Design of a Low Cost Digital Library for the National Library of Bangladesh: Case Study

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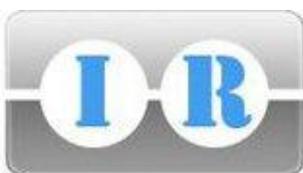tani.nlb@gmail.com

Abstract
This article gives general idea about the low cost digital libraries and requires skills of library professional advantages of Digital Library (DL) activities. Digital Information is, and will be, treated differently than paper-based information. It is likely that in the near future, the terms of accessibility and the conditions for management and collection of electronic information will not be determined by the library profession within the context of traditional library services, but rather by information professionals working to maximize return on corporate information resources. Managers of Various Libraries and Information Centers in developing countries in general and in the South Asia in particular should start building their local digital libraries, as the benefit of establishing such electronic services is considerably massive and well known for expansion of research activities and for delivering services that satisfy the needs of targeted end-users. The aim of this paper is to provide general guideline for design of a low cost digital library providing services that are most frequently required by various categories of library users in developing countries. It also aims at highlighting the barriers and obstacles facing Bangladesh content and how could such problems overcome.

Keywords: Digital Libraries, Information Services, National Library, Open Source Software.

Introduction

We live in an era of information explosion. With the development of a wide variety of technologies, a constant flow of information is now entering into our lives. We all agree to certain advantages of the availability of a wide range of information through the advancement of technologies. The exponential growth of the web stimulates the development of an effective system through personalization system, recommender system, recommender system, and so on to give easy and effective access to meet specific user's need. However, there are some issues, which are yet to be tackled, and information overload is one of them. Research and development in the field of digital libraries has grown significantly over the past decade, and a large number of operational digital libraries are now in existence.

This research originates from a belief that information services for national library users in Bangladesh are poor and not well developed because they are suffering from a general weakness in their principles foundations, equipments, Information Communication Technology(ICT) infrastructure, resources and cadres making it unable to comply with their duties and obligations towards their end users. Developing national library services and activities in Bangladesh should be achievable through implementing and exploiting today's technology. Therefore, it is anticipated that designing a low cost digital library

services and introducing electronic services will assist in solving a great deal of problems in addition to meeting the needs and requirements of the users. For that reason, a shift to information technology and its application would seem to be essential to give these institutions the capability of providing reliable services to targeted end users. It is also important to point out in this context that information and communication technologies present new opportunities and challenges for libraries in general and national libraries in particular. National libraries worldwide are passing through a phase of dramatic changes due to the ongoing challenges being posed by ICTs. Accordingly, they are challenged to explore new ways to accept and implement the changes made be Information Technology (IT) to be fit enough to serve the experts, information scientists, library scientists, and research workers, who always demand specialized services perfectly and accurately. Most scientific information today is available in a variety of formats such as CDs, DVD, Internet, Websites, etc. Which requires knowledge of specialized information handling techniques.

Objectives

The first crucial step to decide the objectives of designing the DL. This step has to be considered early–before any further steps are taken. The objectives of this design are summarized as follows:

➢ Developing the standard of services presented to targeted end users to enhance the levels of research activities with in the library.

➢ Using and putting into practice modern ICT to improve the current level of services and to solve the problems that the national library faces.

➢ Producing a design for a low cost digital library that provides not only access to and retrieval of information, but also the services that are most frequently required by the users.

