Next Generation Retrieval:
Semantic Web and Ontologies

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ABSTRACT

There has been a growing interest in the investigation and development of the next generation web - the Semantic Web. While most of the current forms of web contents are designed to be presented to humans, but are barely understandable by computers, the contents of the Semantic Web are structured in a semantic way so that it is meaningful to computers as well as to humans. In this paper, the authors report recent research and activities on the Semantic Web. In particular, the opportunities that this revolution is bringing to us: web-services, agent-based distributed computing, semantics-based web search engines, semantics-based digital libraries, etc. The paper also discusses the technical and cultural challenges of realizing the Semantic Web: the development of ontologies, formal semantics of Semantic Web languages, and trust and proof models. It is hoped that the paper will shed some light on the direction of future work in this field.

INTRODUCTION

The Semantic Web, in particular the W3C Ontology Web Language (*OWL*), provides powerful new use-cases for information retrieval, searching, and manipulation.

The Internet and the World Wide Web have brought a revolution to information technology and the daily lives of most people. However, most of the current forms of web contents are designed and structured for use by people but are barely understandable by computers. The goal of the Semantic Web, is to develop expressive languages to describe information in forms understandable by machines.

XML (Extensible Markup Language) has brought great features and promising prospects to the development of the Semantic Web. Currently, there are numerous techniques and tools available for XML, *e.g.*, SAX (Simple API for XML), DOM (Document Object Model), XSL (Extensible Stylesheet Language), XSLT (XSL Transformation), XPath, XLink, and XPointer, and XML parsers are available in different languages and for different platforms. Using XML, one can describe document types for various domains and purposes. *For example*, XML documents may represent multi-media presentations and business transactions (XML/EDI-Group). Applications can access XML documents via standard interfaces like SAX and DOM. A number of XML query languages have been proposed, including XML-QL, X-QL, Lorel and XQuery, etc. Furthermore, some researchers propose that these query languages should be extended with an update capability so that an XML document repository becomes an XML database.

XML will continue to play an important role in the development of the Semantic Web. However, it does not provide a full solution to the requirements of the Semantic Web. XML can represent only some semantic properties through its syntactic structure, *i.e.*, by the nesting or sequentially ordering relationship among elements (XML tags). XML queries need to be aware of this syntactic structure via the document type that is defined by a DTD (Document Type Definition). Although one might derive some sort of semantics from the structure of the documents within the context of the document type, the semantics of each element (XML tag) is not defined and its interpretation totally relies on the implicit knowledge hardcoded in application programs. To develop a Web with semantics, resources on the Web need to be represented in or annotated with structured machine-understandable descriptions of their contents and relationships, using vocabularies and constructs that have been explicitly and formally defined with a domain *ontology*.

The most acceptable definition of ontology seems to be the following one by Gruber: an ontology is a "*formal specification of a conceptualization*", and is shared within a

specific domain. The world view that an ontology embodies is usually conceived as a hierarchical description of a set of concepts (is-a hierarchy), a set of properties and their relationships, and a set of inference rules. Berners-lee outlined the architecture of the Semantic Web in the following three layers:

The metadata layer: The data model at this layer contains just the concepts of *resource* and *properties*. Currently, the RDF (Resource Description Framework) is believed to be the most popular data model for the metadata layer.

The schema layer: Web ontology languages are introduced at this layer to define a hierarchical description of concepts and properties. Currently, RDFS (RDF Schema) is considered as a candidate schema layer language.

The logical layer: More powerful web ontology languages are introduced at this layer. These languages provide a richer set of modeling primitives that can be mapped to the well-known expressive Description Logics. Currently, OIL (Ontology Inference Layer) and DAML-OIL (Darpa Agent Markup Language-Ontology Inference Layer) are two popular logical layer languages.

With the creation and development of the Semantic Web, various web resources are able to be accessed by machines in a semantic fashion. The questions are; what opportunities will this new technology bring to us and what challenges and work are we facing now to get us from today's Web to the Web of tomorrow – the Semantic Web? In this paper, the authors share their understanding of the answers to these questions and it is hoped that this will shed some light on the future research in this area.

SEMANTIC WEB SERVICES

Service-Oriented Computing (SoC) and Service-Oriented Architectures have been receiving considerable attention recently and many view them as the emerging distributed computing model for the Internet applications. The Service-Oriented Architecture is manifested by Web Services, which are self-contained, self-describing, modular applications built from components and which may be instantiated on the Internet. The Web Services model develops a componentized view of web applications and is becoming the emerging platform for distributed computing. The standardization process is driven by the growing need to enable dynamic Business-to-Business (B2B) interactions on the Web. Those interactions require smooth choreography (or coordination, orchestration) of Web Services. The Service-Oriented Architecture considers a loosely coupled component model, where a Web Service interface (component) encapsulating any type of business logic is described in a standardized interface definition language, the Web Services Description Language (WSDL). Web Service components interact over an XML messaging protocol and interoperate with other components using the Simple Object Access Protocol (SOAP).

At the same time, Semantic Web Services combine Web Service standards, briefly outlined above, with semantic techniques, methods and tools. The research domain of semantic Web Services is fairly new and, therefore, research has yielded many forms of prototypes, proposals and test-beds. The overall goal of initiatives under the semantic Web Services umbrella are to semantically enrich all activities carried out with Web Services, *i.e.*, publishing, finding, and binding Web Services. This enrichment can be basically achieved by allowing for the attachment of semantic information to Web Services artifacts (documents).

PURPOSE

Humans are capable of using the Web to carry out tasks such as finding the Finnish word for "monkey", reserving a library book, and searching for a low price for a DVD. However, a computer cannot accomplish the same tasks without human direction because web pages are designed to be read by people, not machines. The semantic web is a vision

of information that is understandable by computers, so that they can perform more of the tedious work involved in finding, sharing, and combining information on the web.

Semantic publishing will benefit greatly from the semantic web. In particular, the semantic web is expected to revolutionize scientific publishing, such as real-time publishing and sharing of experimental data on the Internet. This simple but radical idea is now being explored by W3C HCLS group's Scientific Publishing Task Force.

Semantic Web application areas are experiencing intensified interest due to the rapid growth in the use of the Web, together with the innovation and renovation of information content technologies. The Semantic Web is regarded as an integrator across different content and information applications and systems, and provides mechanisms for the realization of Enterprise Information Systems. The rapidity of the growth experienced provides the impetus for researchers to focus on the creation and dissemination of innovative Semantic Web technologies, where the envisaged 'Semantic Web' is long overdue. Often the terms 'Semantics', 'metadata', 'ontologies' and 'Semantic Web' are used inconsistently. In particular, these terms are used as everyday terminology by researchers and practitioners, spanning a vast landscape of different fields, technologies, concepts and application areas. Furthermore, there is confusion with regards to the current status of the enabling technologies envisioned to realize the Semantic Web.

Web 3.0

Tim Berners-Lee has described the semantic web as a component of 'Web 3.0'

People keep asking what Web 3.0 is? I think maybe when you've got an overlay of scalable vector graphics - everything rippling and folding and looking misty — on Web 2.0 and access to a semantic Web integrated across a huge space of data, you'll have access to an unbelievable data resource.

Relationship to the Hypertext Web
Limitations of HTML

Many files on a typical computer can be loosely divided into documents and data. Documents like mail messages, reports, and brochures are read by humans. Data, like calendars, addressbooks, playlists and spreadsheets are presented using an application program which lets them be viewed, searched and combined in many ways.

Currently, the World Wide Web is based mainly on documents written in Hypertext Markup Language (HTML), a markup convention that is used for coding a body of text interspersed with multimedia objects such as images and interactive forms. Metadata tags, *for example*

    <**meta**name="keywords"content="computing, computer studies, computer">
    <**meta**name="description"content="Cheap widgets for sale">
    <**meta**name="author"content="John Doe">

provide a method by which computers can categories the content of web pages.

With HTML and a tool to render it (perhaps web browser software, perhaps another user agent), one can create and present a page that lists items for sale. The HTML of this catalog page can make simple, document-level assertions such as "this document's title is 'Widget Superstore'", but there is no capability within the HTML itself to assert unambiguously that, *for example*, item number X586172 is an Acme Gizmo with a retail price of €199, or that it is a consumer product. Rather, HTML can only say that the span of text "X586172" is something that should be positioned near "Acme Gizmo" and "€199", etc. There is no way to say "this is a catalog" or even to establish that "Acme Gizmo" is a kind of title or that "€199" is a price. There is also no way to express that these pieces of information are bound together in describing a discrete item, distinct from other items perhaps listed on the page.

Semantic HTML refers to the traditional HTML practice of markup following intention, rather than specifying layout details directly. *For example*, the use of <em>

denoting "emphasis" rather than <i>, this specifies italics. Layout details are left up to the browser, in combination with Cascading Style Sheets. But this practice falls short of specifying the semantics of objects such as items for sale or prices.

Micro formats represent unofficial attempts to extend HTML syntax to create machine-readable semantic markup about objects such as retail stores and items for sale.

SEMANTIC WEB SOLUTIONS

The Semantic Web takes the solution further. It involves publishing in languages specifically designed for data: Resource Description Framework (RDF), Web Ontology Language (OWL), and Extensible Markup Language (XML). HTML describes documents and the links between them. RDF, OWL, and XML, by contrast, can describe arbitrary things such as people, meetings, or airplane parts. Tim Berners-Lee calls the resulting network of Linked Data the Giant Global Graph, in contrast to the HTML-based World Wide Web.

These technologies are combined in order to provide descriptions that supplement or replace the content of Web documents. Thus, content may manifest itself as descriptive data stored in Web-accessible databases, or as markup within documents (particularly, in Extensible HTML (XHTML) interspersed with XML, or, more often, purely in XML, with layout or rendering cues stored separately. The machine-readable descriptions enable content managers to add meaning to the content, *i.e.*, to describe the structure of the knowledge we have about that content. In this way, a machine can process knowledge itself, instead of text, using processes similar to human deductive reasoning andinference, thereby obtaining more meaningful results and helping computers to perform automated information gathering and research.

An example of a tag that would be used in a non-semantic web page:

<item>cat**</item>**

Encoding similar information in a semantic web page might look like this:

<itemrdf:about="http://dbpedia.org/resource/Cat">Cat**</item>**

Relationship to object oriented programming: A number of authors highlight the similarities which the Semantic Web shares with object-oriented programming (OOP). Both the semantic web and object-oriented programming have classes with attributes and the concept of instances or objects. Linked Data uses Dereference able Uniform Resource Identifiers in a manner similar to the common programming concept of pointers or "object identifiers" in OOP. Dereference able URIs can thus be used to access "data by reference". The Unified Modeling Language is designed to communicate about object-oriented systems, and can thus be used for both object-oriented programming and semantic web development.

When the web was first being created in the late 1980s and early 1990s, it was done using object-oriented programming languages such as Objective-C, Smalltalk and CORBA. In the mid-1990s, this development practice was furthered with the announcement of the Enterprise Objects Framework, Portable Distributed Objects and WebObjects all by NeXT, in addition to the Component Object Model released by Microsoft. XML was then released in 1998, and RDF a year after in 1999.Similarity to object oriented programming also came from two other routes: the first was the development of the very knowledge-centric "Hyperdocument" systems by Douglas Engelbartand the second comes from the usage and development of the Hypertext Transfer Protocol.

NEED

The idea of a 'semantic web' necessarily coming from some marking code other than simple HTML is built on the assumption that it is not possible for a machine to appropriately interpret code based on nothing but the order relationships of letters and words. If this is not true, then it may be possible to build a 'semantic web' on HTML alone, making a specially built 'semantic web' coding system unnecessary.

There are latent dynamic network models that can, under certain conditions, be 'trained' to appropriately 'learn' meaning based on order data, in the process 'learning' relationships with order (a kind of rudimentary working grammar).Semantic web comprises the standards and tools of XML, XML Schema, RDF, RDF Schema and OWL that are organized in the Semantic Web Stack. The Overview describes the function and relationship of each of these components of the semantic web:

XML provides an elemental syntax for content structure within documents, yet associates no semantics with the meaning of the content contained within.

XML Schema is a language for providing and restricting the structure and content of elements contained within XML documents.

RDF is a simple language for expressing data models, which refer to objects ("resources") and their relationships. An RDF-based model can be represented in XML syntax.

RDF Schema is a vocabulary for describing properties and classes of RDF-based resources, with semantics for generalized-hierarchies of such properties and classes.

OWL adds more vocabulary for describing properties and classes: among others, relations between classes (*e.g.* disjointness), cardinality (*e.g.* "exactly one"), equality, richer typing of properties, characteristics of properties (*e.g.* symmetry), and enumerated classes.

SPARQL is a protocol and query language for semantic web data sources.
Current ongoing standardizations include:

Rule Interchange Format (RIF) as the Rule Layer of the Semantic Web Stack
Not yet fully realized layers include:

- Unifying Logic and Proof layers are undergoing active research.

The intent is to enhance the usability and usefulness of the Web and its interconnected resources through:

- Servers which expose existing data systems using the RDF and SPARQL standards. Many converters to RDF exist from different applications. Relational databases are an important source. The semantic web server attaches to the existing system without affecting its operation.
- Documents "marked up" with semantic information (an extension of the HTML <meta> tags used in today's Web pages to supply information for Web search engines using web crawlers). This could be machine-understandable information about the human-understandable content of the document (such as the creator, title, description, etc., of the document) or it could be purely metadata representing a set of facts (such as resources and services elsewhere in the site). (Note that *anything* that can be identified with a *Uniform Resource Identifier* (URI) can be described, so the semantic web can reason about animals, people, places, ideas, etc.) Semantic markup is often generated automatically, rather than manually.
- Common metadata vocabularies (ontologies) and maps between vocabularies that allow document creators to know how to mark up their documents so that agents can use the information in the supplied metadata (so that *Author* in the sense of 'the Author of the page' won't be confused with *Author* in the sense of a book that is the subject of a book review).
- Automated agents to perform tasks for users of the semantic web using this data
- Web-based services (often with agents of their own) to supply information specifically to agents (*for example*, a Trust service that an agent could ask if some online store has a history of poor service or spamming)

CHALLENGES

Some of the challenges for the Semantic Web include vastness, vagueness, uncertainty, inconsistency and deceit. Automated reasoning systems will have to deal with all of these issues in order to deliver on the promise of the Semantic Web.

Vastness: The World Wide Web contains at least 100 billion pages. The SNOMED CT medical terminology ontology contains over 370,000 class names, and existing

technology has not yet been able to eliminate all semantically duplicated terms. Any automated reasoning system will have to deal with truly huge inputs.

Vagueness: These are imprecise concepts like "young" or "tall". This arises from the vagueness of user queries, of concepts represented by content providers, of matching query terms to provider terms and of trying to combine different knowledge bases with overlapping but subtly different concepts. Fuzzy logic is the most common technique for dealing with vagueness.

Uncertainty: These are precise concepts with uncertain values. *For example*, a patient might present a set of symptoms which correspond to a number of different distinct diagnoses each with a different probability. Probabilistic reasoning techniques are generally employed to address uncertainty.

Inconsistency: These are logical contradictions which will inevitably arise during the development of large ontologies, and when ontologies from separate sources are combined. Deductive reasoning fails catastrophically when faced with inconsistency, because "anything follows from a contradiction". Defeasible reasoning and par consistent reasoning are two techniques which can be employed to deal with inconsistency.

Deceit: This is when the producer of the information is intentionally misleading the consumer of the information. Cryptography techniques are currently utilized to alleviate this threat.

This list of challenges is illustrative rather than exhaustive, and it focuses on the challenges to the "unifying logic" and "proof" layers of the Semantic Web. The World Wide Web Consortium(W3C) Incubator Group for Uncertainty Reasoning for the World Wide Web (URW3-XG) final report lumps these problems together under the single heading of "uncertainty". Many of the techniques mentioned here will require extensions to the Web Ontology Language (OWL) *for example* to annotate conditional probabilities. This is an area of active research.

SEMANTIC WEB BENEFITS AND EXAMPLES

The Semantic Web, in particular the W3C Ontology Web Language (OWL) Recommendation, provides powerful new use-cases for information retrieval, searching and manipulation. This section provides a high level overview of the arguments that support the above statement. A running example (incorporated a W3C example found at www.w3c.org) describe some of the ways in which OWL facilitates the powerful new use-cases. Where possible, it point out the limitations of the technologies that OWL supersedes (such as HTML and RDF).

The studies shows that the Web Services 'stack' in 2003 in comparison to the "current Web", we note that today's Web technology stack (mostly HTML) would mostly sit above XML and below RDF. Related specifications such as Java Server Pages (JSP) (together with Java Server Faces), and Java Script add a layer of sorts above HTML, but with nowhere near the semantic richness of RDF and OWL. Note that Web Services have a complex 'stack' of syntax protocols themselves.

One table stores regions and their traditional meals, another stores meals, courses and wines, while a third stores grapes and their characteristics. In a Relational Database scenario, a single company might store all 3 tables using identical technology; a join between them would therefore be simple. On the Internet, we cannot count on information having the format or meaning that we assume. Therefore, an Internet analogy to the Database join would not be easily possible with the current Web. *For example*, if the three tables were now three Websites with HTML information, one might see an HTML table of meals:

```
<table border="l" cellpadding="0" cellspacing="0"><tr><td>Country</td><td>Region</td><td>Meal</td></tr><tr><td>France</td><td>Bordeaux</td><td>Steak Frites</td></tr><tr><td>France</td><td>Normandy</td><td>Magret de Canard</td></tr></table>
```

While the above HTML will render appealingly in most Web browsers and create a meaningful table for human users, the information therein is not easily interpreted by a software agent wishing to 'joins' this table with other information. This is because the HTML mixes presentation with semantic tags, cannot not make it explicitly clear what the table semantics are, and does not differentiate instances from labels, from examples, and so on (*e.g.* all the things that are easy for human readers to do). The HTML<meta> tag can be used to document a limited, but insufficient, amount of page metadata.

The *Web Ontology Language* (OWL), a W3C Recommendation and a Semantic Web building block, supports the kind of machine interpretability described above. W3C's OWL Lite, OWL DL, and OWL Full are the three increasingly powerful variants of the OWL specification. The language is built on formalisms that admit to *Description Logic* (DL) forms and therefore allows reasoning and inference. Reasoning is the act of making implicit knowledge explicit. *For example*, an OWL knowledge base containing descriptions of students and their parents could infer that two students exhibited the 'brother' relationship if there were both male and shared one or more parent. No explicit markup indicating the 'brotherhood' relationship need ever have been declared. A *Reasoning Engine* is computational machinery that uses facts found in the knowledge base and rules known a priori to determine Subsumption, Classification, Equivalence, and so on. F-OWL, FaCT, and Racer are examples of such engines. OWL Full is so expressive that there are no computational guarantees that inferences can be made effectively and it is unlikely that any such engine will be able to support all its features soon. However, OWL Lite and subsets of OWL DL can be supported.

CONCLUSION

The Semantic Web is still a vision. It is believed that the Web will grow towards this vision in a way like the development of the real world: Semantic Web communities will appear and grow first, and then the interaction and interoperation among different communities will finally interweave them into the Semantic Web.

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Libraries of the Future:
Cloud Computing to Fog Computing

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"You have no idea how eager I am to ensure that the notion of 'library' does not disappear – it's too important."   —**Vint Cerf, 2013**.

ABSTRACT

The paper presents an overview of cloud computing and its possible applications that can be clubbed with library services on the web based environment. The libraries have been automated, networked and now moving towards paper less or virtual libraries. Librarians are also applying different platforms in Library science field for attaining economy and efficient information handling. This paper highlightss the basic concept of newly developed area known as cloud computing and Fog Computing. The use of cloud computing in libraries and how cloud computing actually works are illustrated in this paper.
Keywords: *Cloud Computing, IaaS, PaaS, SaaS, Models of Cloud Computing, Fog Computing.*

INTRODUCTION

A library without books was once unthinkable. Now it seems almost inevitable. Libraries will only survive if the communities they serve want and need them to. Libraries around the country are facing budget cuts as every state governments struggle with the aftermath of the recession – and in many cases that means fewer branches or services. But in the recession more people than ever relied on libraries for frugal entertainment options and to search for employment opportunities.

However, at the same time, libraries are facing an identity crisis: As the Internet has become the threat for existence of library and the primary way people gather information, the traditional "building filled with books" model is less relevant to their lives. As a result, "libraries are really transforming themselves into technology hubs". But would libraries be more digital or slow; for the young or the aged; in suburbs or co-located in denser cities? Which future?

FUTURE SCENARIO

There are four plausible futures. *The first is the "Lean, Mean, and Information Machine."* This future would arise from concern about the costs of buildings, space becoming too valuable and libraries moving down the list of core priorities for funding. Libraries in this future would need to seek funding through philanthropy to supplement government funding. The choices would be: from the user, from community groups, from state govt. grants and from corporate sponsorship.

The second scenario is the opposite of this. Civilizing the world, civilizing ourselves is the foundational purpose of the library. No corporation should fund it, as over time market values would poison human values. The librarian would need to be multi-skilled, understanding the diverse needs of different age groups, ethnicities, community groups - engagement with the community would be primary. The library in this future would model what it meant to be civilized: deep and diverse democracy.

In a third scenario, the library and the librarian becomes a "Knowledge Navigator". Users would see and then create – use information to create new knowledge, new communities learn and recreate. Libraries would be a hybrid of physical and virtual space with cutting edge technologies, cultural maps of the world, to help users develop their interests, find connection to each other and find their place in the changing digital world.

The library would be an 'experience'– Users would find their knowledge treasures through clues left by the knowledge navigator or other users engaged in knowledge sharing and production.

The last scenario takes the knowledge navigator future but makes the tough observation - given the billions of dollars Google and other web engines have to play with, and given the skill sets of their employees and owners, what makes us think libraries can survive. Many librarians as well are unable to meet the challenge of the skills shift. They are unable to be relevant with the new world dis-order. As the library monopoly dies, other competitors enter the fray and foundationally change the nature of the library. A few survive as some still want to see and touch books, but with the virtual book about to include physical senses, the writing is already on the virtual wall.

CLOD COMPUTING

There is potential for a lot of confusion surrounding the definition of cloud computing. In its basic conceptual form, cloud computing involves five primary fundamentals:

  (*i*) Shared resources,
 (*ii*) On-demand,
(*iii*) Elasticity,
(*iv*) Networked access, and
 (*v*) Usage-based
(*vi*) Metering.

- Shared resources are the shared pool of IT resources, such as applications, processors, storage and databases.
- On-Demand allows users to call up resource from the
- cloud and use them as needed. When the user is finished with the resources they release them in a self-service fashion.
- Elasticity, or flexibility that includes scalability, allows the cloud to be dynamic to the users demands allowing the cloud to satisfy peak demands and then
- release resources when demand subsides.
- Networked access allows the cloud to be accessible widely, primarily though the internet.
- Lastly, the usage-based metering allows users of the cloud to pay for the services when needed and used and to release them when they are no longer need, resulting in many benefits including cost and storage efficiency.
- The foundation of cloud computing is virtualization .Virtualization is the consolidation of servers and environment management.
- Cloud Computing can be defined as "A model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (*e.g.*, networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction."

WHAT IS CLOUD COMPUTING?

In nutshell, the cloud computing is:– the Fifth Generation of Computing (after Mainframe, Personal Computer, Client-Server Computing, and the web) the biggest thing since the web? In another way "Cloud Computing," to put it simply, means "Internet Computing." The Internet is commonly visualized as clouds; hence the term "cloud computing" for computation done through the Internet. With Cloud Computing users can access database resources via the Internet from anywhere, for as long as they need, without worrying about any maintenance or management of actual resources. (http://dotnetslackers.com/articles/sql/Introduction-to-Cloud-Computing.aspx)

Wikipedia has defined Cloud Computing as "Internet-based computing, whereby shared resources, software, and information are provided to computers and other devices on demand through the Internet".

Ellyssa Kroski (2009) has defined Cloud Computing "… means using Web services for our computing needs which could include using software applications, storing data, accessing computing power, or using a platform to build applications.

- Cloud computing is a general term for anything that involves delivering hosted services over the Internet.
- These services are broadly divided into three categories: Infrastructure-as-a-Service (IaaS), Platform-as-a-Service (PaaS) and Software-as-a-Service (SaaS).

According to McKinsey: "Clouds are hardware-based services offering compute, network and storage capacity where: Hardware management is highly *abstracted* from the buyer, Buyers incur infrastructure costs as variable OPEX (operational expenditure), and Infrastructure capacity is highly *elastic*". Finally, "It is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (*for example,* networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction." Source: *National Institute of Standards and Technology* (NIST).
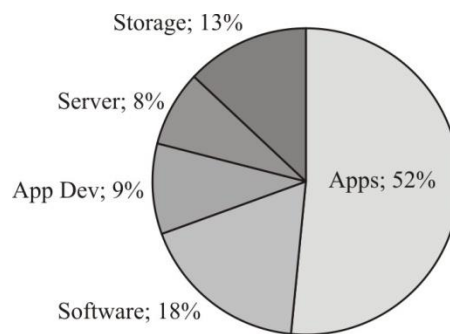
Worldwide IT Cloud Spending 2012
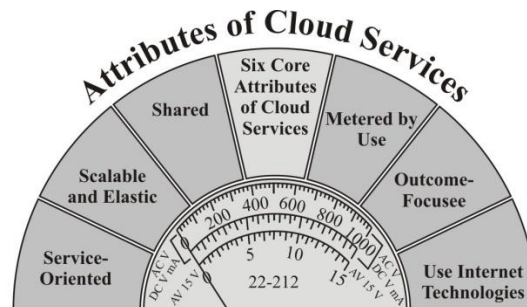
Attributes of cloud service gartner

As far as a user is concerned, a cloud is a service that satisfies all of the following conditions:

- it is delivered over a telecommunications network
- users place reliance on the service for data access and/or data processing
- the data is under the legal control of the user
- some of the resources on which the service depends are virtualised, *i.e.* the user doesn't need any technical awareness about which server is running or which host is

delivering the service, nor where the hosting device is located the service is acquired under a relatively flexible contractual arrangement.

