Digital Libraries in India

A BASELINE STUDY

CKS Working Paper

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A Report Commisioned by EDC

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Educational Development Center

Center for Knowledge Societies

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Abbreviations

ARL	Association of Research Libraries
ANSI	American National Standards Institute
CALIBNET	Calcutta Library Network
CED	Center for Education and Documentation
CIEFL	Central Institute of English and Foreign Languages
CSCS	Center for the Study of Culture and Societies
DCMI	Dublin Core Metadata Initiative
DelNet	Developing Library Network
DRDO	Defence Research and Development Organisation
DRTC	Documentation Research & Training Center
DSAL	Digital South Asia Library
DSIR	Department of Scientific & Industrial Research
DSL	Digital Subscriber Line
EAD	Encoded Archival Documentation
FAO	Food and Agriculture Organisation
IEEE	Institute of Electrical and Electronic Engineers
IFLA	International Federation of Library Associations
IGNCA	Indira Gandhi National Center for the Arts
IGNOU	Indira Gandhi National Open University
IISc	Indian Institute of Science
INDEST	Indian National Digital Library in Engineering Science and Technology
INFLIBNET	Information Library Network
IPR	Intellectual Property Rights
ISDN	Integrated Services Digital Network
ISO	International Standards Organization
ISI	Indian Statistical Institute
ISRO	Indian Space Research Organization
MARC	Machine Readable Cataloging
NCITS	National Committee on Information Technology Standards
NIC	The National Informatics Center
NISSAT	National Information System for Science and Technology
NITC	National Institute of Technology
NSDI	National Spatial Data Infrastructure
OAI_PMH	Open Archives Initiative Protocol for Metadata Harvesting
OCR	Optical Character Recognition
OPAC	Online Public Access Catalogue
PICS	Platform for Internet Content Selection specifications
RDF	Resource Description Framework
SARAI	South Asia Resource Access on the Internet
SIS	Society for Information Science
TIFR	Tata Institute of Fundamental Research
UDL	Universal Digital Library
UGC	University Grants Commission
UNESCO	United Nations Educational, Scientific and Cultural Organization
VRA	Visual Resources Association
VSATs	Very Small Aperture Terminals
W3C	World Wide Web Consortium
WiFi	Wireless Fidelity
WINISIS	Windows Interface of CDS/ISIS
WLL	Wireless-in-Local-Loop

Baseline Study of Digital Libraries in India

0.0 Terms of Reference

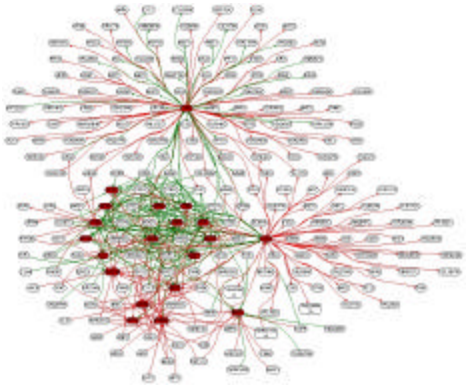
This document by the Center for Knowledge Societies presents preliminary findings from its baseline study into digital libraries in India. For this purpose, the document tables issues for discussion and consideration in order to create a possible new digital library resource to organize the educational and developmental content that EDC is creating for India. It also describes existing digital library initiatives in India and identifies practitioners in the fields of information science and management for future stakeholder meetings. While every effort has been made to identify relevant initiatives, practitioners, experts and standards in India this listing does not aspire to be complete nor comprehensive.

1.0 What is a Digital Library?

We understand a digital library to be an electronic collection of real or virtual resources, which may also be available elsewhere. These resources must be whole works, with which humans can have a complete cognitive or affective engagement. A digital library may allow either online or offline access to the elements it organizes and houses, and may include multimedia as well as multilingual data.

Although accessible online, a digital library is not identical to a website or a portal. However, while portals, specialized websites and search engines cover a wide range of subject areas, digital libraries are more narrowly focused around one or a specific group of disciplines. Digital libraries, moreover, attach content-specific and highly descriptive metadata such as, descriptors or keywords to describe each item in the collection. Therefore, searches in a digital library can produce more useful results, save time and effort in searching, and in the best of cases browsers may directly access the text or multimedia content for which they executed their search.

