CHAPTER – 5

e-RESOURCES MODELS

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CHAPTER – 5
e-RESOURCES MODELS

5.1 Columbia Study

The biggest survey of the use of online books took place at Columbia University between 1995 and 1999. This study concluded that where a user was reading a significant portion of a book then she/he was unwilling to read it on screen and instead printed or, more likely, read the printed version. Where the method of reading was skimming, rather than in-depth, then an online version was more likely to be acceptable. The actual use of e-books was concentrated on heavy use of small share of titles, similar to traditional library usage patterns. Students were by far the keenest users of e-books, with only a very small number of faculty members participating. Potential advantage for e-books were identified as; searching across a collection, browsing, obtaining a book quickly. Conclusions were that early e-books would need to look and behave like their printed equivalents.

5.2 Butterworth-Cranfield study

Butterwotth-Heinemann and Cranfielf University have been co-operative in a publisher/library/faculty joint project since April 2001 to assess the use of an online textbook in marketing studies students. Initial findings are that students far preferred the convenience and ease of use of the printed text. The cohort rejected the idea of interacting online with the text until technology is more mature, but valued the e-book as reference tool which could be searched and then printed as required.

5.2.1 Web-Based Digital Resources

In the last couple of years digital-born resources are published in Web that have no analog antecedent of any kin, whether paper, microfilm, or audiovisual.
While leading libraries have embarked on a variety of digitization efforts, less attention has been given to how to incorporate Internet and other born-digital material into library collections and service.¹

At the same time, continued printing of scientific articles on paper is becoming less effective, and not only because of the limitations of print in a multimedia world. Libraries are hamstrung, by ever tightening budgets, so the myriad journals can no longer be acquired. Space in limited for continued storage of printed materials. The result is that published papers will reach fewer readers, since access to the printed journals will become more difficult.

Publishing via the Internet, whether by electronic mail or making information available through gopher, ftp or world wide web has the advantage of being:

- Quick, as we can communicate or publish instantly;
- Widely accessible to a broad level of internet community.
- Inexpensive to produce web resources, as web mark tools are available freely in the net with desktop publishing technology;
- Easy and simple to produce in terms of effort, time and other factors;
- Total control in publishing process is as different from traditional publishing methods and editorial practices.

Many of the traditional publishing and distribution processes we have relied so far are losing its significance as electronic publishing activity is proliferating. Web publishing of scholarly and non-scholarly information is changing forever the way we organize and seek material.

The major challenge now is to identifying the relevant documents against a query or requirement perfectly and satisfactorily. The end-user expect of retrieve as piece of information as like that of print. It is just not as same as print
information retrieval. The location of information is thus an important issue to those publishing as well as information seekers.

The net information is evidently evolving as a major and significant medium of seeking information source. The perfect way of exploiting the net will be achieved through finding the relevant information. Indexes are the key to this process. The indexes have not yet solved the problem of how to find quality information. Many factors indicates that finding Internet information is at a very early stage of development.

While the basic Internet software is becoming more sophisticated can still be difficult to use. There are problems in accessing sites on the Internet, and to search well takes a great deal of time. Searching can be complex and requires the use of number of Internet indexes, as well as a degree of serendipity. Libraries can expect an increase role as intermediaries in the search for information from the Internet.

Many researchers are occupied undertaking research and policy work. There is a need for good researchers to build up skills in Internet researching. While many who have the Internet at their desktop will do their own searching, an Information Centre or specialist searcher can provide a cost effective result (especially in terms of searching time).

5.2.2 Abstracting and Indexing

Serials information that A & I services capture includes journal title, title abbreviation(s), publisher, ISSN, CODEN, volume and issue numbering, cover date, and page ranges for articles. However these are not available for e-journals. Which are important for identifying an article uniquely decide what bibliographic elements will describe each article and make it obvious in the publications.²
One has to decide on a numbering scheme that ensures a unique article description, both within the journal (e.g. article numbers and pagination) and universally. Keep elements and numbering consistent across the various formats of the publication (e.g. HTML and print).

Still there is no comprehensive A & I services exclusively for e-journals. The current A & I services index and describe print versions of journals and there is no consensus on how to index and describe. Even DC metadata is available it is not descriptive to apply for e-journals.

5.2.4 Cataloguing e-Journals

Libraries now must decide whether or not to catalogue electronic journals. Some libraries list e-journals on their web pages (portal pages) as an alternative to cataloguing them. However, this is cumbersome when dealing with large numbers of titles, and does not provide good subject access. Others do in different ways by not following the rule requirement of creating a separate cataloguing record for the electronic version, by linking to the e-journal from the records for the print journal. This is unsatisfactory when the electronic and print version differ substantially.

Some solutions are being tried. OCLC’s CORC (Cooperative Online Resource Cataloguing), project holds some potential for libraries to create cataloguing records for electronic resources more economically. Embedded metadata may also hold some promise. Some libraries have begun embedding metadata in HTML headers for their web pages so that software like CORC can use it to build catalog records automatically. Something similar might be possible if NSDP supplied descriptive metadata to publishers applying for ISSN’s, and publishers included this on the home pages of their e-journals.
Net Library

Net Library was one of the first aggregators of e-books, launching its first titles in 1998. The company was funded through venture capital and grew from 8 employees to 500 in a two-years period. However, it has attracted insufficient revenue to maintain this level, reducing its staff by 200 and selling of its e-book software arm, peanut press, in order to conclude on the library market. In April 2001 Net Library adopted the OEB standard, enabling it to reduce the resource dedicated to conversion processes and publishers will either have to pay for conversion themselves or deliver material to Net Library in OEB format.

E-Books are full-text electronic version of published books that library patrons can search, borrow, read, and return via the Internet. With net Library e-Books, users can access library resources any where, any time, and perform full-text searches across hundreds of books or within a specific book to speed research and reference project. These books can be viewed online from a library, office, home or remote location using an internet browser. Added benefits include an embedded dictionary in each book with accompanying visual and verbal pronunciation, as well as hyperlinks from the table of contents and index. E-Books are available for varying checkout periods and are automatically checked back into the library collection when the checkout period expires.