Essential Characteristics of Cloud

- On-demand self-service (*i.e.* automated response by servers to direct requests by clients)
- Broad network access (*i.e.* from anywhere, using any device)
    Resource pooling (*i.e.* the provider allocates resources according to demand, rather than assigning resources to particular clients)
- Rapid elasticity (*i.e.* resources are scalable according to demand)
- Measured service (*i.e.* resource usage is metered)

CLOUD SERVICE MODELS

- Software as a Service (SaaS)
- Platform as a Service (PaaS)
- Infrastructure as a Service (IaaS)

Software as a Service (SaaS)

- The applications are accessible from various client devices through a thin client interface such as a web browser (*e.g.*, web-based email).
- The user does not manage or control the underlying cloud infrastructure including network, servers, operating systems, storage, or even individual application capabilities, with the possible exception of limited user-specific application configuration settings.

Platform as a Service (PaaS)

- PaaS provides an application platform, or middleware, as a service on which developers can build and deploy custom applications. Common solutions provided in this tier range from APIs and tools to database and business process management systems to security integration, allowing developers to build applications and run them on the infrastructure that the cloud vendor owns and maintains.

Infrastructure as a Service (IaaS)

- It is the capability provided to the user to enable processing, storage, networks, and other fundamental computing resources where the user is able to deploy and run arbitrary software, which can include operating systems and applications. The user does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, deployed applications, and possibly limited control of select networking components.

CLOUD COMPUTING TYPES

Three types

(*a*) **Public clouds** computing environment are open for use to anyone who wants to sign up and use them. These are run by vendors and applications from different customers are likely to be mixed together on the cloud's servers, storage systems, and networks. Examples of a public cloud: Amazon Web Services and Google's AppEngine. (Source: Wikipedia).

(*b*) A **private cloud** is basically an organization that needs more control over their data than they can get by using a vendor hosted service.

(*c*) A **hybrid cloud** combine both public and private cloud models.

ADVANTAGES AND DISADVANTAGES OF CLOUD COMPUTING

1. Assured maximum availability of your data, application and infrastructure
2. Need to pay only for what has been used (*i.e.* Bandwidth, Resources)

3. Relieves burden of IT staff within organization, as routine jobs are being handled by service providers
4. Easily scalable as per requirement of organization
5. Another benefit of cloud computing is that it addresses resource management in profoundly better ways. Through a cloud computing environment users can save and eliminate cost in services, personnel, and IT infrastructure. Reducing cost is one of the major attractions to cloud computing. Lastly, the new resources requested by a user can be delivered much faster.

General disadvantages of cloud are dependency upon network connectivity, security, legal issues(ownership of data), latency etc. which needs to be carefully reviewed.

CLOUD COMPUTING AND IT BASED LIBRARY SERVICES

Most common library services can be scoped in to following three categories.
 (*a*) **Data:** Bibliographic, Technical, Access, Licence
 (*b*) **Content:** Collection, Subscription, Digital, Print, Publishing.
 (*c*) **Services:** Library as a place, content-access, content-creation, research, preservation

As libraries have service-oriented mission they are in a position to adopt cloud computing. There are very few libraries which are having IT support staff with expertise on advance IT management. This situation makes SaaS, PaaS or IaaS approach tempting to move towards cloud computing for providing better library services. Libraries have been adopting cloud-based solutions services like electronic journal access management, statistics tracking, digital library hosting and now trend is coming up for hosted library management systems. The use of SaaS in libraries dates back to early 2000 with the establishment of companies like Serials Solutions (http://serialssolutions.com).

There are also examples of availability of hosting platforms like INFLIBNET's OJAS (Open Journal Academic System) available at http:/www.inflibnet.ac.in/ojs/, For Institutional repositories there is http://duracloud.org/, for open publishing http://www.biomedcentral.com/ is a well-known platform. In the IaaS, one of the pioneer *i.e.,* Amazon Elastic Computing Cloud (EC2) offers IT infrastructure with differently sized servers using a choice of operating systems, including several flavours of Linux and Windows.

EC2 provides organizations with unlimited storage using Simple Storage Service (S3), the ability to take snapshots of both data and servers, and the ability to include EC2 servers in an organization's private network. A full catalogue of EC2 features is available on the EC2 website (http://aws.amazon.com/ec2/).

By using cloud technologies, library services can be made online without worrying about correct versions of platforms or the underlying technology. It also gives facility to induce new applications quickly without having to focus on identifying available server space or configuration and IT-based library services can be delivered much more quickly than when using locally-based hardware or software.

IMPACT OF CLOUD COMPUTING TO THE LIBRARIES

The followings are the impact to the libraries:
- Cost savings
- Flexibility and innovation
- Broad, general IT skills vs. deep, specialized skills
- Cloud OPAC and Cloud ILS
- Private clouds, hybrid clouds and community clouds.

WHY CLOUD COMPUTING IS SIGNIFICANT?

- Cloud computing reduce energy consumption significantly
- Cloud computing involves centralizing the computing resources on the Internet (the cloud) and making these available to those who need it, when needed

- At the micro level, enterprises that used cloud computing services are freed of worrying about the technological issues related to IT installations
- Cloud computing resources are available immediately as soon as the agreement with the service provider is executed.

CLOUD COMPUTING TO FOG COMPUTING

Fog Computing extends the cloud computing paradigm to the edge of the network. While fog and cloud use the same resources (networking, compute, and storage) and share many of the same mechanisms and attributes (virtualization, multi-tenancy) the extension is a non-trivial one in that there exist some fundamental differences stemming from the reason fog computing was developed: to address applications and services that do not fit the paradigm of the cloud.

These applications and services include:

- Applications that require very low and predictable latency. The cloud frees the user from many implementation details, including the precise knowledge of where the computation or storage takes place. However, this freedom from choice, welcome in many circumstances becomes a liability when any significant degree of latency is unacceptable (gaming, videoconferencing).
- Geographically distributed applications (pipeline monitoring, sensor networks to monitor the environment).
- Fast mobile applications (smart connected vehicle, connected rail).
- Large-scale distributed control systems (smart grid, connected rail, smart traffic light systems)(http://whatis. techtarget.com/definition/fog-computing-fogging).

CONCLUSION

Cloud Computing is the Wave of the Future (Perera, G. J., 2009). Its application in libraries will give a host of benefits such as, Software as a Subscription, Reduced Software Maintenance, Increased Reliability, Increased Scalability. Cost Reduction, Environmentally Friendly, Matches Current Computing Trends, Portability/Accessibility, Efficient Use of Computer Resources and finaly, Versionless Software. No doubt, Cloud computing can be a useful resource to help libraries save money but can also have downfalls. The average citizen doesn't want their personal information unprotected and available. As libraries perfect their cloud computing services, I think that more companies will be open to using these services. This service will provide new inventive ways to use computers and provide services.

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Perception of Semantic Web Technologies in Libraries

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ABSTRACT

In recent years, a growing level of attention has been focused on Semantic Web technology and its potential application to the library. It is unclear where perceptions regarding the Semantic Web currently are and linked data in the academic library community. In this paper, we tried to discuss the most prominent areas for application of Semantic Web and the understanding of key terms and interest in the development of a Semantic Web and its role in libraries. The Semantic Web will bring structure to the meaningful content of Web pages, creating an environment where software agents roaming from page to page can readily carry out sophisticated tasks for users.

Keywords: *World Wide Web, Semantic Web, Internet social networking, digital libraries, e-learning.*

INTRODUCTION

With changing technology, the Internet has taken a pivotal role in all kinds of applications in our daily lives. To handle flood of information on the Internet, smarter Web technology is also required. Tim Berners-Lee, the inventor of the World Wide Web, put forward the concept of meaningful Web or semantic web. He referred to the future of the current web as the semantic web an extended web of machine readable information and automated services that extend far beyond current capabilities. This requirement has led to the advent of newer, smarter and better Web technology called 'Semantic Web'.

SEMANTIC WEB-THE CONCEPT

In the term semantic web also indicates that the meaning of data on the web can be discovered not just by people but also by computers. According to Tim Berners-Lee (1998)- the word semantic means 'machine-possible'. Tim Berners-Lee et al. (2001) describe the semantic web as: "an extension of the current web in which information is given well-defined meaning, better enabling computers and people to work in cooperation." The key enabler of the semantic web is the need of many communities to put machine - understandable data on the web which can be shared and processed by automated tools as well as by people. Tim Berners-Lee has clearly stated the main goal of the semantic web in his statement, if html and the web made all the online documents look like one huge book.

Semantic Web is the next step in Web evolution. High usability of Semantic Web has found significant applications in the field of life sciences, crime investigation, scientific research, literary analysis, social networking, electronic commerce, knowledge management, digital libraries, defense, e-government, energy sector, financial services, healthcare, oil and gas industry, publishing, website back-ends, multimedia, etc.

APPLICABILITY OF LIBRARY FUNCTIONS TO THE SEMANTIC WEB

This section discusses the goals and objectives of the four primary functions underlying the modern library. The discussion also explores the applicability of each function to the semantic web based on the above analysis of library and semantic web similarities.

Collection development in the library: The collection development is to build and maintain various collections that service a designated constant patron population. The activities of collection development policy that viewed as a contract between the library and users. Collection development policies document the library's intent to grow the collection, identify collection strengths and limitations and guide library staff, particularly bibliographers, in their collection development work. Guidelines also include selection criteria about preferred subjects and formats. Collection development policies

are not permanent, rather they need to be reviewed and revised, as user populations' change and present new demands. Finally, collection development can help libraries with administrative activities by including procedures for acquisitions, gifts, weeding, replacing lost items and collection evaluation. Based on knowledge about the library community's experience developing library collection development policies, it is likely that semantic web selection policy development will require time and patience, particularly given the absence of examples specific to the semantic web. The wide availability of library collection development guidelines and resources such as Guidelines for Writing Collection Development Policies provide a useful framework for developing Semantic Web selection polices.

Semantic Web Selection: The semantic web initiative, as a whole, does not identify a specific type of user, although semantic web selection policies will require review and revision for the following key reasons:

- the development of new and related projects—some of which may be competitors;
- the identification of new user agents (computer and human); and
- the development of new technologies and machine capabilities.

Library Cataloging: The purpose of cataloging is to make library collection materials findable and discoverable so that they can be used. Charles A. Cutter's (1904) objectives for a library catalog, printed in the 4th edition of his Rules for a Dictionary Catalog, are among the most influential statements impacting cataloging. Cutter's objectives state that a library should:

1. Enable a person to find a book when the author, title, or subject is known;
2. Show what the library has by author, subject and literature genre.

Semantic Web and Digital Libraries: Libraries are a key component of the information infrastructure which underpins Further and Higher Education. They provide an essential resource for students and researchers for reference and for research. And they are increasingly converting themselves to Digital Libraries.

A key aspect for the Digital Library is the provision of shared catalogues which can be published and browsed. This requires the use of common metadata to describe the fields of the catalogue (such as author, title, date, and publisher) common controlled vocabularies to allow subject identifiers to be assigned to publications.

By publishing controlled vocabularies in one place, which can then be accessed by all users across the Web, library catalogues can use the same Web-accessible vocabularies for cataloguing, marking up items with the most relevant terms for the domain of interest. Then, search engines can use the same vocabularies in their search to ensure that the most relevant items of information are returned.

The Semantic Web opens up the possibility to take such an approach. It offers open standards that can enable vendor-neutral solutions, with a useful flexibility (allowing structured and semi-structured data, formal and informal descriptions and an open and extensible architecture) and it helps to support decentralized solutions where that is appropriate. Thus RDF can be used as a common interchange format for catalogue metadata and shared vocabulary, which can be used by all libraries and search engines across the Web.

METADATA

Metadata is a key component of the provision of online catalogues that are searchable across the Web. In order to use the Semantic Web to its best effect, metadata needs to be published in RDF formats. There are several initiatives involved with defining metadata standards in the library and publishing community, including:

Dublin Core Metadata Initiative which provides a standard set of machine readable fields and guidelines for their use. This now has a well-established RDF vocabulary.

MARC: The well known MARC format from the Library of Congress has an XML representation.

ONIX: The ONIX for Books Product Information Message is the international standard for representing and communicating book industry product information in electronic form XML representation.

PRISM: The Publishing Requirements for Industry Standard Metadata specification defines an XML metadata vocabulary for magazine, news, catalogue, book and journal content.

Such standards can be used across the Web so that they provide a common metadata vocabulary in XML or RDF which can be used to mark up and share library catalogues on the Web. PRISM and Dublin Core are usable now in the Semantic Web. MARC and ONIX require further work, but could be used as a source to enrich the metadata provided on the Web.

Controlled Vocabulary: Controlled vocabularies such as classifications, taxonomies and thesauri are the other key components for cataloguing and searching by classifying documents by subject. Developing tools and formats for representing and delivering such thesauri on the Semantic Web has been a major initiative of the SWAD-Europe project. This provides a set of standard formats and tools for describing controlled vocabularies and classifications called the Simple Knowledge Organization System (SKOS). It also provides some sample thesauri which use these formats, and some demonstration software to allow people and programs to browse and select terms from a thesaurus across the Web. This work is now being taken up by the W3C Semantic Web Best Practices and Deployment Working Group in their Thesaurus Taskforce. JISC Technologies and Standards Watch Semantic Web Technologies

Other projects: There are many other projects and initiatives which are providing access to libraries across the Web, some of which are using the Semantic Web directly, others behind the scenes. Some important ones include: The Open Archive Initiative, which is providing direct access to structured metadata via its metadata harvesting protocol; the Simile Project, which is using the Semantic Web to enhance inter-operability among digital assets, schemata/vocabularies/ontologies, metadata, and services; and DELOS, a European Network of Excellence on Digital Libraries whose website provides many more links to Digital Library projects.

Supporting interaction: A major theme that has emerged during the development of the Semantic Web is the ability to support interaction between groups of people across the Web. This has two aspects: support for virtual communities and support for virtual organizations.

Semantic Web in Virtual Communities: Within virtual communities individuals can publish information about themselves, their interests and their work, and allow other like-minded individuals to discover and share that information in order to build a virtual community of people sharing ideas.

The 'Friend of a Friend' or FOAF project provides a simple language that allows people to publish information about themselves, their work and interests, along with their contact details (with due respect to privacy). This is useful, but becomes interesting when people can also publish links to others they know in the community. Taken together, FOAF provides a network of links amongst people. You can trace the extent and scope of the virtual community of individuals, discovering new potential contacts and adjacent communities of interest. People are taking up this idea to build tools, such as FOAF Naut, which allow you to explore the connections among communities. Thus we have an example of a network effect within the Semantic Web when simple tools and small amounts of information combine to form something of greater value.

Similarly, the Web-based news-syndication system RSS (for either Rich Syndication System, or RDF Syndication System), provides a mechanism for publishing, sharing, combining, annotating and searching news lists and discussion groups, and some versions of RSS use RDF, including RSS 1.0. As an example, RSS is being used by the Nature

Publishing Group to keep scientists and librarians informed of the latest news from their journals, using a combination of Dublin Core and Prism metadata.

Community portals provide central points where virtual communities can communicate and share information, find new contacts and comment on each other's work. Semantic Web technology is being used to construct such portals to provide a richer approach to organizing and searching community portals, typically built on top of the Semantic Portal technology above.

E-Learning: The Semantic Web clearly has large application to e-learning, supporting both distance and local education. The notion of a 'learning object' as a separable unit of educational material which can be reused and combined with other learning objects has been a central feature of e-learning systems. This concept has been criticized for being too inflexible and not taking into account the particular learning needs of individuals or the requirements of context and emphasis of educators. However, used properly, it is a useful and powerful concept and one which the Semantic Web has much to offer.

THE FUTURE OF THE SEMANTIC WEB

We have seen in this paper that there has been significant and enthusiastic effort over the last few years to explore and develop the technology, shared vocabularies and ideas which are turning Tim Berners-Lee's vision into a reality. There is a long way to go until it is a standard part of the Web infrastructure but, nevertheless, there has been startling progress in the last few years, with UK research groups amongst the leaders.

Barriers to adoption: There are inevitable barriers to the Semantic Web which still need to be addressed. We have mentioned the slow progress on certain features, particularly ontology and reasoning support, due to the development community not coming to a consensus. This does not mean that progress cannot be made immediately using the simpler tools for RDF and RDF Schema available now.

Some of the larger IT companies are hanging back, waiting to spot the opportunity and waiting for the research community to settle on standards. Thus the main impetus is coming from communities themselves – it is an opportunity to profoundly affect the way that the world talks to each other.

There is a good deal of RDF data giving semantic descriptions already on the Web, both from website owners publishing their own annotations as RDF files and from sites such as rdfdata.org which provide portals for RDF data. However, before the Semantic Web can become globally usable, there does need to be more, and it needs to be more easily available. There is a distinct overhead to using the Semantic Web in terms of establishing shared vocabularies and ontologies, and in providing the appropriate annotations to resources which make them visible to the Semantic Web. This is a non-trivial task and often users will either not have the time to include this, or the expertise to do it well. A missing component of the Semantic Web is a simple means to support this, similar to the editors and tools for the conventional Web. Undoubtedly the simplicity of the HTML language used within the current Web was a major influence on its success and in order for the Semantic Web to break out from narrow communities to universal use, it needs to address the issues of making it easy to use and accessible to all.

Otherwise, the Semantic Web is likely to require particular effort and expertise. This is expensive and so it may well be confined to particular domains on the Web which see a strong advantage in its use, although over time as the expertise becomes more commonplace it should become cheaper. Also, the 'network effect' can work as both a barrier and an incentive. One of the main advantages of supplying Semantic Web annotation is that it can be shared and can gain advantage to others, so when there is little data to share, then there is little incentive to take the extra expense in sharing; however, once the ball starts to roll, there is an exponential advantage in combining your own data with others'.

These problems may be less of a disadvantage in the HE and FE sectors, which has well-integrated communities with stronger control over their resources. Information science professionals in libraries are available to help with the task of cataloguing and publishing annotations. Thus it is likely that this sector will be in the forefront in the use of this technology.

SUMMARY OF IMPACT AREAS

We have discussed four areas where the Semantic Web is most likely to make an impact: information management, digital libraries, virtual communities and e-learning:

- **Information Management:** The Semantic Web enhances the capabilities of those tools which form a familiar part of the current Web so that they can become useful information management tools in their own right. The Web is already an information source of choice for many learners and researchers. A more structured and directed approach to managing this information space, both within institutions and across the whole community, can make this information more useful with less wasted effort and more capacity to measure the quality of information. By making the annotation machine readable, it becomes accessible to automatic processing, carrying out many routine tasks which consume people's time. A further impact is likely to be in the business of running education, allowing more efficient information flow around institutions.

- **Digital Libraries:** The impact on digital libraries, combined with the Open Access Initiative and the rise of open archiving is likely to be quite profound. Libraries become 'value-added' information annotators and collators rather than the archivists of externally published literature and the holders of the published output of institutions. The Semantic Web, although not a prerequisite or a motivator for this change is nevertheless likely to smooth its development. The tools are in place for sharing classification schemes and to allow the community to develop, deepen and share such schemes. The information infrastructure tools discussed above will have particular impact on the way students and researchers find information, so these tools may typically be provided and adapted by libraries who will tailor them to the needs of their own users. The Semantic Web, like the current Web, has the capacity of being an overwhelming place; libraries are well-placed to make sense of this for the HE and FE community.

- **Building communities and collaborations:** A major impact is likely to occur in the way that academic communities work together. The tools for forming virtual communities and sharing information across that community are simple and lightweight and if the development of blogs and the use of RSS is an indication, can enhance the interaction of an interested community by an enormous amount. Providing a richer annotation structure to these can only enhance their usefulness, bringing them into the information infrastructure as well as providing a means of communication to people across the world.

  Support for virtual collaborations is a much larger issue, as it requires tighter control over resources and security. This is largely taking place in the Grid community and efforts to construct a Semantic Grid are already well underway, bringing the machine readable annotation to automate the discovery and negotiation of services onto the Grid.

- **E-Learning:** All of the above can influence e-learning. However, we should also consider specifically, support for the presentation and delivery of course materials and for assisting and assessing students. Again, the impact of the Semantic Web is likely to mean that these can be more closely tailored to the needs of the user, with a choice of learning objects mediated through selection mechanisms. The Semantic Web can provide context and co-ordination, with workflow tools providing a supporting infrastructure.

- **Timescales:** A major question is how long this is going to take. *Firstly,* the basic recommendations are very much in place, particularly RDF and RDF Schema, but also OWL. These have now had time to establish themselves, with most problems being ironed out and with a large body of knowledge established on their usage. These can be used right now without waiting for the higher layers of the architecture to become more concrete. Within two to three years we will find that RDF is being used 'behind the scenes' for a variety of tasks which we may not even be aware of, similar to the way XML is now being used. This is likely to be particularly true of 'community building tools' which will just come with RDF included.

Secondly, there is greater interest from user organizations such as libraries, infrastructure funding organizations such as JISC and the research councils and other user communities. These are beginning to work together in areas such as information science, medicine or genomics to provide the common underlying ontologies for these domains. Agreement on these will take longer and it is likely that there will be areas of disagreement for a long time – and there will always be a question of revision. However, it seems likely that there will be workable ontologies for some domains within the current round of European projects, say three to four years.

Thirdly, there is now interest from major IT suppliers and a host of smaller companies in providing tools and expertise to build on this infrastructure. Companies such as BT, HP and Adobe are beginning to use Semantic Web tools seriously and include them in their products. The popular browser Firefox uses RDF internally to represent internal data. Search engine companies such as Google and Yahoo are seriously considering how to best use this technology. Mobile communications companies are renewing interest in using the Semantic Web to enhance the experience of mobile users of the Web. Clearly these are going to take some time to come to market, but it is reasonable to expect further 'early adopter' products to appear within the next two years and then for mainstream usage to be within three years after that.

More sophisticated use of ontologies, particularly combined with reasoning tools, will take some time. The standardization process has not passed the exploratory stage and we can reasonably expect it to be some three years before a recommendation appears from the W3C. Then we will expect another two to five years for major applications to appear. The time is not yet ripe to invest heavily in reasoning tools in anything other than an experimental capacity.

The digital library community is already well organized and experienced in the skills required to best use the Semantic Web, and it is here that 'quick wins' could be gained, leveraging a large amount of material which is already catalogued. The barriers in this area are more likely to be cultural, with a tradition of centralized library services and copyright-protected publications, coupled with a suspicion of the more open and anarchic world of the Web, slowing down adoption. Nevertheless, as recent conferences on Digital Libraries have shown, there is considerable interest in exploring the opportunities offered by the Semantic Web. E-Learning applications are likely to follow the digital library community as there is already an overlap between these communities.

Supporting virtual collaborations and e-learning is still some way off. The work on the Semantic Grid is still in its infancy. The base of Web Service and the Grid is still under development, so providing a richer semantic architecture will be constructed on a moving target, which means that solutions are unlikely to be anything other than experimental for the time being.

CONCLUSION

The Semantic Web has great potential; however, it has been a long time in development and does require an investment of time, expertise and resources. Nevertheless, the time does seem right to start to think how best to use the simpler applications of the technology. Institutional libraries should be considering joining collaborations to explore

how Semantic Web can best be exploited and investing in training staff, with a view to providing Semantic Web solutions. Information science professionals and academics working in particular fields should work together to provide the vocabularies and domain ontologies required to support particular fields. Particular communities and research groups could be looking at exploiting the emerging infrastructure to enhance the interaction of their community.

In the future, the Semantic Web may not even be noticeable. The tools of the Semantic Web will be integrated into Virtual Learning Environments and Virtual Research Environments on our desktops, as well as in browsers and search engines. What we will have is a richer experience of IT that is better able to deliver the right information at the right time in the right way, so we can get on with the serious business of research and teaching.

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Rage Against Machines in the Digital Environment: Attitudes of Librarians Towards Technology

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ABSTRACT

Since the emergence of information technology, the gap between information 'haves' and 'have-nots' has been broadening: the information rich become richer, while the information poor are poorer. This situation contributes to various issues related to individuals and society. The move to the Information Age, with its changes and need for adaptation to technology, has been rapid and stressful for many people. While many people have increased their usage of technology and are comfortable with it, many others still do not use much technology and are not comfortable using it when they must do so. Library professionals of Banaras Hindu University were surveyed. Demographics, technology experience and "technophobia" were examined as potential discriminators between Confident Users, Hesitant Users, and Nonusers of each technological device. Results indicated that older, technophobic adults with little computer training and did not use most technological devices.

Keywords: *Human-Computer Interaction, Stress, Technostress, Technophobia computer aversion, Techno-anxiety.*

INTRODUCTION

Technology is the way which extends humans ability. It is very difficult to obtain a precise definition of technology. It is generally accepted that "technology" is more than just a collection of physical products of science. "Technology" is the link between society and its tools. The creation of computer software and hardware, telecommunications, databases, and the Internet has affected society as a whole, and particularly higher education by giving people new productivity options and changing the way they work (Hulbert, 1998). In the so-called "Information Age" the increasing use of technology has become the driving force in the way people work, learn, and play (Drake, 2000). As this force evolves, the people using technology change also (Nelson, 1990). Adapting to technology is not simple. Some people tend to embrace change while others resist change (Wolski & Jackson, 1999). Before making a decision on whether to embrace technology or not, people may look at the practical and social consequences of accepting change. Technology changes the way people work and learn. As the role of technology is being defined and is constantly being improved, change is inevitable (Davis-Millis, 1998; Brand, 2000). As a result, those involved in higher education have to find ways to adapt to technological change. Administrators, faculty, academic librarians, and students should define the role of technology for the purposes of (1) sharing new ideas and techniques for teaching and learning; (2) encouraging enthusiasm and innovativeness; and (3) learning about opportunities and challenges, and how to deal with them (Landsberger, 2001).