There are several advantages of a digital library over a conventional library. These include minimizing storage space and cutting down costs of library maintenance and resource distribution. A digital library is also not merely an automated conventional library, where the resources are electronically catalogued and are available only for browsing purposes. Although conventional libraries do preserve socio-cultural ambiences within their spaces, a digital library can provide more equitable and widely distributed access at lower costs. Moreover, it may be most appropriate means of organizing intellectual artifacts that cannot be represented or distributed in printed formats, such as audio/video multimedia content. Thus a digital library may evolve into a complex system that makes information available in hard copy, on magnetic tape and discs, CD-ROMs and videodiscs, including those from online sources.



According to the National Science Foundation, a digital library ought to serve as an intellectual commons, where diverse members of the community may share their knowledge and practices. The Association for Research Libraries (ARL) points out that digital libraries can serve as a network of links to other digital libraries. In this view, a digital library no longer remains a single-point source but facilitates maximal resource extraction from partnering institutions and libraries. In this way, digital libraries have the potential to revolutionize methods of information access to meet the specific needs of their user communities. Thus, by distributing responsibility for building and maintaining multiple collections, digital libraries create an opportunity for collaboration between users, deviating from older systems where ownership challenges interfered with

collaboration. With organizations owning and maintaining their individual section, collections do not have to be held in the same physical space, further protecting ownership while fostering collaboration and information sharing.

In the light of definitions cited above, how might digital libraries catalyze information revolution in India? India is faced with severe challenges including the need for better educational resources as well as appropriate technology infrastructure. Early research suggests that the process of making resources available through digital libraries in India may suffer a great deal due to (i) lack of relevant content (ii) poor connectivity in rural and peri-urban areas and (iii) dearth of meta-data standards capabilities.

Consider, for example, that in a state like Karnataka, over 70% of all primary students live in rural areas and attend rural schools that lack the resources their urban counterparts may enjoy. Moreover, local resources such as lending libraries, bookshops and the like will also be lacking. In this context, neither students nor teachers have access to the kinds of educational stimulus that might create more engaging classroom interactions. Digital libraries in India would afford greater access to resource material, outweigh operational costs of setting up conventional libraries, and create better opportunities for enriched classroom learning. Digital libraries in India also have the potential to cater to a variety of user communities as they can provide tools for teacher training and adult education as well. While the resource conceptualized by EDC might have a far more limited scope, and though its users might be limited to specialist practitioners, educationists or specific project partners, it is hoped that this resource might prove catalytic for other agencies with a more ambitious agenda for using digital libraries to transform the quality of primary and secondary school education in rural India.

2.0 Technical Issues

2.1 Meta-data Standards and Protocols

Metadata, or "data about data," is a critical element for searching information through a database especially, when the information available in an invisible space like the Internet, unlike a conventional library. Metadata are also types of descriptive information applied to a digital spatial file. The function of metadata is to standardize the structure and content of indexing or cataloging information. Conventional libraries practise Meta data standardizations in the form of non-automated taxonomical systems. Nevertheless, with the advent of digital libraries in western countries, efforts to create better information management systems and improve existing ones have resulted in multiple standrards. However, among the diverse standards that have been tested and tried and at present, there are a few universally recognized standards of classification that are being used around the world for digital resource management purposes.

A brief summary of existing worldwide meta-data standards is as follows. The International Standards Organization's (ISO) Metadata Working Group has a related standard, ISO 11179, Specification and Standardization of Data Elements. It may also be made available to private sectors, civil societies and citizens. The American National Standards Institute (ANSI) has established the NCITS L8 (formerly X3L8), the *National Committee on Information Technology Standards*. The committee covers naming, identification, definitions, classification, and registration of metadata. The World Wide Web Consortium (W3C), a major governing body of the Web has developed *de facto* standards including RDF (Resource Description Framework) and the Platform for Internet Content Selection (PICS) specifications. PICS was originally intended to aid adults in controlling children's access to the Internet. However, its standards are usually at a very general level over which meta-standards can be improvised. The National Spatial Data Infrastructure (NSDI) has developed an NSDI metadata standard for spatial data. A software utility has also been developed by ISRO that allows agencies to

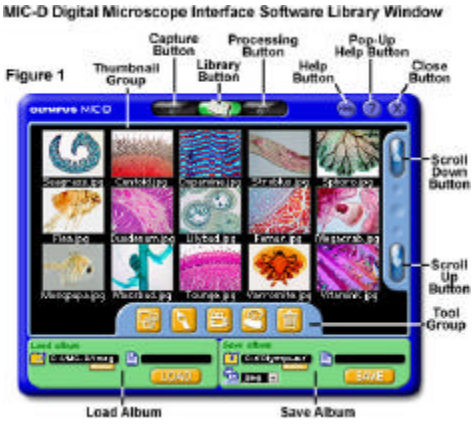
populate their own metadata in the NSDI Metadata Standard format and then link it with the overall metadata server. Maps and satellite images made available through this facility will be used for decisions at the local, regional, state and central level planning, implementation of action plans, infrastructure development, disaster management support, and business development.