5.3 Ebrary

Ebrary is the next major e-book producer. Ebrary uses Adobe’s PDF format to present documents in their original layout, minimizing the need for investment in expensive conversion processes. At round only 3,000 items in its current collection, Ebrary has taken a much more cautious approach to building its online library.

Ebrary has recently announced that it is expanding distribution through vertical collections available through a variety of Internet portals, e-learning
providers and other Web sites. I has been able to build on its partnership with the four publishers, for example, distributing content via Person’s Learning Network site in the U.S.

Ebrary wants to recreate the browsing experience of being in a library or bookstore, its model based on ‘read, then pay’, rather than ‘pay, then read’. Ebrary claims that this model will allow publishers to recoup some of the revenue lost to the photocopying industry. Copy costs are determined by the publisher and Ebrary offers deposit accounts from which small purchases are deducted by use of an Ebrary debit card.

The trend in the last ten years or so is the migration from print to electronic, particularly the web based journals. Currently the entire journal population is available in web form. The expectation now is that the demise of print journals. In the last ten years many newsletters have also switched from the print to web publication. This would result ultimately to all publications. Thus, the journal is of no exception.

With the advent of modern technologies there is an increase in the growth of electronic resources. The academic libraries have spurred their interest in this field due to delay experienced in communicating research results, slowness in the flow of print media, increased overhead costs stagnated budgets. Hence, they are options for e-journals UGC has also initiated an ambitious project, UGC-Infonet. “This seeks to provide high speed Internet connection, electronic access to professional literature and the development of multimedia content to supplement conventional learning and teaching.”

Electronic journals are more cost effective on a per use basis. Storage space for low use bound journals is a major expense. Many readership surveys conducted in the recent past show that the library’s electronic collection is widely accepted and extensively used.
The goal of e-Journals is to provide desktop access freely available electronic version of journals. To this end a web accessible directory developed containing database of journals. For using, the users are required to visit the site and access the full text of articles.

5.3.1 CD-ROM Technology

The CD-ROM technology has achieved popularity in 1980s. Many databases were available in 1980s that was a switch from the expensive online databases. CD-ROM technology has increased its popularity in 1990s to a large extent and the growth was exponential. However due to the web publishing the CD-ROM technology has been loosing its charm.

The Compact Discs (CD) include the basic text recording to real time molecular modeling, simulations, videos of laboratory experiments, and all sort of aids like trial exams with extensive feedback, problem sets with worked outs answers, alternative readings, link to relevant web sites, interactive calculations, built in calculations, java appeals to allow matching of items on an image with vocabulary, real time experiments using java, even interactive remote operation of instruments. In some database product most of the content is produced in CD, in other cases most is on the publishers web site. These web sites can be updated easily and new material added as often as one wants.

The usage of CDs now in India has gained much popularity due to easy availability of CD-ROM titles and also due to depreciates cost of CD players. This technology also extends an off-line alternative for search. Now, several leading companies in the entire world have started to launch their products through electronic book form. Two US based companies such as M/s Nuvo Media and M/s Soft Book Press have developed Rocket e-Book and Soft Book respectively which are small, portable computer designed solely for reading and annoying the
electronic text of books. These texts would be downloaded from the Internet and the prices are expected to be below of paper books.

China happens to be the first Third World country to introduce CD-ROM in 1987 according to 1990 edition of CD-ROM in Print and it started disseminating services in the field of Scientific and Technical Information Institute of Oceanography. Now, CD-ROM is available in various forms such as audio, bibliographic, full text, graphics, images manuals, multimedia, statistics, video, books-in-print, references etc.

A detailed account of the databases in CD-ROM published by different countries has been enumerated as below:

Table-47: CD-ROM Databases by Publishing Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Databases Number</th>
<th>Share %</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States of America</td>
<td>4766</td>
<td>49.103</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>1534</td>
<td>15.084</td>
</tr>
<tr>
<td>Germany</td>
<td>1170</td>
<td>12.054</td>
</tr>
<tr>
<td>Canada</td>
<td>649</td>
<td>6.686</td>
</tr>
<tr>
<td>France</td>
<td>333</td>
<td>3.430</td>
</tr>
<tr>
<td>Italy</td>
<td>2993</td>
<td>3.018</td>
</tr>
<tr>
<td>Japan</td>
<td>224</td>
<td>2.307</td>
</tr>
<tr>
<td>Netherlands</td>
<td>172</td>
<td>1.772</td>
</tr>
<tr>
<td>Spain</td>
<td>113</td>
<td>1.164</td>
</tr>
<tr>
<td>Australia</td>
<td>95</td>
<td>0.978</td>
</tr>
<tr>
<td>Belgium</td>
<td>87</td>
<td>0.896</td>
</tr>
<tr>
<td>Mexico</td>
<td>82</td>
<td>0.844</td>
</tr>
<tr>
<td>Austria</td>
<td>47</td>
<td>0.484</td>
</tr>
</tbody>
</table>
The study reveals that the maximum database being published by USA (4766 nos.) out of a total 9706 numbers of database shares 49.103 percent followed by UK (1534 nos.) with 15.804 percent in the second position and Germany occupies the third position by sharing 12.054 percent for 1170 databases. However, Austria and Switzerland produce the equal number of databases i.e., 47. Each by forming 0.484 percent each country. Sweden shares the lowest 0.288 percent in the rank for databases.

5.3.2 Archiving to CD

CD offers an excellent means of relatively short-term archival storage that is for the period of few years. Compared to physical or even microfilm achieves, documents may need to be stored for 100 years. A few products claim that they have the CD media that is projected to have a 100 year shelf life, but no one expects CD media to last that long. Even if one can assure the CD is perfectly fine, it may be difficult to maintain the drives themselves for such periods. Therefore, if we embrace the rate of change, we see the digitization of the information as the ultimate achieve technique. Digital documents can be easily migrated to each new generation of storage media as they are developed and attain widespread acceptance.