Design Framework

This section focuses on the design for a proposed low cost DL for the National Library of Bangladesh, which is the only single depository and repository library of Bangladesh. It discusses the methodology used for designing the proposed digital library, the framework, and the steps implemented to reach the final goal. Designing a digital library usually comprises several stages. These phases are shown in the following flow design.
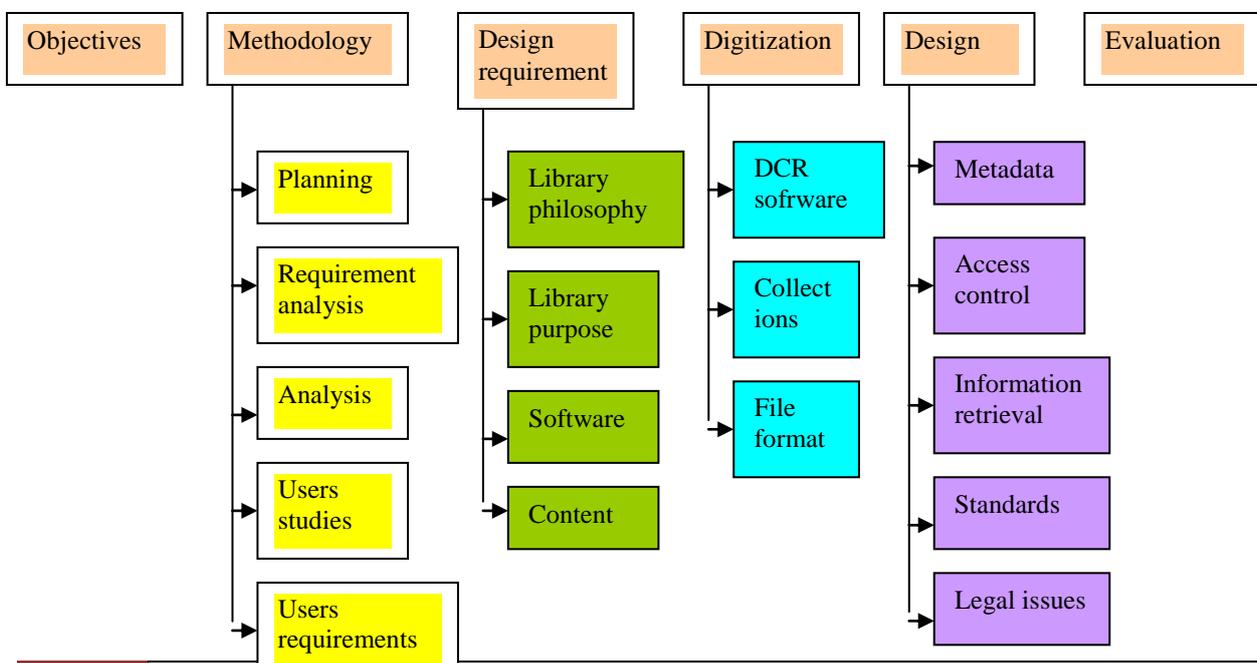
Fig. -1: Flow diagram

Planning

The planning stage comprised a survey of the current collection of the Bangladesh National Library is how? So, the planning phase is considered a fundamental process of understanding why a digital library should be built and determining how it should be built. Questions examining educational, technical and organizational feasibility i.e.

- ✓ What exactly is the project? Is it possible? Is it practicable? Can it be done?
- ✓ If we build a digital library, will it be used?
- ✓ Educational feasibility.
- ✓ Are the benefits greater than the costs? If benefits outweigh costs, then the decision is made to design the library.
- ✓ Technical feasibility.
- ✓ Do we have the technology? If not, can we get it?
- ✓ What is the current scenario of ICTs within the organization?

The aforementioned questions should be answered in this phase to determine the expected value of designing a digital library service. A feasibility study is a short assessment of the proposed digital library to determine whether the projected library can effectively meet the specified services requirements of the organization as well as to identify constrains, budget, time, ICT infrastructure and resources.

