
BOUNDARIES FOR THE BOUNDLESS: MODERNISING DIGITAL LIBRARIES – ANNA UNIVERSITY INITIATIVES

P V Raj Kumar

Abstract

"All that glitters is not gold" goes the saying. This paper deals lucidly with the efforts and other associated hardship and difficulties encountered in the making of a digital library at Anna University. The author has highlighted in the preamble about the genesis of the University with an introduction about the University library. All the concepts, the design components, services and uses of the established Digital library initiatives have all been discussed in detail. The difficulties faced in the making of the digital library have also been dealt with in the paper. Last but not the least, a few valuable suggestions to make the digital library more pervasive and usable by all the users have also been well suggested for the posterity. In a nutshell, this paper illustrates the "digital experience" of the University library.

Keywords : Digital Library, Anna University.

Preamble :

Anna University was established on 4th September, 1978 as a unitary type of University by bringing together the following four institutions in the city of Madras (now Chennai)

College of Engineering, Guindy (CEG), {1974}

Alagappa College of Technology (ACT), {1994}

Madras Institute of Technology, Chrompet (MIT), {1949}

School of Architecture and Planning (SAP), {1957}

Since January 2002, it has become the largest affiliating technological university in the world, having more than 238 self- Financing Engineering Colleges, Government Engineering Colleges, Government aided engineering colleges and other Constituent Colleges from various parts of Tamil Nadu.

The University offers higher education in Engineering, Technology and Allied Sciences relevant to the current and projected needs of the society. Besides promoting research and disseminating knowledge gained there from, it fosters co-operation between academic and industrial communities.

The students of Anna University are selected through Tamil Nadu Professional Courses (TNPCEE) Entrance Examination. The Students are required to have a very high percentage of marks to gain admission into this University. Presently Electronics and Communication Engineering branch at Anna University is the first choice of a large number of high-ranking students from the merit list.

- Awarded Five-star status by National Assessment and Accreditation Committee of the U.G.C./ A.I.C.T.E.
- Awarded "Island of Excellence" by UGC to create a University Centre with Potential for Excellence in Environmental Sciences.
- First University to achieve credit in receiving the Project Development of Micro Satellite from the ISRO.
- First University to start Anna University Community Radio Anna FM 90.4 MHz.

The University has a number of FIRSIS to its credit. It was the first in India to offer a Degree in

1	Mechanical Engineering	1894
2	Electrical Engineering	1930
3	Tele-communication Engineering	1945
4	Highway Engineering	1945
5	Aeronautical Engineering	1949
6	Automobile Engineering	1949
7	Electronics Engineering	1949
8	Instrumentation Engineering	1949
9	Printing Technology	1983
10.	Petroleum Refining and Petro-Chemicals	1992
11.	Geo- Informatics	1992

A Spectrum of Specialized Courses offered by various Centers make Anna University stand out in educational Scenario.

UNIVERSITY LIBRARY

The University Library is located in 2 places, the main campus and MIT campus. The services provided in the University Library are reference service, Bibliographic service, Inter library loan service, MALIBNET service. DELNET ILL service, Reprographic service, CD-ROM search and Internet browsing facility. All the library functions have been automated. The entry into the library and book transaction has been made through smart card. Video Cameras have been fixed at tangible points for surveillance and control of reading materials. The University Library has joined INDEST for

consortium for e-journals access at discounted rates fixed by MHRD. This enables access to the journals on line.

As part of the Digital Library Project which is currently in progress, some of the thesis available in the Library has been digitalized. Also the library has made available the Indian Standards (ISI), ISO 9000, ISO 14,000 compendium and EI compodex in CD format. All the 4 constituent colleges of Anna University are connected through network. The user ambience inside the library is supplemented by a beautiful garden in the front.

1. Introduction

Gone are the days when libraries were storehouses of books. Information Technology has changed the today's environment of libraries in a big way with the current thrust on digital information. With the development of digital information and a knowledge society, libraries are changing their role from document provider to information provider. The need of the hour is to provide authentic information in a split of second. Internet explosion paves the way for the same. The impact of information technology has led to a paperless society, digital libraries and virtual libraries.