LITERATURE REVIEW

The term "stress" has multiple meanings. As Richard Lazarus stated in his 1966 book *"Psychological Stress and the Coping Process"*: It seems wise to use 'stress' as a generic term for the whole area of problems that includes the stimuli producing stress reactions, the reactions themselves, and the various intervening processes Stress came out as a malaise of modernity. *"Stress denotes the cause of disruption, the disruption itself and*

the consequence of that disruption". Stress is defined as a demand to one's physiological and psychological reaction to a challenge that requires a coping behaviour which is imposed on him/her side. During the year 1980s, there was some 50 articles published that was dealing with the stress and burnouts of library employees. Haack, Jones and Roose report on the survey of reference librarians, conducted a conference in 1981 that showed 42% of the respondents were suffering from on-going severe psychological tension. Nathan Smith and his colleagues conducted a series of studies in libraries of various types but their findings varied from context to context that their substantial respondents were experiencing burnouts. Some group of stressors in libraries, associated with technology and change has received attention to *"technostress"* a term that was used by *Sir Craig Brod* in his book in 1984. Julie Bichteler investigated into the problem of technostress among employees of special libraries in 1986 and that stated in her book. Fine discussed these phenomena in terms of fear and resistance to technology on the part of library employers.

TECHNOSTRESS

Craig Brod defined "technostress" in his book *Technostress: the Human Cost of the Computer Revolution* as "a modern disease of adaptation caused by an inability to cope with the new computer technologies in a healthy manner. It manifests itself in two distinct and related ways: in the struggle to accept computer technology, and in the more specialized form of over-identification with computer technology." Our focus on technostress will be with the first type described by Brod and labeled by researchers with various terms like: technophobia, cyber-phobia, computer-phobia, computer-anxiety, computer-stress, negative computer attitudes, and computer aversion. Techno-anxiety most commonly afflicts those who feel pressured–by employers, peers, or the general culture–to accept and use computers".

Nearly fifteen years ago, Lisa Ennis wrote her thesis paper on Technostress and entitled it "*Technostress* in the Reference Environment: A Survey of U.S. Association of Research Libraries Academic Reference Librarians."

From her research at the time, she found six specific causes of Technostress:

- The Rate of Change of the Technology
- The Lack of Standardization
- The Lack of Training Individuals on the Equipment
- The Reliability of the Technology
- The Increased Workload Placed on Each Individual
- The Changing Roles of Librarians

In a September 2005 article entitled "*The Evolution of Techno Stress,*" Ennis updates her findings, stating that she thinks that librarians have grasped the idea of changing technology, and that the output of new software for computers slowed down drastically, allowing more standardization to be introduced. She feels that perhaps today's main cause of Technostress is the changing role of the librarian.

The first major change to library management was the introduction of computer based catalogues – which at the time was deemed sufficient to create the so called "automated library". The change was a minor one yet it has some ramifications as far as librarians and even more so, users were concerned. Many users found it very difficult to adjust to the new technology and many of them who mostly comfortable with cards became dependent on the library staff for using computer based indexes.

In the 21st. century, the technological momentum has increased far beyond our expectations. Thus, there is a growing expectation that rapidly advances in technology with inducing stress in our lives. More and more information is available in a wider variety of formats. Computer operating systems and software versions are changing so fast that by the time librarians get used to one version of the software, the next version gets released. This version change in software's and operating systems bringing with it

the feeling of insecurity, the fear of not being able to keep up with the changing environment of technologies and thus forming a technology fatigue. As the *"Googling"* effect came and any information is available in the library or can be accessed using the internet or via online access to other libraries comes a new form of stress for the library professionals working with the machines and the fear of not being able to locate the information or information sources. Librarians are falling behind with the rapid rate of technological change. With computers in our routine works here we can say that *TECHNOSTRESS* has entered in our library vocabulary. Moreover, one time provision of hardware, software, network infrastructure, and electronic resources is not sufficient. It requires continuous improvement and up gradation of systems and resources to pace with the fast changing information technologies (Holland, 1997).In addition, Sreenivasulu (2000) noted that the success of librarians in this digital age depends on their human and technology management competencies. A study by Chanand Auster (2003) reported that managerial and organizational support for updating knowledge and skills, age, job status (being part-time), organizational reward system were key factors contributing to the professional development of librarians.

BENEFITS OF THE STUDY

Understanding the role of accepting technological change and the presence of the level of technostress among library professionals will benefit many groups of people. First, it could improve their understanding on the issues of accepting technological changes in the workplace. Proper plans to give training to employees can be realized in relations to acceptance of technological changes specifically to the staff that have strong resistance to new technology. Besides, the management can identify the information systems and technologies that would suit the needs of professionals to perform better. Lastly, these employees should be as technology-savvy as other employees in other industries in this extremely competitive and fast-moving global marketplace. Finally, technology used in libraries will subsequently improve daily practices toward having quality workforce.

METHODOLOGY USED

Population and Sample: The survey used for this study had three sections: (1) Demographic section (2) Computer Hassle Scale (3) Computer attitude statements. There are about 200 library professionals of Banaras Hindu University dealing with technology in their day-to-day work experience. Questionnaires were distributed to 75 library professionals of Banaras Hindu University. Two representatives were asked to manage and collect the questionnaire. As a result of tireless effort, 64 questionnaires returned back duly filled in by the library professionals and out of which 42 (64%) are belong to male category and 22 (36%) belong to female category. The response rate was 85.3%.

Table 1.1: Category wise Composition of respondents

Category	Response (N = 64)
Male	42
Female	22

Mandell (1987), posit that younger people are much quicker to accept the new technology than their counterparts who are old in an IT working environment. Laguna & Babcock (1997) argued that while performing the computer tasks, older adults make fewer correct decisions as well as take longer time to do as compared with young adults.

Graph 1.1 Category wise Composition of respondents in the survey

Table 1.2: Age range distribution of respondents

Age Range	No. of Respondents (N = 64)	Male	Female
23-30	6	4	2
31-38	14	9	5
39-46	24	15	9
47-54	16	11	5
55-62	4	3	1

Graph 1.2 Age range distribution of respondents in the survey

Table 1.3: Time Spent using Computer Technology

Period of Time Spent	No. of Respondents (N = 64)	Percent
01-05 Hours	6	09.38%
06-15 Hours	8	12.5%
16-30 Hours	20	31.25%
31+ Hours	28	43.75%

This table denotes the maximum number to library professionals *i.e.* 28 (43.75%) use computer technologies for more than 31 hours in a week to handle the library activities, whereas 20 (31.25%) use computers technologies for 16-30 hours/week, while 08 (12.5%) use for 6-15 hours/week and 6 (9.38%) use it for 1-5 hours/week only.

Data Collection Procedure: 75 questionnaires were distributed to the library professionals of Banaras Hindu University in two consecutive days and were collected back after 20 days. Frankly, it was not easy to get full cooperation from the library staff as most of them were busy with their day-today routine works of the library housekeeping activities.

Instrument used in the study: *Computer Hassles Scale* (CHS) was used to find out the feeling of hassles by computer and computer technologies which was developed by Hudiburg on a 4 point scale with 13 items, A 11-item scale, Attitude toward computer scale developed (Nickell & Pinto, 1986) and out of it 4 items which are phrased in negative statements. Lastly 10 items of demography were also put on.

In this study, the CHS consisted of 13 items and were scored from 1-4 with "1" indicating a response of "not at all" to "4" indicating a response of "extremely". Three items in the questionnaire were worded in the positive statements and eight items were worded in the negative statements. .

In the General *Attitude towards computer survey* scale consisted of 11 items which were made from two sections: The section contained the items which were scored from 1-5 with "1" indicating a "strongly Agree" to "5" indicating a response of "Strongly Disagree".

RELIABILITY AND VALIDITY MEASURE
Computer Hassles Survey (ICT Based Studies)

Table 1.4: Category wise Composition of respondents

List of Hassles by Computer and Computer Technologies	Not at all	Rarely Severe	Moderately Severe	Extremely Severe
Lack of expertise in IT	25 (39.06%)	19 (29.69%)	14 (21.88%)	06 (9.38%)
Lose data when no power back-up	30 (46.88%)	21 (32.81%)	10 (15.63%)	03 (4.69%)
Technical fault as a problem	21 (32.81%)	16 (25%)	20 (31.25%)	07 (10.94%)
Problem with busy websites	15 (23.44%)	19 (29.69%)	27 (42.19%)	03 (4.69%)
Slow downloading irritates you	09 (14.06%)	21 (32.81%)	28 (43.75%)	06 (9.38%)
Security of personal information on the web	25 (39.06%)	15 (23.44%)	19 (29.69%)	05 (7.81%)
Difficulty with poorly documented software(s)	20 (31.25%)	15 (23.44%)	18 (28.13%)	11 (17.18%)
Dead web-links frustrates you	21 (32.81%)	14 (21.88%)	18 (28.13%)	11 (17.18%)
Poor internet connectivity as a hurdle in your job	14 (21.88%)	10 (15.63%)	28 (43.75%)	12 (18.75%)
Confuse with software/ formats while opening document	21 (32.81%)	17 (26.56%)	13 (20.31%)	13 (20.31%)
Information Overload on the web	09 (14.06%)	21 (32.81%)	25 (39.06%)	09 (14.06%)
Learn new software(s)	05 (7.81%)	15 (23.44%)	16 (25%)	28 (43.75%)
Find easy with frequent upgrades in computer networks	02 (3.13%)	15 (23.44%)	19 (29.69%)	28 (43.75%)

The table no. 1.5 connotes that the higher majority of the library professionals of Banaras Hindu University, 28 (43.75%) willing to learn new software(s) and also who are IT competent find it easy with frequent upgrades in computer networks. As it seems from the table that most 28(43.75%) library professionals are working on internet to deliver online reference services or managing the online databases of the library and other consortia's finds poor internet connectivity and dead web-links as a hurdle.

Attitudes Towards Computers

Table 1.5: Computer Attitude Scale

Attitudes towards Computer Technologies	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Network Problem	15	25	10	09	05
Save Time	20	20	15	09	00
Know how to use computer for getting good job	25	20	15	04	00
Solve Society Problems by computer technology	10	20	15	15	04
Sacrifice vacation to keep current with technology	10	25	10	14	05
Less time for family due to technology	10	20	10	19	05
Everyday reading Overwhelm amount of emails	05	15	15	20	09
Feel tired and exhausted at the end of the day	15	30	10	09	00
Feel competent and confident using technology	18	17	15	10	04
More training require to perform ICT operations	25	20	08	07	04

The library professionals reported having the most severe technostress level due to the pace in change in technology that is taking place every now and then. The participants identified computer information and computer runtime problem more than any other problem as two causes of technostress. They also reported increasing their knowledge and skills as the way in which they would cope with their technostress instead of doing non-technology related tasks.

COMMENT AND CONCLUSION

One of the most effective ways to reduce stress is to find the proper balance between work and private life. The library profession is one which changes constantly. We are fortunate to work in such a dynamic atmosphere; however, many librarians feel their environment is changing too rapidly. What is new today becomes outmoded tomorrow, and we often seem unable to catch up. Technology and the related stress are a fact of life in libraries. As Eldridge Cleaver said, *"You're either part of the solution or part of the problem."* (1968) we must focus on the first part of that quotation, and not the latter. This means a change of thinking on the part of many. It requires new job roles and job structures, and, yes, these are always stressful for the persons involved.

Base on the finding of the study, it could be concluded that librarian in the university libraries experience technological stress when they use computer related technologies.

The following recommendations are made in the light of the findings from the study survey outlined in these articles.

Library managers should organize technology-based training for librarians in order to make them comfortable with new technologies and more aware of their dangers. Since technology skills are important part of most library and information jobs, librarians should make sure they acquire technological skills continuously. University libraries

should employed qualified information and technology specialist and troubleshooters to maximize system accessibility and provide a level of comfort to the librarians.

Positive attitude towards computers and sensible coping management strategies will ease technostress and benefit. If such recommendations are followed, librarians in university libraries will look forward to being able to work in a technological stress free environment.

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Implement of Benchmarking:
Essential for University Libraries

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ABSTRACT

It is necessary to compare others for evaluation and improvements him/herself. Such benchmarking enables organization/library to compare their performance and approach with others and to identify elements that can be adopted and adapted in their products and services. This paper describe that what is benchmarking and why benchmarking? Author has also discussed the advantages and disadvantages, action plan of BM, types of BM, application, process and steps of action plan for benchmarking. Some important fields have suggested to implements of BM in university libraries.

Keywords: *Academic library, Automation, Benchmarking, Strategic BM. BM process*

INTRODUCTION

University will be asked to establish their goals and conduct a self-assessment across the full range of their activities. The actual details of the audit process are still being negotiated. It is intended that all universities will be assessed every year. The full range of activities will assuredly include libraries, which are significant investment for universities or, depending on your perspective, a huge drain on resources both print and electronic. Benchmarking and performance indicators should be regularly analyze, develop, review and refined as new sources of data emerge, collection and analysis methodologies improve and the processes or performance to be evaluated change. The library profession is neither lacking in data nor in performance indicators and measures. It does, however, lack clear benchmarks which can be used by libraries to identify best practice, to constantly learn from each other and thus add value for their users and to progressively improve the performance of all libraries. University library is a type of academic library and is a good and adequate collection, which can satisfy the needs of the faculty members, help to students and promote advanced study and research programmes. Now university libraries are doing their library automate and digitize also. In the process of best practice benchmarking, management identifies the best university library. Benchmarking is used to measure performance using a specific measure resulting in a metric of performance that is then compared to others. Also referred to as "best practice benchmarking" or "process benchmarking", this process is used in management and particularly strategic management, in which organizations evaluate various aspects of their processes in relation to best practice of library. The first book on benchmarking, written and published by Kaiser Associates.

WHAT IS BENCHMARKING?

A measurement of the qualities of an organization's people, products, programs and strategies, *etc.* and their comparison with standard measurements or similar measurements of its peers. Benchmarking is as ongoing systematic process for measuring and comparing the work processes of one organization to those of others that exhibit functional best practices. BM is a learning process that helps organization to discover that how they can best improve the services to their users. At it simplest benchmarking means:

Improving ourselves by learning from others. Benchmarking is the process of improving performance by continuously identifying understanding and adapting outstanding practices found inside and outside the organization. Benchmarking in the process of comparing library services and performance to others best library that:

- Why are other better?
- How are other better?
- What can we learn?
- How can we become the best university library?

The Libraries are meant to serve the objectives of its parent organization. Libraries maintain statistical data of all the sections in it. They also maintain the statistics of loss of books, missing issues of the journals. Complains/suggestions of the library received from users and all other similar information of this nature. In most of the cases, this information is not used for evaluating the library performance and may be because of this reasons, libraries in India are experiencing the decreased amount of funds year by year. The 'library is a growing organism' a reality, the maintenance of measures and evaluation performance is becoming difficult day by day. In case of new libraries it may become worsen if they will not measure and evaluate their performances with some certain procedure, rules and guidelines. "The term benchmarking was first used by cobblers to measure people's feet for shoes. They would place someone's foot on a "bench" and mark it out to make the pattern for the shoes. Another definitional history of benchmark is "the term benchmarking was initially used by land surveyors. A benchmark was considered a distinctive mark on a rock building or wall, and it was used as a reference point in determining the position or altitude in topographical surveys and tidal observations. A benchmark today is considered as a sighting point to make standard measurements. Benchmarking is the process of identifying, learning, adapting and measuring outstanding practices and processes from any organisation to improve performance "Benchmarking is a process whereby a company examines the way it does business and compares that findings with those of other companies in the same sector. Therefore, the libraries may establish the benchmark in various types of services/functions/infrastructure by comparing them with others library in India and abroad also which are having better performance in all its fields. So that the maximum number of users can get maximum benefits from a library. In other words "Benchmarking is an academic technique to improve service performance. It is used to compare performance between various and different organizations.

BM: Definitions: "Benchmarking is the practice of being humble enough to admit that someone else is better at something and wise enough to try and learn how to match and ever surpass them at it."

"A standard or base of reference from which specific estimates are made, a precedent or guideline used for making discuss."

BM: Objectives: The objectives of BM are:
- To determine what and where improvements are called for,
- To analyze how other organizations achieve their performance levels, and
- To use this information to improve performance.

WHY BENCHMARKING?

Now question is this that why we apply the techniques of benchmarking to improve our services and products? Then reply is this that Benchmarking gives us the chance of gaining:

Better awareness of ourselves
- What we are doing?
- How we are doing it?
- How well we are doing it?

Better awareness of the best
- What they are doing?
- How they are doing it?
- How well they are doing it?

Now it is clear that benchmarking is a more efficient way to make improvements the university library services. Librarians can eliminate trials and errors. BM speeds up organization's ability to make improvements. It has the ability to bring your performance up as a whole significantly. With the help of you can learn from others experience and set realistic but ambitious targets

APPLICATION OF BENCHMARKING

While applying the benchmarking in the libraries, one should draw some of the important areas for it, addressing some of the questions to determine the 'benchmark', like (for non profit making organization Spendolini).

- "What is the most critical factor to my function's/organization's success?
- What factors are causing the most trouble?
- What products or services are provided to customers?
- What factors account for customer satisfaction?
- What specific problems have been identified in the organization?
- Where are the competitive pressures being felt in the organization?
- What are the major costs in the organization?
- Which functions represent the highest percentage of cost?
- Which functions have the greatest room for improvements?
- What functions have the greatest effect for differentiating the organization in the market place?" The 'Frequently Asked Questions' link also may be provided by the libraries on their newly created websites on 'benchmarking'.
- The benchmarking team should maintain confidentiality.
- The time limit also should be specified for the benchmarking
- The library staff should aware about all its services,
- The library staff should well aware about even marketing of its services,
- The university library staff should aware about the services offering by other libraries of similar nature and characteristics.

TYPES OF BENCHMARKING

Benchmarking can be internal (comparing performance between different groups or teams within an organization) or external (comparing performance with other organization). Within these broader categories, there are three specific types of benchmarking:

- Process benchmarking
- Performance benchmarking, and
- Strategic benchmarking.

These can be further detailed as follows:

- **Process benchmarking:** The initiating firm focuses its observation and investigation of business processes with a goal of identifying and observing the best practices from one or more benchmark firms. Activity analysis will be required where the objective is to benchmark cost and efficiency; increasingly applied to back-office processes where outsourcing may be a consideration.
- **Financial benchmarking**: Performing a financial analysis and comparing the results in an effort to assess your overall competitiveness and productivity.
- **Benchmarking from an investor perspective:** Extending the benchmarking universe to also compare to peer companies that can be considered alternative investment opportunities from the perspective of an investor.
- **Benchmarking in the public sector:** Functions as a tool for improvement and innovation in public administration, where state organizations invest efforts and resources to achieve quality, efficiency and effectiveness of the services they provide.
- **Performance benchmarking:** Allows the initiator firm to assess their competitive position by comparing products and services with those of target firms.

- **Product benchmarking:** The process of designing new products or upgrades to current ones. This process can sometimes involve reverse engineering which is taking apart competitors products to find strengths and weaknesses.
- **Strategic benchmarking:** Involves observing how others compete. This type is usually not industry specific, meaning it is best to look at other industries.
- **Functional benchmarking:** A company will focus its benchmarking on a single function to improve the operation of that particular function. Complex functions such as Human Resources, Finance and Accounting and Information and Communication Technology are unlikely to be directly comparable in cost and efficiency terms and may need to be disaggregated into processes to make valid comparison.
- **Performance benchmarking:** Allows the initiator firm to assess their competitive position by comparing products and services with those of target firms.
- **Product benchmarking:** The process of designing new products or upgrades to current ones. This process can sometimes involve reverse engineering which is taking apart competitors products to find strengths and weaknesses.
- **Strategic benchmarking:** Involves observing how others compete. This type is usually not industry specific, meaning it is best to look at other industries.
- **Functional benchmarking:** A company will focus its benchmarking on a single function to improve the operation of that particular function. Complex functions such as Human Resources, Finance and Accounting and Information and Communication Technology are unlikely to be directly comparable in cost and efficiency terms and may need to be disaggregated into processes to make valid comparison.

PLAN FOR BENCHMARKING

It should include benchmarking areas, review of the operations, provisions of Continuous evaluation; customization of the benchmarking.

- **Testing of the plan:** whatever you have planned, it should be checked out through 'pilot study',
- **Application:** start benchmarking
- **Examining:** whatever data collected, check and correct, if needed
- **Implement:** final implementation of the results of benchmark.
- **Recycle:** there should not be an end of the application. Whenever/wherever improvement needed, it should come through the process of 'recycle' *i.e.* again, Plan, testing, application, examination, implement, recycle.

Generic Steps of Action Plan: The generic steps of action plan are as follows:
- Specify tasks
- Sequence tasks
- Determine resource needs
- Establish task schedule
- Assign responsibility for each library staff
- Describe expected results, and
- Specify methods for monitoring results.

Benchmarking for Libraries: The purpose of the bench marking may clearly be defined.

- The libraries may review the concerned literature before starting the benchmarking.
- The pilot survey may be conducted and the data consulted from the annual reports/annual accounts, etc.
- The libraries may prepare a list of questions on which the benchmarking is going to be conducted.
- While preparing the questions, the libraries may consult library authorities/library committees before starting the benchmarking so that the correct information may be collected for the correct benchmarks.

- The 'Frequently Asked Questions' link also may be provided by the libraries on their newly created websites on 'benchmarking'.
- The benchmarking team should maintain confidentiality.
- The time limit also should be specified for the benchmarking.

ADVANTAGES/BENEFITS OF BM

1. Product and process improvement
2. The present work and service efficiency can be improved in the libraries.
3. The libraries can establish market place.
4. The proficiency of staff can be increased.
5. Users' satisfaction can be achieved.

Suggestions for field of Benchmarking in University Libraries: As I know that the university libraries of India is facing inadequate and trained staff problems. Many university libraries have vacant the post of Librarian since last 10-15 years as well as Assistant Librarian also. How we can expect the better library service from university library. It is age of digitization and digital library but reality is this that many libraries could not implement the automation process and we talk to each other about Digital India. If we want to apply the benchmarking then we should try to garner grass-route input in selecting a project, perhaps by issuing a call for proposals to all staff. This would help ensure interest among team members and cooperation in implementing changes at the level at which the changes would be made. In my view these field should be included, when we are going to compare our university library to other better university library

- Nature of Library
- Collection both print and electronic
- Budget (plan and non-plan)
- No. of library staff and their categories (trained/provision for in-service training)
- Library hours
- Organizational structure of the library
- Rendering services to the users
- Library automation – S/w and H/w
- Barcode/ RFID facilities
- Availability of OPAC
- Digitized library/ Plan for digitization (using s/w for digitization).

CONCLUSION

In my view each organization should evaluate itself and compare to other better organizations of the same field with gap of time regularly. This process helps to judge and give the chance to improve itself. Such all libraries should follow and implement it to analyze and improve library services in digital era. Specially university library play a vital role to collect, organize and disseminate information to the clients/users in their desired form. Due to change in nature of demand of users and invent & implement of new technology, the responsibility of university library is being increased. In present scenario, university libraries are acquiring e-collection for their users. University libraries are facing new challenges day by day to disseminate appropriate information. No doubt, benchmarking is a complex process but it should be implement to all university libraries to know, evaluate itself and compare to other better university library. It is most essential to establish a standards/ benchmark to compare one library to other better library for public library, school library, college library, university library and special library separately.

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The Concept of Plagiarism and Anti-Plagiarism Software

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ABSTRACT

The present paper describes the concept of plagiarism in brief. Plagiarism is an offensive way of take the work of any other author, agency without any acknowledgement to the originator of the work and this is a copyright violation. Self-plagiarism is re-using of self-work, earlier writings in new paper or in any way. The present paper covers the concept of self-plagiarism and ethics. Everyone should avoided plagiarism and self-plagiarism (re-use of previous published work) in other source. This paper also covers the anti-plagiarism software (OSS- Open source Software and Commercial Software). Anti-Plagiarism software are available general and special nature.

INTRODUCTION

The advent of ICT has introduced new dimensions in every sphere and now all information, data and resources are publishing electronically, digitally and virtually on net. ICT have made easy all things in this new knowledge age especially in electronic information. Data may be copied, download and transfer in an easy way in electronic form on computer and net. Plagiarism is a copy of data, text and images from internet or from other sources and put this data in personal papers or any personnel work without any acknowledgement, citation and reference of the original generator of work or author. This is infringement of law of copyright, WIPO, IT act and cyber law. Everyone should avoided the plagiarism and self-plagiarism (re-use of previous published work) in other source.

PLAGIARISM SOFTWARE

Plagiarism has now become an integral part of our digital lives as technology, with the billions of information it gives us access to, led to the exacerbation of this phenomenon. Now there are many software online and offline which may be used to check plagiarism of writing work. Some software are of special nature and used for special work or discipline. Universities have their own policies on plagiarism percentage and excluding including text from writing work at the time of checking of plagiarism. The following are the some main software for checking the plagiarism:

- **Anti-Plagiarism:** Anti-Plagiarism is a software planned to efficiently detect and thereby prevent plagiarism and it is a multipurpose tool to deal with World-Wide-Web copy-pasting information from the assignment of authorship. The objective of this program is to help reduce the impact of plagiarism on education and educational institutions. At present, it distributes free software to detect plagiarism and it may check fluently the document in a format of *.rtf, *.doc, *.docx, and *.pdf.
- **DupliChecker:** It is a 100% open source tool (free to use) online. In this software we may copy-paste, or upload our essay, thesis, website content or articles, papers and click 'search', and we may get the examination reports within seconds. It is very fast tool for checking plagiarism.
- **PaperRater:** It is a multipurpose software as it offers three tools: Grammar Checking, Plagiarism Detection and Writing Suggestions of any document. It is a free resource (open source software) that is developed and maintained by linguistics professionals and graduate students. It is unquestionably free to use and it permits us to check for plagiarized parts in our essays. We may search for entire URLs and files in format of HTML, DOC, DOCX, RTF, TXT, ODT and PDF.