While metadata standards are protocols *per se*, metadata systems are those that describe a set of metadata elements such as Title, Author, Rights, Date and so forth for a given digitizable material. For example, Dublin Core, MARC, DESIRE, SHOE, XML are metadata systems, of which Dublin Core is more widely adopted around the world. The Dublin Core Metadata Initiative (DCMI) began in 1995 with an invitational workshop in Dublin, Ohio that brought together librarians, digital library researchers, content providers, and text-markup experts to improve discovery standards for information resources. The original Dublin Core emerged as a small set of descriptors that quickly drew global interest from a wide variety of information providers in the arts, sciences, education, business, and government sectors. It also has official standing within the WWW Consortium and the Z39.50 standard. Dublin Core metadata is endorsed formally by governments in three countries for promoting discovery of government information in electronic form, and Dublin Core is under consideration as national information standard in at least five others.

At present, digital library initiatives in India make use of Dublin Core for web-based publications, Encoded Archival Description (EAD) for archiving and Visual Resources Association (VRA) for visual data. Consortia such as the INFLIBNET and INDEST are involved in developing Indian metadata standards and software applications as part of the Open Archives Initiative Protocol for Metadata Harvesting (OAI_PMH). This would be used to automatically extract metadata information from digital libraries and enhance interoperability between systems. This would also enable users to access all information repositories of participating institutions of the OAI. eprints@iisc, the eprint archive of Indian Institute of Science, is probably the first OAI compliant institutional repository initiative in India.

2.2 Software Issues

Figure 1



Greenstone is a digital library software used for building and distributing digital library collections, organizing information and publishing it on the Internet or on CD-ROM. Produced by the New Zealand Digital Library Project, it integrates functions such as metadata, full text search and retrieval, multilingual support, support for multiple document formats and administration. Greenstone is open-source software, issued under the terms of the GNU General Public License. The aim of the software is to empower users, particularly in universities, libraries, and other public service institutions, to build their own digital libraries. The Indian Labour Archives was one of the first Indian digital library initiatives to use Greenstone.

In India, at present, Information Library Network (INFLIBNET), a consortium incubated under the rubric of UGC, is actively involved in Library Automation, Database Creation, Software Development, Human Resources Development, Information Services and Networking. They have developed a software SOUL based on relational database management language, which is used for cataloguing, archiving as well as enabling online public access of resources. The Indian Institute of Science in Bangalore is closely involved with the INFLIBNET for developing and standardizing protocols of information management for digital library as well as information repository initiatives. The National Informatics Center (NIC) of India has also developed digital library software – DelSis – that is used by the Developing Library Network (DelNet), which is also an effort to network libraries and for resource sharing. DelNet aims to provide access to content in Indian Languages and in Urdu using this software.

2.3 Digital Rights Management

Given the vulnerability of materials accessible over the public access networks like the Internet, issues of IPR of material over the digital domain has become a serious concern. Digital Rights Management involves ways in which the digital library operators manage issues of IPR, those of ownership of material made available on the digital library, how one controls access to as well as dissemination of copyrighted material. Several methods of managing digital rights do exist nowadays from which one could choose to adopt the more convenient one for their purposes.

Examples include, (i) charging a fee for the use of material as part of a copyright fee if that is mandatory, (ii) act as a middleman for other libraries so as not to get involved in these issues and to let the source organization deal with its IPR. For example, the TIFR online catalog provides access to the ACM Digital Library, Springer-Verlag list of publications and IEEE subscriptions. The NIT Calicut Digital Library – Nalanda also acts as an intermediary in providing access to standard international publications and journals (iii) holding restricted access to resources using user authentification method for those paid/registered users. This can be enabled using magnetic swipe cards, biometric methods or simple online security software that pops a username/password dialog box (iv) withholding original material and sending photocopies to the addresses. Of course, this works only at a local level and also for only an automated library that provides access to its catalog online and allows requests for materials to be sent. (v) using logos, logotypes as watermarks to protect source ownership of the materials.

