Awareness and use of e-Resources in Academic Libraries: A study

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1. Introduction

The Library is a product of “cultural maturation”, it is a response to the total communication patterns of modern society. The real purpose of any academic library is to provide its users with relevant information in order to fulfill its core function of facilitating teaching, learning and research. In today’s contemporary world where the internet has become crucial to the survival of any establishment, it is incumbent on academic libraries to provide its users with access to online academic databases. Information is part of all functions of the present day society. As the society is becoming more complex and dependent on the science and technology, the need for timely organization, communication and dissemination of information is also increasing more and more. The invention of information technology has resulted in reducing the size of libraries. The digital and electronic information is based on digitized information, which has gradually replaced paper based records. With the advancement of Information Communication Technology (ICT) the information storage and dissemination along with organization in the Library and Information Centers (LICs) have changed globally. The increasing growth of online resources as well as need for the access of current information is very important in the present day society.

Today’s rapid changing world highlights the influence and impact of technology in all aspects of learning life. Higher education institutions in developed western countries believe that these developments offer rich opportunities to embed technological innovations within the learning environment. Electronic resources (e-resources) have become a sign of the modern age. It is an invaluable tool for teaching, learning and research. Sethi and Panda (2011) notes that the library and information landscape has transformed with the onset of the digital era and today, traditional libraries have changed their role to serve as ‘knowledge centers’ with priority on value added electronic information services. Academic institutions are focusing on services which compliment as cutting-edge technology. Such institutions have changed their contemporary outlook towards the functions, operations and services of the academic libraries. The traditional environment has been rapidly changing to an electronic one and the demand for internet and e-resources among academic and research communities has increased manifold over the years. However, the literature reveals that there is a dearth of studies on the use of e-resources and the internet in the context of academics, researchers and students across the globe.

The growth of online resources results in the shifting of print media in to online digital media. As a result the availability of more online resources in the form of electronic version of books, journals, newspaper, and magazines in online network environment as online resources and these online resources are increasingly becoming the backbone of many LICs due its optimum use and popularity. Electronic information resources can be defined as the electronic representation of information which can be accessed via electronic system and computer network. It may include e-journals, e-news, e-discussions, e-mail, online chatting, data archives etc. In this digital era the users have a large number of options to fulfill their information needs. There is no need to come physically to the library to use the documents. They can access a variety of library resources and services through networks at any time.

2. Objectives of the study

The general objective of the research is to promote electronic resources in academic libraries. The major objectives of the study are,

1. To identify different types of e-resources and services available in the library.
2. To study the different types of e-resources.
3. To study the purpose and frequency of using the electronic resources and services.
3. Methodology

Among the various methods of collecting primary data, interview method is used for collecting the required data for the present study. The interview questionnaire consists of questions on electronic information resources available in the academic libraries. Librarians are interviewed and usage statistics are observed from the library software’s

4. Review of Literature

Several studies have been undertaken by national and international agencies and by individuals related to the topic. For the current study, the primary as well as the secondary sources of literature has been consulted. Some journal articles and theses have also been consulted. Ananda (2017) conducted a study on “use and awareness of electronic information resources among UG & PG students of T John College, Bangalore: A study.” The study indicates that 81% opined that they are aware of Electronic Information Resources and 19% opined that they are not aware of Electronic Information Resources. The major purpose for using Electronic Information Resources by students is project work. Sohail and Ahmad (2017) investigated on the topic “use of electronic resources and services by faculty members and students of Fiji National University.” The objectives of the study are to explore the awareness, use and perceived importance of the e-resources among the faculty members and students, to determine the level of satisfaction among the users of electronic services and to know the benefits of e-resources over the conventional documents. This study reveals its impact in terms of awareness and effective use of available resources with a few constraints by the library users. Hossaini (2017) carried out a study on “use and impact of electronic resources: a study on two selected academic libraries.” The other objectives of the study are to Study the impact of electronic resources on the academic works of users, know the different types of electronic resources available in the selected libraries and identify the impediments faced by the users while accessing and using e-resources. The study shows the benefit of using e-resources, problems that are faced by the users when accessing electronic resources and the perceived impact of e-resources on academic library users.

Sejane (2017) conducted a study on “access to and use of electronic information resources in the academic libraries of the Lesotho library consortium.” The objectives of this study are to investigate access to and use of e-resources in the academic libraries of LELICO. This study established that the type of e-resources accessed and used by academic libraries of LELICO includes e-mail, search engines, websites, OPAC, e-journals, full-text databases, reference databases and institutional repositories. This study find out that the main uses of e-resources were for communication and to support teaching and learning activities. It is also showed that awareness of e-resources was mainly through formal engagement, such as library orientation and through informal engagement such as colleagues. Vijayalakshmi (2017) conducted an investigation on the topic “study of Electronic information resources and usage pattern among the students and faculties in Chennai medical college hospital and Research centre, Trichy.” This study examine the factors like experience of e-resources, use of various types of e-resources, use of e-databases subscribed by the library, awareness factor, learnt to use e-resources, purpose of use, preferred e-resources file formats and rating of available e-resources in the library and information centre. In this study questionnaire method was used to collect the necessary data, keeping in view the objectives of the study. This study reveals that electronic resources have become the vital part of information source and being widely used by CMCH&RC students and faculty.