Digital Technology has been making such an impact on different sectors of human activity which leads the present period as paperless society. Its impact on libraries and their services is not less.

The concept of four walls library is fading off today at least to some extent even in developing countries. The audience does not wait for the librarians to take them to this new world of digital technology. Unlike campus libraries, the modern librarian has to make the transformation to the digital world under scrutiny of the user's eye, while serving the parent body as well as the academic, and increasingly, the scholar. The balance of serving these important constituencies is one of the most difficult issues the traditional institution will face in the immediate future.

From the digital technology perspective on the outside, the balance between serving the scholars who create knowledge and the broader needs of the user community and the social pressure forces the librarians, collectively, to consider the shape and form of comprehensive libraries of the future. Librarians must consider what is possible in the digital environment, how to provide services, and how to interact with other libraries within a nation and in the world.

If National and Global information are to serve "every citizen" then digital libraries should be reasonably easy to understand and to use.

What is a Digital Library?

Digital Libraries are digitally accessible organized collections of knowledge. 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. The content of digital libraries includes data, metadata that describe representation, creator, owner, reproduction rights, and metadata that consist of links or relationships to other data or metadata, whether internal or external to the digital library. (reference)

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. These information institutions include among others, libraries, museums, archives and schools, but digital libraries also extend and serve other community settings, including classrooms, offices, laboratories, homes and public spaces.

Recent advances in technology which can assist in the conversion of print materials to digital formats now enable librarians to go well beyond access and make library resources that were previously available only in one physical location available to anyone via the World Wide Web. The joint purchase of commercial databases and conversion of unique print collections to digital format can create a virtual library available to anyone, anywhere.

Digital libraries offer such benefits as: equitable access; reduced barriers of distance; timeliness; shared resources and content delivery. Digital Libraries promise an exciting new service paradigm for the 21st century.

Creating true digital libraries, not just digital collections, will require librarians to work closely together to: (reference required)

- Create an open, distributed, publicly accessible resource that documents crucial information for users.
- Establish a collaborative structure to co-ordinate and guide the implementation of the digital library.

-
- Develop criteria and standards to guide the selection of materials for inclusion in the digital library;
 - Add value to digital resources;
 - Assist libraries, museums, archives, schools, government and non-government organizations, and other institutions in digitizing materials and managing digital library projects; and
 - Showcase content and the rich resources held by our libraries and other repositories worldwide.

Need for Digital Library in Engineering Institutions

Engineering is a profession directed towards the skilled application of a distinctive body of knowledge based on Mathematics, Science and Technology integrated with Business Management, which is acquired to education and professional foundation in a particular engineering discipline. Engineering is directed to developing providing and maintaining infrastructure, goods and services for industry and the community.

