use the digital library in the next 3 months?

☐ Yes ☐ No

3.2 If your answer is *YES* to Q 3.1, then answer to the rest of the questionnaire (Q 3.2.1 – Q 11)

3.2.1 How long have you been using digital library?

☐ Less than 1 year ☐ 1 – 2 years ☐ 3 – 4 years ☐ 5 – 6 years

3.2.2 Frequency of using digital library

☐ More Frequently ☐ Frequently ☐ Occasionally ☐ Rarely ☐ Don't know

4. The content of digital library

Richness	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Uptodateness	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Adequacy	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Completeness	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Clarity	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Relevance	[1]	[2]	[3]	[4]	[5]	[6]	[7]
Usefulness	[1]	[2]	[3]	[4]	[5]	[6]	[7]

5. Knowledge of search domain

5.1 I know how to search under subject or author domain of digital library

Strongly disagree	[1]	[2]	[3]	[4]	[5]	[6]	[7]	*Strongly agree*

5.2 I have knowledge on the topic, that I need to search for digital library

Strongly disagree	[1]	[2]	[3]	[4]	[5]	[6]	[7]	*Strongly agree*

5.3 Search mechanism is easy to discover information before retrieving it

Strongly disagree	[1]	[2]	[3]	[4]	[5]	[6]	[7]	*Strongly agree*

6. Digital library system characteristics

6.1 The EWU digital library system is available when I need it to use

Strongly disagree	[1]	[2]	[3]	[4]	[5]	[6]	[7]	*Strongly agree*

6.2 The user interface on the screen is well-designed that enables me to search, browse, follow links, navigate, retrieve, and read documents

Strongly disagree	[1]	[2]	[3]	[4]	[5]	[6]	[7]	*Strongly agree*

6.3 The system provides easy accessibility to its contents and services

Strongly disagree	[1]	[2]	[3]	[4]	[5]	[6]	[7]	*Strongly agree*

6.4 I usually get documents and services of high relevance from the system

Strongly disagree	[1]	[2]	[3]	[4]	[5]	[6]	[7]	*Strongly agree*

6.5 The system is fast enough to access, retrieve, and download files

Strongly disagree	[1]	[2]	[3]	[4]	[5]	[6]	[7]	*Strongly agree*

7. Service quality

7.1 I get instant technical and other support from the library staff when required

Strongly disagree	[1]	[2]	[3]	[4]	[5]	[6]	[7]	*Strongly agree*

7.2 The digital library is prompt in providing its services

Strongly disagree	[1]	[2]	[3]	[4]	[5]	[6]	[7]	*Strongly agree*

7.3 The digital library provides full text access to its resources

Strongly disagree	[1]	[2]	[3]	[4]	[5]	[6]	[7]	*Strongly agree*

7.4 Help messages on the screen is very useful

Strongly disagree	[1]	[2]	[3]	[4]	[5]	[6]	[7]	*Strongly agree*

7.5 I can get smooth service without breakdown

Strongly disagree	[1]	[2]	[3]	[4]	[5]	[6]	[7]	*Strongly agree*

8. Perceived ease of use

8.1 Learning to use digital library is

Difficult	[1]	[2]	[3]	[4]	[5]	[6]	[7]	*Easy*

8.2 The use of digital library seems to me

Difficult	[1]	[2]	[3]	[4]	[5]	[6]	[7]	*Easy*

8.3 My interaction with the digital library is

Difficult	[1]	[2]	[3]	[4]	[5]	[6]	[7]	*Easy*

9. Perceived usefulness

9.1 I find the system very useful to meet my information needs

Strongly disagree	[1]	[2]	[3]	[4]	[5]	[6]	[7]	*Strongly agree*

9.2 The role of digital library in conducting my study and/or research is effective

Strongly disagree	[1]	[2]	[3]	[4]	[5]	[6]	[7]	*Strongly agree*

9.3 The contribution of digital library to improve my overall performance is satisfactory

Strongly disagree	[1]	[2]	[3]	[4]	[5]	[6]	[7]	*Strongly agree*

10. Intention to use Digital Library

10.1 I intend to use the digital library due to percieved ease of use of the system

Strongly disagree	[1]	[2]	[3]	[4]	[5]	[6]	[7]	*Strongly agree*

10.2 Assuming that, the digital library is useful for my purpose, I intend to increase my use of the library

Strongly disagree	[1]	[2]	[3]	[4]	[5]	[6]	[7]	*Strongly agree*

11. Please indicate your level of overall satisfaction with EWU University Digital Library

Strongly unsatisfied	[1]	[2]	[3]	[4]	[5]	[6]	[7]	*Strongly satisfied*

I would appreciate your comments, if you have.