3.0 Content in India

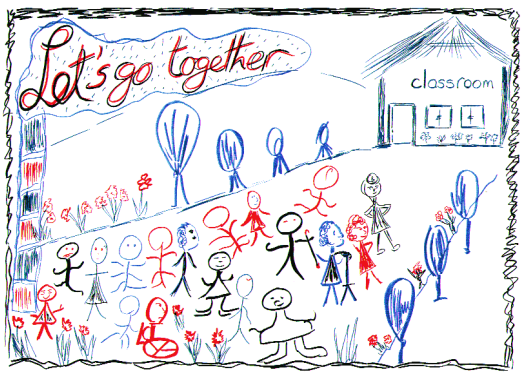
The first step towards creating a digital library is to digitize existing printed / media material into digital formats. For example, the CSCS Media Archive has digitized its archival collection on media-based articles such as newspaper clippings. Common procedures adopted in this process were scanning and storing the clippings as either image or document formats to be readable over the internet. Also, the archive is stored in offline formats such as CD-ROMs. This project was originally intended to be an income-generating model, however, issues of IPR over media-related information posed major constraints to make it available for free access. Also, meta-data standards adopted do not seem to reveal a sophisticated organization of data.

In contrast, eprints@iisc is a project that seeks to provide a user with a full complement of features ideal for advanced searching as well as web publishing. This initiative seeks to address bottlenecks from both the user-end as well as the provider-end. IISc seeks to provide a wider arena for research scholars to increase their publication skills as well as access more relevant content from other resources. Some of the other initiatives that will also contribute to this effort in the future include the Vidyanidhi Library of Theses and Dissertations and the Digital Library of India. Although the user groups that these initiatives primarily target are the research students community in India, it is still a worthwhile effort to look into their operational strategies to enhance institutional resources in an economic way.

Interactive educational, informational, and even leisure content is not readily available in many India's regional languages. Even if developmental funds are specially directed towards the creation of such content in the initial stages of this digital library project, these are likely to be consumed quickly, and there will be a drop off in the interest and value of the library, unless user groups continue to encounter novel content on each visit. This has been the experience of the Azim Premji Foundation's CLCs, for instance, where students soon mastered specially commissioned educational games in the local language, and began to prefer pirate-copies of violent and ribald computer games.

Special programming and training efforts can be directed towards enabling segments of the local community to create their own digital media. The JIVA foundation in Faridabad, for instance, ran a highly successful project, which taught local teenagers how to make their own digital-movies, from storyboarding and scripting to direction and post-production editing. The example of the Hole-in-the-Wall project reveals the extent to which unsupervised interaction among students around an interactive medium can induce learning, dialogue, and even basic computer literacy.

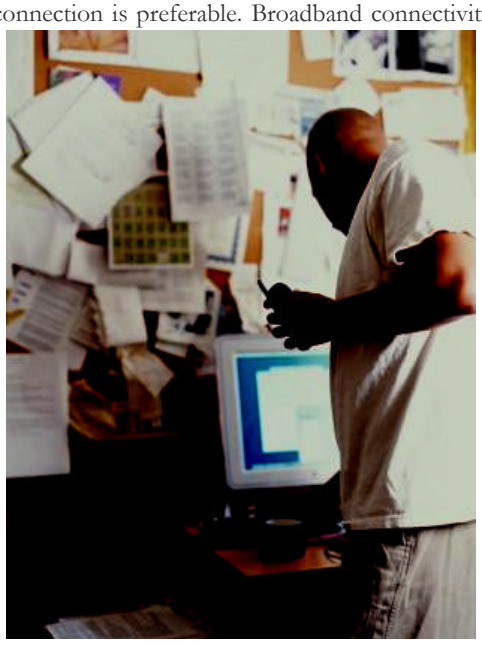
Of course, one effective solution to the problem of content can emerge from the communities using the digital resources themselves. A TV-tuner card costs under USD 35, and allows a computer to display satellite cable-TV programming. Graphic, visual, aural, and musical data can now be grabbed from the airwaves, sampled, mixed, recontextualized, and in other ways reassembled to create local reinterpretations of broadcast media. A local newspaper, for instance, can condense global and national news for local understandings. Student projects can be illustrated using digital images captured through a webcam. Teachers can use printers to create a wealth of visually-rich teaching aids. Digital libraries can be used to organize such content or to gain access to resources that can spur the creation of local content.