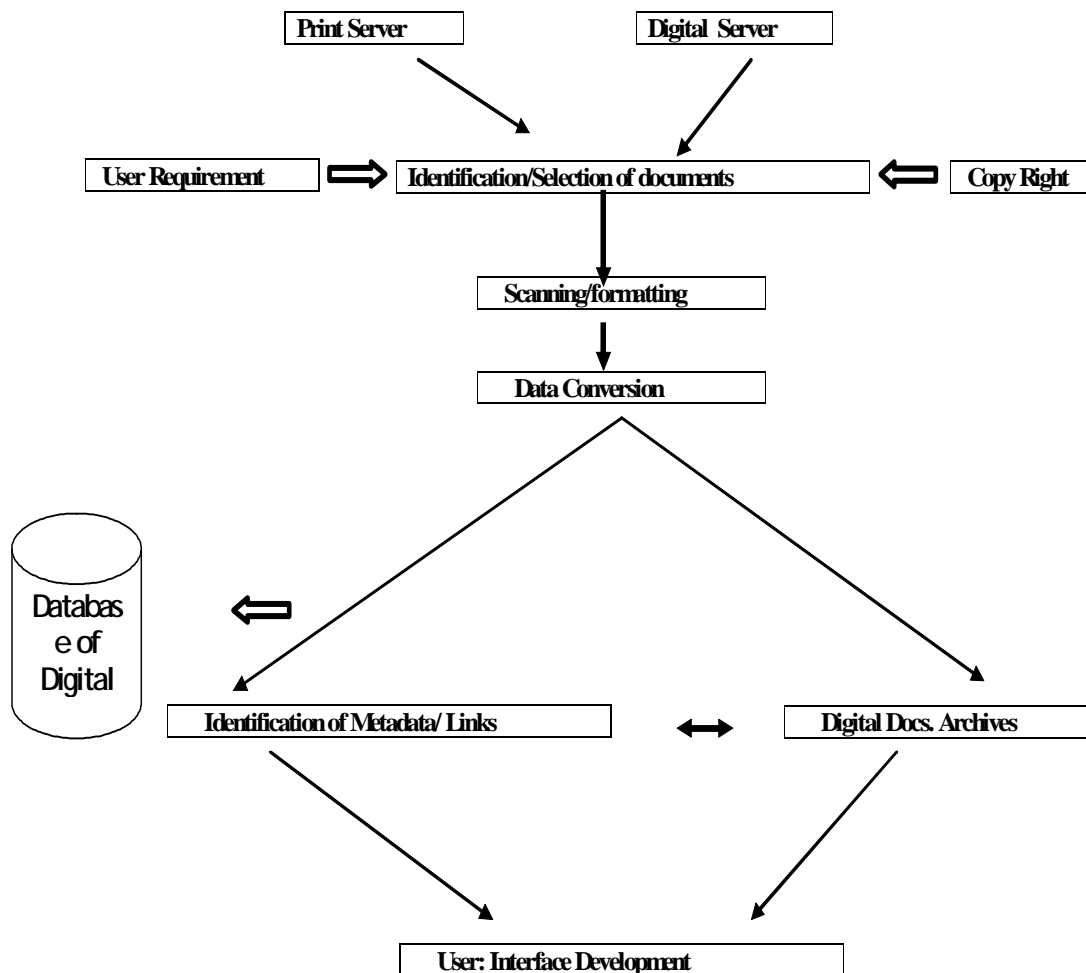
Anna University will create network of 250 affiliated Engineering Colleges across Tamil Nadu to access the high performance computing environment virtual reality simulation systems, parallel servers, clustered servers, super computer infrastructure from any part of the grid and to provide knowledge creation, sharing dissemination and reuse.

While the traditional mission of libraries presents challenges of its own, the introduction of new media and a new information technology compound these challenges. This may include a new concept of the library itself as a virtual or digital library, as well as the provision of CD-ROMs and other electronic sources, including Internet sources, to library users.

Digital Libraries contributors will need to collaborate in their efforts to digitize resources if they are to be successful and distinguish themselves from digitization projects which have stood alone inside individual institutions or organizations. These efforts are allowing participants to become more familiar with the formidable technical challenges facing them. They also prompt them to work together across lines, institutions, and professions to:

- Create a mutual vision for a common future of all engineering college;
- Share expertise and rich collections of technical subjects;
- Build upon earlier models of co-operative activities such as preservation, interlibrary loan, and collection development;
- Reduce redundancy and the waste of acquiring or converting materials more than once;
- Leverage scarce financial resources;

- Allow the development of selection criteria which focus on coordinated digital collection building;
- Encourage coordinated preservation strategies;
- Ensure equitable access to technical information from anyplace/ anytime;
- Reduce barriers of distance and time ;
- Permit users to leap to actual technical information;
- Develop value -added components to the information contained in the digital library;
- Assist libraries and other engineering institutions in digitizing materials and managing library projects;
- Build the library of the future; and
- Create a new service paradigm for the 21st century



The primary aim of the digital library will support the institutions learning, teaching and research, which might change significantly with number of users.

