

Managing E-Resources in Digital Libraries

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Abstract

Digital libraries, particularly in higher education are getting popularity among library professionals and users as well. Accurate and timely information access is possible with in digital libraries, but they are also posing problems in handling & managing electronic resources.

The paper aims to describe the challenges to be faced by the librarians in acquiring and handling the e-resources with possible solution.

Keywords: Digital Libraries, Electronic Resources, ERMS.

1. Introduction

Earlier the books were important channel for dissemination of information. They constituted an important and useful aid for the support of teaching and learning purposes and still they are playing an important role in promoting culture, education and everyday ways of life. But one of the outstanding and exciting developments of 20th century is the publication of documents in electronic form. The electronic media has provided many possibilities and opportunities for providing faster and quicker access to information at the global level through communication networks, hitherto not possible. That's why digital libraries are getting attention world wide because of their round the clock availability and providing accurate and correct information quickly.

Digital libraries are not single entity and therefore require technology to link the resources of many, the linkage between digital libraries and information services are transparent to end users, also, digital collections are not limited to document surrogates and therefore extend to digital artifacts' formats (ARL, 1995).

ODLIS (2007) defines a digital library as: "A library in which a significant proportion of the resources are available in machine readable format accessible by means of computers. The digital contents may be locally held or accessed remotely via computer networks".

Therefore, digital libraries are not only digitization of physical resources, but also thoughtful organization of electronic collection for better access. Such organization provides coherence to a massive amount of shared knowledge base. While the method of access provides convenient information retrieval for a wide range of global user, essentially a digital library deals with organization and access of a large information repository.

2. Electronic Resources (E-Resources)

Dhiman and Rani (2012) mention that the conventional books as carriers of information have some limitations, viz., difficult to reproduce, expensive to disseminate, difficult to update, single copies cannot be shared or can be damaged and vandalized easily, bulky to transport, embedded material is unreactive and static, cannot utilize sound, cannot utilize animation or moving pictures, unable to monitor reader's activity, cannot assess reader's understanding, and unable to adapt material dynamically. But electronic documents remove all the barriers.

E-documents or e-resources can simply be defined as the electronic surrogates of print based media. They are not visible to the users as the traditional resources show their presence in the libraries. Unlike printed resources, electronic resources consist of data – the information represented by numbers, text, graphics, images, maps, moving images, music, sound, and many others. They provide selectivity, interactivity, multimedia facility and hypertext / hypermedia functionality.

Table: Functionality of Electronic Resources (After Ball, 2009)

Selectivity	The user can selectively search for and access individual elements of content. Content elements can be extracted from the medium without damaging it.
Interactivity	The user can choose the order and presentation of content elements. Using the bookmark function, the user can mark passages in the text to which he or she wants to return.
Multimedia	Picture, video, sound, and text are digitally integrated into the medium.
Hypertext /Hypermedia	Linking of content and structural elements both within and beyond the medium itself to other media. In the information space, the user moves using the navigation function.

Electronic documents or publications cover the rapidly increasing area of publications that require a computer to be used to access the information that they contain. There can be documents distributed free of charge or obtained by purchase. They are supplied in two forms—Off-line publications and Online publications. Some electronic publications are not supplied on physical carriers rather they need to be copied into the libraries' access system and be stored on hard disc stacks, tape streamers or other data storage systems while others are supplied on physical carriers and can be stored on shelves (Dhiman and Rani, 2012). Generally, following types of formats are available for e-documents or resources:

- **PDF** : PDF or Portable Document Format is a file format created by Adobe Systems. It is a well established open standard that can be read by most computers, and also is supported by most e-book readers. Like EPUB, it can display images. However, unlike EPUB, it does not support word wrap.
- **Plain Text** : Plain Text is the "lowest common denominator" of open standard text files. It can be read by virtually all computers, and most e-book readers. It however does not support images, or digital rights management, making it a poor choice for publishers who wish to block users from making unauthorized copies of their works.
- **EPUB** : A short for electronic publication. EPUB format can support images, and text is reflowable, meaning the text size can be resized without compromising word wrap around images and at page margins.

However, the pdf is more common format used world wide.