Digital Library Model

Digital Library as a server connected to a computer network of users where the server has the ability to respond to user requests by retrieving relevant information from document data stored on an electronic storage medium. The specific research topics are determined by the architecture of the DL, which is shown in here. It consists of an off-line process wherein document data is captured and prepared for storage, and on-line process where quires are received and processed for information retrieval. There are three major computational process shared between the off-line and on-line processes of the DL viz. document data capture, data integration/indexing and information retrieval.
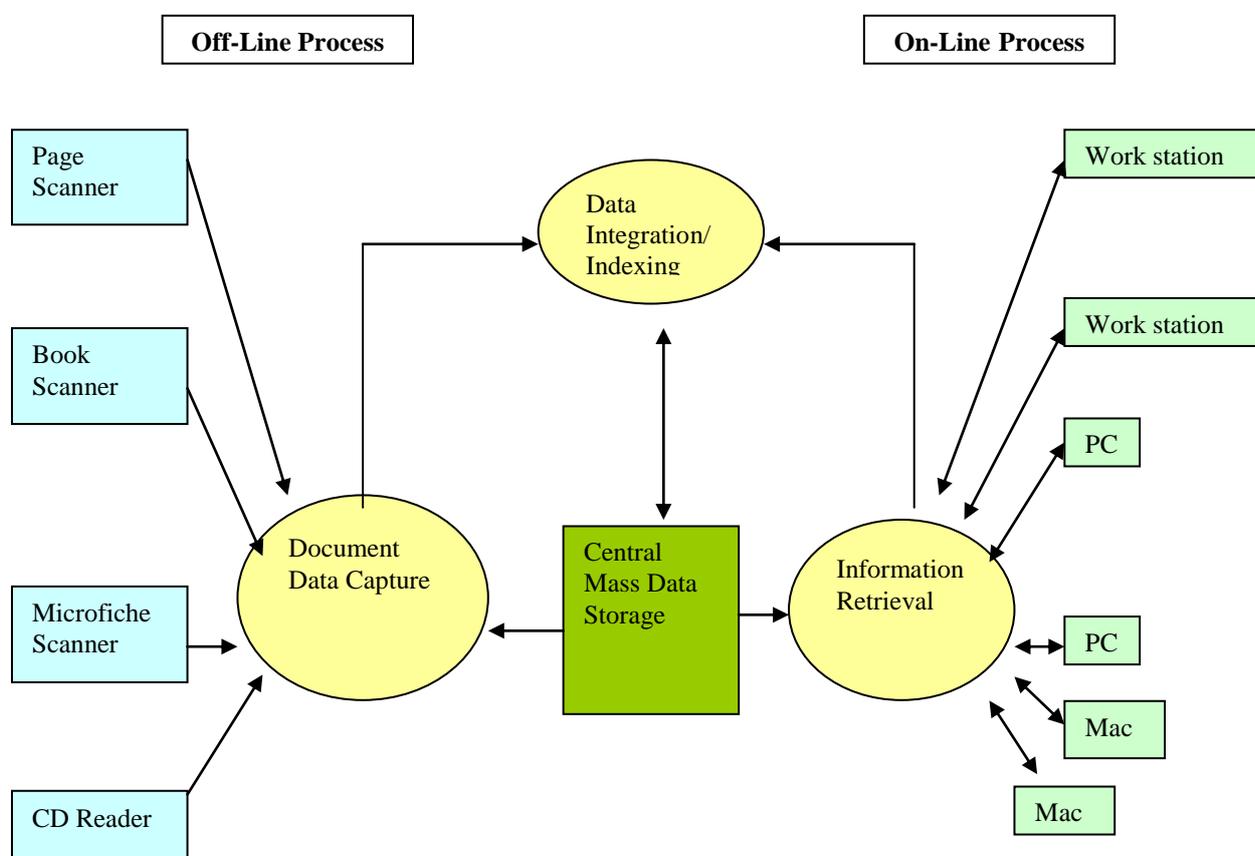
Off-Line Process		On-Line Process

Fig.-2: DL Model

Any librarian having some basic knowledge of computer applications can create the digital library for their users. If this digital library is made available through their website, other users looking information on same topic will be benefited librarians can acquire or convert digital information taking into considerations the need of their users. And DL software has made it possible to manage and organize the large amount of digital information.

Elements of Low Cost DL
There are three components of a low cost digital library: data, metadata and processes. Data are library materials. Metadata constitute the information in the library and its materials. Processes are active functions performed relating for library materials. For example, a book in a library is a data of that library. An index of a book titles in a card catalogue is a library metadata the act of libraries in helping a patron find a book by suggesting the use of the card catalogue may be thought of as a process. Secondly, each of these elements may take the form the elements of the physical library or of the newly digitized elements.