Building Digital Library

- Except Change
- Know your content
- Involve the right people
- Design usable systems
- Ensure open access
- Be aware of data rights
- Automate wherever possible
- Adopt and adhere to standards
- Ensure quality
- Be concerned about persistence

Components of Digital Libraries

A digital library requires multimedia kit, more numbers of PC's having LAN and CD-ROM drives, locally developed databases, e-mail services, network connection, manpower having knowledge of computer and also the variety of functions to retrieve data. A variety of system functions to coordinate, manage the entry and to retrieve data.

The three main components of digital libraries are

- Technology
- Operations (Research, Education and others)
- Documents

Standards

In terms of bibliographic description, Anglo American Cataloguing Rules (AACR II, Machine Readable Cataloguing (MARC), Standard Generalized Mark up Language (SGML) and Hypertext Mark up Language (HTML) are issued. For documents descriptions Page Description Format (PDF) is used.

Services

- E-mail Service
- Bulletin board Service
- File Transfer protocol (FTP)
- Remote Login (TELNET)
- Browsing the World Wide Web
- Catalogue Databases

- Current Awareness Services (CAS)
- Selective Dissemination of Information Services (SDI)
- Online Public Access Catalogue (OPAC)
- CD-ROM Databases
- Remote Information Services
- Internally Published Newsletters, Reports & Journals
- Internet Information Sources Mirroring & Cataloguing
- Types of Information Exchange that happen in the Digital Library
- Exchanging short social notes (memorandum, a note, an event)
- Getting the latest news from around the world (date breaking news)
- Collaborating on scientific research.
- Transferring computer files (downloading software)

Uses of Digital Libraries

- Minimizes the duplication of new invention
- Helps in Resource sharing facilities
- Saves the Library Manpower and Funds
- Helps to reach information of their users at faster rate through on-line communication. Helps the libraries to get recent publications from the publishers.
- Researchers/ Information Scientists will get information within minimum time. Helps to get Bibliographical Information, Retrospective Search, Union Catalogue, Abstracting and Indexing of Periodicals.
- On-line Library catalogue through Internet give access to Bibliographic Records of millions of books and details of Academic and Research Libraries, Electronic Journals and Newsletters.
- Electronic Publications provide aids for connectivity, Audio-Visualizations, Customizability, Creation and Revision of Documents, Interactivity and Rapid Information Retrieval , Electronic Publications may help in overcoming the restrictions on the length of the paper imposed by many scholarly journals.
- Universal accessibility
- Access to more information than possible to physical acquire and maintain
- Support to both formal and informal learning
- Remote access to expensive and rare material
- Protecting rare books that are rapidly deteriorating through over-use.
- Solving massive storage problems.
- It helps to preserve rare & fragile.

Characteristics of Digital Libraries

- Network accessibility
- User friendly interface
- Advanced search and retrieval
- Supporting multimedia content
- Accessibility from anywhere, home, school, libraries, during travel etc.
- Providing access to very large collections including access to primary and secondary information.
- Availability for long time
- Greater opportunity for publishing etc.

Functions of Digital Libraries

- To enable one to perform searches that is not practical manually.
- To preserve unique collections through digitization.
- To manage contents from multiple locations.
- To enable greater access to information
- To provide means to enrich the teaching and learning environment and
- To protect owners of information.

Difficulties of Digital Library Services

Difficulties in developing standard definitions for electronic media and services related to cost expenditures for the following:

- System/service hardware: local integrated systems, terminals, desktop computers, servers, printers and scanners.
- Software: operating systems, site licenses, application software and new releases user authentication and validation, and blocking/filtering software.
- Communication services: telecommunication lines, cabling, routers, modems, network service provider fees and local area network charges.
- Training and education: staff training, user education, documentation, and user support services.
- Facility upgrades/maintenance: building renovation, cabling and wiring and equipment.
- Content/resource development: collection development, formatting graphics development, site design and commercial arrangement.
- Program planning /management /staffing: staff recruitment, budget preparation, program analysis, planning and consultation.
- Difficulties in accommodating successive new generations of systems and software release changes and in addressing obsolescence.