Birth of ISO 9660

For CD storage, basically the “The High Sierra” standard was accepted by the majority of CD-ROM manufacturers at the time. Later on, it was adopted by
the International Standards Organization (ISO) with minor changes. They have assigned it the cryptic name ISO 9660.

**CD Speeds**

In the ISO 9660 standard, upon which the original music CDs were designed, the data-transfer rate was 150 KB per second, and this became the basis for “IX”. By this measure, a 4X drive has a speed of 600 KB per second, an 8X drive has a speed of 1.2MB per second (1 MB per second is 10 times faster than 1KB per second) and so on. Now we have 52X speed and currently the DVD technology tends to influence the user base.

The retrieval software for accessing information in the CD is usually included on the CD. The ISO 9660 complaint CDs can run on many platforms, from DOS too UNIX, makes CD an ideal medium for storing digital content. The Adobe Acrobat search engine is an example, which can be used to publish a CD-ROM. A content manager can use Acrobat Catalog to index the collection, to create a database of documents that will be fully searchable on the CD-ROM.

Information storage on CD-ROM is very timely and very cost-effective compared to all media when a large volume of information must be conveyed. Documents with Acrobat Web links and other hyperlinks can be distributed on CD-ROM and have access to dynamic updates via the World Wide Web.

### 5.3.4 E-mail

E-mail is shorthand term, meaning Electronic Mail. E-mail much the same as a letter, only that it is exchanged in a different way. Computers use the TCP/IP protocol suite to send e-mail messages in the form of packets. The first thing we need to send and receive e-mails is an e-mail address. When we create an account with an Internet Service Provider we are usually given an email address to send
from and receive e-mails. If this isn’t the case we can create an email address / account at web sites such as yahoo, hotmail and lycos.

E-mail client programs are software applications that reside and run on the hard disk of a home computer/network (for information on Client programs). Because they are client programs and e-mail client programs uses resources from a client server to be able to receive and send new messages. Below are some of the most popular e-mail client programs.

- Eudora
- Outlook Express
- Netscape Messenger
- E-mail Spam

This becoming a major problem for the Internet users with many governments trying to create new law to prosecute people who send e-mail spam. E-mail spam is email messages that are unsolicited and usually automated. E-mail spam messages are usually trying to sell commercial products or are a “scam” of some sort. Luckily companies like Yahoo and Hotmail who provide free e-mail messages are now providing users with spam filters that stop unsolicited automated e-mail messages.

The e-mail communication took a new turn in the sense that this medium is not merely an improved communication system, but used as a major way of developing elite scholarly knowledge transfer. Through the extended e-mail systems that are server controller group communication, it becomes possible to deliver a piece of mail to unlimited number of email users. These e-mail discussion forums and list servers play crucial role in knowledge transfer.

5.4 List Servers

The internet has given many benefits to the information users; one such bonus is the discussion lists also referred to as mailing lists. Thousands of these
electronic forums already exist or are being created, catering to a large of special interest groups, information services, electronic journals and research projects. The attraction is that the lists provide a relatively simple route to interactive communication via electronic mail, allowing Internet users around the world access to each others’ ideas, publications, and information. Where a single document (e.g. a letter, message, or report) could be sent to many different addresses at one time. Mailing lists made it possible for an individual or organization to sponsor and maintain special interest discussion groups through electronic mail. People wanting to join a discussion group would send a message to the sponsor, who would then add the individual’s address to the group’s mailing list. Similarly, when users wanted to contribute an article or posting to the list, they would send their contributions to the sponsor. The sponsor would then forward the postings to the other members of the mailing list.

Early users of electronic mail in the ARPANET (the first nationwide computer network widely available to the scientific community, noted the convenience of being able to send items to many others on a distribution list. Standardized lists became established to distribute messages to people interested in a wide variety of topics. These lists evolved into the next generation of community system, the electronic bulletin board. An illustrative current-day bulletin board system is Netnews, which distributes messages over Usenet. Usenet is not a centrally planned and maintained network, but a loose collection of computers running the unit TM operating system connected by a wide variety of physical transmission lines from high speed lines to ordinary telephone lines. It operates today with more than 250,000 users on more than 10,000 machines spread throughout the world. Netnews contains more than 650 boards across a wide variety of topics, ranging from comments about existing computers to technical science to popular culture to job positions to movie reviews to cooking recipes. The software functionality has evolved to support streamlined posting to
the appropriate boards, comments on previous messages, reading of selected boards, and saving of selected messages.

The list servers available are now in hundreds and thousands and no one can able to list all as we have too many even in narrow fields of knowledge. It is obvious that electronic technologies have already had considerable impact. Virtually all libraries, at least in the most developed countries, are new members of networks that greatly facilitated the location of success of information and gaining of access to them. Card catalogues have largely been replaced by online catalogue and these are being expanded through the addition of materials not previously included. The whole idea of what a catalogue should be, is changing; it is no longer seen as a tool bounded by the collection of a single library but one reveals the availability of resources in a network of libraries or even one that is essentially a gateway to a universe of information resources in printed, electronic or other forms. Use of terminals or work stations to access databases of various kinds is now routine for the libraries and add electronic resources to their collection in CD-ROM or other forms. Use of terminals or work stations to access databases of various kinds is now routine for the libraries and add electronic resources to their collection in CD-ROM or other forms.

5.5 **Electronic Performance Support Systems (EPSS) Model**

Electronic Performance Support Systems are making inroads into office and manufacturing environments – hot on the heels of the computer revolution. The performance support approach is rapidly spreading throughout the professional training community as an alternative approach to training, and is offering a new set of interface design principles for professionals in the human computer interface design community.

According to Gloria Gery, an Electronic Performance Support Systems is “An integrated electronic environment that is available to and easily accessible by
each employee and is structured to provide immediate, individualized online access to the full range of information, software, guidance, advice and assistance, data, images, tools, and assessment and monitoring systems to permit job performance with minimal support and intervention by others”.