5. Electronic Resources

A well-established library is essential for any academic institution. The impact of information technology brought tremendous changes in the library. Most of the users prefer to browse through the internet for their information needs. So, there is no need to come physically to the library. To attract the users and also to provide better services to them, the library should develop electronic resources along with print materials. The development of ICT, internet and World Wide Web, there has been exponential growth publishing of electronic journals, e-books and online databases, which have together changed the entire scenario of the library services. The emergence of e-resources has maintained the status of all the libraries and information centers across the world during the last few decades. There has been a rapid urge of the user community to get more and more information online which has been reflected poor attendance of library users in the libraries. Everyone wants desired information instantly on their fingertip without physically come to the libraries. Internet and World Wide Web (WWW) have a biggest source of information with widest coverage and the fastest access. It is the most powerful tool for global communication and exchange of information. The amount of publicly available information on the web is increasing consistently at an unbelievable rate. It has revolutionized the way that people access information, and has opened up new possibilities in areas such as digital libraries, information dissemination and retrieval, education, commerce, entertainment, government and health care. The WWW can be a great place to accomplish research on many topics but finding quality web materials. The term electronic library is described as an organized and managed collection of information in a variety of formats such as structured data text, image audio, video and graphics all in digital form.

Nowadays librarians are shifting their role from the manager of library learning resources to the provider of service-oriented digital information resources. The use of computers, increased support on computer networks, prompt growth of internet and information explosion in terms of quality and quantity led libraries to implement new techniques for storage organizing, managing, retrieval and dissemination of e-resources to the end users in the networked and digital environment. An “electronic resource” primarily denote as any work encoded and made available for access through the use of a computer. It includes both online data and electronic data in physical formats. To avoid confusion with these terms as used in the copyright process, online will refer to intangible works: physical to a tangible work. The library users can access e-resources on the library website within the campus network. E-resources are the electronic version of print materials. Electronic resources may be defined as any journal,
Electronic resources are regarded as the mines of information that are preserved through modern ICT devices, refined and redesigned and more often stored in the cyber space in the most concrete and compact form and can be accessed simultaneously from infinite points by a great number of audience. The phrase “electronic resources”, has broadly been defined as information accessed by a computer, maybe useful as bibliographic guides to potential sources but, as of yet, they infrequently appear as cited references in their own right (Graham, 2003). Moreover, electronic resources refer to that kind of documents in digital formats which are made available to library users through a computer based information retrieval system. Because of the effective presentation with multimedia tools, electronic resources have become the source of information.

Electronic resources on the Internet manifest themselves in numerous flavors and categories. Although most of them emulate the traditional publishing while others are revolutionary in their design and approach. While the present trend to imitate and emulate the traditional models of scholarly communication may continue for some time, eventually the capabilities added by the new media would be used in more innovative ways.

6. Concept of Electronic Resources

Due to the developments taking place in information and communication technology, a variety of information sources are appearing besides print media. In contemporary librarianship the acquisition and subscription of electronic resources became important and unavoidable. These resources have advantages over print format which encourages the libraries to move towards digital and electronic sources. The library professionals too accepted and recognized the importance of potential use of these resources for which computers and computer technology is mandatory. The beginnings of electronic resources can be traced back to 1960’s with the development of Machine Readable Catalogue format. Almost, at the same time the bibliographic databases became available. The development of computers also encouraged the use of electronic resources in libraries. In 1990, the World Wide Web was created by Tim Berners Lee; this facility encouraged the use of electronic resources in libraries. Consequently web based electronic resources and their use begins in the mid 1990’s. Libraries offered Web-based catalogues, bibliographic and full-text databases, electronic journals and eventually electronic books through the Web. Patrons no longer had to go to the library to do a significant amount of their research. To satisfy the five laws, as enunciated by Ranganathan, the use of electronic resources through which a variety of information services should be offered. The developments of technology during 20th century are convenient, economical and user friendly. As a result the libraries are coming forward to move towards electronic resources.

7. E-Resources: Definition

Electronic resource is an electronic information resource which can be accessed from anywhere, anytime and it breaks the barrier of time and physical boundary. These resources can be manifestation through online or offline. These e-resources contain different types of electronic document like e-books, e-journals, e-databases, academic web resources, official document etc. These resources are available, 24x7 for the library users. These electronic resources are cost-effective as well as free of cost available for the library users. Electronic resources have different situation and comfortable like printed document but its current information or contents are available in the various format like image, audio, video and multimedia designs.