Basic Elements of Low Cost DL

	Data	**Metadata**	**Processes**
In the Physical Library	Books, Magazines, Journals, Reports, Newspapers, Govt. Publications, Maps, Movies etc.	Static index, Classification Special Arrangement	Acquiring data Suggesting sources Helping locate sources.
In the Digital Library	Hyper novels, Scientific visualization Computer Programmes.	Dynamic index Personalized Structure Annotations.	Full text searching personalizing Presentation, Retrieving by users.

Selecting Materials for digitization

The selection of printed materials for digitization should be based on the nature and needs of a library. In a national library priority will be given to documents of national importance. In a special library users will be seeking special categories of information, so that the selection of materials will be different from other libraries. Similarly, the digitization needs of public and academic libraries will be unique to them. But the need to make a choice is common to all libraries and before creating digital products library should think seriously and should take decisions wisely. The creation and maintenance of the electronic products of digitization require funding, skill and sustained commitment. The desire of users of all libraries is the same: to gain access the existing collection even from remote locations. Thus digitization can occur for entirely different purposes and in a variety of contexts.

Low Cost DL System

After the establishment of the digital library, the infrastructure has to be developed the various library functions (i.e. to acquire, store, manage, preserve and provide access collection). The digital library needs to be fully integrated with existing and planned services and systems within the library and not be something separate.

Need of DL in National Library of Bangladesh (NLB)

Man kind is known in the 21st century and under going the third industrial revolution. In this context the US sociologist, Peter F. Druker has envisioned that, "Today the real controlling of resources and the absolute decisive factor of production is neither capital, nor land, or labor, it is knowledge".

Exponential growth of knowledge and information of information networks at national and international levels etc. require digitization for access, greater possibility of online and remote database searched and resources sharing among libraries.

The Bangladesh National Library collections are very rich. But now NLB is not providing any digital resource based services to their. In the digital era steps have to be taken to create a

digital library in NLB. In order to modernize the national library and its services, it needs of digitization of all resources available with users and make available to the global community.

Major needs in digital library are:

The DL should support –

- Effective Searching and Retrieval.
- Increased Speed of Access.
- Promote Paperless Environment.
- Printing on demand.
- Ensures Operational Excellence.
- Users can refer the papers in press.
- Users have no boundaries.
- Effective Control and Coordination.
- Time Saving.
- Promotes E-learning.
- Digital Delivery of Sound, Film and Image.
- Increased Productivity.
- Improved Searching and Manipulation.
- On-line user Education.
- Instant Downloading of Information.
- Multiple Access to resource.
- Storage of Large Volume of Data.
- Promotes Services 24/7.
- Access @ anytime @ anyplace by anyone.
- Reduced Bureaucracy.
- Faster Addition and Gap Reduction.
- Connects Users with Authors Instantly.
- Digital Library comments to users.
- Promotes E-hearing.