An EPSS is the electronic infrastructure that captures, stores and distributes individual and corporate knowledge assets throughout an organization to enable individuals to achieve required levels of performance in the fastest possible time and with a minimum of support from other people.

EPSS (Electronic Performance Support Systems) are systems that provide employees with the information, advice and learning experiences they need to get up to speed as quickly as possible and with the minimum of support from other people. An EPSS also provides the electronic infrastructure that captures, stores and distributes knowledge throughout an organization to enable it to learn faster than its competitors. Also we can call EPSS as an electronic system that directly supports a staff’s performance when, how, and where the support is needed.

By combining all the definitions we can say an EPSS:

- Encompasses all the software needed to support the work of individuals. Integrates knowledge assets into the interface of the software tools, rather than separating them as add-on components.
- Looks at the complete cycle including the capture process as well as the distribution process.
- Includes all the management of non-electric as well as electronic assets.
- Has the ability to work with the existing Knowledge Based Systems (KBS)

Electronic Performance Support Systems are used for:
- Task structuring support: help with how to do a task (procedures and processes), Access to knowledge bases (help user to find information needed).
- Alternate forms of knowledge representation (multiple representations of knowledge, e.g., video, audio, text, image, data)

### 5.5.1 Features of EPSS

An electronic performance support system (EPSS) displays some or all of the following characteristics.

- **Computer-based:** EPSS are computer-based, which is what the “electronic” in their name indicates.
- **Access during task:** EPSS provide access to the discrete, specific information needed to perform a task at the time the task is to be performed. This is a two-part characteristics:
  - Access to the specific information needed to perform a task, and
  - Access to the information at the time the task is to be performed.
- **Used on the job:** An EPSS provides information to people at their workstation on the job, or in simulations or other practice of the job.
- **Controlled by the staff:** The staff decides when and what information is needed. There is no need for a teacher, as the staff is guided by the needs of the task. Reduce the need for prior training: The easy availability of the information needed to perform a task reduces the need for much (but probably not all) prior training in order to accomplish the task.

### 5.5.2 Easily updated:

The very nature of an EPSS, that it provides the information needed to perform a task, requires that it be easily updatable, in order to keep the information
that it provides current. The computerized nature of an EPSS makes updating faster and easier in some ways than in other media, such as print, video, or audio.

5.5.3. **Fast access to information:**

The user must be able to access the needed information quickly when it is needed on the job and avoidance of irrelevant information.

5.5.4. **Remote delivery of training:**

Removes /reduces the costs associated with attending courses including instructor costs, accommodation and fooding costs.

5.5.5. **Allow for different levels of knowledge in users:**

In order to speed up information access and understanding, an EPSS can provide minimal information for those who do not want details; yet, through the hypertext links in the databases and through optional tutorials provide detail for those who do want more.

5.5.6. **Allow for different learning styles:**

Through multimedia, an EPSS can accommodate users with varied learning styles, thus providing more optimal learning. The same information can be presented in visual, textual, and audio formats with the user selecting the format.

5.5.7. **Integrate information, advice, and learning experiences:**

An EPSS can integrate information, advice, and learning experiences for the user. An EPSS is not an absolute system that contains all these characteristics. Rather, different systems will fall on a continuum of these characteristics. An EPSS displaying all these characteristics would be the ideal. Since performance support systems are still young, it is more likely that many will display only the key characteristics.
5.5.8 EPSS in Indian University Libraries:

There are a number of good reasons why a performance support approach is becoming increasingly attractive. To name a few:

- The Indian work force is suffering from information overload. Indeed, the total volume of business information, said to be doubling every two to three years, is growing exponentially.
- The traditional training approach is not working for many university libraries. A growing body of educational research concludes that learning is far more effective when it takes place in context of work. And many organizations report that only 10 to 15 percent of what employees know was learned in formal training.
- A variety of social and economic reasons have forced libraries to analyze their current and future performance requirements so that they may remain competitive.
- Without performance support, corporate knowledge is situated in the heads of its staff, and should they leave or be transferred, the knowledge leaves with them. With an EPSS, the know-how resides in the computer and is available to any of its users.
- The cost advantages of EPSSs include “increased productivity, reduced lost opportunity costs, reduced support costs; and reduced training event costs”.
- Strategically EPSS could lead to “improved quality, increased retention of corporate knowledge, and improved responsiveness to changes”.

5.5.9 Implementation of EPSS:

As told earlier, EPSS can especially be used for improving the performance of libraries. This can be done by improving the performance of the staff. For doing this some serious steps has to be taken. First step could be to know the strength
and weakness of each staff of the libraries in terms of their qualification and expertise. Keeping this in mind, work can be assigned to them to get the maximum output, which in turn can improve the performance of the library.6

A manual should be prepared about the work being done by library staff and what are all the approaches they are adapting at present. Generally in classification, cataloguing, and shelf arrangement, they are interpreting the standards in their own way and also they may be using their own developed rules or they may be having some other local practices. These all should be recorded so that if any new staff joins, they may come to know about that easily and can continue with that.

**Potential Roadblocks**

There are some potential roadblocks in implementing this EPSS in Libraries. They are:

- Coordination among the staff of different sections inside the libraries.
- Lack of integrated system approach.
- Lack of Extensive cross-disciplinary training and re-training. ü An additional perceived roadblock is that much of the technical infrastructure available to implement EPSS is complex and still emerging.

**Identifying Opportunities**

How do you identify opportunities in your organization for electronic performance support? Here are three things look for, each of which presents a major opportunity for EPSS:

- **Performance Problem**: Is there a performance problem in library? Is there a gap between the best and worst job performers? Are training courses and documentation not improving performance enough? Are
users suffering from information overload? Are employee turnover or fast changing job requirements resulting in inadequate performance levels? A “yes” to any of these would indicate an opportunity for EPSS to help improve performance.