According to AACR2 2002 revision 2003 update an electronic resources is “material encoded for manipulation by a computerized device. This material may require the use of a peripheral which is directly connected to a computer device, or perhaps a connection to a computer network.” The International Standard Bibliographic Description for Electronic Resources (ISBD-ER) defined electronic resources as the materials which are codified for computer elaboration, including those materials that required the use of computer peripherals. The electronic resources are coordination in which information is stored electronically and made available through electronic managements and computer networks. These resources contain OPAC, CD-ROMs, Online databases, E-journals, E-books, internet resources etc. Different access speed, comfortable in content, reprocess, relevance, anywhere access is certain types of e-resources. E-resources compromise access to information that might be limited to the users because of physical setting or assets. Electronic resources have the ability to provide broad links to explore further resources or related contents.

The uses of electronic resources are considered as significant resources of teaching, research and training. So, most of libraries as well as the universities of the present day provide access to the electronic resources to their end users for class room teaching-learning and research. E-resources and services mention to the multiplicity of electronic and digital sources of information accessible to teachers and students within a hypothetical context. The conversion in probable document delivery services, from print to electronic, has come about very quickly and libraries and information services have tingled substantial conversion in order to successfully deliver electronic resources to the academic community. In current years, an essential module of e-resources, have gained popularity among the library users.

8. Characteristics of E-Resources

E-resources are more useful in libraries nowadays because of their characteristics. The following are the characteristics of e-resources.

1. Access to e-document by anyone from anywhere and provide global access to literature on any subject.
2. Retrieval of information from the e-resources is quicker and accurate than print resources.
3. Easy to search the text using different search technique and tools.
4. Users can be guided to the documents by providing links to similar and related documents.
5. Space and cost constraints are not a problem in search strategies.

9. Benefits of E-Resources

The following are the benefits of e-resources.

a. Accessibility and Availability: Rapid advances in ICT have resulted in researchers being able to access information resources from all over the world.

b. Cost Effective: Cost of electronic journals is decreased because of eradication of paper, printing, postage etc. as compared to print journals. The tough competition among the publishers, entry of new publishers in the field, availability of e-journals in public domain, emergence of digital libraries, consortia arrangements of the libraries at local, regional, national and even international level, the electronic journals are cost effective.

c. Better Storage and Retrieval: Digitally available information has eradicated the problems like binding, shelving, storage, maintenance etc. and gives opportunity for better retrieval.

d. Time Saving: The time is saved in terms of digitally submission of research work to the publishers, the same is sent for peer review, selected rejected or return to authors for necessary amendments in electronic form and finally by providing the electronic access to the libraries.

e. Excellent Searching Techniques: The user can search the information by using and, or, not, between, up to, after etc. phrases. The publishers provide hyperlinks to connect the related work.

f. Multi-user Access: This is a wonderful gift of electronic publication that by subscribing the electronic journals, books databases etc. many users can access the same material at the same time from different places connected through intranet or internet.

g. Self Publishing: Electronic publication made it possible for the individuals to publish their own work by exploring the World Wide Web. The individual can sought the suggestions from experts in the field and can distribute the publication to his friends and colleagues just free of cost. Web presents an attractive mode for electronic publishing. People having the knowledge of hypertext markup language (html) can contribute in publishing research material on web. Now scientists make use of electronic publishing to communicate their research work with the colleagues, experts, co-author, collaborator, editors, publishers and other professionals.

h. Use of Multimedia Technology: It is the beauty of electronic publishing that the text material may be provided with audio and visual support for making the text more presentable and effective. It is possible with the help of multimedia technology. The use of multimedia technology in electronic publishing leads to better information quality and better utilization of information resources.

10. Need of E-Resources

Electronic resources have great potential and bright future to attract users. It combines all the benefits of the multimedia, digital coding and internet. It enable user to carry everywhere and can be read on all types of computers including handled device.

1. E-Resources can be downloaded instantly.
2. Users can read an e-resource any time.
3. Due to portability, e-resources can be taken any where on portable computer.
4. Font size can be changed suitably.
5. E-Resources provide facility to hold and turn pages easily.
6. Physically disabled users can hear audible e-resources.
7. In buying e-resources the overhead charges like shipping, postal, handling are totally ruled out.
8. Some e-resources are interactive.
9. E-Resources have background music and animations.
10. E-Resources do not require bindery and repair.
11. E-Resources have human resources for shelving and rectification.
12. User can not misplace e-books.

11. Types of Electronic Resources

Electronic information resources can be classified in the following types:

- Electronic Conferences
- Electronic Preprints and E-prints
- Electronic Journals (e-journals)
- Electronic Books (e-books)
- Electronic Mail (e-mail)
- Full text Databases
- Electronic images (e-images)
- Electronic audio resources
- Electronic Clipping (e-clipping)
- Electronic references resources
- Electronic Newspapers
- Electronic Magazines (e-zines)
- Electronic Thesis and Dissertations
- Online Databases
- Electronic Patents (e-patents)
- Electronic Standards (e-standards)

Electronic Conferences (e-conference)

Technological developments on the Internet in the early 1990s created an environment which was suitable for holding an electronic conference. In 1994, the electronic means for meeting was all in place. The World-Wide Web provided a robust environment for presenting scientific information. The web permits a document to contain text, figures and links to other materials. In November 1994, the first Electronic Computational Chemistry Conference (ECCC-1) was held. Electronic Conferences, variably known as electronic forums, electronic user group, listservs, and discussion groups are important resources for researchers and scholars in every
discipline. New scholars in particular get an opportunity to discover what topics are being discussed in their field, to learn who are involved in these discussions, and to make them known within their discipline by their own contributions.