- The open and unrestricted nature of network services makes control, regulation and planning difficult.
- Difficulties resulting from complex telecommunications infrastructure technologies and rapidly changing bandwidth pricing practices from electronic content publishing industry.
- The challenge of keeping current with rapid pace of change in business and pricing practices from electronic content publishing industry.
- Confusion and uncertainty relating to document delivery services and fair use of copyrighted materials in electronic format.



- **Central Processing Units (CPUs)**: Two 350Mhz 128bit UltraS arc Processors (can have up to eight)
- **Random Access Memory (RAM)**: 4 GB (can have up to 14GB)
- **Hard Drive Storage**: 112 GB+ (configurable storage array)
- **Network**: 100Mb/second to the campus backbone
- **Tape Drive Storage**: 14 GB
- **Peripheral Components** : CD-ROM Drive

Software

Sun Solaris operating system, version 2.6. Application software includes:

- Apache 1.3.9 - base Web server software
- List Processor 6 - software for hosting electronic discussions
- Harvest
- HyperMail - turns electronic discussion email into a browse able archive
- DynaWeb - Web server software that translates SGML files into HTML on-the-fly.
- MOmspider - link checking software
- mSQL - a SQL-compliant database package
- Netscape Commerce Server - Web server
- Netscape Enterprise - Web server
- OCLC SiteSearch, including WebZ, a Z39.50-compliant Web server.
- Perl 5

-
- Pico - a simple full-screen text editor (used by the Pine email software)
 - Pine - Email software
 - SWISH-Enhanced - Simple Web Indexing System for Humans - Enhanced.
 - Tcl/Tk - "Tcl (tool command language) is an embeddable scripting language and Tk is a graphical user interface toolkit based on Tcl. Both packages are freely available."
 - WGet - a web crawler.

Epilogue :

The advent of the World Wide Web and the internet has provided a watershed moment for all Libraries. We now have technology that enables us to reach more people than ever before and enables us to ensure that the people not only have the means to record and share their unique stories but continue to enjoy free access to information, a freedom that is at the heart of their ability to participate in the democratic process. Creating the digitized items is only part of the story. Integrating the digitized content with services that help interpret, organize and make accessible is also important. And providing an infrastructure that ensures that the digital bits and bytes persist in perpetuity is the final leg of the three-legged stool.

Digital Libraries have the potential to increase learning and knowledge. The challenge for libraries is to take that same content and make it usable and searchable in ways that can engender discovery, creativity and invention.

In the light of the above, a four key suggestions to make digital libraries more pervasive and usable by all users.

- **Suggestion 1.** Support expanded digital library research in metadata and metadata use, scalability, interoperability, archival storage and preservation, intellectual property rights, privacy and security and human use.
- **Suggestion 2.** Establish large-scale digital library Test beds.
- **Suggestion 3.** The Government should provide the necessary resources to make all public material persistently available in digital form on the Internet
- **Suggestion 4.** The Government should play a leadership role in evolving policy to deal fairly with intellectual property rights in the digital age.

References

1. Conway, Paul. "Digital Preservation", "Paper and Microfilm go electronics" Library Journal 119, February 1, 1994 p 42-45

2. Lorist J. "Standards for Digital Libraries and Archives" Digital Longvil: March 2002
3. Borgmon. C.A (1999) what are digital libraries competing Vision Information Processing & Management 35(3) 227-243
4. Desidoc Bulletin of Information Technology Vol .25(3) May 2005, p 8-17
5. Harvey, Ross., Preservation in Libraries: Principles Strategies and Practices for librarians, London : Bowker - Saur, 1993

ABOUT AUTHOR

Mr. P V Raj Kumar, is a practicing Library professional serving with the University Library of Anna University for the past 23 years. He is a post graduate in Economics, Library and Information Science, an M.Phil in Library and Information Science and an M.B.A graduate with specialization in Marketing Management. He has authored and published more than 40 technical and research papers in various National and International Conferences and has also coordinated many workshops and Seminars.