4.0 Multiple Access Possibilities

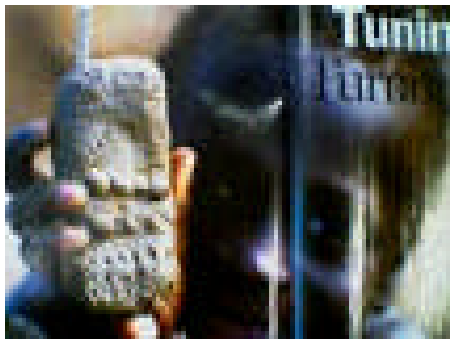
One of the greatest challenges in the establishment of a digital library network in a country like India is Internet connectivity. The lack of networked infrastructure and inappropriate pricing patterns can also prove significant hurdles for a fledgling ICT initiative. Several connectivity options now exist and it is helpful to understand their relative costs and benefits. Dial Up access, using regular telephone lines emerges as an immediate connectivity solution as existing network infrastructure can be tapped. Due to limited bandwidth and slower speeds, Dial Up is suitable only for basic emailing and browsing. Moreover, it ends up being exorbitantly expensive for longer durations of use.

The Indira Gandhi National Center of Arts digital library for example, primarily supports a variety of multimedia formats including audio and video files of archaeological or cultural significance. Interactivity to a very limited degree is also embedded. However, even for such minimal activity broadband connection is preferable. Broadband connectivity, including ISDN (integrated services digital network), an older technology, and DSL (Digital Subscriber Line), offers high speeds with high costs, but may not be available in most rural areas. While this low maintenance technology is appropriate for bandwidth hungry applications like multimedia, bulk data transfers or teleconferencing, it is usually only accessible to those living near the telephone company central offices. It often proves too expensive unless cable infrastructure already exists in the area of deployment.



Wireless-in-Local-Loop (WLL) systems afford subscribers wireless access through a base-station, which is then connected to a broadband backbone. The n-Logue customized version of this configuration called 'correct' WLL system provides both voice and data transmissions simultaneously. WiFi or 802.11 networks allow high speed wireless data or voice transfer within extremely local areas, usually under 300 meters. It is ideal for networking multiple classrooms as their locations do not change over time. VSATs (Very Small Aperture Terminals) connect up to diverse kinds of satellites using the C and Ku bands. Even though VSAT costs have reduced considerably over the last several years, operating costs are still higher for than that of other means of connectivity. VSATs are suitable for usage patterns characterized by bursts of traffic or applications. It is ideal for downloading media files, applications and freeware that children can find use for in their curriculum.

Initiatives such as the Center for Education and Documentation (CED) that maintain historical manuscripts and archives of media combine digital and offline modes of content delivery. CED provides access to a searchable database of catalogs and indexes. Users can register themselves as members for a subsidize fee and request selected material to be sent to them via post or email depending on what format the resources are available. Recently, CED has also started making its resources available in digital formats that can be emailed to users as this would aid in cutting cost for the users as well as increase geographic reach. Therefore, a digital library initiative in a country like India has the flexibility of making use of a combination of existing networks of communications and distribution including print, CD-ROM, postal, email, and online.



Mixed Media approaches to connectivity may employ radio and data-transfer using mobile phone networks in combination with some form of Internet access. Data transmission over cellular networks is a possibility for one-way broadcast and streaming of appropriate media content that can be relayed on a closed group network. They may be used for peer-to-peer communication to exchange information on a mesh network. Combining mobile phones with GPS technology and audio/camera functionalities may find a lot of use for interactive and project-based learning programs. Combined with desktop facilities of editing and processing and transferring insights to peers may also contribute towards creative learning experiences. In the future it could become much more sought-after, in terms of high bandwidth and low equipment and operating costs. The existing conditions in a deployment area, alongside the proposed content-and-service applications must be taken into consideration while choosing a mode of connectivity.

5.0 Insights on India from Related Digital Library Events

The following is a brief summary of ongoing efforts in the field of digital libraries in India, which came out of the conferences that CKS personnel participated in. Several papers and discussions were presented on a range of themes including digital library concepts, the digital divide, digital library policies, and a number of case studies of digital library initiatives.