- **Computer based training project:** Are you building computer-based training (CBT) or multimedia-based training? If yes, have you considered the benefits of integrating the CBT into a performance support framework? Doing so gives a double benefit: You can use the training modules you build both as a learning tool and as a reference tool. On-line documentation /CD-ROM: Are you putting documentation on-line (e.g., on the Web) or planning to distribute it on CD-ROM? If you are, consider restructuring the documentation in the form of a performance support system. Reading documentation on-line is 30 percent slower than on paper, so if you don’t tailor it to electronic media you risk making the performance problem worse, not better. Using hypertext, intelligent technologies, and visual programming language, you can turn your documentation into a much more powerful performance support system.

**Content Features**

Some of the content features of EPSS include:

- User procedures-step-by-step instructions on performing system transactions.
- Demonstrations on how to conduct selected transactions.
- Process maps, flow charts and process overviews.
- Glossaries and key word search functions.
- Checklists, frequently asked questions, exercises and job refreshers in text or graphic format.
- Computer-based training (CBP)
Components of EPSS

Most EPSS consists of four components: (a) an advisory components, (b) an information components, (c) a training component, and (d) the user interface component. There are no published detailed systematic design guidelines for developing an EPSS. While help for designing the overall structure of an EPSS is limited, there is more specific help for the individual components of the EPSS. This is because EPSS utilize many technologies that are usually used to build standalone, single purpose tools.

Information Component

The information component can use any combination of databases, hypertext, and on-line help systems.

*Database*: Database systems are computer systems designed for the relatively permanent storage and retrieval of data. Database systems usually provide methods for adding, deleting, and changing the data in the database. Database systems usually provide methods for querying the database to gather subsets of the data. Hypertext: Hypertext is a non-linear way to go through information. With hypertext you go through the information topic by topic, only viewing the information that is relevant to your purpose.

*On-line help systems*: Online help systems should be part of every software application.

Five types of questions that should be answered by an online help system: (a) goal oriented, (b) descriptive, (c) procedural, (d) interpretive, and (e) navigational
Training Component

There are important differences between the way instructions should be built for traditional CBT lessons and the way instruction should be built for use in EPSS. Traditional CBT lessons: Instructional designs frequently use task analysis to determine the sections required to meet an instructional goal of the CBT lesson and the desired sequencing of the sections in the CBT lesson.

Trends of Technologies

Several technology trends are making the shift toward performance support easier to implement. Here are some of the keys enabling technologies:

Hypertext: This technology provides for the electronic linking of information that provides a flexible approach to disseminating large volumes of cross-reference material—often called an “information base” in EPSS terminology. It is particularly useful when combined with such text retrieval technologies as “key-word” searches (i.e., the author links important words that the staff may want to use to retrieve some small chunk of knowledge), or full-text searches (i.e., the EPSS searches every word in its information base to match a word typed by the staff).

The Internet: The Internet as a whole and the World Wide Web in particular are opening up new EPSS opportunities, especially for distribution organizations made up of field service technicians and company sales forces.

CD-ROM: Another way of distributing an EPSS, CD-ROM can be used either as an alternative to, or in conjunction with, the World Wide Web. CD-ROM becomes a desirable option when staffs don’t have access to an
Internet connection or when the information base contains a large amount of graphics, sound, or video. Portable Devices: A steady drop in prices is making portable devices increasingly affordable. These include laptop and notepad computers as well as hand-held devices like the Apple Newton.

**Intelligent Technologies:** An essential attribute of an EPSS is to augment the human problem-solving process by automating some of the more routine reasoning processes. Here are some technologies being used in performance support applications:

**Visual Programming Languages:** Visual programming languages have made considerable strides over the past few years. These languages let you build an EPSS using an approach called “rapid prototyping” in which you iteratively develop the EPSS to meet staff’s needs.

**Object-oriented Languages:** Object-oriented program languages let you build software that behaves more intelligently.

**Rule-based knowledge systems:** This technology lets you present knowledge as a series of “if then, rules, which the computer will use to help recommend decisions or make selections. This technology, also known as an “expert system”, has been heavily refined over the past two decades, and there are established methodologies or building these rule bases.

**Case-based reasoning:** This approach involves creating a database of case studies or examples of problems and their associated solutions. It also provides tools to search the database to match a current problem with a previous example. In this way, past history and the accumulated expertise of others in an organization can be preserved and retrieved to help solve new problems as they arise.

**Neural networks:** This technology helps you analyze patterns in data, and use these patterns to predict future behavior.
**Model-based systems**: These tools let you build a model of a physical system, and then use the model to simulate various scenarios and diagnose problems.

**Emerging Methodology**: A recent trend is the establishment of cross-functional groups within companies to develop performance support systems. Accompanying this move is a merging of professional disciplines. Among the new titles appearing on business cards are “performance support specialist”, “performance support developer” and “performance support manager” – terms that the replacing “instructional designer” or “training manager”.

**Hybrid Methodology**: Because the scope of performance support is broad, the methodology for its development is broader than for many existing disciplines. Performance support engineering is in fact a hybrid approach that includes elements of information and systems engineering, computer / human interaction and interface design, business process reengineering, instructional systems development, computer based training, human performance technology, organizational design, knowledge engineering, and technical writing.

**Advantages and Limitations of Electronic Performance Support Systems**

**Advantages**

- EPSS use a wide range of technologies in their components.
- EPSS incorporate job aids and therefore have the same advantages as job aids.
- EPSS also incorporate CBT lessons. The CBT lessons provide the mechanism for the employees to gain an understanding of the content of the job aids.
- EPSS provides the user a seamless interface to move between the CBT lessons and the job aids.
- EPSS reduce the cognitive overhead of manipulating more than one system.

Limitations

As happens with most new technologies, some people will promote EPSS as the answer to all problems. Like most technologies, PSS has its limitations.

1. Learning should take place on the job in small increments.
2. Skills will be lost.
3. It is hard to justify the cost to develop traditional CBT. How are people going to justify the cost of developing the much more complicated EPSS.