**Electronic Preprints and E-prints**

Electronic preprints are research articles that are made available for distribution through the network in electronic format before they go through the process of peer reviewing. Ginsparg preprint archive, started in 1991, has become a fundamental means of communication for a growing number of fields, starting with theoretical high-energy physics, later spreading to other areas of physics; and now also to computer science and mathematics. Ginsparg's preprint archive is a sterling example of how technology can lead to a sudden profound and beneficial transformation. ‘E-prints’, is the term generally used to describe electronically mounted copies of the final, peer-reviewed versions of journal articles. One important international movement is the Open Archives initiative (OAI), which aims to develop and promote the use of a standard protocol, known as the Open Archives Metadata Harvesting Protocol (OAMHP), designed for better sharing and retrieval of e-prints residing on distributed archives. A few examples of preprint servers are:

- Open Archives Initiative
- CERN Preprint Server

**Electronic journals (e-journals)**

An electronic journal, also known as online journals, e-journals, and electronic serials, is basically complete text that is available in an electronic form. Electronic journals, accessed via electronic transmission, are usually published on the web. Electronic journals first appeared during the 1970s, but they only gained popularity in 1996. Electronic journals, which are available in electronic media, such as floppy disc, CD-ROM, DVD, and online databases can be accessed online through Gopher, FTP, Telnet, and e-mail or discussion list. These are mainly accessed through the web. Electronic journals are published in two different ways on the web: they are commercial and open sources. The main difference between the two types lies in one being a paid and purchased version, while the other is free to use. The PDF is the most popular format used for electronic journals; however, some electronic journals are also published in HTML. Electronic journals are available through an aggregator database, or directly through a publisher site such as EBSCOHOST, PROQUEST, Lexis-Nexis, JSTOR, Project Mouse, Science Direct, Emerald, etc.

E-journals offer many advantages. Maxymuk outlined some of the advantages:

- They take up no physical space on limited shelving.
- They are accessible at any time.
- They can be accessed from almost any workstation that can connect remotely to the institution's network.
- They can be searched and browsed.
- They can be printed on demand.
- They often can be downloaded as electronic files.

**Electronic Books (e-books)**

Electronic books are long for e-books. These are text and image based publications in digital format that can be read on computers or other digital devices. In 1971, an e-book was created as the first steps of Project Gutenberg; a domain digital library where users can access books from a public domain. "It is nearly 40 years old, already. But this is a short life compared to the five-century old print book" The Oxford Dictionary of English defines the e-book as “an electronic version of a printed book, but e-books can and do exist without any printed equivalent.” For reading e-books, one can use mobile phones, computers, and smart phones, as well as other sophisticated electronic devices. Kindle versions available on Amazon are also popular ways of reading e-books. Most e-books can be read as PDF files, and hence reader applications or devices must be able to read such a file format. The PDF version of an e-book is popular, because it looks similar to that of a paper book, but on electronic media. The users can make notes, bookmark the pages, highlight the texts, and copy, paste, save, and print selected texts. In addition to these, some e-book readers also include varying font styles, as well as dictionaries within them. The name of a few aggregators and publishers who produce e-book include: OCLC Net Library, Questia, University Press, ebrray, and sage Publications, etc.

Advantages of e-books are:

- Access anytime, anywhere. Academics and students do not have to come to the library to check something; they can do it at their own convenience. Academic staffs are frequently away from their offices or travelling internationally and want to be able to access collections at times that suit them.
- Full-text searches. E-books offer full-text searches with other search capabilities and more comprehensive retrieval of information.
- Enriched text. Functionalities of electronic text that are useful include the ability to change font sizes and typefaces. E-books allow non-permanent highlighting and annotation. Though accessing and using e-books has advantages, there are disadvantages as well. The following are some of the disadvantages of e-books.
- Difficulties with reading on screen. Many people still find it difficult to read on screen.
- Technical requirements. Some books available as e-books cannot be read on particular e-book readers because they are not supplied in a readable format.
- Compatibility with citation software. Academic libraries usually support a particular citation software package, and this may not be compatible with some e-book collections.

**Electronic Mail (e-mail)**

E-mail as a method of exchanging digital messages from an author to one or more recipients. Modern e-mail operates across the internet or other computer networks. E-mail servers accept, forward, deliver and store messages. Neither the users nor their computers are required to be online simultaneously; they need to connect only briefly, typically to a mail server, for as long as it takes to send messages. E-mail uses technology to communicate a digital message over the internet. Users use e-mails differently, based on how they think about it. There are
Electronic references resources

Now various vendors and publishers are providing various reference sources in electronic form through their databases and web sites such as dictionaries yearbook, encyclopedia sets. Some of them are dictionaries online (WWW.dictionaries.com, www.dic.leo.org); yearbooks online (www.uja.org); directories online (www.people.yahoo.com). Etc Wikipedia’s a new form of reference source which does not have its printed counterparts. Lots of information is available in the Wikipedia and the most interesting thing is that new information can be added by the user and the information available can also be altered.