3. Advantages and Disadvantages of Electronic Resources

A number of advantages are there with the use of e-resources but based on Ball (2009) and Dhiman and Rani (2012), major advantages are :

- Fast acquisition and fast updates;
- 24/7 and global availability;
- Support searching capabilities through web-like interactivity and search functions;
- Access to and, in some cases, purchasing of individual chapters;
- Multimedia elements may be embedded along with text;
- No deterioration through use.
- Can be used by many users simultaneously.
- Accommodate unique features such as links to related items;
- Interactive and allow interaction between author/ publisher and users;
- Do not require physical processing;
- Can be easily merged with altering service;
- Provide improved access through full text searching; and
- Makes the discharge of library services less strenuous.

But together with various advantages, some disadvantages are also associated with them. Their main disadvantages include:

- Initial high infrastructure and installation cost.
- Need special equipments to access.
- Hardware and software compatibility issues between publishers and users.
- Dependent on access to the Internet;
- Dependent on a technical platform;
- Lack of the physical 'look & feel' of the print book;
- Reading on screen is not very comfortable;
- Lack of individuality compared to a book (size, binding, etc.);
- Limited access rights (often no concurrent proprietary systems);
- Lack of compatibility among different publishers.
- Difficulty inherent in relating to a large amount of data on a screen.
- Causes more concern about copyright.

4. Types of E- Resources

E-journals, E-books, Full-text (aggregated) databases, Indexing and abstracting databases, Reference databases (biographies, dictionaries, directories, encyclopedias, etc.), Numeric and statistical databases, E-images and e-audio/visual resources are the resources which are generally housed in a digital library (Johnson, 2012). Singh, Khan and Chauhan (2007) have identified them into following types:

4.1. Paid E-Resources

Resources for which the publisher or owner charges some fee to access come under this category. Access to products from the commercial publishers is mostly available on payment. Few of the leading publishers under this category are Royal Society of Chemistry, Elsevier, Springer, Blackwell Publishing Agency, Cambridge University Press, etc.

4.2. Free E-Resources

The list of this type of resources is quite long and it can be divided in few more sub-categories, like:

- (i) **Open Access Journals/Free Journals:** Many of the publishers are providing free access to few of their journals. Besides, many organizations are making open access for their products.
- (ii) **Information available at Institutional Repositories:** Various institutional repositories are accessible to the world without any cost, e.g., Institutional Repository of Dspace at the INFLIBNET (<http://dspace.inflibnet.ac.in>) and Institutional Repository of Indian Institute of Science, Bangalore can be accessed freely.
- (iii) **Organizational/Individual's Websites:** Organizational and individual websites are also a source of accurate information. For example, Union Databases (books, serials and those available with Indian universities) and other specialized databases which are being maintained and hosted by the Information and Library Network Centre (INFLIBNET) at its official website are good source of information.
- (iv) **Individual Blogs/Professional Discussion Forums:** These are the latest and new web options on the Internet to share the views or opinions with other fellow professionals around the world. Day by day various forums, discussion groups and blogs are flourishing well with explosive speed.

5. E-Resources: Some Concerns

Two types of digital resources – offline and online are found available in today's digital libraries. Off-line publication is an electronic document which is bibliographically identifiable, and which is stored in machine readable form on an electronic storage medium. Examples may include - CD-ROM encyclopedia or CD-ROM journal. Offline resources cause no problem and they can be treated as print surrogates in the libraries. They can be classified, catalogued and may be placed on the shelves (of course in closed glass door almirah for the safety purpose) in any library.

Online resources are the electronic resources which are available through networks and are not stored physically but in special computers, called SERVER. The main problem arises in the handling of online e-resources.

Several issues are to be taken into consideration for e-resource subscribing / building as discussed below (Dhiman and Rani, 2012):

5.1. Organizational Issues: E-resource building is more oriented towards users point of view and to a great extents depends on organizational culture, objectives, effective strategic planning.

5.2. Procurement Issues: Procurement and installation of hardware, software, communication and networking etc. involve and require guidance of experts in the concerned areas. Internet connectivity, Internet based library applications, networking etc. requires technical skills of IT experts.

5.3. Financial Issues: Initial expense to develop necessary infrastructures for e-resource building is quite high. Further it requires recurring expenditure for maintenance and continuation of such related services.

5.4. Formats: It is quite difficult task to decide on the available file formats from a numbers of available formats such as PDF, ASCII, HTML, GIF, TIF, etc.

5.5. Access to E-resources: Issues regarding accessing of information via Internet or through the corporate Internet besides hardware support, system support, standardization, ease of use and up gradation etc., need due consideration.