5.6 UNESCO ETD Model

Electronic Theses and Dissertations (ETDs) in Indian Universities

Electronic Theses and Dissertations (ETD) can take a variety of forms, from a Word or PDF version of a printed theses, to a truly digital publication that includes audio and visual material and may be organized quite differently from a printed thesis. The broader benefits of ETDs have been described as follows:

- Broader exposure of university research;
- New forms of creative scholarship through interactive elements, multimedia, hyperlinks, etc.;
- Ability to hyperlink to the thesis/dissertation on homepages and electronic CVs;
- Professional development for researchers who learn the basic skills of scholarly publishing in an electronic format;
- Conservation of paper, library storage space, and staff time;
- Faster access, with publication near the point of submission rather than three to four months later;
- Theses or dissertations accessible to any reader at any time.

**Digital Libraries of Electronic Thesis and Dissertations**

The digital libraries of electronic theses and dissertations (ETDs) are promising to be extremely advantageous to scholars especially in developing countries. The ETD initiatives started in India during late nineties and popularity of this concept is growing rapidly in the higher educational and research institutions to disseminate newly emerged knowledge and expertise. Presently ETDs submitted in Indian universities in mainly in text format, and many libraries have no open access policy. Perhaps the greatest challenge for librarians today, is to develop and maintain sustainable model of open access ETD repositories for users.

There has been a realization of the usefulness of the availability of online theses by higher institutions particularly, the elite science and technology institutions. During the last few years more and more research and development institutions and universities are beginning to embrace the idea of creating and maintaining a repository of electronic theses and dissertations. One of the major barriers facing by scholars and researchers in India is lack of access to current literature in their field.\(^8\)

ETDs consist of masters or doctoral research work that is submitted or archived electronically by an institution, either on an internal network or on the web. According to UNESCO ETD Guide website “An ETD is a document that explains the research or scholarship of a researcher/student. It is expressed in a form simultaneously suitable for machine archives and worldwide retrieval. The ETD is similar to its paper predecessor. It has figures, tables, footnotes, and references. It has a title page with the author’s name, the official name of the university, the degree sought, and the names of the committee members.”
It documents the author’s years of academic commitment. It describes why the work was done, how the research relates to previous work as recorded in the literature, the research methods used, the results, and the interpretation and discussion of the results, and a summary with conclusions”. (http://etdguide.org/). The experts are of the opinion that ETDs can accelerate the scientific research level of the country, increase visibility and improve communication among researchers.

Universities in India oblige researchers to submit the print version of the theses to library, additionally few universities/research institutions require the same version on a CD-ROM or submission online. In spite of number of sporadic efforts there is no single authentic source available where one can locate accurate statistics about the theses produced in India. Researchers often have difficulties in locating the relevant dissertations done by previous students as there is no uniform user interface to conduct a formal search for theses and dissertations. The following sources/databases include information on accepted theses in India:

- **University News** – a weekly publication by Association of Indian Universities, New Delhi gives comprehensive list of theses accepted by universities under various subject headings. Library web page or OPAC of individual institution.

- **DELNET** (Developing Library Network) database has 44,304 records of theses and dissertations submitted to various Indian universities on different subjects. INFLIBENT (Information and Library Network) union database covers the bibliographic metadata of doctoral theses submitted to more than 130 universities/institutes in India. It has over 150,000 records from all subject areas.

- “Vidyanidhi” at University of Mysore, hosts bibliographic as well as full text records of theses deposited by member universities.
ETD initiatives are important because financial barriers prevent researchers in developing countries from accessing the research information they need. University Grant Commission (UGC), an apex body of Government of India is planning to put in place a regulatory policy and an implementation mechanism for maintaining standards, archiving, and accessing of doctoral research from the Indian universities. The setting up of National Knowledge Commission on 13th June 2005 by Planning Commission and its formal launching by Prime Minister of India on 2nd August, 2005 on matters relating to institutions of knowledge production, knowledge use and knowledge dissemination is an inevitable initiative in the current context of knowledge economy.

The commission has recommended institutional repositories of research articles, reports, institutional publications and ETDs. One of the easiest and most effective ways to promote open access to research and educational content involves support of ETDs. There are nearly three hundred universities and more than hundred research institutions and deemed universities who can grant doctor or master degrees, so there are increasing number of theses and dissertations every year but most of them are not published and relatively inaccessible. U.P State Universities have theses and dissertations, and smaller institutions have P.G. theses and other major projects. But this literature is not easily accessible because of not applying ETD.

**INFLIBNET’s National online union catalogue of Doctoral theses**

Murthy mentioned “as per UGC-INFLIBNET Program, 142 Universities are funded for creation of databases of doctoral theses....” A memorandum of understanding (MOU) is signed between universities and INFLIBNET in this regard. It is further reported that more than 200 universities / institutions from all over India have contributed data / records in electronic format (ISO).
The metadata of Indian PhD theses are available since 1905 and more than 1,50,000 records of doctoral dissertations can be accessed as a single collection. The portal provides users with a simple and intuitive interface for searching and browsing through a merged metadata collection of theses. This online database has the provision to search from the following access points as Title, Researcher, Guide(s), Department, University, Place, Year, subject(s), and Boolean Search etc. It has been proposed that UGC Infonet will have a data centre with large server capacity and e-theses can be maintained in this server.

5.6.1 ETD initiatives at Central Library, IIT Mumbai

The ETD digital library project was initiated at central library, IIT Bombay in 1999. It has bibliographic records as well as full text; online submission is mandatory. Statistics of ETDs submitted by IIT Mumbai students from 2001 to early 2006 is furnished below:

IIT Delhi provides web-based access to bib. Database of Ph.D. theses

The bibliographical list is available since 1966 till 2006 includes nearly 2000 records of Ph.D. theses. The institutional repository eprints@IIT Delhi is registered as e-theses repository in ROAR. The Dspace e-theses repository is accessible within the campus and thirty items are available in the repository; 21 theses are from computer science and four theses are from Chemistry. The central library offers mediated submission service to ease the load of academic community.