- **PlagiarismChecker:** It is very simple for educators or academician to check whether a paper has been copied from the Internet from other resources. Users can also use the "Author" option to check if others have plagiarized their work online but after publication the concerned work. It is very simple and easy to use as it does not require any download or installation. We may use it online on browser.
- **Plagium:** It is a free (open sources software) plagiarism recognition tool. It's very easy to use but we may paste in the original portion of text (only max 250 characters) and hit "search. Limited text search is available in this software. It is available in multiple language (six languages) and having an alert feature.
- **PlagTracker:** It is online plagiarism detection service that checks efficiently whether similar text content looks elsewhere on the web. It scans your document in more than 20 million academic works for any plagiarized copy and after scanning, we may get report with details about our work.
- **Viper:** Viper is a fast plagiarism detection tools with having the capability to scan our document through more than 10 billion resources, such as academic essays and other online sources, offering side-by-side comparisons for plagiarism. It is free (open source software) and may download it very easily and may install it only windows.
- **See Sources:** It is an online, automatic and free (open source) plagiarism checker tool and use MS Word in the formats (.doc/ .docx) or HTML in the formats (.htm) or text (.txt) or text document (limitation up to max. 300KB, 1000 words). With "Start Analysis" the source search begins. You will be updated about the progress continuously, search takes about 1 minute per document.
- **Glatt Plagiarism Screening Program (GPSP):** This software is available since 1990 and it provides consulting services to academic institutions with Plagiarism Forensics. The consulting services include developing policies and procedures to deal with issues of academic dishonesty and plagiarism.
- **EVE2 - Essay Verification Engine:** EVE2 is a very powerful software tool that allows educator, professors and teachers to determine plagiarized material from the World Wide Web. EVE2 accepts material in plain text, Microsoft Word, or Corel Word Perfect format and returns links to web pages from which a student may have plagiarized. EVE2 comes as close as possible by employing the most advanced searching tools available to locate suspect sites. Not only does it find these suspect sites, but it then does a direct comparison of the submitted essay to the text appearing on the suspect site. If it finds evidence of plagiarism, the URL is recorded. Once the search has completed, the teacher is given a full report on each paper that contained plagiarism, including the percent of the essay plagiarized, and an annotated copy of the paper showing all plagiarism highlighted in red.
- **Turnitin Software:** It is a powerful software to check plagiarism of large documents on billions of resources. It work on browser and there is no need of installation of it. Turnitin is a commercial software and may check 440 pages at once (below 40 MB). In this software a class is made and under class an assignment is made in which we may submit paper, thesis, dissertation and assignment etc. This allow to instructor to create group as class , assignment and instructor may allow to student see plagiarism report or student may be restricted to only submission of work. Although it uses is difficult but this software is very good and suits to university college system in an efficiently way.
- **Ithenticate:** It is very easy and simple software but a powerful toll to check plagiarism especially phd thesis, dissertation etc. Like turnitin in it, we may upload 40 MB size or 400 pages document at a time. Both turnitin and ithenticate software are provided by the same company. In India INFLIBNET (UGC) has also provided access of turnitin and ithenticate software for one year to assessment these software. This software is also commercial and accept all type of documents (Pdf, MS Word, html etc.).

Ithenicate software there is no need to create class and assignment etc. We may direct submits any documents.

- **Self-Plagiarism:** Authors, scholars and writer re-use their previous published work in other sources without knowing that it is a Self-plagiarism. Self-plagiarism may be one of the most dangerous forms of misconduct due to the lack of understanding of the ethics involved. The pressure to publish, combined with an ever-growing body of scholarly research, makes it difficult for publishers and institutions to investigate and prevent cases of such duplication. Organizations and individual authors and researchers should take preventative measures in their writing practices and editing processes, including the use of plagiarism detection technology that helps detect potential self-plagiarism before publication. The white papers gives readers insight on best practices from the following resources:

People think this is our work and we may use it again and again but this is not a good practice. Author may use his/her previous published work with proper citation and this work be limited in nature. *For example* we published a research paper in any reputed journal and also transfer the copyright of that paper to this reputed journal. And now we use this work in our other paper without any citation or reference than this will be an infringement (Previous journal may file copyright case).

CONCLUSION

Copyright Law, WIPO, IT Act, Cyber Law and plagiarism detection software or tool save the right of an author or original creator of work and these also leads the research to new dimension. Plagiarism detection software can make a useful contribution to minimizing plagiarism, however these software provide no magical answers as some software are expensive; most is time-consuming and all software are useless without internet connection. Software also fails in regional language, many work generate in regional language and these software not covers all language. Many unpublished work and printed work not coverable by these software. These software may covers or search only resources available on internet. 'No software seems to discriminate between quotations which are properly cited and those which are unacknowledged: what the software detects and notifies is duplication. So reports issued by plagiarism software alert the user to what may appear to be plagiarized material that is in fact appropriately referenced'. Manual checking and human judgments are still needed.

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Plagiarism: Causes, Effects and Prevention

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ABSTRACT

We all are familiar with the words like emerging trends, innovative approach, information exploitation/exploration, ICT development, changing scenario, 21st century etc. through which we are living in the current academic environment. We are very lucky that we are living in the age of modern technology in which starting from early in the morning to late in the night we are using different kinds of modern ICT tools and techniques. This paper has thrown the light on the plagiarism which may emerge from above scenario. Because people are becoming very smart in this age and doing such kind of copying activity very cleverly with the use of such modern ICT tools and techniques. I have tried to understand such causes, effects and prevention of plagiarism (CP=copy paste) in this paper through which our academic community can improve their research work.
Keywords: *Plagiarism, Intellectual Property, ICT.*

INTRODUCTION

In earlier decades where the invention of computer and internet was not there, the researcher or academicians are doing there work very sincerely, carefully without copying from others material. But, at that time there was not a flow of digital information. They have to see the hard copy of each and every reading material or reference material from the university and college libraries. So, the researcher have to think deeply and put their own efforts to made a meaningful dissertation, thesis or research paper or work as it was very time consuming to reproduce from the hard copy. I may not say that at that time there is no plagiarism, but the ratio was very low *i.e.* 100:5 compare to now which is reversed today. Now, the meaning of research is changed in the internet era. Majority of students and teachers agreed that students perceive and practice "research as a googling".

Innovation has given us both the things. Plagiarism is comes up in the floor of academic world rapidly and more adversely due to emergence of ICT as it becomes very easy and handy, and the same ICT has given us the solution to prevent it which is more innovative matter.

DEFINITION OF PLAGIARISM

To copy of other ideas, research work, or anything which is not of own and reproducing it without taking permission of that person/s or citing any references, the presentation of the work of another person as one's own or without proper acknowledgement are called plagiarism.

In simple words plagiarism is theft of intellectual property. (An Intellectual property is an original idea or information which is usually stated in words or numbers is treated as the property of its creator).

A professor of an American association of university said that "taking over the ideas, methods or written words of another, without acknowledgement and with the intention that they be taken as the work of the deceiver" is called plagiarism.

"Plagiarism is the act of appropriating the literary composition of another, or parts or passages of his writings, or the ideas or language of the same, and passing them off as the product of one's own mind"

The American Heritage Dictionary of the English Language (4th Ed.) defines plagiarism as a piece of writing that has been copied from someone else and is presented as being your own work.

When a researcher, scholar, faculty, student or any academician doesn't mention the citation or cite of his or her sources from where he has taken the reference or quote or paraphrase the ideas and words, it is called plagiarism.

CAUSES

It is very difficult to say about the exact causes of plagiarism as it is done intentionally and without intentionally also. In my view, the causes of plagiarism in academicians are as under.

- Easy availability of computer and internet
- Easy accessibility of digital information amongst the world
- To complete the work in less time with less efforts
- To achieve the high academic profile
- To finish the assignments in the case of late submission
- To show his/her skill on paper to the higher authority
- Lack of research skills
- Lack of citation skills
- Misconception of subject
- Laziness and poor efforts
- Lack of IPR rules
- Poor time management
- Pressure to complete the work within prescribed time limit
- Lack of knowledge about plagiarism
- Lack of proper guidance
- Intention
- Ambiguity of thoughts
- Just to get credit or marks or degrees
- Dishonesty and cheating themselves
- Fear of failure
- perception that cheating is easy
- lack of interest
- Seeking thrills
- Ignorance of plagiarism.

So, above are the causes of doing plagiarism which we often noticed after checking it. Most of the common answer is I am too busy, I am not able to do work in the time, I have to submit within time limit, I have to produce to my higher authority, I have not knowledge of "how to cite" the sources, I have no such idea of plagiarism, I am really forgotten to quote the original sources, I have to score good marks, I have to get the degree for promotion etc., as a result the effect of plagiarism is adverse mentioned as below.

EFFECTS

There is a definitely negative effect of plagiarism to the academic community. It spoils the reputation of student or faculty as well institution. The adverse effect of plagiarism can be ethical or legal. It can be a personal or professional. It can affect individual or group. It can affect the teacher or faculty and students who have done such kind of activities with or without intention. The consequences of plagiarism have been widely reported in the world of academia. Ultimately it kills the creativity which affects on overall development of the individual, institutional and affects on society as well nation also.

- It kills the own creativity of learning
- It stops critical writing
- Moral of other scholar students/researchers may down
- Breaks the enthusiasm of teachers

- Breaks the relationship of student-faculty/teacher
- Reputation may harm, name is ruined.
- lose of faith and trust in academic community
- Stops further academic development
- Dignity of the faculty/research scholar may decrease in case of teacher/faculty
- Professional carrier may destroyed.

COMMON KNOWLEDGE (NOT CONSIDERED AS PLAGIARISM)

When such information is knows by everyone which is called common knowledge. We don't need to give citation for such common knowledge. If this kind of information is not quoted or cited by the researcher, it may not be count as plagiarism. For eg. It is the fact that the earth reveals around the sun or S.R. Ranganathan is a father of library science in India.

Prevention of Plagiarism: When we write anything in hard or soft way, we have to explain from where we got our information. Some of the ideas will be our own, but many will have come from information we have quoted or cited from other sources like book, journals, from internet etc. which we have to cite correctly to avoid plagiarism. This is a moral way to prevent the plagiarism. Now, there is number of software are available in the market to detect the plagiarism whether it is free from internet or commercial. In an October 2010 "Psychology Today" article, Dr. Shelley Carlson indicated that instructors bear the responsibility of enforcing requirements that students do original work [6]. If, originality is lost, creativity is lost and if creativity is lost everything is lost to be a good academician in the life. So, to be a life time good academician, it is essential to not do plagiarism as well prevent also.

TYPES OF PLAGIARISMS

There is various types of tricks and techniques through which one can make plagiarisms. It's one type of theft. One can copy full text, half text, part of the text, jumbled the text, digitally reproduce or physically reproduce with adding such tricky sentences. Copy from the sources of internet and some other digital sources is also the big issue for plagiarism. So, there is a below mentioned types of plagiarism can occur in the academic field.

- Copy Paste (Full, Part, Paragraphs, Sentences)
- Word switching
- Find-replace
- Hybrid
- Idea
- Text, images, tables, graphs, charts etc.
- style
- Clone
- Intentional
- Unintentional.

There are number of software are available in the market to detect the plagiarized material through which we can prevent the plagiarism. Free online software is also available in the internet through which we can go through the plagiarism checking.

BASIC NEED OF SOFTWARE

To check the sources of information, there is a need of such software which can check all the information whether it is text, images, tables, graphs, videos or whatsoever is essential to avoid plagiarism. So, there is a need of such software which may fulfill the above checking to detect the plagiarism.

INFLIBNET has published the tenders in 2013 to make plagiarism software for them in which they demanded the below mentioned theft detection tools.

The software should be able to perform the check for plagiarized content and should support the following minimum requirements

- Permit site license for unlimited users in a university
- Off line content checking
- On line content checking
- Plagiarism check with maximum number of authentic on-line sources
- Integration with popular search engine *e.g.* Google, Google Scholar, OAIster,
- SCIRUS, Bing and Altavista
- Minimum test time
- Native PDF support without 3rd party software
- Multiple Formats Support: HTML, MS Word, Word Perfect, Post Script, Portable Document Format (.pdf), Rich Text, Plain Text
- State-of-art advanced report viewing interface
- Source tracing mechanism
- On-the-Fly original to source comparison with dynamic statistics
- Plagiarism chart generation
- References automatic detection
- Multiple documents processing
- Seamless integration with the existing CMS/LMS
- Should cover a large number of databases for comparison.

Plagiarism detection is the process of filtering the text, images, tables, graphs or whatsoever which is taken or copied from other sources which it checked and shows the result that how much portion of the research article, thesis or any reading material is being plagiarized. Here is some of the reputed software which can detect the plagiarism.

SOFTWARE AVAILABLE ONLINE
- Article Checker: www. articlechecker.com
- Crossrefme: www.crossrefme.com
- Duplichecker: www.duplichecker.com
- eTBLAST: http://etest/vbi.vt.edu/etblast
- ITS: www.itseucation.asia/plagirism-checker.com
- Paperrater.com: www.paperrater.com
- Plagiarism checker: http://plagiarismechecker.com
- plagirism detect: http://plagiarism-detect.com
- plagiarism Software: www.plagiarismsoftware.net
- See sources: www.plagscan.com/seesources.plagiate.php
- The Plagiarism Checker: www.dustball.com/cs/plagiarism.cheker
- Plagiarism Finder: www.m4-software.com
- Eve

COMMERCIAL SOFTWARE
- iThenticate: http://www.ithenticate.com/
- Turnitin: http://turnitin.com/
- Dustball Plagiarism Checker: www.dustball.com
- EVE: www.canexus.com
- WordCHECK DP: http://www.wordchecksystems.com
- SIM: http://www.cs.vu.nl
- Jplag: http://wwwipd.ira.uk
- Glatt Plagiarism Screening Program (GPSP): http://www.plagiarism.com

DOWNLOADABLE ONLINE
- Plagiarism detector: www.plagiarism-dector.com
- Anti-plagiarism: http://sourceforge.net/projects/antiplagiarism
- Viper: www.scanmyessay.com
- Wcopyfind: www.plagiarism.bloomfieldmedia.com
- Winsite: www.anti-plagiarism-software.winsite.com

SUCH FREE SOFTWARE (REQUIRED REGISTRATION)
- Plagiarismcheck: http://plagiarismcheck.org
- Open-access Plagiarism Search-OPAS: http://oaps.eu (right now new registration in closed).

PLAGIARISM DETECTION SOFTWARE USED IN INDIA
- IIT Delhi : Using Turnitin since 2012
- Jamia Millia Islamia : Using Turnitin since 2012.
- DESIDOC : iThenticate for detecting plagiarism in research papers
- Motilal Nehru National Institute of Technology: Launched an offensive mechanism against plagiarism
- Jawaharlal Nehru University : Mandatory for PhD Supervisors and students to use Turnitin before submission of final thesis.
- IIT Kanpur : Devised a policy to put a stop to plagiarism.
- UP Technical University : Implementing anti-plagiarism software
- Pune University : Taken an initiative to educate its students and teaching community regarding plagiarism and its consequences.
- Sir Dorabji Tata Memorial Library: Using Turnitin software. Berhampur University : Set up a dedicated centre for checking plagiarism in PhD thesis with INFLIBNET.

EXAMPLES OF REAL PLAGIARISM
Consider the following real-life examples of plagiarism and the consequences of the offender's actions:
- In a notice by the journal Biotechnology Advances in its Nov./Dec. 2010 issue, an article published by Dr. Sangiliyandi Gurunathan and group at Division of Molecular and Cellular Biology, Kalasalingam University has been retracted due to plagiarism.
- A biochemist resigns from a prestigious clinic after accusations that a book he wrote contained appropriated portions of text from a National Academy of Sciences report.
  A psychologist has his doctoral degree rescinded after the university finds that portions of his doctoral dissertation had been plagiarized.

ADVANTAGES
- It improves the quality of research work
- It helps to researcher to cite the references in a proper way
- Intellectual property issues can be minimizeIt helps to develop the own ideas of researcher
- Researcher can find out whether his/her research work are copied by others
- It creates the fear if copied from others which is ultimately benefited to start own thinking about research
- Effective and efficient research is promoted
- Due to availability of various duplication detection software, users has many options to cross check his research work
- It creates awareness among academicians, research scholars and students which is resulted as better output of research
- It displays the correct sources, so researcher got the chance to correct his article and put the correct citation
- Checking procedure is very fast so it saves the time of user to proceed further
- In Ph.D. thesis, dissertations and in research papers; the work of researcher will be very realistic, informative and original, also the citations would be proper

LIMITATIONS OR DRAWBACKS
- The material which is not digitized yet is not been plagiarized by the plagiarism detection software
- It detects the words not ideas

- Some software matches the title, authors name, address, email id, contact details, such common information as plagiarism which should not be considered as plagiarism
- Some software like duplichecker checks the .txt and .docx file only so in case of other file extensions it can not be checked by the software.
- In some software there is no facility to upload a file
- At a time there is limit to search 1500 words, 1000 words, or 300-500 kb word files only
- Some software are available free for demo purpose only
- Some software like winsite needs special operating system to run. It can not be download in windows operating system
- In most of the cases free software is not available
- Only English language is checked, other language like Hindi, Guajarati can not be checked out.
- Books are not searched in such software.

SUGGESTIONS

Researcher does mistakes in two ways. First is intentionally which is not considered as mistake and second is unknowingly. So, here are some suggestions to avoid plagiarism considered above two ways.

- First of all, the teacher or faculty should inform or aware about the plagiarism to their students.
- I suggest that students should be aware from the school time in the modern trend of ICT tools and techniques
- In most of the cases of students, there is a less awareness about citation and style of referencing which should be explain properly by the faculty
- Citation is the most important factor. Give the proper citation for each and every word or phrase or text taken as a reference from any kind of source.
- Proper guideline and rules of citation style should be followed. For eg. MLA, Chicago, MLA etc.
- Ethical writing must be in the mind of everyone
- Through conversion of different file extensions into word and then copy paste should be restricted because these helps a lot to the pp (plagiarism person)
- Keep in mind the copyright act before reproduce anything
- Use the material which is in public domain. After 60 years and the death of author, we can use the government document and material as per Indian Copyright Act, 1957.
- Under the copyright act 1957, "fair use" matter should be considered. Using short quotations for criticisms is considered as fair use.
- We have to use any trademark or patent words or material with citation or permission.
- For the 'as it is word' of others, always use quotation marks.
- Librarians have to come forward in each and every academic field to aware about the plagiarism.
- Initially librarians has to explain to the students and faculties about reference sources, citations, citations styles and about quotations.
- Use of modern ICT tools and techniques in a positive way with ethics can make the real difference for plagiarism issues.

CONCLUSION

In the age of ICT and exploitation of information, to avoid plagiarism is a need of time to save the academic integrity. It is also a question of institutional quality of their researcher. Taking into consideration the causes and effects, every academician should take initiation to aware about the plagiarism to their students. Ethics to not do plagiarism is must applicable to the faculty also. As we know that there is some limitations to detect the 100% plagiarism, it is our moral responsibility to stop plagiarism. To give the proper

citation for whatever the part taken as a reference from any kind of source is the most important. Librarian has to play keen role to prevent the plagiarism. As a librarian, we have to organize awareness program, we have to explore the cause and effect of plagiarism, we have to explain about the diverse effect of plagiarism, we have to generate confidence on the students and faculty, we have to explain them to keep patience, persistence and put proper efforts to achieve the excellence in their research work. As, we know that any plagiarism tool or anti plagiarism devices is not a magic or "Rajnikant" who scans everything within a fraction of second and give 100% perfect result; so it's our moral and ethical duty to avoid plagiarism to achieve great success in our life. Ultimately this helps to build ourselves, our society as well nation in a successful way.

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Plagiarism and Researchers: A Survey of PhD Students

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ABSTRACT

Plagiarism is one of the most complex ethical issues scientists and engineers face in connection with publishing and publications. The present article presents the results of a survey of PhD students.
Keyword: *Plagiarism*

INTRODUCTION

Plagiarism is the uncredited use,of both intentional and unintentional, of somebody else's words or ideas (Purdue University, 2015). While, in practice, plagiarism is one of the most complex ethical issues scientists and engineers face in connection with publishing and publications (Visser, Haidegger, and Papanikolopoulos, 2012).

There are many factors which lead to plagiarism. The use of performance indicators based on publications, citations, impact factors and the like may also be adding to the temptation to stray from previous conventions regarding what constitutes appropriate research behaviour (Martin, 2013).

In a survey of research assistants and PhD researchers it was found that the reasons that leaded them to plagiarize if they plagiarized in some time of their life were: problems with using foreign language (32.40%), time constraints (31.10%), lack of knowledge about plagiarism (25.70%), overloaded course requirements (18.90%), lack of ideas about the work/assignment/paper (17.60%), lack of interest in the topic (13.50%), difficulty of the assignment (12.20%), lack of understanding of the assignment (12.20%), lack of enough academic skills (10.80%), lack of respect or interest for the course (5.5%), lack of punishment for the plagiarism (5.5%)(Eret & Gokmenoglu, Plagiarism in Higher Education: A Case Study with Prospective Academicians, 2010).

METHODOLOGY

A questionnaire was designed to collect the data on the ability of researchers to recognize plagiarism. The researchers were required to self assess themselves. Self assessment has its own advantages and disadvantages. The questionnaires were distributed to researchers in sciences only. The collected 245 questionnaires were analysed with SPSS software version 16.

RESULTS

Demographic Information: 46.9% researchers were from Life Sciences, 46.9% from Physical Sciences, 3.7% from Mathematics and Statistics and 2.4% from Computer Science. 49% researchers were male and 51% were female. 27.8% researchers were in the age group 20-24 years, 58.4% in 25-29 years, 12.7% in 30-34 years and 1.2% in 35-39 years.

Table 1: Ability to Avoid and Recognize Plagiarism

Ability to Avoid and Recognize Plagiarism	Frequency	Percent
No response	21	8.6
Needs attention	93	38.0
Good	112	45.7
Excellent	19	7.8
Total	245	100.0

Table 2: Ability to Avoid and Recognize Plagiarism by *Subject*

Ability to Avoid and Recognize Plagiarism		Subject				
		Life Sciences	Physical Sciences	Mathematics & Statistics	Computer Science	Total
No response	Count	5	16	0	0	21
	% of Total	2.0%	6.5%	.0%	.0%	8.6%
Needs attention	Count	44	49	0	0	93
	% of Total	18.0%	20.0%	.0%	.0%	38.0%
Good	Count	64	33	9	6	112
	% of Total	26.1%	13.5%	3.7%	2.4%	45.7%
Excellent	Count	2	17	0	0	19
	% of Total	.8%	6.9%	.0%	.0%	7.8%
Total	Count	115	115	9	6	245
	% of Total	46.9%	46.9%	3.7%	2.4%	100.0%

Table 3: Chi-Square Tests - Subject

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	47.153[a]	9	.000
Likelihood Ratio	54.615	9	.000
Linear-by-Linear Association	.868	1	.352
N of Valid Cases	245		

As evident from Table 3, there is significant different in the ability to recognize plagiarism amongst different science subjects.

Table 4: Ability to Avoid and Recognize Plagiarism by Age

Ability to Avoid and Recognize Plagiarism		Age				
		20-24 years	25-29 years	30-34 years	35-39 years	Total
No response	% of Total	2.0%	6.5%	.0%	.0%	8.6%
Needs attention	% of Total	14.7%	17.6%	5.7%	.0%	38.0%
Good	% of Total	11.0%	26.5%	6.9%	1.2%	45.7%
Excellent	% of Total	.0%	7.8%	.0%	.0%	7.8%
Total	% of Total	27.8%	58.4%	12.7%	1.2%	100.0%

Table 5: Chi-Square Test - Age

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	28.693[a]	9	.001
Likelihood Ratio	38.768	9	.000
Linear-by-Linear Association	4.847	1	.028
N of Valid Cases	245		

There was significant difference in the ability to avoid and recognize plagiarism in different age groups, as evident from Table 5.

Table 6: Ability to Avoid and Recognize Plagiarism by *Gender*

Ability to Avoid and Recognize Plagiarism		Gender		
		Male	**Female**	**Total**
No response	% of Total	2.4%	6.1%	8.6%
Needs attention	% of Total	18.0%	20.0%	38.0%
Good	% of Total	25.3%	20.4%	45.7%
Excellent	% of Total	3.3%	4.5%	7.8%
Total	% of Total	49.0%	51.0%	100.0%

Table 7: Chi-Square Tests - Gender

	Value	**df**	**Asymp. Sig. (2-sided)**
Pearson Chi-Square	5.786[a]	3	.123
Likelihood Ratio	5.916	3	.116
Linear-by-Linear Association	2.196	1	.138
N of Valid Cases	245		

There was no significant difference in the ability to avoid and recognize plagiarism between male and female PhD researchers, as apparent from Table 7.

CONCLUSION

Many PhD students are plagiarizing, be it knowingly or unknowingly. There is a need to make them aware of the disadvantages of plagiarism and ways to avoid it.

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Radical Switch in the Role of Librarians in the Digital Footprint: A Changed Panorma

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ABSTRACT

The transposition from conventional libraries to modern libraries in the digital age has compelled the librarians to shake hands with both new opportunities as well as stumbling blocks. Since generations it has been witnessed that librarians are one of the most intelligent, insightful and keen professions of all. The librarians need to act smart and deliver the library services in alignment with the user's expectations. It is highly important to focus on the human side of this change in order to develop an understanding about managing the digital library resources and services. The paper incorporates the Challenges faced in digital age, Changing role of the Traditional librarians, librarians re-designated in the Digital Library Environment, new generation e-reading products and services, professional competencies to be imbided in by them and answer to the question is there a need of Libraries and Librarians in present scenario.

Keywords: *Web-based services, Professional competencies, Library 2.0, Challenges in the digital age.*

INTRODUCTION

In recent years there has been a sea change in the nature of library services as well as user's needs. It is the librarian who needs to facilitate much closer relationship between libraries and patrons. In the age of multimedia it is librarian who should inculcate the ability to take the library services to the user's virtual spaces. Building a sense of community between libraries and its users is his foremost objective. Having a variability of skills for using the emerging e-technology is the need of the hour. It is the librarian who will be looked upon while finding the paths for the users through complex content. So the vision of the future academic library professional must be to create a World Class Networked Global Library and Information Centre to provide timely web based quality information service to the user in time in the e-learning environment.