Design

Once the requirements analysis is concluded, the next step is to design the proposed digital library. The design phase decides how the system will operate, in terms of hardware, software and available infrastructure. The first step in the design phase is to develop the design strategy or the framework. In fact, there are several points that need to be considered before starting the physical design of the proposed digital library.
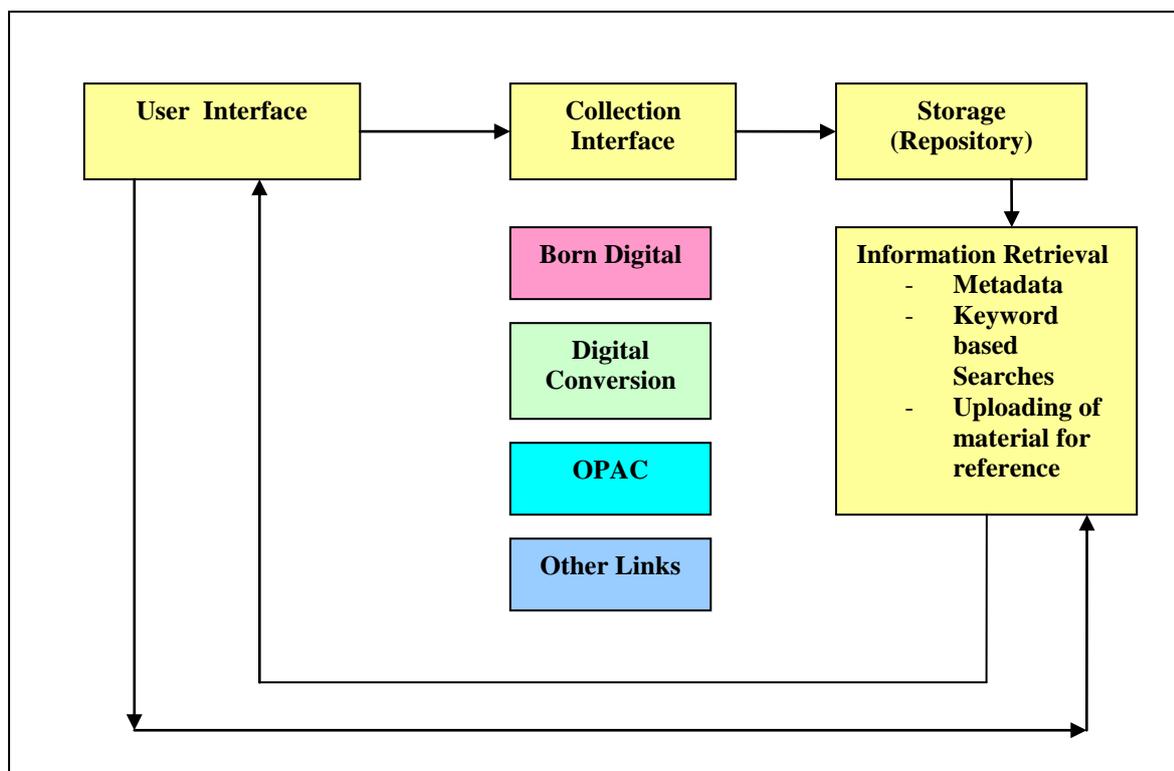
Fig. 3 : Proposed DL design

Software

There are various types of software available for the creation of the proposed digital library. However, because the main principle of this research is to design a low cost digital library, selection from diverse freely available software is a complicated question. Moreover, due to the availability of a variety of open source Software that could serve the purpose of the proposed library, selection of appropriate software was a vital issue. Greenstone software was selected due to its good reputation and its support for different languages, which is an essential aspect for the design of bilingual content. In addition Greenstone is capable of displaying the user's interface in multiple languages and handling collections of text, pictures, audio, and video files. The program also offers flexible browsing facilities and can run on Windows and UNIX. Despite the availability of various open source software programmes required for building digital libraries such as Dspace, E-prints, Open repository, Open publication system, Fedora, DigiTool etc. many organizations and institutions worldwide have built their digital libraries using Greenstone software.

However, the most important reason for selecting Greenstone software lies in its capability for building bilingual content, as this feature is not available in all other open source software. None of the previously mentioned software is capable of building Bengali content or displaying the user's interface in Bengali. Greenstone software is capable of that because the software is supported by UNESCO(United Nations Educational Scientific and Cultural Organization), which encourages developing countries to participate in the current information revolution by adopting modern ICT systems. Designing a bilingual digital library that could support both Bengali and English languages was a crucial aspect due to the following:
- English is the second most used language in Bangladesh.

- Most of the literature written in any branch of knowledge can be found in English.
- A considerable number of research workers, especially in the National Library in local and foreign researchers in Bangladesh, are non-Bengali speakers.
- A substantial number of Bangladeshi research workers are acquainted with English.