5.6.2 Developing a National ETD Repository

The vast bulk of research work (theses and dissertations) produced by Indian universities or other tertiary level institutions remains as grey literature or accumulates dust on the shelves of libraries and is thus effectively lost. One of the major limitations of INFLIBNET database is incomplete coverage and non
availability of full text or even abstract. Vidyanidhi’s coverage is far from being comprehensive therefore not successful in achieving the status of a national e-theses repository. We need to rethink and develop a model which will involve all the stakeholder and work in collaboration.

Developing a comprehensive web site (an e-portal of theses and dissertations) is required to facilitate a national ETD project. A unified repository is likely to be better indexed and generally ranked higher by search engines than many separate repositories. The local ETD repositories generally not visited by internet robots. Since the primary purpose of ETD repositories is accessibility, a central reservoir with unifying access is the need of the hour.

5.7 Proposed Model: Efforts of U.G.C.

It is evident that in a vast country like India, successful management of the ETD archives and distribution requires participation of all stakeholders. It looks impossible for a single agency to develop and maintain a national repository, as there is large number of Ph.D. granting institutions spreading across the country with variety in institutional spreading across the country with variety in institutional settings. A cost effective model is necessary in order to sustain the service and infrastructure, and fund the digitization of theses currently available only in hardcopy at the participating institution. It is envisaged that in order to maintain a viable service, the national ETD repository would have the following architecture:

- Four zonal data banks as data provider and a central agency as service provider; the service will not be for-profit.
- Participating universities/institutions will be offered a choice of two participation options: data provider and ordinary member.
The model has been proposed to keep in mind the UGC regulations 2005 of establishing OAI complaint e-theses repositories at each University and metadata harvesting services at national level; each university would send the metadata to a centralized agency to be named by the UGC. It is further proposed that central agency would work closely with the zonal data banks and other stakeholders to develop standards and tools to support local developers. To maintain good quality collection only elite institutions will be encouraged to contribute as data provider.

A minimum subscription fees can be charged if necessary from the libraries requesting documents and have not contributed any data. The data providers or members of the national networks and consortium any avail services at free of cost. The core services of content upload to the Central Hub/metadata harvesting will be open to all higher educational institutions. The central server will serve as a common database built with metadata gathered from local e-theses server or zonal databank.

Small libraries without digital library infrastructure can directly upload theses into the server of the zonal databank. In order to achieve the interoperability between four zonal systems and central server an intense effort of standardization is essential. The adoption of a common metadata set is a fundamental step to achieve interoperability between Zonal ETD data banks. The central server will offer ETD services tailored to the requirements of the institutions without local repositories.

The centralized activities will include: Standardization of record formats, quality control monitoring, distribution/dissertation of full text, data integrity for the central server, access authorization to document delivery, management and maintenance of the central server. On the other hand decentralized activities have: Data entry and editing, Quality control, Storage, archiving and preservation, Copyright and IPR control for full text etc.
Difficulties in ETD Repository Setting

The growth in digital libraries of ETDs brings along many new problems and challenges including those of copyright, digitization problems, long term preservation of e-theses etc. There are numerous challenges which relate to the ability of organizations to integrate the management of ETDs into their organizational structure. The following major issues are being faced in many developing countries:

(1) Lack of Expertise/Awareness
(2) Lack of support from Faculty/academic staff
(3) Leadership problem-The lack of initiatives on the part of parent institutions and the absence of action plans or priorities.
(4) Lack of Funding/infrastructure
(5) Access and security
(6) Copyright and Intellectual Property Right

IPR is one of the key issues and a significant barrier often confronted in institutions which have embarked on ETDs projects. In most institutions, libraries are one of the key role players in the management of theses and dissertations. With the growing diversity of media and technologies for the production of theses and dissertations, there are a wide range of copyright and licensing issues that need to be taken into consideration.

ETDs is a new generation of theses and dissertations that can include color diagrams, color images, hypertext links, audio, video, animations, spreadsheets, databases, simulations, and virtual reality worlds. Greater collaboration is required to improve ETD sharing and, ultimately, to develop a nationwide digital library of theses and dissertations. The first and main focus at the moment is on setting up the infrastructure and getting the content into the institutional repositories.
Further, there is the question of which organizations should build cross-institutional services; this seems less problematic in nations with organizations, such as INFLIBNET, Vidyanidhi and INDEST; each of them have already developed infrastructure and can act as zonal centre. Continuing the natural development of these isolated efforts of ETD digital libraries, effective handling of ETDs automatically requires some collaboration among the stakeholders in institutions.

A project for developing a complete national union catalogue of ETDs or amalgamation of existing bibliographic databases already in possession under INFLIBNET, DELNET or other library networks need to be initiated in order to avoid any duplication of work. E-portal and interface—a good user interface is essential for visibility and maximizing access and act as a guide for the stakeholders on IPR issues in particular. A comprehensive website (e-theses portal) need to be developed for providing guidance to researchers, postgraduate students and supervisors on ETD submission format, metadata creation etc.

5.7.1 ETD SYSTEM: A Model

Formats for Main Files

When constructing the ETD system, there will be a need to convert files in different formats to a unified format, which can preserve the contents, format and layout of original documents, created by various programsprocessors. Still there is no standard electronic format accepted for all kinds of documents, the PDF format is the most popular and adopted in most current ETD systems. It is always better if the text-based portion of the theses or dissertation is in PDF, which allows documents created through word processing like MS Word, to be made available on the Web in an effective way. PDF retains the appearance of the print version across platforms and browsers.
5.7.2 Formats for Additional Files

Multimedia supplements can be mounted on an ETD server to support the text, but most ETDs still resemble their print equivalents. As scholars begin to desire better information along with better access to information, then the use of multimedia files will increase. MP3 is the file format of choice for audio files. This nonproprietary file format requires relatively little storage space. Apple QuickTime and MPEG Movie Player can be used to incorporate video clips. The widespread availability of these applications will ensure future access to the contents of ETDs, if the institutions take steps to make the software available by maintaining freely distributed applications by bundling them with corresponding media files on the host server.