LIBRARIAN: A SEARCH ENGINE OF THE DIGITAL ERA

The digital librarian acts as a guardian of information superhighway and acts as a symbiotic human machine guru. While traditional librarians allegedly seeks stability and perfect standards with scant regard of time, the IT specialist's approach emphasises on speed and efficiency.

- **Information Manager:** To meet information need of the user they should know how to manage and deliver appropriate information services.
- **Information adviser/instructor:** Ensure that user/staff know how to access relevant sources of information (literacy).
- **System and Networking:** For delivery of information to their users in an appropriate manner they develop and design appropriate systems.
- **Information Broker:** for both print and electronic media- identifies, retrieves, organises, repackages and provides electronic access to digital information sources.
- **Change Agent** *i.e.* **Technology Application leader:** collaborates with IT services to design and evaluate systems that would facilitate e-access.
- **Facilitator:** makes access easier, *e.g.,* provides network access, purchases software and e-journal licenses.
- **Educator:** Trains clients on internet use: tools, search engines, databases and catalogs, use of web based instructions and online tutorials.

- **Innovator/ website designer/ manager:** designs library web page and search and evaluates information resources to be linked to the site, creates an awareness of library services on web.
- **Database Manager:** print bibliographies are no longer in use as searching via online databases is faster and efficient.
- **Collaborator:** expanded area of collaboration, not just with fellow librarians but also IT people, the community etc.
- **Policy maker:** develops and participates in the development of information policy for an organisation, ensuring total or selective access to resources.
- **Business Manager:** negotiates with the publishers and aggregators for licence agreements for e-journals and databases.
- **Image maker:** adds value to library to gain management support and project a positive image to the outside world.

CHALLENGES OF DIGITAL AGE FOR THE LIBRARIAN

ICT has changed the whole nature of publication, storage, transmission, delivery and use of information. Web has utterly transformed the information access behavior of the users posing various challenges for library professionals.

- **Changing patron needs:** There has been a drift from passive users to active users in e-environment. ICT revolution has heightened the level of user's expectations and has given birth to new patterns of scholarly publishing and communication. Users demand information access facilities at their desktops. Users expect high quality, comprehensive, user friendly new generation services.
- **Computers/Web that Replace Reference Librarians:** Technology is highly dynamic and changing at a fast pace. The new technologies allow completely new solutions to old problems and consequently old services are displaced by new ones. Thus LIS professionals need to seriously think about improving their competencies to deliver need based high quality information services to user community.
- **Transition from Print to Digital:** Students with new needs focus on saving their time by efficient use of e-resources like e-journals, e-books, etc. Librarians need to offer different information access and delivery mechanisms such as networked CD-ROMS, videoconferencing, downloading via web.
- **Technological infrastructure and digital collections:** Slow internet connectivity, lack of systems, equipments and databases are to be dealt with, which requires high amount of money as well as skills on part of the library staff.
- **Constraint of dwindling budgets:** Intensive use of digital resources, interactive virtual learning environment, online bookshops, development of digital, hybrid libraries resulted in financial constraints for libraries.
- **Change is inevitable:** What is latest today will become outdated tomorrow. Change is the law of nature. Survival of any library demands change, updation and modernization.
- **Lack of Library orientation:** Orientation programmes for the users for making them familiar with each corner of the library should be carried on regular basis.
- **Lack of skilled professionals:** Professionals face big problem in equipping themselves with new technologies. They need to keep pace with ICT trends, search and web technology, wifi and RFID, online information services and subject gateways.

CHALLENGES IN E-RESOURCE MANAGEMENT

- **New generation of learners:** Students now begin their search for information with Google or similar search engines. Thus it is the duty of librarian to develop a virtual learning environment to accommodate an increasingly diverse group of users.
- **Copyright/Privacy/Confidentiality:** Issues like large scale of piracy of software and plagiarism are to be faced frequently. Despite copyright notices, e-publications can be

easily forwarded to people outside the licensed user group. Thus, library stands responsible for maintaining awareness of all users about copyright issues.

- **Online/Virtual crimes and Security:** Virus-proof procedures should be implemented for downloading e-information and also databases need to be modified by hacker-proof procedures. Creating separate login and password could a great help.
- **Manpower:** In fast changing technological world librarians should have to keep their best foot forward. Core competencies should be expanded.
- **Organizational Structure:** Technology has broken down the rigid hierarchical structure and there is a lot more scope for experimentation now.
- **Preservation archiving of digital e-resources:** Practices of migration and emulation needs to be tackled carefully.
- **Lack of clarity in vision:** There has been a lack of direction somewhere. It is time for librarians to become capacity builders and facilitators making library both a place and gateway for accessing information within and beyond the four walls of library.

IMPACT OF E-RESOURCES ON LIBRARIES

In digital environment, there is a change in the role of librarians and it is inevitable for survival in the Digital world. Librarians and Information Scientists are needed for packaging and repackaging of information or for Knowledge Organization and Dissemination, for reference purpose, to advise the users about the strategy to identify relevant electronic sources, etc. Digital libraries or Digital documents are not going to replace the physical existence of libraries/documents completely. Librarians not only have to attract new patrons to the library but has to equally work upon retaining the existing users.

- Radical changes in the organization, collections, processes, services and products, etc.
- The library collection now is a hybrid of print and digital media.
- Better access, retrieval and dissemination of information are observed.
- Requirement of highly specialized skilled professionals who are proficient in handling electronic equipments for proper acquisition, maintenance and dissemination of information.
- In order to cope up with the present day challenges of information explosion, libraries have to re-examine the strengths and weaknesses of their organization and transform themselves according to their patron's needs and expectations (SWOT Analysis).

PROFESSIONAL COMPETENCIES

Qualified library staff coupled with excellent customer service will boost the overall customer satisfaction and confidence in using digital libraries. The more the staff understands customer preferences the more a refined segmentation can be achieved.

Managerial Skills:
- Demonstrate the knowledge of vision, commitment and leadership.
- Encourage teamwork and involvement by all staff.
- Strive for cost effective utilization of all resources of the library.
- Communicates the value of library and information services to decision makers.
- Understands and uses effective team process skills to realize the objectives, mission, and vision of the library.
- Develops and implements policies and procedures for the efficient an effective operation of library functions.
- Continually adjusts programs and services to respond to societal changes and service opportunities.

Knowledge of Policies, Procedures, Issues and Standards:
- Maintains current awareness of professional issues impacting libraries.
- Demonstrates knowledge of library policies, procedures and service standards.

Knowledge of Information Sources and Services:

- Develop specialised subject knowledge about the purpose of the organization.
- Identify materials appropriate to customers' requirements and their abilities.
- Expert knowledge in the content of information resources and ability to critically evaluate and filter them.

Technology Skills:

- Use appropriate latest technology to manage and deliver information services.
- Continually develops skills in using latest relevant technologies.
- Use technology to generate value-added products, such as bibliographies, databases etc.
- Function creatively and innovatively in a Web-based environment.

Professional Search Skills:

- Adequate knowledge about search process, search strategies, search techniques, search engines and search technology.
- Capable of finding and evaluating the information resources best suited to user needs.
- Expert knowledge in searching catalogs, databases and web sources.

Communication Skills:

- Communicates clearly and respectfully with customers and colleagues.
- Demonstrates active listening skills with customers and colleagues.
- Effectively negotiate with publishers, customers, management and vendors.

Presentation Skills:

- Develops and practices readers' advisory skills to promote reading habit among all levels of users
- Increase awareness of the role of libraries and librarians in promoting information literacy.
- Use variety of presentation techniques to convey information to users with different learning styles

Customer Service:

- Understand customer needs and preferences for information.
- Instruct in information gathering, literacy, research and technical skills.
- Continually design and improve user oriented information products and services.

Commitment to Life-Long Learning:

- Take responsibility for the development of one's own professional career.
- Remain knowledgeable in current events and technologies.
- Pursues learning opportunities, personally or through formal training.
- Flexible in adapting to new situations, systems, tools, environments.
- Anticipates accepts, adapts and manages change effectively.

Evaluation and Assessment Skills:

- Continually analyzes, investigates and assesses the information service needs of the users.
- Continually Designs and deliver specialized value added information products and services.
- Evaluates the outcomes of the use of library and information resources and services.
- Conducts research to find solutions to the identified information management problems.

SOURCES FOR PROFESSIONAL COMPETENCY DEVELOPMENT

To deliver right message to the right customer at the right time in most courteous and professional manner, adequate training must be conducted ensuring the smooth running of the project.

- Acquiring formal qualifications
- Pursuing doctoral research
- Distance and E-learning courses
- Reading professional literature
- Tours and visits to well managed libraries
- Affiliation to professional bodies
- Attending professionals meetings. Conferences & Seminars
- Presenting papers in conferences and seminars
- Writing papers in periodicals and books
- Participation in specialist groups
- Personal interactions with expert fellow professionals
- Attending workplace programs
- Attending staff training and development courses
- Undertaking research and development projects.

WEB BASED LIBRARY SERVICES

- **Digital reference services:** Users have become tech savvy and it is the librarian who has to reach the users to their preferred and virtual spaces. Some Virtual reference services are:
  - Electronic current awareness service
  - Electronic research guides
  - Virtual reference desk
  - CREDO reference
  - Emails
  - Webforms
  - Real time chats
  - Video-based reference service
  - Ask A Librarian
  - Ebrary
  - Question Point.
- **Electronic Delivery Services:** In the era of digitisation the users don't have to personally visit the libraries to collect the required document rather he can get it online through inter library loan and the services like "Infotrieve''.
  - Documents may be shared across *network platforms.*
  - *Location not an Access Point:* Information is accessible regardless of the user's location as librarians don't consider the space as their access points and provide a barrier less service to the users.
  - Knowing availability of a particular document online, user account status online, online posting of overdue details.
  - In the Journal Section electronic article delivery, article alert service, open J-gate, pro-active web-based TOC can be some online services.
  - Fill-in forms for feedback and suggestions should be made available online on the library's website or can be sent to the users on their emails.
  - Recommendation forms for purchases by the faculty, electronic reserves through the user's login and password, knowing the status of reserved documents online, finding aids(other than WebOPAC).
  - Request for a document can be made online through Interlibrary loan service *e.g.,* DELNET.

- ▪ *Web-based User Education:* Web-based library tutorial Information about special exhibits, web-based user education and library outreach programs.
- ▪ Online in-house library bulletins, library blogs, online mailboxes for user-comments or suggestions, library forums (e-mail based) Bulletin Boards, Discussion Forums and Listservs.
- ▪ Virtual Library Tours, Library maps and floor plans on each floor should be exhibited properly for guiding and instructing the users.
- ▪ Library Web Sites should have a *gallery of Photographs* which will present all the ventures and affairs being taking place in the library.
- **Links to library WebPages:** Librarians should make an effort to provide
  - ▪ Links to various e-resources, databases on their Library's Home page
  - ▪ Current news and upcoming events
  - ▪ Recent workshops, training programmes, conferences
  - ▪ List of new arrivals online
  - ▪ Provision of alert services-like new additions
  - ▪ Frequently Asked Questions (FAQ).
- **Subject Gateways or Library Portals:** Provides search facility, links to related sites and resources such as electronic Journals, Discussion Groups, Mailing lists and many specialized user facilities required to the users of Specific Discipline.
  - ▪ Agricultural Sciences, Forestry, Food, Veterinary – NOVAGate
  - ▪ Art, Design, Architecture and Media - ADAM
  - ▪ Arts and Humanities - AHDS
  - ▪ Health and life sciences - BIOME
  - ▪ Engineering, Mathematics and Computing - EEVL
  - ▪ Economics - NetEc
  - ▪ Humanities – HUMBUL
  - ▪ Library and Information Science - BUBL
  - ▪ Media and Communication Studies - MCS
  - ▪ Philosophy Studies - Philosophy Around The Web
  - ▪ Social Sciences - SOSIG.
- Library Calendar which sets forth the events to be held in the near future.
- Union Catalogue of all the relevant colleges.
- Tutorials of complicated databases and for other services.
- Newsgroups and online forums to discuss and consult customer grievances.

IMPLEMENTATION OF LIBRARY 2.0, LIBRARY 3.0 TOOLS

To provide more interaction and user-centric library services, Library 2.0 technologies may be used. Library 3.0 is a virtual complement to physical library spaces:

- **Instant Messaging (IM) and SMS Enquiry Service:** Access to Mobile Library catalogues, websites, services and resources (SMSChilly, MySMSmantra, Solutionsinfini, boomadcom, mvaayoo and many are the bulk SMS service providers available in India) as mobile reference service is today's need.
- **Streaming Media:** Makes it possible for users to take advantage of interactive applications like video search and personalized playlists. Allows content deliverers to monitor what visitors are watching and how long they are watching it. Provides the content creator with more control over his intellectual property because the video file is not stored on the viewer's computer. Once the video data is played, it is discarded by the media player.
- **Blogs and Wikis:** Blogs contain posts, sometimes similar to journal entries, from a person or a group. The posts are dated and listed in reverse chronological order. People can comment on posts as well as provide links to related sites, photos, and blogs. A wiki is a Web site that enables users to collect team knowledge, plan events, or work on projects together. People can easily add new content or edit existing content.

- **Tagging:** Commonly used in blogs, site authors attach keyword descriptions (called tags) to identify images or text within their site as a category or topic. Web pages and blogs with identical tags can then be linked together allowing users to search for similar or related content. Tags are also called tagging, blog tagging, folksonomies or social bookmarking.
- **Podcasting and Vodcasting:** Podcasting is a free service that allows Internet users to pull audio files from a podcasting Web site to listen to on their computers or personal digital audio players. Vodcasting is a step beyond podcasting, vodcasting, also called video podcasting or vlogging, adds video to the downloadable sound files podcast listeners are used to.
- **RSS Feeds:** RSS solves a problem for people who regularly use the web. It allows you to easily stay informed by retrieving the latest content from the sites you are interested in. You save time by not needing to visit each site individually.
- **Social Bookmarking Services:** A social bookmarking service is a centralized online service which enables users to add, annotate, edit, and share bookmarks of web documents. *e.g.,* Delicious, Stumbleupon, tumblr, reddit etc. **Social Networking:** A social networking service (also social networking site or SNS) is a platform to build social networks or social relations among people who share interests, activities, backgrounds or real-life connections.
- **Library 3.0 technologies:** such as the semantic web, cloud computing, mobile devices, etc. could be implemented by the library.

CONCUSION

The Libraries and Librarians are becoming more and more important in the Digital Environment. Librarians have great opportunities and bright career prospects as long as they improve their professional and technological competencies and grab them. They need to have enthusiasm for life-long learning and new roles, will-power, assertiveness, creative thinking, self-confidence and innovativeness. If the users can not come to the library, let the Library reach to them as per their convenience and the way they want. Thus, librarians can adapt to the changes but they cannot be abandoned. The human component of the libraries as a librarian cannot be replaced or ignored.

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Library and Information Services Through Intranet in Present Scenario

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ABSTRACT

The power of Information technology has highly affected human knowledge, skills and abilities. In the mean time, Intranet development had a great impact on library and information centers. It has made significant change in library working environment, especial in the field of Information process & retrieval (IRS). This article gives brief overview about the Intranet, its history, importance, limitations and characteristics. Then it stress on various library & information services offered with the help of Intranet.

Keywords: *Intranet, Intranet applications, Digital library services, corporate library*

INTRODUCTION

In recent development, the Intranet has become a common technology in most businesses, organizations and institutions. It is based upon Internet technology, in particular World Wide Web (WWW), to build information systems within organization or enterprise to accomplish standardization and automation. The major difference between these two is, Internet is an open, public space, while an Intranet is designed to be a private space. An Intranet may be accessible from the Internet, but as a rule it's protected by a password and accessible only to employees or other authorized users. Sometimes the term refers only to the most visible service, the internal website. The same concepts and technologies of the Internet such as clients and servers running on the Internet protocol suite are used to build an Intranet. HTTP and other Internet protocols are commonly used as well, such as FTP. There is often an attempt to use Intranet technologies to provide new interfaces with corporate "legacy" data and information systems.
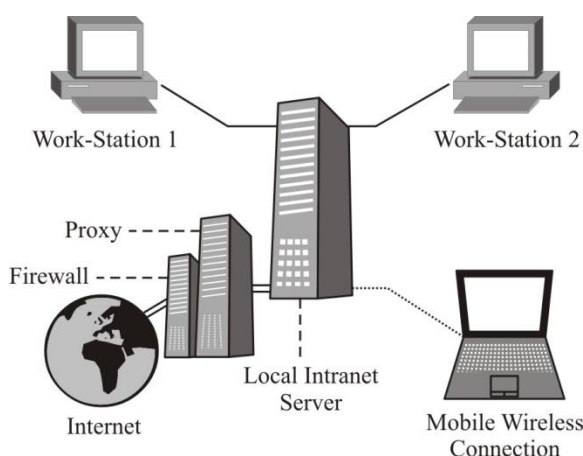

Fig. 1: Intranet architecture.

In libraries also Intranet can facilitate so many services. It helps in dissemination of stored information as well as allows to access to remote information. Through Intranet, libraries can discharge the required information to its users in less time, with high effectiveness. Information Professionals are becoming Webmaster and Intranet Coordinators, combining technical expertise with information management ability. With the increasing emphasis on resource sharing not only between libraries but between

different branches and departments of a library, the Intranet offers the potential to be very important tool in libraries' effort to make the most efficient use of their resources.

DEFINITION

In general Intranet is defined as a network based on TCP/IP protocols (Internet) belonging to an organization, usually a corporation, accessible only by the organization's members, employees, or others with authorization.

According to Peter Auditore "Intranets represent a new way of solving business problems by facilitating efficient information management, resource sharing, and workplace collaboration. The Physical location of applications, information and computing resources will become irrelevant in future organizational Internet works and Intranets as the adoption and use of Internet and web technologies proliferate."

HISTORY OF INTRANET

The whole Intranet phenomenon had its start in 1994 by some particularly perceptive people at Lockheed Martin, NASA and Amdahl. They saw the potential for incorporating Internet technology within their own companies. A group at Amdahl ran with this idea, envisioning a lucrative business of developing Web-based software to perform internal functions. Steven L. Telleen, at the time with Amdahl, was the one who coined the term "Intranet" in July 1994. The first commercially printed appearance of the term is found in Stephen Lawton's article on Intranets in Digital News and Review in April, 1995. In it he discusses Fortune 1000 companies posting web pages and installing telnet and ftp servers. The pioneers were Boeing, Schlumberger Ltd., Weyerhaeuser Corp., Sun Microsystems and Digital Equipment Corp. The advantages were listed as low cost of setup, ease of writing HTML, and access to various kinds of documents online such as employee manuals, research material, and individual homepages.

The Popularization of the term is due in large part to Netscape. When Netscape began to develop their business strategy around the full-service Intranet, it put the term in our everyday vocabulary. Now IBM (Lotus), Microsoft (Out look) and Netscape are the key player scheming over the nascent Intranet market.

Internet vs. Intranet

The major difference between Intranet and Internet is as follows:

Table 1: Difference between Intranet and Internet

Fields	Intranet	Internet
Users:	Organization employees	Any one can use
Tasks:	To find out information about your services & products	General & complex applications
Type of Information:	Draft reports, project progress reports, human resource information, and other detailed information related to company.	Marketing information and customer support information.
Amount of Information:	High due to the extensive amount of work-in-progress that is documented on the Intranet	Less
Bandwidth:	Often run between a hundred and a thousand times faster than most Internets	Slow
Navigation system:	Stronger	Weaker

IMPORTANCE OF INTRANET

Intranet is necessary in organizations because of the following reasons:

- **Information Access:** Users can access information they need, when they need it from the Library.
- **Access Control:** One determines as to who can have access to what data, and to what extent.
- **Information sharing and management:** Resources can be shared and maintained electronically.
- **Vendor independence:** It can be customizable according to over requirement.
- **Organizational learning:** It facilitates organizational learning.
- **Updation:** Databases can be updated dynamically – as the transaction occurs.
- **Innovation:** Easy to accommodate new technology.
- **Communication:** Communication can take place instantaneously – anywhere in the world.
- **Remote Access:** Users can work remotely and also access data.
- **Outline:** One can access data and send data – acquisition, ordering, etc through Intranet and also communication is possible.
- **Security:** Puts user in control of their data (prevent from un-authorized access).

CHARACTERISTICS OF INTRANET

Some of the important characteristics of Intranet are as follows:

- **Openness:** Open architecture based on Internet.
- **Flexibility:** All of the solutions available for customizing.
- **Scalable:** Web-based Intranets are fully scalable. From 10 documents to 10 million, an Intranet can serve its constituents faithfully, as long as network bandwidth suffices to meet user demands.
- **Centralized source:** Internet technologies lead to a central marketplace where users can actively produce and consume information, communicate, and collaborate with others
- **Inexpensive to implement:** Surprisingly inexpensive and available in low network cost, license fee, client program install expense.
- **Extendable:** Extended Intranets offer organizations the opportunity to communicate and transact business with key vendors, partners, and remote workers through controlled access to internal information.
- **Ease to use:** Web technology allows users to easily navigate and find information by simply clicking a word or graphic.
- **Gated:** Can be connected via gateways to selected Internet contents or access.

LIMITATIONS OF INTRANET

- **Maintenance:** The biggest foreseeable problem with an Intranet is maintenance. There has to be procedures for updating materials and for reviewing and discarding items on the networks, someone must be assigned to these duties and to the maintenance, design and upgrade of the hardware and software.
- **Lack of Training / Interest:** Another possible problem with an Intranet is that people will not use it. This obstacle is very real and must be overcome by a decided effort to train and encourage users to fully utilize this tool. Again, this may require a great deal of resources.
- **Performance Limitations:** Some applications that have been well optimized for conventional and proprietary systems create a heavy system workload when migrating them to an Intranet platform or merging them with Intranet presentation; this problem will reduce with enhanced Internet technologies and continuing improvements in hardware price-performance.

OTHER LIMITATIONS OF THE INTRANET
- Architecture and infrastructure of an organization.
- Configuration of everyone's system.
- Kind of search engine going to be incorporate.
- Processes and policies for getting the messages on the Intranet site.
- Determining the reliability and currency of the content.
- Unauthorized access.
- Denial of services.
- Management fears loss of control.

APPLICATION OF INTRANET IN LIBRARIES

The Intranet is perhaps our best opportunity to talk to the rest of our corporate, and provides the information center with a valuable and effective tool for the dissemination of information. As in other organizations, the primary benefit of an Intranet in a library is the facilitation of information sharing. The Intranet is also used for following library services:

- **New Arrivals:** Newly arrived books list is prepared and displayed on Intranet. We can also prepare the list based on particular subject and it can be shared with specific project team or department members.
- **Announcements:** Library special events like Book exhibition, Book talk, Library week, Librarians day & Copy rights day etc are can be announce through Intranet.
- **Training or Orientation:** Through Intranet we can provide library induction or training for new joiners/ existing users using videos in electronic format as CD-ROMs or DVD's, Power point Presentations (PPT) etc.
- **User satisfaction survey:** It's also an important tool to get feedback from employees on library sources and services.
- **Search facility:** Search engines and other software familiar from the web can be used on the internal networks and locate the various versions of a given document. There is considerable potential for the library and information service to be involved in the developing the use of the engines, as well as supporting the management of the versions, ensuring that the most accurate, authoritative and recent version of a document is located when search terms are entered.
- **Current content alert:** A table of contents of the scholarly journals/magazines available in the library is prepared and published usually weekly or monthly. It assists users in keeping abreast of the most recently published literature in their areas of interest or specialization.
- **Issue and renewal:** Users can issue or renew the books without visiting the library.
- **OPAC:** With the help of OPAC (Online Public Access Catalogue) employees can access the bibliographic details of library resources at computers within the library, or from home.
- **Collection development:** Generally it can be done in following three steps:
  - *Recommendation to library:* The employees can directly make requests to the librarian for purchase of particular books or periodical via the Intranet.
  - *Approval:* Books or periodical recommended list is forwarded to higher authority to get an approval.
  - *Ordering:* After getting an approval we can place an order through mail. Once the receipt of requested books or periodicals the same can be intimated to the respective employees
- **News alerts:** Project specific or domain specific news bulletin are compiled using Internet resources and it can be communicated periodically within specific user group. It helps users in keeping abreast of the most recently happenings in their areas of interest or specialization. It can be also call this service as E-SDI (Electronic- Selective Dissemination of Information) service.

- **Overdue reminders:** With the help of Intranet, librarian can send reminder to overdue book holder through Intranet e-mail.
- **Handling queries and downloads:** With the use of Intranet librarian can provide answer for user queries. And also requested articles are downloaded or scanned (if hard copy available) from the available library resources (E-journals, databases etc.) and send it through mail.
- **Resources sharing:** Library resources like books, articles, reports, standards etc. can be shared with remote users or libraries through mail. While sharing the resources librarian should be aware of copy right policy.
- **Marketing of library sources and services:** Few marketing strategies are as follows:
  - Displaying advertisements or posters of library resources & services on Intranet.
  - Online induction or orientation program.
  - While announcing library special events.

CONCLUSION

The Intranet has certainly revolutionized the information management processes in the libraries. It has distinct advantage over LAN, has helped in faster data collection and dissemination. It is indeed a challenge to the library professionals not only to accept and assimilate this new technology, but also to spice it up with the classical knowledge to further improve the entire information management processes in the libraries. Intranets are relatively cheap and easy to develop because they use the existing technology of the Internet. The value of an Intranet is that it can integrate in one central source a combination of internal, external, formal and informal information. There is a suggestion however that because Intranets are productive layer in knowledge economy engineered organizations' they are less likely to be really successful in strictly hierarchical organizational structures. An Intranet is a learning organization, capable of integrating people, processes, procedures and principles to form an intellectually creative culture dedicated to implementing total organizational effectiveness.

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Comparative Features of Integrated Library Management Software Systems: A Study

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INTRODUCTION

It is well realized fact that libraries have been an essential part of our civilized society. The basic goal and functions of the library are to acquire reading/information resources, process them and retrieve the same for the purpose of user's reading, reference and other academic need. Although, libraries have been in existence since ancient times, but due to knowledge explosion in the 20th century, managing of information by library & information professionals became a very difficult task. Due to advancement of science and technology, now libraries are using a variety of technology especially information and communication technology (ICT) to provide value added services to their clienteles.