Electronic Newspapers

E-newspaper is a newspaper that exists on the World Wide Web or internet and holds the information electronically. It may exist either separately or as an online version of printed newspaper. E-newspaper much like hard copy newspapers and have same legal boundaries such as privacy and copyrights. For example, Times of India, Hindustan times in India provide latest and most updated news electronically.

Electronic Magazines (e-zines)

Electronic magazine or e-magazine is an online magazine published on the World Wide Web. Some online magazines call themselves a webzine. An ‘ezine’ (also spelled e-zine) is a more specialized term appropriately used for small magazines and newsletters distributed by any electronic method, for example, by electronic mail. Some social groups may use the terms cyberzine and hyperzine when referring to electronically distributed resources. Similarly, some online magazines may refer to themselves as “electronic magazines” or “e-magazines” to reflect their readership demographics or to capture alternative terms and spellings in online searches. An online magazine shares some features with a blog and also with online newspapers, but can usually be distinguished by its approach to editorial control. Magazines typically have editors or editorial boards who review submissions and perform a quality control function to ensure that all material meets the expectations of the publishers (those investing time or money in its production) and the readership. Many large print-publishers now provide digital reproduction of their print magazine titles through various online services for a fee. These service providers also refer to their collections of these digital format products as online magazines, and sometimes as digital magazines.

Electronic Thesis and Dissertations

E-Thesis and Dissertation is now very useful tool to collect large data for specific subject. This is a very useful service for users or mostly researchers. It reduces the duplication of research works and gives assistance for the selection of the research area to the users of the libraries. As these can be searched subject wise, it reduces the labour of the reference staff a lot. It is an electronic document that explains the intellectual works or research of researchers carried out in a

many software platforms available to send and receive; popular ones include: Gmail, Hotmail, Webmail, Yahoo, Outlook and many others. The ‘at’ sign (@), is part of every Simple Mail Transfer Protocol (SMTP) e-mail address. E-mail offers a way to communicate effectively with academics, library staff and users. E-mail Listserv technology supporting a web form provides a way for academic staff and users to communicate messages about problems with e-resources to the appropriate users and subject librarians. Other uses of e-mail to support e-resources management communications are individual e-mail messages about federated search tools, email from users, and general e-mail address that staff provides to vendors for communication to multiple individuals in e-resources management. In general, e-mails facilitate access to and use of e-resources and are one of the ICTs which academic libraries have to put in place.

Full Text Databases

A full-text database is a compilation of documents or other information in the form of a database in which the complete text of each referenced document is available for online viewing, printing, or downloading. In addition to text documents, images are often included, such as graphs, maps, photos, and diagrams. A full-text database is searchable by keyword, phrase, or both. Full-text databases are defined as a collection of data in a server or computer for easy access format that provide full-text document instead of just a citation typically in PDF or HTML. Full-text databases became common around 1990 when computer storage technology made them economic and technologically possible. Electronic databases form the basis of most of IRS available today. Access to these databases is normally restricted to registered personnel or to people who pay a specified fee per viewed item. Full-text databases are also used by some corporations, law offices, and government agencies.

Electronic Images (e-images)

An e-image is a system of photography using a sensor placed behind a camera lens to translate an image into an electronic signal which can be stored on a disk or magnetic tape for playback on a VCR or video disc player and viewing on a television screen. Electronic image is an image represented as a 2-dimensional array of brightness values for pixels.

Electronic audio resources

E-audio resources are used to download free of charge to our e-reader or other digital device such as a mobile phone or MP-3 player. For example, Dolby E is an audio encoding and decoding technology developed by Dolby Laboratories. It allows up to eight channels of audio to be compressed into a digital stream that can be stored on a standard stereo pair of audio tracks.

Electronic clipping (e-clipping)

The main objective of e-clippings is the retrospective search and comprehensive analysis of new items. It helps the users to retrieve new clips by simple clicks. The news items from different sources are identified and scanned at the earliest. The routines for scanning and storing the clips, in other words the sources for the clips have to be made easy with suitable programs that would speed up the process. The news items are archived into server and users have the options to view them by specific data, duration, keyword or new source.
particular subject domain and specifying a particular period. These documents are undoubtedly highly valuable collections especially in digital format that qualify to be an important component of a digital library. Several universities and institutions have already implemented electronic submission of doctoral dissertations under the overall umbrella of an international digital library initiative called “Networked Digital Library of Theses and Dissertations (NDLTD)”.