Digital Library concepts sought to educate audiences on the basic features, aspects and workings of a digital library. Issues such as tools, techniques and standards that are or can be used for digitization were mentioned. A vast majority of projects seemed to build their searchable databases on Dublin Core, with a base of Z39.50 earlier identified in this report. The most popularly used software to build the digital libraries themselves was Greenstone Digital Library as this was open source and free to download. However, several implementers had some problems with specific elements of the software that it is not able to support certain multimedia formats of files. This software supports metadata standards such as XML and Dublin Core to name a few. Therefore, one can see a GSDL Software-Dublin Core combination in most of the initiatives. Indian software include SOUL developed by UGC-INFLIBNET consortium, LibSys and LIBSuite that follow GSDL.

The areas of greater challenge in building a digital library seemed to lie in the actual process of digitizing existing resource material on print as the cost factors involved were not sufficiently supported due to lack of dedicated funding for digital library efforts in academic institutions. Other technical concerns that were highlighted were those of access and storing. Interesting solutions to address technical issues of digitizing content include using digital cameras to capture print material as images as opposed to scanners. Providing broadband access was an impeding factor to make large files or audio-visual data or streaming data available over the digital libraries. One of the associated reasons for such impedance cited was also lack of trained professionals in maintaining the smooth technical running of the process. However, a majority of institutions have taken a step forward in automating their libraries and making Online Public Access Catalogue facilities available at their premises. Under the consortium efforts of INFLIBNET several state universities have received funding for digital library initiatives.

Some key applications identified for digital libraries included (i) archival preservation such as manuscripts, ancient literary works, cultural artifacts, community identities, (ii) legal documentation such as government documentation of plans and policies, history of legal cases, census and statistical data, spatial data and other relevant information that can

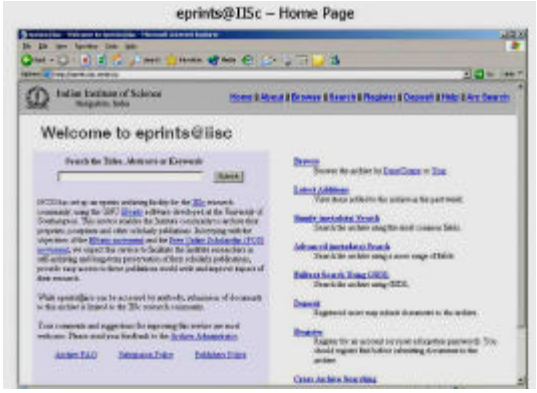
be brought into the public domain, and (iii) educational and research purposes such as scholarly publishing, theses, research work, hosting reference material. With particular reference educational and research applications a number of initiatives in India seem to focus on advanced research and scholarly publishing. One of the reasons for this concentration around research is the availability of a comparatively larger resource base in both universities as well as public libraries. The paucity of digital library resources for school education is due to lack of documentation of practices and limited use of extra-curricular content for school learning purposes. However, there is a great need for such resources in order to address goals of lifelong learning, which includes stronger foundation for education. A handful of initiatives work on e-learning in Tamil Nadu state in India. One of the other crucial issues was that of multilinguality, which is based on the argument that several resources for child audiences are available, but only predominantly in English. Suggested solutions to develop multilingual interfaces for digital libraries included the use of Unicode in programming the interface.

While many such initiatives are in progress, one of the biggest challenges cited was converging experiences and efforts towards common goals such as lifelong learning, facilities for citizens to participate in the society, community history and identity, training and employment, as well as business and economy. These were also indeed some important visions that came out from the President of India, Dr. A.P.J. Abdul Kalam's inaugural speech at the International Digital Library Conference. There were strong optimistic feelings about the potential of digital libraries in their ability to springboard India towards an information economy. It was suggested by a large participant community at the conferences that constituting national policies that would enable smoother and successful transition from traditional to digital libraries was the need of the hour. Policy intervention required in strategic issues of implementation included legal issues and bibliographic control, infrastructure, collection development and preservation, capacity building and funding, and partnerships and collaboration.

In spite of technical impediments, divergence in initiatives and managerial issues, at present India is witnessing an era of transformation that seeks to make digital content available for public access to the largest extent possible by 2010. The existing opinions seem to voice that there is no one single model of operation that alone can provide better results, but alternate models of digital libraries could be evolved or adapted to borrowing from other countries' experiences also. However, it was also felt that it is critical to have a national vision or plan that manifests itself as a sound policy that would direct all initiatives towards interoperability. This is especially crucial as the world of metadata standards or software applications is also constantly evolving and is subject to obsolescence. In this regard, the role of consortia and collaboration in the country is perceived to be very influential in terms of converging nation-wide efforts to build interoperable as well as cost-effective systems.