The impacts of new technologies are felt by libraries on every aspects: such as housekeeping operations, collection development, information processing, storage and retrieval of information, information exchange besides providing efficient and accurate services, controlling the rapid growth of information, enabling to provide new services, facilitating co-operation and accommodating increased work load and finally things have gone into a sea change.

According to **ALA Glossary** "Information Technology is the application of computers and other technologies to the acquisition, organization, storage, retrieval and dissemination of information". Thus, without automation the libraries in the modern ICT driven knowledge society will remain as a monument and will not be able to serve the users effectively.This leads to library automation.

WHAT IS AUTOMATION?

The word automation has been derived from a Greek word "Automose" which means something which has the power of spontaneous motion or self movement. Automation, when used in a library context, refers to the computerization or mechanisation of all library activities.The term mechanization is often used to refer to the simple replacement of human labour by machines, but automation generally implies the integration of machines into a self-governing system.(IGNOU reading material for B.L.I.Sc, Library Automation-unit-1, page-5)

According to **International Encyclopaedia of Information Technology and Library Science**, Automation as the technology concerned with the design and development of progress and system that minimizes the necessity of human intervention in their operation.

According to **ALA Glossary of Library and Information Science: A**utomation as the performance of an operation, a series of operations or a process by self-activating, self-controlling or automatic means. Automation implies the use of automatic data processing equipment such as computer order labour saving devices.

WHAT IS LIBRARY AUTOMATION?

Automation is computer application in the services and different operations of library and use of automatic equipments and machines to do work previously done by human being. A computer system can be viewed as high-speed automatic information transformation devices (called hardware and computer program called software). **Hardware** refers to the physical components of a computer, while **software** refers to a set of instructions for the hardware to follow. Computer can function only when hardware and software are combined in an appropriate manner that is both must be compatible.

KINDS OF SOFTWARE

There are different kinds of software packages. Software can be broadly divided into utility software and applications software.

Utility software is made available by computer equipment manufactures or software houses in order that certain basic functions may be performed.

Application software is written individually, to operate specific tailor made procedures and systems, such as sales ledger system, wares systems, stock inventory systems, and library circulation control systems, etc. Common types of software packages of interest to information managers are:

- Business software
- Database software and database management systems
- Communication software
- Library Management software.

LIBRARY MANAGEMENT SOFTWARE: GROWTH AND DEVELOPMENT

The term library management software package is generally used to refer to software packages designed to automate library housekeeping functions such as acquisition, serials control, circulation control, OPAC etc.

Design and development activity of library management software packages in India started in a big way during the mid-1980s with the introduction of the CDS/ISIS software package from UNESCO in Indian libraries by the National Information System on Science and Technology (NISSAT). From the experience of use of CDS/ISIS, MINISIS, etc. some Indian libraries and information centres developed their own software. One such example was the Defence Library Management System (DELMS) developed by DESIDOC during 1988 in COBOL under a multi-user UNIX environment and implemented at the Defence Science Library (DSL). Another package was Catman, developed by the Indian National Scientific Documentation Centre (INSDOC) and implemented at the National Science Library (NSL) in INSDOC, which is now known as NISCAIR. The Sanjay package was developed for small libraries by DESIDOC under a NISSAT project to popularise CDS/ISIS and to develop a model-automated library by implementing it at Technology Bhawan Library in DST.

Now, the library management software (LMS) systems are established as an essential tool in the support of effective customer services, stock management and management of services offered by the libraries.

STATEMENT OF THE PROBLEM

Selection of suitable software for libraries is a problem because of the lack of good and up-to-date comparative studies on software packages. Thus, an attempt has been made here to evaluate a number of software packages used in the libraries and information centres.

OBJECTIVES AND METHODOLOGY

The objectives of this study were to:

1. identify the platform/environment on which the different software packages are available;
2. determine the compatibility of the software to support different library and technology standards;
3. study the software OPAC to see whether it allows flexible searching of library holdings and whether it empower users by offering access to other services, *e.g.* interlibrary loan, document delivery services, alerting services and access to other web resources;
4. identify the facility to store, retrieve, display and print records in Indian scripts and the capacity to translate other languages and scripts;

5. study the capability for database security at the module and functional level; and identify the facility to incorporate multimedia information resources and other customized services.

The survey was based on questionnaire, observation, interviews and personal visits. Information about the software functionalities was acquired using a structured questionnaire that was completed by the software vendors linked to the respective library management software systems.

RELAVENCE AND SCOPE

A large number of library management software packages and networking technologies are available for the information retrieval and storage as well as handling of all activities of libraries through computers. But still no any such work has been done to present comparative and descriptive study of integrated software packages. This study may help libraries in selecting the software for their automation and management.

Therefore, present study has special scope in the field of Library and Information Science.

LIMITATIONS

Profile of selected Library Automation Software Packages since there are many library automation software packages available in the market place, it is not possible to discuss all the software packages in detail. Accordingly, a few selected software packages, including the recent developed software using the web as a platform for global communication among the group of libraries and other libraries as well, are discussed in brief in the following.

LITERATURE REVIEW

Initial studies in India indicate library automation needs, software understanding and application of computerisation activities in various information systems. Some fifteen years ago, Saxena and Srivastava (1998) took some of the important library software packages such as Granthalaya, LibSys, Sanjay, Suchika, Basisplus-Techlibplus, etc. and evaluated them. Parameters selected for evaluation of these software packages included facilities provided in the software packages, hardware requirements, operating system platforms, language of software development, search facilities, etc. The authors concluded that for small libraries, Sanjay (ver. 2.0) and for big libraries Suchika, Granthalaya, and LibSys were the most suitable software packages.

Ravichandra Rao and Abideen Sainul (1999) discussed the need for automation in libraries and provided an overview of the features and functions of library automation software. They also discussed the additional features that library automation software should have in the context of internet. In addition, their paper examined the need for evaluation of library automation software, factors to be considered, and checklists used for selection and evaluation of library automation software. A comparative study of the features of selected packages was also presented.

Ramesh Babu and O'Brian (2000) enumerated the various features of web Online Public Access Catalogues (OPACs). The paper considered some of the features and functions of Web OPACs for evaluation.

Husain and Ansari (2007) evaluated the cataloguing modules of three packages, namely, Alice for Windows, LibSys and Virtua. They adopted a checklist method for evaluating the different software. In the measurment of providing maximum functionalities in its cataloguing module, LibSys was rated as the best software among the selected three. Goh *et al*.

Kapoor and Goyal (2007) evaluated web OPACs of five LMS systems *i.e.* LibSys, VTLS I-portal, Troodan, NewGen Lib, and AFW implemented in five academic libraries of India. The study showed that most of the OPACs used by the academic libraries of India offered the basic search features required by users, and belong to what is often

referred to as "second-generation catalogues" as they are searchable by author, title and control number. All the OPACs have a log-on and password facility, and only the NewGenLib OPAC explains the comments and coverage in the OPAC. The major limitation of the online catalogues investigated is the lack of federated search facilities.

Shafique and Mahmood (2008) evaluated library automation software packages available in Lahore, Pakistan. The study covered WINISIS, LIMS, INMAGIC and LAMP for evaluation and rated INMAGIC as the best. The study also obtained opinions of librarians in Lahore about the selected softwares.

Finally, Francis (1998) elaborated on important software problems faced by the library professionals in India.They were analysed and various compatibility and suitability issues in the selection of library software were pointed out. The paper also hinted that these problems have affected the progress of computerisation of libraries. Up-to-date and detailed information on software packages available in India can prevent several issues that may arise in the course of computerisation. An agency or mechanism to continuously evaluate the softwares may be necessary to meet this requirement. A number of software packages for this purpose have come out through government and private agencies. Published sources assessing this technology are yet to appear, therefore choosing the right software is difficult task. This study presents a brief overview of four selected indigenous packages namely Limsys, LibSys and Virtua. The underlying framework, text retrieval and library management facilities in these packages are discussed in his study also. for libraries.

POPULAR LIBRARY MANAGEMENT SOFTWARES

There are more than hundreds of software packages being developed by various software agencies and institutions for libraries and information centres so as to make the services of libraries more efficient in terms of accuracy and promptness. Some of these packages are already in practice others have appeared in the market but are awaiting acceptance in to. Some LMS are

Library Management Softwares and their Developing Group

1. Alice for Windows: Softlink International, Australia
2. Archives (1,2,3): Microfax Electronic Systems, Mumbai
3. BASIS plus & Techlibplus: Information Dimension Inc., USA
4. CATMAN: INSDOC, New Delhi
5. CDS/ISIS: UNESCO/ NISSAT
6. Cybrarian: CR2 Technologies Ltd., Ahmedabad
7. DLMS : DESIDOC, New Delhi
8. DELMARC/DELPLUS: DELNET, New Delhi
9. DELSIS: DELNET Society, New Delhi
10. e-GRANTHALAYA: NIC Banglore
11. Golden Libra: Golden Age Soft.Technologies, Mumbai
12. GRANTHALAYA: INSDOC, New Delhi
13. Libman: Datapro Consultancy Service, Pune
14. Libra: Ivy Systems Ltd., New Delhi
15. Librarian: Soft-Aid, Pune
16. Library Management: Raychan Sysmatics, Bangalore
17. Libris: Frontier Information Technologies Pvt.
18. Lib Soft: ET & T Corp., New Delhi
19. LIBSYS: Libsys Corporation, Gurgaon
20. LIMSYS : Renuka Associates Pvt Ltd, New Delhi
21. LS/2000: OCLC
22. Maitrayee: CMC Kolkata with CALIBNET
23. MECSYS: MECON, Ranchi

24. NettLIB: Paramahansa Systems & Software, Noida
25. NILIS: Asmita Consultants, Mumbi
26. Nirmals: Nirmal Institute of Computer
27. SALIM: ExpertiseTiruchirapalli&Uptron IndiaLtd,ND
28. SANJAY: DESIDOC in collaboration with NISSAT
29. SLIM: Algorythms, Mumbai
30. SOUL: INFLIBNET
31. Suchika: DESIDOC, Delhi
32. TRISHNA: NISTADS, ND with NISSAT
33. TLMS: TRANCE Group, Germany
34. TULIB: Tata Unisys Ltd., Mumbai
35. ULYSIS: WIPRO Information Technology Ltd., Seccunderabad
36. Virtua: Virginia Tech Library System (VTLS) Inc., Virginia, USA
37. WILISYS: Wipro India, Bangalore

Some Open Source Integrated Library Software

1. KOHA: Katipo Communications Ltd., New Zealand
2. PMB: Francois Lemarchand, Grance
3. PhpMyLibrary: Polario Babao, Philippines
4. New Gen Lib: Keshvan Institute, India
5. Emilda: Realnode Ltd., Finland
6. GNUTECA: Brazil.

A large number of library software packages have been designed and developed indigenously and these are being used in various Indian Libraries and Information Centres. Due to limited time and resources, it is not be possible to study all the software packages in details. Therefore the following popular integrated software packages have been included for the present study:

1. LimSys
2. LibSys
3. Virtua.

LimSys (Library Information and Management System: LimSys is designed by both library and information specialists and developed by Renuka Infotech Pvt. Ltd., a Renuka Group Software Development Company, New Delhi.LimSys enterprise 4.0 integrates the latest technology with proven library processes and standards to empower libraries to deliver an exceptional level of services to their patrons. LimSys enterprise 4.0 uses the latest technology, ease of use, interoperability and customisability with fully web-based architecture. As a fully browser based application, LimSys enterprise 4.0 perfectly work in a wireless network environment.

LibSys: LibSys Ltd. is a Gurgaon (India) based software company established in 1984. LIBSYS Ltd. is a brand setting benchmark for library automation in India serving library community for over 3 decades and with more than 2500+ libraries in India and Overseas. The elite and varied clientele of LIBSYS includes many National Level Laboratories, Academic Institutions, Universities, Government Departments, Defense, Corporate etc. Its continuous growth for the last 12 years has made LibSys a defacto standard for libraries in India. Its acceptance in the global market further strengthens its popularity across the country as the most field-proven library system in a wide spectrum of libraries with unmatchable depth in functionality and features. LibSys is integrated multi-user library management software that caters to the needs of an advanced library and information professionals. It provides a tree structure system with each system comprising of several sub-systems having unmatchable depth in functionality.

Virtua: Virtua is the web-based library automation software from Virginia Tech Library System (VTLS) Inc., Virginia, USA. Virtua is an Integrated Library System (ILS) that is standards-based, fully integrated, flexible and open. With advanced features

such as FRBR (Functional Requirements for Bibliographic Records), update notifications through SDI, user reviews and ratings, and support for mobile computing, Virtua also provides full multilingual support and leveraging a solid Oracle foundation. Since no two libraries have the same needs, VTLS have developed flexible software that lets individual libraries create custom profiles for each library and staff user, controlling access to more than 600 functions throughout the system. Engineered for the robustness and ease of use that library patrons and staff demand, Virtua lets the customer set the rules and parameters that work best for a particular library. Virtua is easy to learn and use and offers integrated functionality that includes OPAC, cataloging, acquisitions, serials, circulation and reporting. Other components include FRBR, Consortium Databases, and Union Catalogs, SDI, and Open URL [2].

ANALYSIS OF DATA AND DISCUSSION

A comparative study of the three selected LMS systems can now be made on the basis of the previous discussion. The comparative study is done by taking into account five aspects –hardware requirements, facilities available in different modules, technology supported by the LMS systems, security and customer support service.

Minimum hardware and software requirements for installation of LMS systems Any LMS is application software, which requires some system software and hardware to perform efficiently. So for selecting any LMS systems, it is essential to know what are the minimum hardware and software requirements to perform software efficiently and effectively. The essential backend software and minimum hardware requirements for the selected LMS systems are given in the Appendix (see Table AI).

Functions and report generation in different modules: Software has different management modules to perform different functions used within the library, such as the Acquisition module, which is used for the procurement of library holdings and accessioning, while the Cataloguing modules are used to store, organize and retrieve information, etc. So, in any given software every module will have unique functionalities to perform. This data are collected on the common and essential functionalities of the different management modules.

Functions and reports available in acquisition modules: The information regarding to the functions performed in an acquisition module are given in the Table-1. It also provides information regarding some of the reports associated with the acquisition module.

Table 1: Functions and reports available in acquisition modules

S.No.	Different functions and reports available in acquisition modules	Limsys	Libsys	Virtua
1	Access to external database of information source	1	1	1
2	Recording request	1	1	1
3	Budget control	1	1	1
4	Checking of duplication	1	1	1
5	Verification of book with order file	1	1	1
6	Claiming for a cancellation of outstanding order	1	1	1
7	Keeping records of procured documents and other materials	1	1	1
	Reports			
8	Preparation of order cards/slips	1	1	1
9	Print-out of received or non-supplied document	1	1	1

10	Status of orders	1	1	1
11	Status of request	1	1	1
12	Status of funds	1	1	1
	Total	**12**	**12**	**12**

Table 1 reveals that in the Acquisition module, the following functions were found in LimSys, Libsys, Virtua *i.e.* access to external databases, budget control, checking of duplication, verification of books with order file, and accession work, recording requests claiming for or cancellation of outstanding orders and accession work.The facility to generate different reports are found in all the software.

Facilities available in cataloguing module: An attempt was made to collect data about the different functionalities of cataloguing modules and different reports for its variety of functionalities.

Table 2: Facilities available in cataloguing module

S. No.	Different functions and reports available in cataloguing modules	Limsys	Libsys	Virtua
1	Primary or original cataloguing	1	1	1
2	Import of data from MARC21	0	1	1
3	MARC-based data entry	1	1	1
4	Import of records from external sources	1	1	1
5	Editing and deletion of records	1	1	1
6	Shelf list	1	1	0
7	Centralized/co-operative or shared cataloguing	1	1	1
8	Cataloguing multimedia files	1	1	1
9	Automatic keyword generation	0	1	1
	Reports			
10	List of new catalogue records	1	1	1
11	List of new or dropped authority terms	0	1	1
12	Spine labels, book labels and barcode labels	1	1	1
13	Catalogue cards	1	1	0
	Total	**10**	**13**	**11**

Table 2 shows that in cataloguing module primary or original cataloguing, Editing and deletion of records, shelf list, centralized or cooperative cataloguing, cataloguing of multimedia files are available in all types of software. Import of data from MARC 21 resources & automatic keyword generation is found in all except LimSys.On the other hand, shelf lists generation is not done in Virtua software. In report generation of cataloguing module are found in all the three software except Virtua, which does not print catalogue cards and LimSys lacking list of new or dropped authority terms.

Facilities available in serial control module: Table 3 reveals that all the basic functionalities of serial control modules are supported by all the selected software.

Table 3: Facilities available in serial control module

S.No.	Different functions and reports available in Serial Control modules	Limsys	Libsys	Virtua
1	Creating purchase order, renewals and new subscription	1	1	1
2	Receipt of issues and fund accounting	1	1	1
3	Claiming issues not received	1	1	1
4	Details of current holding	1	1	1
5	Accession bound volumes	1	1	1
6	Administration of binding	1	1	1
7	Entering the abstract of serials	1	1	1
	Reports			
8	List of serials holdings	1	1	1
	Total	**8**	**8**	**8**

Facilities available in circulation module: Information was collected regarding the circulation activities like issue-return of the documents, member records, ID card generation, etc. **Table 4** shows that all the selected software supported all the listed functionalities of circulation modules. In report generation all the selected software supported all the listed reports.

Table 4: Facilities available in circulation module

S.No.	Different functions and reports available in circulation modules	Limsys	Libsys	Virtua
1	Registration of users	1	1	1
2	Issue and return of the documents	1	1	1
3	Renewal	1	1	1
4	Reservation of items	1	1	1
5	Calculation of fine and fine receiving	1	1	1
6	Setting parameters for members	1	1	1
7	Setting parameters for items	1	1	1
8	Handling photographs of members	1	1	1
9	Generating ID card	1	1	1
10	Self issue-return	1	1	1
	Reports			
11	Book status	1	1	1
12	Book issue history	1	1	1
13	Period-wise issue history	1	1	1
14	Overdue notice production	1	1	1
15	Production of membership cards	1	1	1
16	List of members	1	1	1
	Total	**16**	**16**	**16**

Facilities available in web OPAC: An attempt was made to collect data regarding the different facilities found in web OPAC of the selected software. The OPAC is a very important part of the software because with its help users can search and retrieve information of their choice.

Table 5: Facilities available in web OPAC

S.No.	General features of OPAC/web OPAC	Limsys	Libsys	Virtua
1	Integrated OPAC and web browser access	1	1	1
2	Customization in OPAC	1	1	1
3	Provision for search limits or search refinements	1	1	1
4	OPAC interface with circulation	0	1	1
5	Online mailbox for user comments	1	1	1
6	Linkage for image, sound files and video clips	1	1	1
	Total	**5**	**6**	**6**

Table 5 reveals that Libsys, Virtua have all six facilities listed as important. Thereafter Limsys supported all the facilities except OPAC interface with circulation.

Value added services in OPAC/web OPAC: Owing to recent ICT development, software provides some value-added services, which may not actually be in the scope of these LMS systems but due to hardware, software and connectivity do provide solutions for these types of services.

Table 6: Some advanced features used in OPAC/web OPAC

S.No.	Some advanced features used in OPAC/web OPAC	Limsys	Libsys	Virtua
1	Inter-library loan	1	1	1
2	Alerting services	1	1	1
3	Access to other web resources	1	1	1
4	e-serials	1	1	1
5	Search engines	1	1	1
6	Library map	0	1	1
	Total	**5**	**6**	**6**

Table 6 compares the different kind of services offered in OPAC of selected software. The table gives value-added services used in OPAC of the selected LMS systems. It shows that all six kinds of services used in OPACs are found in Libsys & Virtua; and Limsys does not have library map functionalities.

Searching facilities available in OPAC: An attempt was made to find what kind of searching facilities were offered by the selected LMS systems. Table VIII shows that all kinds of searching techniques are used by the selected LMS systems except Limsys. Limsys does not permit phrase and truncation search facilities.

Table 7: Different types of searching facility offered in OPAC

S.No.	Different types of searching facility offered	Limsys	Libsys	Virtua
1	Simple or advanced search	1	1	1
2	Browsing facility	1	1	1

3	Phrase searching	0	1	1
4	Boolean searching	1	1	1
5	Truncation	0	1	1
6	Word proximity or word adjacency	1	1	1
	Total	**4**	**6**	**6**

Access points: Table 8 collects data regarding the different access points, which are used in the OPAC interface in selected LMS systems for the ease of users. Access points in OPACs give an opportunity to users to be able to search documents according to their requirements. As depicted in the table, all the selected LMS systems have all the listed access points in its OPAC modules.

Table 8: Access points through which users can perform searching

S.No.	List of access points through which users can perform searching	Limsys	Libsys	Virtua
1	Author (personal/corporate name)	1	1	1
2	Title	1	1	1
3	Keyword	1	1	1
4	Subject heading	1	1	1
5	Keyword in title	1	1	1
6	Class no.	1	1	1
7	Accession no.	1	1	1
8	Series	1	1	1
9	ISBN/ISSN	1	1	1
10	Publisher	1	1	1
	Total	**10**	**10**	**10**

Value-added services used in the LMS systems: These are the essential works and services of library management, which are generally not included within the scope of LMS systems. But with the development in the hardware, software and connectivity, presently LMS systems are trying to provide software solutions for this type of work and services. Table 9 compares such type of services in selected LMS systems. Table 9 reveals that due to technology advancements many changes are taking place in the software marketplace. Libsys and Virtua both are sharing the top position for supporting maximum recent technologies. Besides these two software packages, the other *i.e.* Limsys do support the most common technologies such as RFID and other biometric devices, ISO 2709 server, customisation, RSS feeds besides that Limsys is not allowing federated searching for all library holdings.

Table 9: Value added services

S.No.	Value added services	Limsys	Libsys	Virtua
1	Provision for computer integrated telephony for automatic renewals, reminders, etc.	1	1	1
2	Support for RFID or other biometric devices like finger print reader, smart cards, etc.	1	1	1

3	Provision for accessing OPAC and other services through mobile or other hand held devices (PDA etc)	1	1	1
4	Allow federated searching for all library holdings	0	1	1
5	Provision for Z39.50 server	0	1	1
6	Online reference service	1	1	1
7	Customisation as per user requirements	1	1	1
8	Provision for RSS feed	1	1	1
	Total	**6**	**8**	**8**

Security features of the software: Nowadays security of the software and data within it is a major issue in a networking environment. With the help of recent technology advancement software vendors are offering different techniques for the security of data and software as well. Shown in Table 10, are some of the security features supported by all the selected LMS systems.

Table 10: Security features of the software

S.No.	List of security features	Limsys	Libsys	Virtua
1	Provision for user ID-password	1	1	1
2	Access restriction to certain records/fields	1	1	1
3	Provision for staff to log in/log off	1	1	1
4	Provision for students to log in/log off	1	1	1
	Total	**4**	**4**	**4**

Customer support services from the software developers/agents: The support services from the software developers/agents at the right time and at the right place is a critical factor. The modes of support for selected LMS systems are compared in Table 11.

Table 11: Customer support services

S.No.	Customer support services offered by the software vendors during installations and post-installations	Limsys	Libsys	Virtua
1	On-call and on-site support	1	1	1
2	Continued R&D and software updation	1	1	1
3	Live internet support and updation	1	1	1
4	Performance and service warranty	1	1	1
5	Full documentation included in the price of software	1	1	1
	Total	**5**	**5**	**5**

As depicted in the table - 11, all the software developers/agents/ vendors of selected LMS systems are providing customer support services during installations and post-installations.

Consolidated score for all features supported by the LMS systems: All the features of the selected LMS systems covering functionalities, technology, security and customer support aspects are gathered in Table 12.

Table 12: Consolidated score of selected LMS systems

S.No.	LMS systems	No. of features supported by the LMS systems	Total features	Rank points
1	Libsys	94	94	I
2	Virtua	92	94	II
3	Limsys	85	94	III

The table clearly shows that Libsys supports all the listed features and functionalities. Virtua came second with 95, while Limsys was bottom with a mere 87 out of 96.

Table 12 revealed the consolidated score of each LMSs on the basis of their supported and non-supported features.

DISCUSSION

In the selected Library Management Software Systems, all the data collected through software vendors shows that Libsys is the best software when compared to the other selected LMS systems having regard to supporting library standards, technology standards, offering enhanced services and also incorporating most recent technological advancement. Besides supporting virtually all of the features, both software packages are supporting various hardware and software platform. According to the acquired results, Limsys also supported maximum library standards after Virtua. On the other hand, looking at web compatibility of the software for their different management modules, Libsys and Virtua provide a total web-based solution for all of its management modules. In addition, the analysis relating to offering enhanced services reveals that Libsys is the only software among other selected LMS systems that offered maximum enhanced services. It is both surprising and disturbing to note that despite the fact that librarians are involved in designing Library Management Software Systems and thus presumably should be aware of the requirements of not only themselves but also fellow librarians in addition to users, several of the selected software packages studied did not provide certain important features.

CONCLUSION

This study was based purely on a survey of the three selected LMS systems mentioned previously. It is clear from the study that current LMS systems are capable of providing solutions to the majority of problems of library management activities. From the previous data we find that the top three positions are captured by those softwares that are using the web as a platform to perform efficiently. This software is very user friendly, and provides advanced technology support to the library personnel for ease at their work. All libraries need LMS systems with all functionalities that are compatible to provide convenience and speed in the day-to-day operations of libraries as well as provide high-end technology features and backed by strong customer support. So the present study indicates that Libsys developed by LIBSYS Ltd. is a Gurgaon (India) based software company satisfied all requirements of modern libraries. Libsys work as a SaaS (Software as a Service) – perfect for those libraries and organizations with limited IT resources, internal IT skill or time available for system maintenance and administration tasks, Libsys hosting options offer complete freedom from IT responsibilities and hardware, staffing and system maintenance concerns.