**Online Databases**

On-line Database is a collection of information categorized by specific fields. Databases are usually searchable by keywords topics. An e-database is an organized collection of information, of a particular subject or multi-disciplinary subject areas. The information of an e-database can be searched and retrieved electronically. Contents include journal articles, newspaper articles, book reviews and conference proceedings, etc. Information organized and stored in a database, with structured cross-document search and retrieval, relational data structured, efficient query mechanisms. On-line search access to databases has generated the concept of libraries because the literature reported in the on-line searches is scattered in many libraries. The libraries instead of acquiring everything on their subject field will depend more on the network of which they will form a part and share the resources among themselves.

**Electronic Patents (e-patents)**

Patents are specifications concerning the design or manufacture of products and processes that are protected and secured for the exclusive profit of the designer or inventor for a limited number of years that varies in different countries from fifteen to twenty years. The term patent usually refers to an exclusive right granted to anyone who invents any new, useful and non-obvious process, machine, article of manufacture or composition of matter or any new and useful improvement thereof, and claims that right in a formal patent application. The procedure for granting patents, the requirements placed on the patentee, and the extent of the exclusive rights vary widely between countries according to national laws and international agreements.

**Electronic Standards (e-standards)**

Standards are agreed targets for performance, or an accepted format for the operation of a system. Technical standards specify how materials and products should be manufactured, defined, measured or tested according to proven and accepted methods. Standards maybe issued by companies, or by other organizations both national and international. Standards are very important both in the library and computer fields. MARC and its variant are bibliographic standards that are used most extensively in the libraries for cataloguing of bibliographic records. Similarly, AACR-II is a standard for rendering, display and printing of bibliographic records. Universal Decimal Classification Scheme (UDC) is a British standard (BS-1000).

**12. Emerging Types of Electronic Resources**

Listed below are emerging types of e-resources that take unconventional and innovative routes to handle information, and hold considerable potential for libraries as well.

- **Blogs**
  
  Blogs are personal diaries where the entries and events are listed in reverse chronological order. They have a very simple format, and do not have very stringent patterns of writing. Thus, they have revolutionized the concept of web publishing. Other readers can also record their comments and concerns on the blogs.

- **Wikis: Editable Websites**
  
  Wikis are a useful tool for facilitating online education. They can also consider helpful for the creation of delivery of user-generated documentation for the work groups and teams, since these are places where blogs and wikis are maintained to track progress report.

- **Really Simple Syndication Feeds**
  
  Really Simple Syndicate or Rich Site Summary (RSS) is an “XML text based data format containing a list of items, each typically with a title, summary, URL link, and date.” Its main purpose is to alert users to any future changes and modifications that have been made within the core document or the source. Libraries can use RSS feeds as an easy means of publicizing activities, developments, and other library-related news. RSS feed give us the ability to subscribe to various services and link to other users. It can be used to disseminate news events or summary of information on a particular topic.

- **Shared Bookmarking: “Social Classification” or Folksonomies”**
  
  This offers libraries a new tool, although, almost by definition, they are possibly of more use to personal users. It allows users to store bookmarks online.

**13. Utilities of E-Resources**

- a. E-publishing may be less costly than paper.
- b. E-Resources are created in any file format like text, audio, video and images.
- c. E-resources are available for 24 hours of a day and save library space.
- d. The E-resources search is easy because of user-friendly interface.
- e. They provide users faster, more convenient and anytime access from home, campus or library.
- f. E-resources can be accessed by the support of advanced search and retrieval system.
- g. The content can be reproduced, forwarded, modified and leading to problem with copyright protection and preserving authenticity.
- h. The electronic environment enables to library to integrate with other libraries and make use of their resources also.
- i. Those who have limited time to access to the libraries can effectively access to the libraries by dialing up process.
- j. The libraries provide access to very large amount of information resources.
14. Discovery of a New Potential Resource

A resource may be discovered in a variety of ways, such as a vendor sales call, e-mail, or brochure; a subject librarian referral; or a patron referral. The discovery of different resources may vary greatly within an institutional organization, but will vary between types of libraries. Once a resource of interest is identified, the following items must be determined and assessed:

- Overlap with current content.
- License terms.
- Possible access points and issues.
- Pricing.
- Audience size.

15. Acquisition of Resource/Price Negotiation

During the acquisition phase of the cycle, the librarian who manages the collections will begin the process of price and access level negotiation. The first step of this process is generally agreeing on what price will be paid for the resource at a given access level. The pricing of a resource is generally negotiable; even though the resource price was quoted in the discovery phase, it is not necessarily the price that will be paid once negotiation concludes. Traditionally, the acquisition phase has focused primarily on ordering, receiving, and paying for published materials and services. Librarians working with e-resources must consider the following variables:

- Quantity
- Purchase type
- Costs
- Archival rights
- Vendor
- License terms

16. Contact Negotiation (Licensing)

It is a vital step in the process of obtaining an e-resource, because the contract governs the use of the resource by the end user. It is important that a librarian responsible for licensing review the terms in detail and negotiate for as much flexibility as possible for the end user.

17. Activation and Provision of Access

The majority of e-resources that are purchased by a library will need to be activated in some form or fashion. Many publishers as well as vendors provide tools to assist both in the registration of these materials and in the provision of access. A librarian will need to choose the mode of provision of access for all the e-resources that are acquired. Making the resources available to the patron in as many locations and in as many ways possible will ensure that the resource is used by the largest percentage of the potential user population as possible.