6.0 Directory of Digital Library Resources

6.1 E-Prints at IISc: www.ncsi.iisc.ernet.in



The National Center for Science Information in Bangalore hosts e-library facilities and provides fullfledged comprehensive set of e-publishing tools set up as part of the Open Archives Initiative Protocol for Metadata Harvesting. This is one of the very first initiatives to provide online publishing facilities for research scholars and academia. Metadata used include a combination of Dublin Core, EAD and VRA to support a variety of media formats of information to download and upload.

6.2 TIFR Digital Library Initiative: www.tifr.res.in/~library/

The TIFR online public access catalog provides access to several standard international publications and journals such as IEEE and Springer. This resource is also involved in the process of providing digital access to materials, e-books. It uses Dublin Core metadata for this purpose.

6.3 Center for Education and Documentation: www.ced.org

The Center for Education and Documentation hosts a variety of resources including books, journals and newspaper clippings on contemporary history and video documentaries on social change and development in its premises in Bangalore and Mumbai. CED has also come up with online reference facilities such as DocPost and DocEmail, where one could selectively request photocopies or softcopies of material to be sent via post or email with subsidized charges.

6.4 IGNCA Digital Library: www.ignca.nic.in/dgt_0001.htm

This digital library created in 1999 by the Indira Gandhi National Centre for the Arts (IGNCA) affords a varied documentation of resources such as digital images, audio and video recordings, animations, electronic books and so forth related Indian arts and culture. The main objective behind establishing this online tool is to encourage preservation of art and culture through digital documentation of works.

6.5 CSCS Media and Culture Archive: http://www.cscsban.org/html/media_archive.htm

This component of the CSCS Media Project assembles what could be the definitive media archive of post-Independence India. Material will include press clippings and reviews; pamphlets, reports and papers by government agencies, independent organisations, and individual work; visual images, advertising and publicity leaflets; market research reports; it will also facilitate video archiving through the Internet.

6.6 INFLIBNET: Information and Library Network Centre: www.inflibnet.ac.in

Developed by the UGC in collaboration with NISSAT, this digital library network is probably one of the more full-fledged steps towards digital libraries in India. Major Activities of this association include Library Automation, Database Creation, Software Development, Human Resources Development, Information Services and Networking. They have created a software SOUL that is based on a relational database management language, which is used for cataloguing, archiving as well as online public access of resources.
http://www.artistudio.narod.ru/india_in_nature/schools/page_01.htm

6.7 Digital South Asia Library: http://dsal.uchicago.edu

The Digital South Asia Library is a global collaborative effort to make important and rare resources available to the international community. DSAL includes resources from many disciplines as well as a variety of data types. The component parts of the project include maps, statistics, bibliographies, union lists, indexes, photographs, books and journals, as well as a reference collection that is strong in pedagogical tools for South Asian language learning.

7.0 Identifying Possible Stakeholders

This section identifies practitioners, experts and other relevant personal identified also based on feedback on earlier draft of report. For this purpose, CKS officers met with digital library practitioners at conferences to identify key people. The personnel are identified under various sectors in order to understand what advisory or other role they may play in the future.

7.1 Information Management System Experts

The following personnel are involved in digital library initiatives in India and also are part of national consortia that conduct workshops and discussions on the design of digital libraries and adopting meta-data standards and other relevant protocols.

7.1.1 Dr. Shalini Urs
Head, Department of Library and Information Science
University of Mysore,
Mysore, INDIA

Shalini Urs is a member of the Asian Digital Library Steering Committee. Dr Urs is involved with the Vidyanidhi digital library along with other such efforts and agencies in India. She is on the governing board of INFLIBNET. She has organized many a workshops and conferences in India

7.1.2 T. B. Rajashekar
Associate Chairman, National Centre for Science Information
Indian Institute of Science
Bangalore , INDIA

Dr. Rajashekar is currently involved with the eprints@iisc digital library project. His other activities include development and management of variety of network-based e-information services for the IISc research community.

7.1.3 T. A. V. Murthy
Director
Information & Library Network Centre (INFLIBNET)
Ahmedabad, INDIA

Some of his noticeable contributions are setting up KALANIDHI Reference Library and Manuscript Information System, Multimedia Digital Project at IGNCA and Digital Laboratory at CIEFL. He was an elected member of IFLA-from Asia on Art Libraries and served the same for 5 years.