Budget of the proposed low cost DL

* This estimated budget for Low Cost Digital Library is done for one year in 34 persons.

Sl/No.	Item	Quantity	Per/Unit	Total
Equipments :				
01.	Server	02 nos.	US $ 5000	US $ 5000X 2 = 10,000
02.	Desktop Computer	20 nos.	US $ 600	US $ 600X20 = 12,000
03.	Hub/Switch	02 nos.	US $ 700	US $ 700X2 = 1,400
04.	Laptop Computer	04 nos.	US $ 1200	US $ 1200 X 4 = 4,800
05.	DL Software	-	-	-
06.	Scanner	2 nos.	US $ 600	US $ 600X2 = 1,200
07.	Laser Printer	5 nos.	US $ 500	US $ 500X5 = 2,500
08.	Air Conditioner	10 nos.	US $ 600	US $ 600X10 = 6,000
Total : US $ 37,900				
Man Powers :		**12 month (1 year)**		
09.	Chief Librarian	1 person	US $ 650X12 = 7,800	US $ 7800X1 = 7,800
10.	System Analyst	1 person	US $ 600X12 = 7,200	US $ 7200X1 = 7,200
11.	Programmer	1 person	US $ 500X12 = 6,000	US $ 6000X1= 6,000
12.	Assistant Programmer	2 persons	US $ 400X12 = 4,800	US $ 4800X2 = 9,600
13.	Network Administrator	1 person	US $ 400X12 = 4,800	US $ 4800X1 = 4,800
14.	Librarian	1 person	US $ 300X12= 3,600	US $ 3600X1 = 3,600
15.	Assistant Librarian	2 persons	US $ 250X12= 3,000	US $ 3000X2 = 6,000
16.	Data Entry Operator.	10 persons	US $ 150X12 = 1,800	US $ 1800X10 = 18,000
17.	Cataloguer	5 persons	US $ 150X12 = 1,800	US $ 18,00X5 = 9,000
18.	Office Assistant	2 persons	US $ 110X12 = 1,320	US $ 1320X2 = 2,640
19.	Driver	3 persons	US $ 150X12 = 1,800	US $ 1800X3 = 5,400
20.	MLSS	5 persons	US $ 100X12 = 1,200	US $ 1200X5 = 6,000
21.	Training	-	-	US $ = 4,000
Total : US $ 90,440				
Others :				
22.	Vehicle (1 Car + 2 Micro bus)	3 nos.	US $ 20,000	US $ 20,000X3 = 60,000
23.	Furniture	-	-	US $ = 20,000

24.	Telephone	4 nos.	US $ 80	US $ 80X4	=	320
25.	Fax	1 nos.	US $ 600	US $ 600X1	=	600
26.	Internet	Broadband	-	US $ 1000X1	=	1,000
27.	Photocopy Machine	1 nos.	US $ 3,000	US $ 3000X2	=	6,000
28.	Miscellaneous	-	-	US $	=	8,000
				Total : US $ 95,920		

Grand Total: US $ 22,4,260

Conclusion

It is very honest effort to put down in the form of a article to enable Low Cost DL in our National Library of Bangladesh. I had made this plan of action considering the real picture of my work place, nature of work that I am doing. My major points in this article is how can I really make Low Cost DL for our NLB and develop that to a greater extend adopting a change in Library Service methodology for the benefit of our user.

Man can know that the library is the key instrument, which brings out all the development process and prosperity of a nation. So it is vital for all library professional to work use ICT for the modern library services to our future generation. So, I feel our librarians and all library professional need to know modern technology to furnish quality library service to the users. Our librarian strengths and weakness should be explored, recognized and they must be encouraged and given proper training time to time, to enable them to provide right type of Information Services as required for this 21st century.

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Greenstone Digital Library Software: A Case Study of Bangladesh

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This case study describes the activities of DLNETSA and present scenario of using greenstone digital library software as library institutional repository in Bangladesh. INTRODUCTION Open source software is software that is made freely obtainable to all and its source code is also available for anyone to see and manipulate.