5.6. Security: It is associated with the issues pertaining to security of passwords and information from misuse, hacking etc.

5.7. Retention: It pertains to look at the issues of retaining the articles, copying, downloading under IPR rules and regulations.

5.8. Licensing: The e-resources are acquired via licenses for accessioning the electronic copy for a specific period of time and usage as per the terms and conditions negotiated in the license.

it becomes a threat to some sets of librarians. Oshilalu (2100) has presented following challenges in the form of threats to be faced by digital libraries:

6.1. Increase Workload

With the emergence of electronic library resources, librarians now have additional work load. Aside having to add electronic resources to their library collections, they have lots and loads of electronic resources to treat. Electronic publishing has led to information overload and explosion. Based on this, librarians are now charged with the task of ensuring that the right information gets to the needed hand at the right time at the right place. In this case, it challenges the professionalism of librarians to ascertaining the quality of lots of materials to meet the numerous tastes of their users. Further, all information that is published electronically is credible for inclusion into library collection. But, one has to note that, every publisher has a target audience in mind.

6.2. Increase and Continuous Skills Acquisition

Librarians now require computer knowledge to be able to handle electronic library resources conveniently besides having knowledge of librarianship. Also, since some electronic library resources have unique access means, librarians cannot but keep updating their computer use skills.

6.3. Erratic Power Supply

Continuous power supply is a problem, more particularly in developing countries. Since access to electronic library resources is with the aid of computer or such alike devices, it becomes a problem to libraries to ensure that the library has constant supply of power to facilitate access and usage of electronic resources.

6.4. Material Cost

With the emergence of electronic library resources, libraries are faced with the challenge of acquiring sophisticated materials needed to access and use these materials. The cost of acquiring this set of material is really a problem that must be addressed by library management. Besides, purchasing electronic resources, cataloguing them and maintaining user statistics are other challenges which librarians are to solve efficiently.

6.5. Purchasing Electronic Resources

There are available a number of purchasing methods for electronic resources. More importantly, following types of methods are used to subscribe them.

(i) **Individual Subscription:** In this type, the library acts as a source of information on what is available. It requires the users to have access to internet but there are no storage problems.

(ii) **Local storage at Institutional level:** In this type, the journals are stored once and the searching mechanisms are used to access them which are controlled by the institutions.

(iii) **Commercial e-journals Providers:** There are many commercial providers or aggregators which ensures high standards in delivery and presentation. However, it may require special equipments and/or software to use this service.

(iv) **Consortia Type Purchase:** In this type, a group of institutions/organizations together negotiates with the publisher. This is most common method of subscribing electronic documents. Following models of consortia purchasing are used in digital libraries to subscribe them (Singh, Khan and Chauhan, 2007; Dhiman and Gupta, 2012).

Print plus model in which access to those electronic resources is given of which print formats are being subscribed in the library as subscribed information. *Print & Electronic Combined*, here electronic and print combinedly, are subscribed in which subscription rate are based on print subscription. *Bundle purchase*, where selected groups or subject clusters of titles are being subscribed.

Pay-per-View model is also there, where client has to pay for whatever has been downloaded by the users of at the client end. *Subscription with Historical Archive* is another model, in which all the publishers have different subscription price for accessing back volumes of their products. Some time subscription is based on onetime payment and some time access with moving wall option for few years of back volumes.

It is seen that with the online publishing and the growth of collective purchasing by library consortia, the supply chain has changed. Therefore, which model is to be adopted in a particular library is a challenge.

Bothmann (2004), Crum (2008) and Ball (2009) have listed some other challenges before digital librarians. These are enumerated as under:

6.6 Cataloguing of E-Resources

Cataloguing is one of the main fields of work in libraries. Libraries expect to receive metadata from e-book providers – both catalogue data for formal cataloguing (data such as author, year, source, size), and elements for

defining the contents of a publication, such as keywords or controlled vocabulary. They need to be able simply to import these to their local library system. When, full cataloging is not practical, libraries can load batches of records, either brief records generated in-house or records obtained from a vendor. Having journal holdings integrated in one source—the catalogue—is extremely helpful for users searching for journals.