7.2 IPR Experts

7.2.1 *Sunil Abraham*
Open Source Software Consultant
Mahiti Infotech
Bangalore, INDIA

Mr. Sunil Abraham is an expert at open source software platforms and is well-informed of IPR issues / digital rights management. Mahiti Infotech provides IT services for NGOs in India.

7.3 Relevant ICT Players

7.3.1 Shri N. V. Sathyanarayana
Software Applications Development
Chairman & Managing Director
Informatics India Limited
Bangalore, INDIA

Dr. Sathyanarayana is involved in informatics solutions for digital libraries in India, and would be a useful resource to identify some alternative software solutions to create a digilib.

7.4 Development Practitioners

7.4.1 Pradeep T.
Samuha
Bangalore, INDIA

Mr. Pradeep runs a very large network of NGOs - Samuha that seeks to integrate different ICT components into their devlopmental projects. Samuha is also involved in educational projects in North KArnataka. Mr. PRadeep may provide several field insights from a developmental perspective on the possible use of digital libraries.

7.4.2 Gitanjali Sah
Director
Habitat Learning Centers
India Habitat Centre
New Delhi

Ms. Gitanjali Sah is currently in charge of HLC, where computer assisted learning and IT training is provided via a large NGO network in New Delhi. She is keenly interested in enhancing learning environments through innovative uses of ICTs . THe India HAbitat Centre Library is a also an interesting example of an automated library of international standards.

8.0 Bibliography

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9.0 Select Online Resources

9.1 www.dot-edu.org
Website of the dot-EDU alliance, USAID

9.2 www.edc.org
Website of the Educational Development Center

9.3 www.kar.nic.in/publib/SCL.htm
Website of Karnataka State Public Libraries

9.4 www.nist.gov
National Institute of Standards and Technology.

9.5 www.sarai.net
Sarai is an India based online forum on media-related issues and practices

9.6 www.iitb.ernet.in; www.iitm.ac.in; www.iitd.ernet.in
E-Journal facilities at the Indian Institutes of Technology in Mumbai, Chennai and Delhi.

9.7 www.insdoc.org
INSDOC, Institution for Information System and Services runs a digital library under CSIR.

9.8 www.infolibrarian.com
Database of digital libraries and related sites across the world.

9.9 http://coombs.anu.edu.au/WWWVL-AsianStudies.html
Website of network of virtual libraries of the world

9.10 http://www.columbia.edu/cu/lweb/indiv/southasia/cuvl/
Columbia University's South Asia Resource Access on the Internet

9.11 www.caorc.org/CSAL
Website of the Center for South Asia Libraries

9.12 www.lcweb.loc.gov
Website of the Library of Congress

9.13 http://sunsite.berkeley.edu/
The Berkeley Digital Library SunSITE provides information / support to digital library developers worldwide.

9.14 www.sarn.ssrc.org
The South Asia Research Network promotes knowledge sharing in social sciences.

10.0 Appendix: Survey Questionnaires for Practitioners in Digital Libraries in India

The following survey questionnaires were prepared to identify future stakeholders as well as to assess field possibilities of creating digital libraries that could aid K-12 education initiatives of EDC in India.

SERIAL NO:
NAME:
DESIGNATION:
ORGANIZATION:
EMAIL:
VOICE:

10.1 For Digital Library Practitioners

1) Are you involved in the process of creating digital libraries?

2) What kinds of users does your digital library address?

3) Please describe what meta-data standards and technologies that you use for your digital library?

4) How can digital libraries be used to enhance India's existing institutional resources?

5) Can you imagine ways in which a digital library could be used to improve K-12 education for urban and rural non-elites?

6) Can your digital library be used through dial-up access? What are the pros and cons of hi-speed connectivity?

7) Which human/intellectual resources do you think we should be in touch with for future stakeholder meetings and other activities?

8) Which institutions of learning, research and training should we be in contact as we develop the program further?

10.2 For Development Experts

1) What kinds of educational content do you use for your grassroots development activities?

2) Would online access to such materials improve your initiatives? How? Who would access these materials and why? In what kinds of media formats should these resources be made available?

3) Do you feel that cataloguing and archiving educational and developmental resources in Indian languages is a worthwhile endeavor? What kinds of problems would be solved through such a resource?

4) What kind of access would you make these resources available through? Why?

5) Would you consider providing access to content in regional language also for the end user? Why?

6) Would this resource be used for activities such as teacher training and specialist training too?

7) Does your organization create content that could be catalogued through a digital library resource?

8) What kinds of media would you like to have access to within your organization?