18. Troubleshooting Resources

Electronic resources come with a variety of issues and problems that may or may not occur during the life of the resource. These problems can range from human entry errors in date range availability or IP range information to errors in the products themselves. It is important for a librarian to know what types of issues he or she can resolve and what types of issue must be delegated to either internal organization information technology professionals or external vendor or publisher-based IT professionals.

19. Statistics Gathering

Statistics are vital in the evaluation of resources as they come up for renewal each year. Statistics can be used as a tool to justify the need for additional funding, or even in the battle to minimize financial cuts. There are a variety of services that can be purchased to aid in the gathering and processing of statistical information. However, many libraries of all types and size choose to create their own statistics gathering models using a program such as Excel to gather and breakdown the usage information for various resources and resources sets.

20. Review and Renewal of Resource

Review of the resource is the final step in the electronic resources life cycle. This steps results in the renewal of the resource for another year, a multiyear contract, or the cancellation of the resource. This is the final step of the yearly process for most electronic resources subscribed to by a library. This step of the process may be conducted by a single individual or by a group of stakeholders. Many libraries have created a committee of people who work on this type of decision-making process. In many cases all of the following people are included in such a committee:

- Electronic Resources Librarian
- Acquisition Librarian
- Collection Development Librarian
- Collection Selectors
- Reference Librarian
- Library Administrators

Once this step of the process is complete, the life cycle begins again for the next year.

21. Selection of E-Resources

Selection is not a new term to librarian, staff and users as they have been doing it since long back the libraries started acquiring printed material. However libraries are now focusing to take e-resources information technology approaching towards the e-resources rather than printed material as technology developed. The selection process should be done in relevant with the demands of the users, committee, focus group, user’s recommendation etc. Apart from this, it should take into consideration the following steps:

1) To identify library needs.
2) To identify content and scope of the e-resources.
3) To evaluate quality of that particular resource and search capabilities.
4) To estimate the cost.
5) To check either subscription based or web based when acquiring.
6) To evaluate the systems and technical support.
7) To review licensing agreements.
8) To evaluate application software and installation, updated sporadically or in regular schedule.
9) To check the facilities for educational support and training.

22. Issues Related to E-Resources

E-resources more benefited to all but there are many issues and challenges posed in its management to librarians like:

a. **Licensing Issues**: E-resources need the license from the publishers to use in libraries. License may be for single or multiple users and selected as per the need of users and availability of funds and demand of its use.

b. **Intellectual Property Rights**: E-Resources can be easily copied and forwarded to the users, so librarians have to be alert about IPR (Intellectual Property Rights) issues while delivery of information.

c. **Standards of Metadata**: There are standards for metadata description like MARC21 but the available e-resources in the market are not following standardized MARC21.

d. **Low Budget**: Libraries are non-profit organization so they cannot purchase and afford the costly electronic resources since budgets are very limited and not increased. Budgets are not suiting to fulfilling needs of users even in e-environment.

e. **Skilled Manpower**: To manage electronic collection properly, additional skills are required among the staff but existing manpower is lacking desired skills.

f. **Lack of Infrastructure**: Use of electronic collection is more effective if supported by powerful ICT components. It is observed that infrastructure in many libraries is not to the mark. Use of r-resources need best configuration.

g. **Awareness of e-resources**: Users are not aware of resources available in their areas and ultimately use is also limited. There is a strong need to enhance the use of e-resources by orienting users. Orientation to users develops awareness and use of e-resources may enhance.

23. Advantages of E-Resources

1. **Accessible and searchable**: E-resources can be accessed on/off the campus 24x7 and are easily searched with advance search techniques which are quick and can be used for easy pinpointing. Full-text search of e-resources can also be done via an online index. The same resources can be used simultaneously by a number of institutions and patrons.

2. **Interactive**: articles are available in e-resources can be read, commented on, and amended quickly by readers, and also can receive feedback through the web.

3. **Links and Alerts**: The hypertext format provides links to relevant articles and important websites, as well as constant URLs for particular articles. The latest issues loaded/published alert the users/readers through e-mail and other modes.

4. **Inexpensive**: Electronic resources are cheaper than printed materials with regard to printing and distribution costs. Electronic formats alleviate the staff and facility costs associated with material shelving and storage, both in current stack areas and in storage facility.

5. **Flexibility**: E-journals evolve quickly. They are not tied to or regulated by a particular format, printer, or distribution network.

6. **No physical boundary**: The users of e-resources are not need to go to the library physically; users from all over the world can gain access to the same information, as long as an internet connection is available.

7. **Space**: traditional libraries are limited by storage space, whereas digital libraries with e-resources have the potential to store much more information, and simply because e-resources require very little physical space to contain them and media storage technologies are more affordable than ever before.