But many users begin their searches in article databases, using the catalogue or a Web list afterwards to find out which of their desired articles the library can provide. To provide those users with seamless access to these articles—one-stop shopping from article databases—the library needs another tool, the link resolver. The link resolver matches metadata from a citation against a database of the library's holdings, often called a knowledge base, and offers the user a menu of links to full text and/or other services, for example - a document delivery request form. The link resolver, then, can link the user directly to the desired article or journal from a citation, without requiring the user to visit the library catalogue. If all of the library's journal holdings, including those from aggregated databases as well as some free titles, are loaded into the resolver, it can provide another form of one-stop shopping.

6.7. Usage Statistics

Authenticity and validation is not the problem with open access journals or the information available freely. Hence, this needs no attention. But scholarly information, which has been subscribed by paying huge amount, institution will ensure proper and exhaustive information use by its users. The use of statistics, both for the active management of holdings and for general operational monitoring, has become standard for electronic media today. Advanced usage statistics are also essential as a management tool for e-books - at the individual title level, or even at the chapter level—enabling the library actively to manage demand.

7. How to manage Searched/Downloaded Information

Information on the Internet is just like an ocean, everything is there but question of authenticity or validation of the searched information, is matter of concern for the information managers as well as information users. Thus, the libraries are in need to develop an information management system that can help to manage downloaded scholarly literature. Later, libraries can use the same information for their bonafide users in future.

One-stop shopping for journal literature - the catalogue, integrated electronic resources management modules, link resolvers, and federated search tools can be one solution as suggested by Crum (2008). With these tools, libraries can—and should—provide access to print and electronic holdings, including holdings from aggregated databases and selected free titles, from a single source. But Electronic Resource Management Systems (ERMS) are becoming a new frontier for the library world.

ERMS is a comprehensive solution to meet out the needs of managing e-resources, which identify the potential e-resources for use within the library and manage the acquisition and procurement process, including customizable workflows for sending out appropriate notices and obtaining all needed approvals. They manage all administrative information for access to a specific e-resource: URLs, IDs, passwords, IP addresses, authentication including proxy, password/authorization, protocol, MARC record, etc. ERMS provide information to users about the licensing rights and restrictions, such as ability to print, cut/copy/paste, e-mail or access through ILL/resource sharing solution. ERMS also create and deliver a complete set of management reports to facilitate the management of all electronic resources. Also they are able to export the management data for use with any other tool. Dynix (www.dynix.com), OpenDLib (www.opendlib.com), V-sources (www.vubis-smart.com) and TDNet (www.tdnet.com) are name to few, which can be quoted as sample ERMS and which are being used for managing e-resources in various libraries worldwide.

ERMS helps the libraries to attract patrons and become a key part of any user's research process. Because they are Web-based, ERMS enables librarians to build out Library 2.0 user services that are tightly integrated with e-resource access, and maintain an up-to-date knowledgebase that tracks the constantly changing e-resource landscape (Dhiman, 2010a).

8. Conclusion

Changes are uninevitable. Sometimes, they are positive while sometimes, they may have negative effects. Singh, Khan and Chauhan (2007) mention that the limitations imposed by print documents on the library system were resolved with the help of electronic resources which have changed the information scenario all around the world. However, the information on the Internet is getting doubled in every two to three years, where researchers and academicians are in need of scholarly information that is mostly being published by the professional publishers. Hence, the increasing and speedy information demands of users forced the library to subscribe scholarly literature by paying huge amount to the publishers.

But with the changing pattern of publishing and access of information, the role of librarians and library professionals is also changing. Librarians have traditionally been concerned with certain functions in the print era i.e., collection development and acquisition, classification and cataloguing, circulation, reference service,

preservation, conservation and archiving. Most of these have their parallel roles in the internetted information era also (Dhiman, 2010b). In the recent past, the librarians were supposed to play the role of facilitator who facilitated in transaction of books and maintaining their records. Today, however, there is a remarkable change. As Dhamdhare (2012) mentions, the librarian's role is more about ORGANIZING the KNOWLEDGE and WISDOM available in society in print or electronic form. Today's librarians are supposed to act as Information broker for print and electronic information, where he has to identifies, retrieves, organizes, repackages and provides electronic access to digital information through portals. They have to play the role as a Technology Application Leader, Facilitator to make access to information easier, Educator (who trains clients on internet use and accessing E-resources, Consortia, and databases), Website Designer, Blog builder, Database manager, Server manager (cloud / virtual servers), Policy maker and as Business manager while negotiating with publishers, aggregators in digital environment for providing information through electronic documents. Then only, they might be able to manage electronic resources efficiently in digital libraries.

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