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Library Automation Features and Implementation: An Overview

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ABSTRACT

Information technology is undergoing a vast and fast transition during the last one decade. The world of information is at our fingertips now. Information technology made possible the journey of libraries from the storehouse to the current stage of information centers and e-libraries. Automation improves the storage and collection of library books and journals. The Root of the history of automation has been since early time when the electronic instruments were used to make library use very effective and convenient. Lack of the qualified staff and affordability of the automation instruments is the obstruction in the automation of library. Function atomization aims at automating almost all technical and user based functions like, collection, processing, storage, acquisition, circulation, serial collection, retrieval, dissemination, budgeting, reference and transmission for all types of information centers. Here electronic machines used to automate the libraries like computer, bar coding system, RFID, etc, which is further made more advance sense when connected through the internet. In this paper, we will discuss about automation, its need, features and challenges faced to automate the libraries.

Keywords: *Automation, Library Automation, Library technology*

INTRODUCTION

Modern society is characterized by an increasing need for specialized institutions in various fields of activity for the performance of their day-to-day functions as well as research and consultancy work. These institutions require speedy access to qualitative published information. Exposure, the methods of storage and dissemination of information are changing fast, so no library can store all published information and can provide efficient services with its old manual operations. (Alabi GA 1984). Therefore, "Automation" is important and necessary to handle the vast amount of information and for providing fast, accurate, precise, efficient, and effective information and services as well. This is the era of computerization, but still tradition manual working system exists in Indian libraries especially in undeveloped areas. In the series of development of the library world is acclimatized to the computer environment in daily routine as well as information storage and retrieval. Automation to a greater extent can reduce the pressure of library workload. It also shelters from work stress and fatigue. It not only offers efficient services and opens a new era in bibliographical control, but provides access to the required database in the country and abroad as well. A computer is capable enough in reducing the storage place. It is helpful in finding information in less time, which in not possible through the manual working system. This information is capable of being recalled with ease and at most speed, as and when required. (Chandhok, 1994).

AUTOMATION

Automation is a process of using the machineries for easily working and saving the human power and time. The term automation was coined in the automobile industry about 1946 to describe the increased use of automatic devices and controls in mechanized production lines. The origin of the word is attributed to D.S. Harder, an engineering manager at the Ford Motor Company at the time.

- **Encyclopaedia Britannica:** The term is used widely in a manufacturing context, but it is also applied outside manufacturing in connection with a variety of systems in which there is a significant substitution of mechanical, electrical, or computerized action for human effort and intelligence.

- **Webster Dictionary:** Automatically control of an apparatus, a process or system by mechanical or electronic devices that take place of human organs of observation, effort or decisions.
- **D. S. Harder (1936):** Automation is the technology of automatic working in which the handling method, the process and the design of processed material are integrated to utilize as is economically justifiable of mechanization of thoughts and efforts in order to achieve an automatic and in some cases a self regulating chain of processes.

LIBRARY AUTOMATION

In libraries, automation or mechanization is playing a vital role these days. Automation implies a high degree of mechanization of various routine and repetitive tasks to be performed by human beings. In present day context applications of modern information technology in the library management functions is known as library automation. Library management functions includes all types of housekeeping operations such as acquisitions, cataloguing, circulation, serial control, budget management etc. thus, when we talk about library automation, these days, it means the use of computers and other semi-automatic devices to work in the library and provide library services. Library automation which started in 1970's in few special libraries, has now reached most of the libraries. Because the main aim of a library is to provide convenient, easy and faster means of accessing knowledge with the help of various devices and computer is an information machine which has enabled the libraries to achieve their purpose. Library automation is also a first step for establishing a digital library. Automation is required for improving the efficiency of services to be delivered at all levels.

NEEDS OF LIBRARY AUTOMATION

There are many reasons for automating the library activities. The need of computer is present in all areas depending upon its usage for the good administration of the libraries computers are used in all levels of work flow. There are so many factors responsible for automation:

- Information explosion
- Economic feasibility
- Information available in machine readable form
- Increasing users expectations and demands
- Labour intensive nature of library routine jobs
- To well management and retrieval of information
- Storage capacity
- Availability of info in various formats (print, non-print, graphical, audio-visual etc.
- Depth of content analysis
- Reducing response time
- Easy, fast and reliable sharing of resource between libraries
- Duplication in housekeeping operations
- To search national and international database.

OBJECTIVES

- To improve control over collection
- To have an effective control over entire collection
- To improve the existing services
- To share effectively the resources among various libraries
- To avoid duplication of work
- To use the services of the existing staff effectively.

BASIC REQUIREMENTS FOR LIBRARY AUTOMATION

- Adequate collection
- Financial assistance

- Hardware
- Software
- Trained staff
- User training
- Maintenance and development.

IMPLEMENTING THE AUTOMATED SYSTEM

The implementation phase consists of retrospective conversion, database of members, operations, statistics generation and training for staff and users.

- **Retrospective conversion:** The process of converting the bibliographic or documentary details of the existing stock into the machine-readable form is known as retrospective conversion. This technical processing consists of Bibliographical data entry and physical processing. The steps in Bibliographical data entry are:
- **Acquisition of documents:** In library automation planning process, it is desirable to formulate a model for automation listing all itemized and prioritized information systems being maintained on a manual basis by the library. For this exercise it is necessary to break down these procedures into their constituent parts. When further subdividing these activities, each item is to be considered of its functional elements. Library automation can be developed to handle basic housekeeping functions of a library either single function or an integrated one. The systems and subsystems listed below are only indicative and may vary with differing library system environments. Acquisitions Selection ordering claiming/cancellation receiving/invoice processing extended procurements, Gift tracking, Fund control, Maintains information about all library related funds, Ability to group funds (nesting), Track fund allocations and adjustments, Fund encumbrance fund expenditure cash balance, Free balance, Automatic updating of fiscal information through recording of specific transactions, Track year-to-date expenditures, Create purchase orders.

Some of the objectives for automation of acquisition as given by Burman(2007) are:

- **Cataloguing:** Although the software has the facility of printing card catalogues, there not raised any need of that, since we are using the Online Public Access Catalogue (OPAC).

  Some of the fuctions of the computerized cataloguing are:
    - Creation of worksheet for input cataloguing data
    - Promoting the system operator or cataloguer by displaying possible input 'tag'.
    - Maintenance of name and subject authority file.
    - Production of catalogue, cross reference cards
    - Arrangement of entering in filing sequence.

- **Indexing:** In the case of books all the entry fields are indexed and searchable. Where as in the case of periodicals indexing terms were feed into the database.

- **Barcoding:** In an automated environment every document should be unique and searchable. It is done through bar coding. Barcoding facilitates the searching, circulation and systematic shelfing of the concerned document. After entering all the details regarding the documents into the database, barcodes are printed on adhesive labels according to the accession number of the document. For this process we used one barcode software and laser printer.

- **Labelling:** The barcode label was pasted on the lower bottom of the title page of the book. This has been read by the barcode reader during circulation and stock verification. The second label that pasted on the lower bottom side of the spine of the book is called spine label. It contains Call number (class number and book number), Accession number and library code. After pasting, these labels were covered with cello tapes for more protection.

- **Shelf arrangement:** The processed books were arranged on the shelves in the stack room according to their call numbers. If more than one books are present with the

same call numbers, they were arranged based on the alphabetical order within the call number.

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Digital Libraries: A Comprehensive Study

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INTRODUCTION

Now a day's developments in information technologies have changed the role of libraries and librarians in all ways. As a result, libraries and librarians are facing new challenges, competitors, demands, and expectations. Libraries are providing services and information products to users' community but IT add value to library services for satisfying the changing information needs of the user community. Traditional libraries are handling largely printed materials. Information requirement of different users are no longer satisfied with only printed materials. Users want to supplement the printed information with more dynamic electronic resources. So demands for digital information are increasing.

We are living in an environment in which digital information may substitute for much print-based information. A library's existence does not depend on the physical form of documents. Its mission is to link the past and the present, and help shape the future by preserving the records of human culture. This mission is unlikely to change in the near future. Digital libraries provide easy and fast access of information in multimedia forms.

DEFINITION

A digital library is a library in which collections of information and associated services are provided in digital formats and accessible over a computer and network. Digital libraries contain diverse information for use by many different users. Digital libraries range in size from tiny to huge. They can use any type of computing equipment and any suitable software. The unifying theme is that information is organized on computers and available over a network, with procedures to select the material in the collections, to organize it, to make it available to users, and to archive it.

The Digital Library Federation defines digital libraries as: Organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily available for use by a defined community or set of communities.

A digital library requires technology link the resources of many collections. The links between digital libraries and their resources are transparent to users. Digital library collections are not limited to document but they are the actual digital objects such as images, texts, etc.

Clifford Lynch a well know expert on Internet and web technology, defines digital library as "System providing a community of users with coherent access to a large organized repository of information and knowledge. The digital library is not just one entity, but multiple sources are seamlessly integrated."

According to R. Smith digital libraries are "Controlled collection of information bearing objects that are in digital form and that may be organized, accessed, evaluated and used by means of heterogeneous and extensible set of distributed services that are supported by digital technology."

According to E.A. Fox. the digital library may defined as the " New way of carrying out the function of libraries encompassing new types of information resources, new approaches to acquisition, new methods o f storage and preservations, new approaches to classification and cataloguing intensive use of electronic system and networks and dramatic shifts in intellectual organizational and electronic practices."

Difference between traditional and digital libraries:

Traditional Libraries	Digital Library
Print collection	All resources in digital (multimedia) form.
Stable, with slow evolution	Dynamic and ephemeral
Individual objects not directly linked with each other.	Individual objects are directly linked with each other. Multi-media and fractal objects
Less/Minimum collection of data	Large collection of data
Scholarly content with validation process	More than scholarly content with various validation processes
Limited access points and centralized management	Unlimited access points, distributed collections and access control
The physical and logical organization correlated.	The physical and logical organization may be virtually
One way interactions	Dynamic real time dialogue
Free and universal access.	Free as well as fee based.

Mayank Trivedt (courtesy)

NEEDS OF DIGITAL LIBRARY

With the arrival of computers, the concept centered on large bibliographic databases, the now familiar online retrieval and public access systems that are part of any contemporary library. Increase in the number of user and their different needs have made modem libraries to apply new information and communication technology. As a result of this there is a worldwide need and trend to collect organize manage, protect and distribute information in digital form. When computers were connected into large networks forming the Internet, the concept evolved again, and research turned to creating libraries of digital information that could be accessed by anyone from anywhere in the world. Phrases like "virtual library," "electronic library," "library without walls" and, most recently, "digital library," all have been used interchangeably to describe this broad concept.

CHARACTERISTICS OF DIGITAL LIBRARIES

Cleveland (1998) Arms, 1995; Graham, 1995a; Chepesuik, 1997; Lynch and Garcia-Molina, 1995): describes some characteristics of digital libraries that have been gleaned from various discussions about digital libraries (DLs):

- Digital Libraries include both digital collections and traditional, fixed media collections. So they encompass both electronic and paper materials. So digital libraries support multimedia content.
- Digital Libraries will also include digital materials that exist outside the physical and administrative bounds of any one digital library. Thus digital libraries provide access from very large information collections.
- Digital Libraries will require both the skills of librarians and well as those of computer scientists to be viable.
- Focus on providing access to primary (or complete) information not merely surrogates or indexes.
- Digital libraries are Network accessible Provide user-friendly interface.
- Use declarative representation of document (*e.g.* tagged small text) in addition or as against image, postscript, etc. forms.
- Digital libraries are providing unique referencing of digital objects.
- Digital libraries Support traditional library mission of collection, development, organization, Access and preservation.

• Digital libraries are providing Support advanced search and retrieval.

FUNCTIONS OF DIGITAL LIBRARY

• Access to large amounts of information from various sources to users wherever they are and whenever they need it.
• Access to primary information sources.
• Provide information in multimedia content along with text.
• Network accessibility on Intranet and Internet.
• User-friendly interface.
• Hypertext links for navigation.
• Client-server architecture.
• Advanced search and retrieval facility.
• Networking with other digital libraries.

PURPOSES OF DIGITAL LIBRARY

• For systematic development of collection, store, and organize, information in digital form.
• To provide require information economically to all users.
• To increase co-operative efforts in resource, computer, and communication networks.
• To increase communication and cooperation between educational institutions.
• To take leadership role in the generation and dissemination of knowledge.
• To satisfied different information needs and requirement of different users.

TECHNICAL ISSUES IN THE DEVELOPMENT OF DIGITAL LIBRARIES

Some of the major Technological challenges and issues drawing the attention of workers in this area include:

• High band with computer network supporting efficient multimedia document transfer
• Open communication protocols (client-server, *e.g.* z39.50for IR)
• Information access tools (browse, display and search tools)
• Meta database (data based that describe and provide links to other databases/ Information sources
• Electronic publishing tools (personal, institutional, publisher)
• Data compression
• Digital storage
• Scanning and conversion technologies
• Media integration technologies (multi-media)
• Advanced retrieval, indexing, natural language processing, routing and filtering
• Document description and representation standards (*e.g.* SGML)
• Inter operability (how do multiple digital libraries interact)
• Privacy, authentication and security

PLANNING TOOLS FOR DIGITAL LIBRARY

A library committee should be formed to plan for creation and maintenance of digital library. The members must be from various library departments, and, if necessary, consultants can be hired from outside agency. There are at least two ways of developing a digital library:

• Converting a traditional library into a digital library.
• Direct development of a digital library.

PLANNING TOOLS FOR DIGITAL LIBRARIES INCLUDES

• Target audiences
• Collaboration
• Usability of the Digital Library
• Quality of the Holdings in the Digital Library

- Maintenance of the Digital Library
- Rights to Distribution and Modifications
- Access and Security
- Funding and Cost Implications
- IT Infrastructure
- Digitization
- Staffing
- Furniture
- Equipment, and space
- Services
- Funding

ADVANTAGES OF THE DIGITAL LIBRARY

The advantages of digital libraries are:

- **No physical boundary:** The user of a digital library need not to go to the library physically, people from all over the world could gain access to the same information, as long as an Internet connection is available.
- **Round the clock availability:** Digital libraries can be accessed at any time, 24 hours a day and 365 days of the year.
- **Multiple accesses:** The same resources can be used at the same time by a number of users.
- **Structured approach:** Digital library provides access to much richer content in a more structured manner *i.e.* one can easily move from the catalog to the particular book then to a particular chapter and so on.
- **Enhanced Information retrieval:** The user is able to use any search term bellowing to the word or phrase of the entire collection. Digital library will provide very user friendly interfaces, giving click able access to its resources.
- **Preservation and conservation:** An exact copy of the original can be made any number of times without any degradation in quality.
- **Unlimited storage space at lower cost:** Whereas traditional libraries are limited by storage space, digital libraries have the potential to store much more information, simply because digital information requires very little physical space to contain them. When the library has no space for extension digitization is the only solution.
- **Networking:** A particular digital library can provide the link to any other resources of other digital library very easily thus a seamlessly integrated resource sharing can be achieved.
- **Cost:** The cost of maintaining a digital library is much lower than that of a traditional library. A traditional library must spend large sums of money paying for staff, book maintains, rent, and additional books. Digital libraries do away with these fees.

DISADVANTAGES OF THE DIGITAL LIBRARY

The disadvantages of digital libraries are:

- **Copyright:** Digitization violates the copy right law as the thought content of one author can be freely transfer by other without his acknowledgement. So One difficulty to overcome for digital libraries is the way to distribute information. How does a digital library distribute information at will while protecting the copyright of the author?
- **Speed of access:** As more and more computer are connected to the Internet its speed of access reasonably decreasing. If new technology will not evolve to solve the problem then in near future Internet will be full of error messages.
- **Initial cost is high:** The infrastructure cost of digital library *i.e.* the cost of hardware, software; leasing communication circuit is generally very high. So establishment of digital libraries is costly in initial stage.

- **Band width:** Digital library will need high band for transfer of multimedia resources but the band width is decreasing day by day due to its over utilization.
- **Efficiency:** With the much larger volume of digital information, finding the right material for a specific task becomes increasingly difficult.
- **Environment:** Digital libraries cannot reproduce the environment of a traditional library. Many people also find reading printed material to be easier than reading material on a computer screen.
- **Preservation:** Due to technological developments, a digital library can rapidly become out-of-date and its data may become inaccessible.
- **Skill person:** If we want to work in digital system we need skill persons in working and maintaining digital libraries.
- **Effect of Technology:** The digital library wholly dependent on telecommunication and computer. As new technology comes in the market the digital system should change or adopt that technology.
- **Security problem:** When our digital system is connected to Internet the major problem is the security to prevent the unauthorized access and to prevent the information from virus is the major task in digital system.

CONCLUSION

There will be continuing expansion of digital library activities. LIS and computer science professionals facing new challenges that may lead to improve systems. Digital libraries will build upon work being done in the information and data management area. Digital libraries provide an effective means to distribute learning resources to students and other users. Planning a digital library requires thoughtful analysis of the organization and its users, and an acknowledgement of the cost and the need for infrastructure and maintenance. Digital Libraries are presenting opportunities and challenges for the library and information communities and all stakeholders.

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Digital Library Services and Communities in Academic Libraries

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ABSTRACT

The advancement of computer and communication technologies has resulted in the development of digital libraries. It is generally true that digital libraries are capable of providing the desired information instantaneously, but it poses some serious problems to the professional libraries and librarians, especially in third world countries like India where finance is a big constraint for implementation of digital libraries in every corner of the country. This article aims to discuss the general overview of digital libraries. Discuss the issues related to and future prospects and challenge of digital libraries. This paper also talks about the changing environment and future roles of academic librarians in assisting users to obtain reliable and latest information. It stress on the process of collaborative knowledge creation among professional from different discipline and building digital services and communities. It determined on challenges, problems and prospects in digitalization in academic libraries.

Keywords: *Digital Library, Digital Service, Community, Challenge, Strategy, Management, Information Communication Technology (ICT), Broader Knowledge, Digital Collection.*

INTRODUCTION

Most academic libraries have strategies and strategic plans for physical libraries, to keep the library relevant to the academic, but lack any consistent plans for digital content and associated services. Access to information is of the utmost importance to users in academic libraries. An academic library is a trustworthy collaborator for knowledge creation and dissemination. Digital mode of learning is gaining lot of momentum and is only way of reaching the unreached both in quantum and quality. E-Resources can be in the form of e-books, e-journals to facilitate e-leaning. E-resources data centres contains substantial amount of data pertaining to the all field of knowledge. Computerization in libraries is practical linking of the libraries entire unit, division or a single unit together using networking cables via trucking tracks and deploying library management software. Similarly digitations are a process of converting no-digital documents to digital documents. While automation in libraries is a state where all or selected activities in the libraries are now being performed via machines without the aid of man.

We have seen that the digitization of information recourse in academic libraries will afford research, academic outputs, indigenous information etc. that is emanating from the body of academic libraries to be adequately viewed and accessed by researcher or academicians all over world. Making the digital library available over the web would open up readership to a host of potential new users. A major advantage for existing library users would be convenience of remote access – from workplace or home, if they had an internet connection, or perhaps from branch libraries. Another would be the possibility of new ways of finding information in the library, *for example* full-text search.

Due to advent of technology all librarians are undergoing changes in this digital age. However, the academic librarians faces number of challenges that are unique to the newsiest environment, and they must potion themselves to survive in the changing environment. As the technology alters the academic landscape, there are demands for new and improved ways of managing information. As more and more information becomes freely available, it has significant effects on both consumers and care providers.

Librarian need to capitalize on the flexibility created by change and expand the library's role beyond traditional services.

DIGITAL SERVICES AND COMMUNITIES

Information Communication Technology is basically an electronic based system of information transmission, reception, processing and retrieval, which has drastically changed the way we think, the way we live and the environment in which we live. It must be realized that globalization is not limited to the financial markets, but encompasses the whole range of social, political, economic and cultural phenomena. Information and communication technology revolution is the central and driving force for globalization and the dynamic change in all aspects of human existence is the key by-product of the present globalization period of ICT revolution. The world telecommunication system, the convergence of computer technology and telecommunications technology into the Information Technology, with all its components and activities, is distinctive in its extension and complexity and is also undergoing a rapid and fundamental change. The results of this are that national boundaries between countries and continents become indistinct and the capacity to transfer and process information increases at an exceptional rate. The global information communication has been called the world's largest machine, and it is very complex and difficult to visualize and understand in its different hardware and software subsystems.

Now, ICTs are increasingly playing an important role in organizations and in society's ability to produce, access, adapt and apply information. They are being heralded as the tools for the post-industrial age, and the foundations for a knowledge economy, due to their ability to facilitate the transfer and acquisition of knowledge. These views seem to be shared globally, irrespective of geographical location and difference in income level and wealth of the nation. ICT may not be the only cause of changes we are witnessing in today's business environment, but the rapid developments in ICT have given impetus to the current wave of globalization.

COLLECTION AND CORRECTION

The academic libraries encounters a very real concern especially the decisions of acquiring and access to a digital resource. Its impact on how and at what cost that resource will be used in the academic libraries. How it will be integrated into existing library collections and services? How it will be maintained and supported over the period of time? In effect, one encounters the earliest stages of what may emerge as a fundamental modification of traditional library collection policies and practices. Such modifications can only be encouraged even if it transpires that the same high-level considerations effectively govern the development of traditional and hybrid collections of the library. From our present perspective, the differences on either side of the digital divide are more apparent than the similarities. For digital formats, the rate and pace of technical change, the volatility of digital media, and the implications that access licenses have for collection development and use forces fundamentally new considerations, *e.g.*, the costs involved in accessioning:

- The costs involved in accessioning a data resource into a collection – a process that may itself include data reformatting, metadata creation or amendment, systems design or modification, development of any documentation that may be required by end users, public service librarians, systems librarians, etc.
- The copyright and licensing issues and associated system requirements (*e.g.*, to maintain security, process registrations or payments);
- The hardware, software, and networking environments that is required to provide access to a resource and of the stability, maintenance, and Potential migration of those environments;

- The methods and costs involved in migrating data through changing technical regimes with as little information loss as possible;
- The development and provision of appropriate user support services;
- The impacts that a digital resource once accessioned or created will have on the work of departments concerned with cataloguing, licensing and administration, public service, and library systems.

FACTORS RESPONSIBLE

In the developed countries libraries and archive have taken the initiatives to acquire, preserve and make accessible digital information of archival value that form the documentary inheritance of the countries. Many have developed policies and strategies to this effect. Partnerships on the management of digital information have been developed at national and international levels and various best practice guides and documents have been produced. The major challenge is ensuring the long-term availability and integrity of the growing collection of digital information. However, there are many challenges academic libraries faced in this era of digital age especially in developing countries where such problem include financial constraints, inadequate infrastructure and inadequate staff training opportunities and facilities which hindered the digitization process in the libraries.

The broader areas that academic library professionals need to address at various levels are:

- Lack of resources relating to finance and technology infrastructure (software, hardware and systems) and connectivity
- Lack of passion towards the use of technologies and other related information and communication technologies (ICTs)
- Inadequate background of training and orientation
- Inadequate staffing of library and digital centres and paucity of qualified staffs
- Lack of adequate funding
- Incessant bickering amongst librarians
- High infrastructural costs and maintenance
- Training in managing digital library programmes and projects
- Broader knowledge within the profession of the way in which libraries and other digital contents preserve create the ability to preserve digital contents and to ensure the preservation academic records , much of which is born digital.

To digitise an entire library would be a formidable undertaking. One challenge would be the sheer magnitude of the task of converting all the library's contents into digital form by scanning them into the computer. Scanning books is much easier if they can be taken apart by removing their spines, but in this application the job would probably have to be done non-destructively. Dealing with old and fragile material would be particularly time-consuming. But an over-riding problem would be the legality of the whole enterprise. Typically only a small percentage (if any) of a library's content is out of copyright and it would be impossible for the library to obtain permission to digitise from all copyright holders.

- To develop improved technology for digitizing analogue materials.
- To design search and retrieval tools that compensate for abbreviated or incomplete cataloguing or descriptive information.
- To design tools that facilitates the enhancement of cataloguing or descriptive information by incorporating the contributions of users.
- To establish protocols and standards to facilitate the assembly of distributed digital libraries.
- To address legal concerns associated with access, copying, and dissemination of physical and digital materials.
- To integrate access to both digital and physical materials.

- To develop approaches that can present heterogeneous resources in a coherent way.
- To make the National Digital Library useful to different communities of users and for different purposes.
- To provide more efficient and more flexible tools for transforming digital content to suit the needs of end-users.

CONCLUSION

Digital library is an emerging field and an exciting development for libraries. Digital libraries have tremendous potential to transform teaching, learning, research, and scholarly information. Priority should be given to locally produced material for which copyright permission can be obtained that is in high demand by readers – examples might include course notes or other high-volume teaching material. Digitisation can be used to promote special strengths of the library, such as unique collections of primary source material. It can also reduce handling of fragile originals, especially if they are heavily used. Other considerations include resource-sharing partnerships with other libraries and available funding opportunities. Digitization of information resources in academic libraries has the potentials to store much more information and presenting new forms of communication. It also has the potential of improving and promoting information retrieval activities. Academic libraries in the digital age have great opportunity to provide easy access to electronic resources and offer great user satisfaction, offers solution to problems of storage and maintained cost. Therefore, the present library system has to undergo changes to provide enabling environment to accept and implement changes especially at this era of which information is the key to every success and to meet up with the challenges of globalization. The academic libraries thus need to develop holistic approaches to the management of information in a digital enrolment.

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Library Automation: Issues and Challenges

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ABSTRACT

A process of great change has been taking place today in libraries due the impact of information technology and application of computers in library work. We hear a lot about library automation in libraries and library automation is nothing but application of machines viz. computers to the routine library housekeeping operations such as acquisition, serial control cataloguing and circulation.. In India, some libraries and information centers made efforts to 'automate' their library routines and information services in 1960s with punch card and with a couple of second generation general computers that were available at Kanpur and Bombay. INSDOC was the leader in experimenting with computers for their application in documentation and information work in 1964. Initially they made use of the IBM 1620 Model I that was available at IIT Kanpur. The first attempt was with work on data collected for union catalogue of scientific serial. The real boost in library automation came from the establishment of INFLIBNET, Before INFLIBNET; scattered efforts were being made in academic libraries especially in institution of special characters like IITS, IIMS etc. INFLIBNET proved a real catalyst by providing finance and laying standards.