5.7.3 Software to Manage ETDs

In India, for long-term preservation, we have to find an economical way to save digital content for future generations by using a variety of open source archiving solutions. We should give consideration to a number of systems that have already been tested and adopted by respected institutions. These include DSpace, Eprints, Virginia Tech University’s ETD-db, Greenstone, and several other software packages. Many open source packages show some degree of similarity, but the key factors in selection are Suitability, Functionality, Interoperability and Sustainability. Copeland and Penman suggest the following criteria for selecting software for ETD systems.

**Suitability**: Software should be easy to install on a range of hardware and operating systems, and should be available free and open source. The ease of customization and availability of upgrade are prime concerns.

**Functionality**: It should have an intuitive and appealing user interface for administrator and author, and it encourage authors to submit content. Persistent URLs are essential for preserving long-term access to content. Simple and
advanced metadata searching will allow a variety of search methods, ideally with full-text searching. It should be possible to apply metadata that conforms to national or institutional schemes. The software should support any file format or file size.

**Interoperability:** The software system must comply with the latest version of the ‘Open Archives Protocol for Metadata Harvesting’ (OAI-PMH), as well as satisfying individual institutional policies for integrating ETDs with other material in electronic repositories. This is an important to ensure that the system will import and export information from one system to another.

**Sustainability:** Repositories are long-term commitments, and the institution should be confident that the software will offer continued support and development. This is especially important because much ETD, digital library, and institutional repository software is relatively new and untested. As is common with much open source software, once a user community is established, the knowledge base can help ‘keep the ball rolling’, by offering support to new users.

**Limitations of the Model**

The proposed model uses Dublin Core metadata for describing the ETDs. The ETD-MS Metadata standard especially developed by NDLTD for ETDs can be implemented in this model. The full version of an ETD system can be developed by creating add-ons to D-Space, according to the requirements or practices of a university. This will be a fully automated system, similar to existing practices for writing a dissertation, including registration of a researcher, submitting the proposal, approval by the committee, interaction with the advisor, sending interim reports, submitting the theses to committee members, comments and revisions by members and advisor, final submission, and award of degree. TAPIR (Theses Alive Plug-in for Institutional Repositories) as an add-on to
D-Space is a good example of this. Similar things can be developed for Indian conditions.

5.8 Proposed Model of e-Resources: Organization and Access

5.8.1 e-Resources

* Material encoded for manipulation by a computerized device.
* In the 1980’s e-journals were mailed through FTP in textual format.
* Invention of Gopher technology facilitated access to web based publications without the commercial and other intermediaries through World Wide Web.
* By 1997 most of Scientific Societies could provide e-journals and also the universities had the platform to receive them.

5.8.2 E-Resources –Access Management

* NETWORKING: Internet and Intranet facilities with high bandwidth and monitor the uninterrupted access.

* LICENSES: varies
  –IP authentication, Password authentication.
  –campus wide licensing.
  –Limited user licenses. e.g. Scifinder and IEL online etc (can be accessed at limited identified IP address.)

* ACCESS PERIOD: varies from publisher/database to another
  –e.g. IOPP offers online access to their archival collection for a period of 10 years to their print subscribers.
–ELSEVIER offers 5 years content to their print subscribers at an additional cost of 12.5%.

5.8.3. e-Journals Consortium (UGC Infonet- a gift to University Academics)

- In the consortium members in a group cannot achieve individually can achieve collectively. Consortium member libraries More and more libraries join the prices come down in the long run.

- This consortium provides full text resources and Bibliographic databases for Indian universities.

- Proposed to cover colleges

- The first set of journals and databases that would have costed Rs.32,87,02125 as per their list price.

- The total consortium price comes to Rs.6,04,66,616 which amounts to an overall savings of Rs.26,82,35,516.

5.8.4 e-Resources - Organization

* Cataloguing

* Maintaining Library portal displaying the electronic resources

* Linking through OPAC, WebOPAC and Library webpage

* Sending communications

* Posters
5.8.5 e-Resources – Cataloguing (MARC 21)

Supports the cataloging of electronic resources with their specific features by rendering in respective bibliographic tags or fields.

– ISSN (Tag 022)

– Source of Acquisition (Tag 037)

– Journal title or Database (Tag 245)

– Physical Distribution (Tag 300)

– Subject heading (Tag 650)

5.8.6 e-Resources

Cataloguing Options

Link to electronic version through bibliographic record available through

– Intranet (CDs / DVDs, Institutional/Digital Repositories, Content Pages, Digitized Monographs)

– Internet / www

Link electronic/web version of print

– Through same bibliographic record

– Provides separate bibliographic record for print and electronic journals which provides full cataloguing description for each work

5.8.7 Separate Record Option

* When exists only in e–form.

* If the content of e-resources is different from print resource

* When the resources changes in format from print to e-form

* To catalogue exclusive electronic resource database (either full text or abstracts or citations) e.g. Ebsco, Sciedirect, Web of science
When the resource contains new material than the print version

When the original text cannot be identified.

5.8.8 WebOPAC

* Online Public Access Catalogs (OPAC)
  – card catalog is limited to library premises
  – computerized form is not limited to the Library premises but

* Accessible at the desktops of campus users via Local Area Networks.

* The advanced form of catalog which is linked to Internet is Web OPAC, facilitating the off campus search across countries.

Conclusions

The above existing models help to develop collection building of e-resources in university libraries but right now we don’t have any model to follow them except proposed model of UGC. There is need to some implementation and the steps are

1. Sharing e-resources that is simpler than print resources

2. Updating IP changes, if any should be promptly notified to the vendors and publishers.

3. Used some gateway services to handle the maintenance of URLs and IP addresses.

4. Acquiring extensive resources at reduced prices and it is beneficial as more and more libraries come together through consortia favor library acquisition. This consortium trend poses a challenge to the pricing patterns of the publishers.

5. Academic Libraries should also develop necessary infrastructure to receive abundant e-resources being offered by UGC level Consortiums like INFONET and also open access resource.
Reference