24. Disadvantages of Electronic Resources

1. Discomfort in reading from the screen or poor graphic quality.
2. Access to e-resources requires knowledge of computer and internet skills on the part of the users.
3. Depending upon the internet speed, e-resources can be accessed and downloaded.
4. Perishable Citation: Once online, if a website changes, the URL citations disappear.
5. Authenticity: Authors concerned about establishing the sources and authority of material in general, find it hard to convince the reader of their credibility.
6. While searching through the web for a particular e-resource, a deluge of related information appears against the useless ones.
7. It is tough to decide when one should stop searching the required information and start writing. This leads to procrastination, as one keeps on looking through information and making it difficult to get started with the writing stuff by holding a particular end.
8. There are chances that the quality of work that one wishes to develop may go down because of the elaborate and taxing search through what is legitimate information and what is not.

25. Various digital information services provided through Electronic Libraries

Following are some of the electronic/Digital information services, which can be provided by Electronic libraries:

1. On-line public Access catalogue (OPAC)
2. CD-ROM Network Service
3. On-line Circulation Transaction
4. E-mail Service
5. Bulletin-Board Service
6. CAS (Current Awareness Service)
7. SDI (Selective Dissemination of Information)
8. Indexing and abstracting service
9. Content page service
10. Intranet and Internet service
11. Other bibliographical service and demand

26. Role of E-Resources in Higher Education

E-resources play an important role in higher education. “Library”, “resources” and “education” are three indissoluble and indivisible concepts. The easy of availability of e-resources have led to an increase in the demand for research and academic materials. E-resources have become more popular because of the set of incredible benefits that they bring to organizations, students, faculties, and research scholars. A few benefits have been discussed below:

1. Simultaneous searching and accessibility by multiple users.
2. Searching by keywords helps the academician and researchers in building an environment where work-isolation has become irrelevant.
3. Search can be conducted through various search engines.
4. Before acquisition e-books, e-journals, abstracts of the journals, or content of the books can be accessed and reviewed by faculties, research scholars, and students.
5. The users appreciates the way of searching online, browsing, retrieval, scanning and even submission of manuscripts, as it saves their time and increase work productivity.
6. Knowledge sharing can be done through transfer of electronic files via emails, messengers, and other media.

Considering these benefits, students, faculties, and research scholars in most institutions access e-resources to support their academic and research work.

27. Evaluation of the E-Resources

Evaluation of e-resources is the most important step for the librarian once the resources have been identified. There are several criteria for the evaluation of e-resources, they are discussed as follows:

a. Content: The first step calls for reviewing and evaluating the content present within the e-resources to investigate areas like full-text, bibliographic citations, availability of retrospective material, annotations, statistically and graphically explained data, for the better guidance of users. These are generally based on the curriculum of the research work of the users.

b. Updates: To find out the frequency of updates, content embargos, and archiving availability is another part of the evaluation of e-resources.

c. Quality: Evaluation is essential to investigate the reputation of a publisher, and find out about their intellectual level, along with the quality of information they are offering.

d. Indexing Upgrades: Upgrades should be done to keep track of the e-resources, as well as the frequency of their indexing.

e. Authority: It is important to consider that e-resources should be authoritative. Evaluate whether a particular resource is scholarly or not. In the case of journals, the impact factor (its citation rating) should be considered.

f. Accessibility: The evaluator should also consider that the product should be easily accessible for users. The various interfaces such as the possibility of customization, stability, availability of a thesaurus, downloading options, searching options such as Boolean, and proximity, field-specificity, etc., should be looked into while evaluating the e-resources.

g. Cost Factor: Cost considerations for e-resources are the most confusing part. For products like monographs and periodicals, costs vary according to the number of simultaneous users, remote access and so forth. The pricing plans, though, are not standardized between vendors, but may be standardized for individual vendors.

h. Technical Support: Evaluation should consider the technical support of the service provider for the products. Technical support may include a staff training program and online help, as well as detailed help pages for the users of the product which are compatible with existing hardware and software.

i. Licensing Agreement: Though reviewing a license agreement is not considered a selector’s job, it is important to carefully consider the general agreement such as various restrictions, access to archived information, definition of authorized users, use for distance education, off-campus access, and availability of usage statistics.

28. Conclusion

The e-resources available in different formats help and support the users to carry out the teaching and research in an efficient manner and quickly, as the e-copies are available anytime and anywhere. The present age is rightly characterized as the age of information. The fact that information is a key resource for the economic, socio-cultural and political development of a nation is gaining increasing acceptance. In this computer age, electronic resources play an important role in library and information centers. This is especially because of information explosion, availability of information in machine readable form, increase in users, storage capacity etc. The internet and electronic information resources are becoming a part of today’s education system. The study helps to find out the use of e-resources in the educational and research fields.

In conclusion, it can be said that in view of credibility, the internet and e-resources have exponentially changed the way people communicate, interact, acquire, sharing knowledge, search, investigate and participate in creation and reuse of the
content and prompted to bring the revolutionary changes in almost all the spheres of activities of present day education and learning system and evolved broadly a collaborative structure over the ground and pillars of a range of new technological tools and techniques.

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