Keywords: *Automation, Library Automation, Resource Sharing.*

MEANING OF AUTOMATION

The word "automation" has been derived form Greek word "automose" means something, which has power of spontaneous motion or self-movement. The term "automation" was first introduced by D.S. Harder in 1936, who was then with General Motor Company in the U.S. He used the term automation to mean automatic handling of parts between progressive production processes. Automation is technology of automatic working in which the handling method, the process and design of professional material are integrated. This is the effort to achieve an automatic and self-regulating chain of processes. According to **Webster's Third New International Dictionary of English Languages**, automation is, "the techniques of making an apparatus, a process or a system operate automatically". In other words, it is the machinery that mathematically manipulates information storing, selects, presents and records input data or internally generated data. Mechanization of library house-keeping operations predominantly by computers is known as library automation. (Gove, 1986).

According to **Encyclopedia of Library and Information Science:** "automation is the technology concerned with the design and development of process and system that minimize the necessity of human intervention in operation". (Kent, 1977)

According to **McGraw Hill Encyclopedia of Science and Technology:** It defines automation as "a coined word having no precise generally accepted technical meaning but widely used to imply the concept, development, or use of highly automatic machinery or control systems". (McGraw, 1982)

According to **Webster's Third new International Dictionary of English Language:** Automation is defined as "automatically controlled operation of an apparatus, processor system by mechanical or electronic device that takes place of human organs of observation, effort and decision". (Gove, 1966)

According to **the Oxford English Dictionary:** It defines automation as "application of automatic control to any branch of industry or science by extension, the use of electronic or mechanical devices to replace human labour".

MEANING OF LIBRARY AUTOMATION

Automation is a process of using the machineries for easily working and saving the human power and time. Library automation, stated in single term, is the application of computers and utilization of computer based product and services in the performance of different library operations and functions in provision of various services and production of output products. There is a great impact of computers and information technology and its application on the libraries due to which a process of great change is taking place in libraries. Modern technology is tending to alter radically the nature of our society and affect the prevailing economic, political and social values and libraries are also in the process. Industrialized countries were the first to realize that in the context of stock of knowledge, classical approaches relating to storage, retrieval and utilization of the information were no longer adequate and effective and that the solution lay in making fullest use of new developments in electronics, computer, telecommunications and micro-recording etc. Library automation implies a high degree of mechanization of various routine and repetitive tasks to be performed by human beings. With the advent of automation, the human intervention is reduced to a great extent. The appearance of computer has greatly increased the library automation. In addition to computer advancement, telecommunication and audio-visual technologies gave way to new possibilities in information handling In India; the use of computers is limited to only some specialized libraries unlike the case of developed countries. Library automation includes use of computers and other semi-automatic devices like punched cards to reprography. These are semi-automatic because human intervention is greater in extent. So, when we talk of library automation, these days, it is principally the use of computers; associated peripheral media (magnetic tapes, disks, optical media, etc); computer based products and services in library work. The main purpose of library automation is to free the librarians and library staff and to allow them to contribute more meaningfully to spread of knowledge and information.

In the simple language "When we use machineries for collection, processing, storage and retrieval of information and do another works of library with the help of machineries that called library automation".

DEFINITION

Library automation may be defined as the application of automatic and semiautomatic data processing machines (computers) to perform traditional library house keeping activities such as acquisition, circulation, cataloguing and reference and serials control. Today "Library Automation" is by far the most commonly used terms to describe the mechanization of library activities using the computer.

ENCYCLOPEDIA OF LIBRARY AND INFORMATION SCIENCES

"Library Automation is the use of automatic and semiautomatic data processing machines to perform such traditional library activities as acquisitions, cataloguing, and circulation. These activities are not necessarily performed in traditional ways, the activities themselves are those traditionally associated with libraries; library automation may thus be distinguished from related fields such as information retrieval fields such as information retrieval, automatic indexing and abstracting and automatic textual analysis" (Kent, 1977).

DEVELOPMENT OF LIBRARY AUTOMATION

- 1930s Punch card for circulation (IBM)
- 1950 Info & Docu. Center America
- 1961 Invention of IC by Rober Noyce (Intel) and Jack Kerby (Texas)
- 1961 KWIC H. P. Luhan IBM
- 1966 MARC-I and in 1968 it was converted in MARC-II by Henriette Avram

- 1965 Indian Science Abstract: author index by INSDOC
- 1970s Many library networks establish in India

OBJECTIVES OF LIBRARY AUTOMATION

- To maintain bibliographical records of all the materials, in a computerized form.
- To provide bibliographical details through a single enumerative access point of holdings of a library.
- To reduce the repetition in the technical processes of housekeeping operations.
- To provide access to information at a faster rate.
- To have the resources through library networking.
- To implement new IT processes to provide high quality information.
- Suitability for library cooperation & coordination development.
- Simplicity in library management to meet the objectives Proper use of human resource.s
- Develop the new library services.
- Prepare the reports and correspondence.
- Suitability for resource sharing and networking.
- To develop of human resources.

NEED FOR LIBRARY AUTOMATION

From the above definitions, we can say that the need of library automation has several reasons. Need of computers is present in all areas depending upon its usage. They range from acquisition control, serial control, and cataloguing and circulation control. They are also used for library manager's evaluation of reports, statistics, etc. For the good administration of the library computers are used in all levels of work. Above all, the unique characteristics of computer made it the right choice for the library world. Computers right from the beginning are considered to aid man, in doing various operations.

Computers help in the following are:

- Capacity to handle any amount of data and information.
- Participating in network programmers and resource sharing.
- Flexibility in information search.
- Standardization of library procedures.
- Speedy processing of information and its retrieval.
- Provide better bibliographic control at local/regional/national and international level.
- Facilitate interdisciplinary nature of research and information.
- Economic implication of latest information technology.
- Overcome geographical and other barriers to communication.

The library services, products and increase its awareness to promote the use of Libraries:

- Avoid retyping if we want to include or delete any matter, thus saving time and energy.
- Retrieve much more precise and accurate information in less time as compared to manual search.
- Get printed list of a specific subject within a few minutes.
- Heavy bulk of data can be stored in the computer and thus certain problems, which arise with storing records in wooden cabinet, are avoided. (Jain, 1987).
- Due to these advantages of a computer, computer became a universally accepted tool to provide assistance to man in all fields.
- In the field of Library Science, the need for making use of computers *i.e.* library automation was felt due to the following reasons

Traditional methods for handling information are inadequate: This age is termed as the 'information age' because large amount of information is being generated every moment. This information which is generated is stored and retrieved in a library which is used by the users. In the libraries, there are various methods of handling of information like providing reference service, cataloguing etc. due to the information explosion, these traditional methods of handling information have become inadequate and hence automation is necessary

Difficult to update information due to voluminous increase and rise in degree of specialization: Due to increase in research activities, and interdisciplinary specialization in different fields, there is the result of information explosion and due to this it becomes very difficult for the libraries and information centers to update the information. Hence library automation is necessary. Techniques are suggested for applying the computers with its advantage of speed, vast storage capacity and accuracy in library work. These three, *viz* speed, storage and accuracy are some of the characteristics of a computer, which permits humans to rely on computers in dong certain operations.

Need for co-operation and resource sharing: No library in this world is self-sufficient and therefore to satisfy its users' demands, the concept of resource sharing comes into existence. In resource sharing the resources of one library are lent to another library for a stipulated period of time. So, library automation helps to promote resource sharing by saving a lot of time and effort of library staff as well as the users.

SPECIAL FEATURES OF LIBRARY AUTOMATION

- It is an electronics based activity which is carried out by human beings
- It is helpful to providing library services
- Standardization in library work
- Accuracy in work
- Speedily communication of information
- Avoid duplication in the library work
- Trained staff
- Availability of information
- It is a time saving system
- User friendly system
- Networking.

BASIC REQUIREMENTS FOR LIBRARY

- Automation
- Adequate collection
- Financial assistance
- Hardware
- Software
- Trained staff
- User training
- Maintenance and development.

ADVANTAGES OF LIBRARY AUTOMATION

Many activities of a library are routine in nature; a few are repetitive. Automation of these activities helps in managing the library's resources in a better way at the same time saving time, money and manpower. *For example*, once the bibliographic details like author, title, edition, publisher, price, ISBN number, etc are entered at the time of ordering, the same data can be used for accessioning, cataloguing (OPAC), and circulation. Other important factors associated with automation are speed, and accuracy. One can imagine the time saved in literature searches and in preparing bibliographies.

- Easily searching of information
- Time saving

- Speedily communication
- Helpful in stock verification
- Easily working with the help of automation
- Helpful in resource sharing
- It motivate to library staff
- Development of human resource.

IMPLEMENTING LIBRARY AUTOMATION

Library automation, which started in late 70's in few special libraries, has now reached the university libraries. It is yet to take off in college libraries in India. Library automation refers to the use of computers in the routine and important services of a library. Automation of a library has mainly two components, *viz* computerization and networking. Computerization will help a library to modernize its in-house operations while networking will allow it to access other libraries for the exchange of information.

Acquisition: Acquisition is one of the important functions of any library. The goal of the library which is to satisfy the users will depend on the acquisition system of the library *i.e.* the user of the library will be satisfied only if the library acquires reading materials based on the users' demands. Acquisition also results in effective and efficient collection development of the library and hence acquisition of reading materials is an important job and is also highly labour intensive. Therefore automation in this area is very much required. Kimber, (1968) has given the major objectives of an automated acquisition system may be:

- **Cataloging:** The library catalogue is considered as a mirror of the library because it reflects the collection of the library *i.e.* whether the library possesses good, bad or satisfactory collection. It is considered to be the base for most of the library activities such as acquisition, reference, inter library loan etc. In acquisition activity, the catalogue is referred to avoid duplication of reading materials. In reference and inter library loan activities, the catalogue is consulted to see reference and other documents which can be provided on loan or can be consulted to answer reference queries. Hence, the catalogue is considered as an important tool in the library. So, if automation of the catalogue is done, then it will be very much beneficial to the users and the staff wherein they can get the desired information with no time. Similarly if the catalogue is made available in a network environment through LAN, then users can have simultaneous access to the same database. So also the library staff will appreciate the automated system since it will eliminate their job of printing the cards, filing the cards, keeping the catalogue up-to-date, etc. The automated catalogue also conserves space as compared to the large catalogue cabinet, which occupies a lot of space in the library.
- **Circulation:** The main component of a circulation control system is the transaction of documents *i.e.* issue and return of documents. This database contains bibliographic details of the documents which provide information on titles, authors and publishing details, which are used in notifying the users about the overdue. Circulation involves the charging and discharging of library materials, reservations, statistics, sending of reminders for the over-due material, etc. Rao (1986) has given the following functions of an automated circulation control:
- **Serial Control:** Serials are published at regular intervals and the publication is intended to continue indefinitely. Besides scholarly journals and popular periodicals, serials include magazines and all other periodical publications as newsletters, newspapers, annual reports, proceedings of learned bodies, monograph series etc. the term serial control usually denotes two very distinct aspects: bibliographic control and processing control. Bibliographic control of serials involve preparation and maintenance of a central master list of all serial publications which includes full title, short title, variation form earlier titles, publishers, ISSN, frequency etc. Serials

processing control comprises of acquisition, claims controls, cataloguing, circulation, binding, weeding out etc.

ISSUES OF LIBRARY AUTOMATION

Library automation brings great changes in the functioning of the library and proving effective and efficient library services. But in spite of these great advantages, there are many issues which occur at the time of implementing the automation in libraries. There are following problems faced by the library during automation.

- **Fear of adverse impact on employment:** Let us examine each of the points. If we analyze the various jobs such as book acquisition, technical processing, circulation and reference service one can conclude that human interference is necessary at each and every step. The only area where substantial manpower can be saved is the cataloguing. The data entered at the time of ordering can be used for cataloging with some updating would eliminate multiple card preparation and subsequent filing. The manpower thus saved can be utilized in retrospective conversion and later on for analytical cataloguing or introducing new services. Therefore, there will be no adverse impact on employment.

- **Apprehension that the technology could be too expensive:** There is an apprehension that the technology, both hardware and software would be expensive and unaffordable. The cost of hardware and software depends on the level of automation. From the user point of view cataloguing system is most important and also forms the base for other library activities.

- **The library staff has to undergo extensive training:** The in-house training for handling the software is usually provided by the developers and one can choose the software which can suit their budget. However, training for CDS/ISIS is available at INSDOC, INFLIBNET and DRTC. For further information on training programmes one can contact NISSAT. The training of library staff also depends on the level of automation. If one decides to go only for cataloguing a minimum training of one or two week's duration will enable the librarians to develop a database and maintain it. With this basic training one can easily transfer the same data on a server/main machine in a network environment. The job becomes easy as most of the institutions have systems department with computer professionals maintaining the network.

- **Lack of support from the management, may be owing to budget constraints:** Fourthly lack of support from the management, may be owing to budget constraints, will be one of the barriers. Here the role of librarians becomes crucial in convincing the management that the users of libraries will also be the major beneficiaries of automation. Also, the skill and initiative play a major role in convincing the management.

- **Retrospective conversion of data:** The fifth reason could be retrospective conversion of data. As mentioned earlier the manpower saved could be utilized for retrospective conversion and later on for analytical cataloguing.

CHALLENGES OF LIBRARY AUTOMATION

Let us examine each of the points. If we analyze the various jobs such as book acquisition, technical processing, circulation and reference service one can conclude that human interference is necessary at each and every step. The only area where substantial manpower can be saved is the cataloguing. The data entered at the time of ordering can be used for cataloging with some updating would eliminate multiple card preparation and subsequent filing. The manpower thus saved can be utilized in retrospective conversion and later on for analytical cataloguing or introducing new services. Therefore, there will be no adverse impact on employment

- The library staff has to undergo extensive training.

- Lack of support from the management, may be owing to budget constraints
- Retrospective conversion of data.

CONCLUSIONS

Economical help should be provided by central, state, local govt. and library authority according to library and information policy. Libraries should be conducted training program time to time for the development of library staff. Librarian should be selected best hardware and software for automation .All the data or information should be secure with the help of different security tool such as use of Anti-virus, firewall and taking a backup of data time to time. Inverter should be used for power.

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Libraries in the Digital Age

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ABSTRACT

Modern libraries are creating the society of knowledge and these in modern libraries a librarian's works as information officer who is a guide to help search the relevant information in numerous sources of information. The librarians are constantly; open to any changes in their field and eager to improve their skills and knowledge. The information environment is greatly changing throughout the world. Present rapid development in communication system and recent innovation in technology witnessed as changing emphasis in the role of information and its management. The new technologies have facilities the transformation of data into digital format. This paper highlights the tools for digitization and future direction for the digital library.

Keywords: *Information and Management, Digital Library Environment, Research Organization and Digital Resource.*

INTRODUCTION

In ancient days, the libraries were considered as storehouse of books and other reading material whereas the librarians were considered merely as the custodian of these documents. The medium of information storage has changed from clay tables, palm leaves, papyrus to papers and now to electronic and optical media. This has brought a revolutionary changed in the way libraries adapt and function, shifting from print to electronic dissemination centre. Digital libraries are an emerging concept, as today's libraries routinely provide information and services in digital form. As the nature and role of libraries have changed in response to the new digital environment, new applications and services have been developed. Digital libraries have unique characteristics that differ from traditional libraries and their approaches to information provision. The evolutionary view of digital libraries has been addressed by practitioners in the library and information field. However, the main purpose of digital libraries remains consistent with that of traditional libraries in that the purpose of digital libraries is to organize, distribute, and preserve information resources just as it is for traditional libraries.
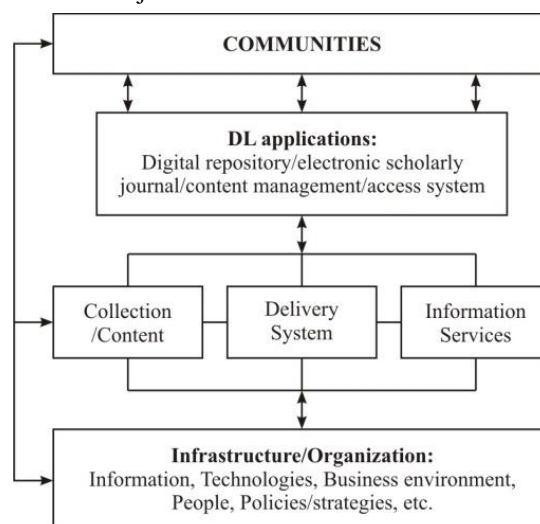
As we move into the 21st Century, the pace of globalization and the growth of new technologies, such as the Internet, are fueling both economic prosperity and human advancement. The Internet itself has started to transform the way we deliver and receive information and, in turn, how we live and do business. This recent phenomenon is being labeled by many as nothing short of a revolution - the Information Revolution. The World Bank, among other leading organizations, now recognizes that advancement in the new Digital Age depends on being given meaningful access to new information tools, such as the Internet.

WHAT IS DIGITAL INFORMATION?

Digital encoded data do not represent the infinitely variable nature of information as faithfully as analog forms of recording. Digits are assigned numeric values which are fixed, so that great precision is gained in lieu of the infinitesimal gradations that carry meaning in analog forms. Digital information is not eye-legible: it is dependent on a machine to decode and represent the bit streams in images on a computer screen. Without that machine, and without active human intervention, those data will not last.

WHAT IS A DIGITAL LIBRARY?

According to **Lesk (1997):** "Digital library are organized collections of digital information. They combine the structuring and gathering of information, which libraries and archives have always done, with the digital representation that computers have made possible."

According to **Williams Arms:** "An informal definition of a digital library is a managed collection of information, with associated services, where the information is stored in digital formats and accessible over a network. A crucial part of this definition is that the information is managed. A stream of data sent to earth from a satellite is not a library. The same data, when organized systematically, become a digital library collection."

- Digital library is a collection of electronic resources that provides direct or indirect access to systematically organized collection of documents.
- "Digital Library is "a focused collection of digital objects, including text, video, and audio along with methods for access and retrieval, and for selection, organization and maintenance of the collection"- Ian Witten and David Bainbridge.

LIBRARY, YESTERDAY AND TODAY

Library and information services have always been seen as part of a wider provision of research and learning support. In the last decade or so, infrastructure development to create systems- wide efficiencies included creation of systems that brought together services and data holding from different libraries. Focus was on integrated library systems, more openly available abstracting and indexing services and electronic journals. In the web environment, the common pattern of provision became multiple websites, each with a stand-alone interface, and databases that were hidden behind these interfaces.

DIGITAL LIBRARY (DL) VS TRADITIONAL LIBRARY

DL provides efficient and qualitative services by collecting, organizing, storing, disseminating, retrieving and preserving the information.

DL supports preservation besides making information retrieval and delivery more comfortable.

DL provides online access to historical and cultural documents whose existence is endangered due to physical decay.

Digital libraries necessarily include a strong focus on the management of digital content, just as traditional libraries have focused for long on the management of content in physical forms.

TOOLS FOR DIGITIZATION

We need to improve the tools for the digitations and indexing of texts, particularly for non-English language and for old materials and fonts. Progress with the technological tools can contribute to reducing costs and to increasing efficiency of digitization. To do this, we need to combine the specialist knowledge in the Member with the different stakeholder communities and research organization. Interdisciplinary cooperation in real centres of competence can help us advance the technologies for digitization in Europe. What users want from digital libraries are easy to find materials that are the most precise and complete answer to their queries, without having to navigate through pages of result or information on screen. This requires much more sophisticated and automatic indexing of the resources that will be in our future digital libraries - audio, visual, 3D constructions, as well as text.

SCOPE OF INTERNET AND WORLD WIDE WEB

Internet, network of networks, connects several computers and resources around the world using the language called TCP/IP (Transmission Control Protocol/Internet Protocol). During the early years of Internet use, the access was mainly for basic database searching in large systems such as Online Computer Library Centre (OCLC), Research Libraries Information Network (RLIN), Bibliographic Retrieval System (BRS), and DIALOG. With the growth of the Internet and the addition of more diverse electronic resources, the capacity for searching the Internet also increased. Since 1993, the Internet has experienced unprecedented growth in terms of networks, host computers and users. Prior to the Internet dissemination of information was limited to the delivery of formal print publications. In contrast, nowadays a person is able to create a Web page or send an e-mail message for disseminating information. Furthermore, people are able to use e-mail or teleconferencing to exchange information with others in real-time collaborative sessions. World Wide Web (WWW) or Web is the practical and existing real world application of the age-old dreams of a universal in- formation database - information that would not only be ac- accessible to people around the world, but information that would link to other pieces of information so that only the most useful information would be quickly found by a user. World Wide Web, developed by Tim Berners-Lee of European Particle Physics Laboratory (CERN), can be defined as a "distributed heterogeneous collaborative multimedia information sys tem". The most fundamental and powerful features of the Web are its: Support to distribute information in a number of different sites all over the Internet; Capacity to incorporate all types of media objects (video, sound, images, text, etc.) into a single document; Utilization of hypertext or hypermedia-oriented architecture in which a document has embedded links to other documents, which can exist locally or anywhere in the world; Ability to span the depths of heterogeneous client/server platforms. One can view from any client platform (DOS, UNIX, etc.) a data object stored on virtually any server.

STANDARDS AND BEST PRACTICES

The need for "standards" and "best practices" is universally felt but so differently defined as to render the objects of desire almost meaningless. The emergence of guidelines that lay equal claim to objectivity and authority, a welcomed sight when only a trickle, begin to compound the obfuscation through their proliferation. In this context, it may be helpful to reveal three related, but distinctive, needs:
- for information that helps digital libraries flatten their own learning curves;
- for some community-wide agreement about the minimum level of data creation practices that promise to support the library in its various roles of integrating access to, supporting use of, and managing electronic information content;
- for benchmarks that help "consumers" evaluate digital library collections and services.

Flattening the learning curve is a main source of concern that can be explained in part with reference to the fact that the digital library's ambitions frequently exceed its research and development capacity. Whether launching an initiative to construct EADs, digitize illuminated manuscripts, or develop proxy authentication services, the digital library has a natural inclination to learn from, rather than to relearn, the experiences of others. Satisfying this substantial demand is probably more a matter of information sharing than some other complex effort aimed at identifying standards or even best practices. What is required is not so much prescriptive documentation (*e.g.*, how to use the Core Categories supplied by the Visual Resources Association-VRA) so much as decision tools that guide project planning and introduce and signpost alternative solution strategies.

THE NET OF THE 21ST CENTUARY

In the Net of the 21st centaury, there will be a billion repositories distributed over the world, where each small community maintains a collection of their own knowledge. The internet will have been transformed into the Interspace, where users navigate abstract spaces to perform correlation across sources. Information analysis will become a routine operation in the Net, performed on the daily basis worldwide. Such functionally will first be used by specialty professionals and then by ordinary people, just has occurred with text search. Information infrastructure will become the essential part of the structure of every day life, and digital libraries will become the essential part of the information infrastructure.

USAGE SCENARIOS FOR DIGITAL LIBRARY

A digital library system was designed as the framework for several multimedia service scenarios, which will be realized within it. The main topics addressed in this area are:
- The management of different types of data including stream based data,
- The creation of multimedia publications,
- The storing of documents and objects contained in these documents,
- The possibility of describing objects and documents by simple metadata foe searching,
- Access control for content.

WHAT SHOULD 21st CENTURY LIBRARIAN BE LIKE?

21st Century libraries heap new tasks upon a librarian. There is a lot of difference in the model for a hybrid librarian and a stereotypical librarian, except in lending books. Modernized working condition *i.e.* new library building, new technologies undoubtedly, influence the changing image and prestige of a librarian. A contemporary librarian becomes a guide in the world of knowledge, which demands they know how to use the new sources of information skillfully. Modern librarians are crucial now for not only their high level of expertise, but also for being able to associate with the modern individual's personality. A 21st Century librarian must be modern, with acquiring psychological, praxeological, social and professional capabilities. A librarian should be aware of modernization, new resources and new technological developments, noticing the need for their own development, not only when encouraged by their superiors, but also resulting from their own motivation to learn. The need for development must stem from the natural predispositions in the librarian because such skills are not provided by the education. A librarian must be aware of his or her role and aware of the need to constantly develop and improve.

DIGITAL SCHOLARSHIP: SUPPORT BY DIGITAL

The digital environment has changed, even revolutionized, scholarship in a dramatic fashion. Among other it has speeded and extended the exchanged of ideas; increased cooperation in great many disciplines, not only in science and technology but also in humanities; and enabled the creation f many kind of works that are accessible to end

users directly. Digital resources have become essential tools for scholars conducting research, building scholarly network, and disseminating their ideas and work. Digital libraries are becoming closely associated with digital scholarship by among others, building digital collection of information for further study and analysis creating the tools to use them; and developing a variety that make use of the space, nd interactivity that the Internet allow.

FUTURE DIRECTIONS

The pace of change in digital library technology and its applications has accelerated in recent years as the focus has begun to shift from R&D to full-scale deployment. Several key trends are emerging and will continue to gain momentum:

- The shift from text and image-based systems to audio and video will continue. As network bandwidth becomes more economical and streaming technologies improve, increasing numbers of institutions will have access to the practically of full multimedia solutions.
- Broadly accepted best practices will emerge for digitization, rights management, preservation, metadata encoding and other key digital library processes.
- The library discipline is highly collaborated and has a history of sharing successful approaches. Debate about these issues will recede as proven techniques mature and spread.
- The next generation of digital library development and deployment will focus on standardization, usability and productization–providing great reusability for library patrons, increased interoperability among digital collections, and more cost effective choices for institutions just beginning digitization programs.

CONCLUSION

Digital library is the electronic library, which the information is stored in the digital form. With the advancement and new technology in the field of information librarians need to improve new skill using the new technology and it requires reorientation of traditional skill of librarian ship information professional and librarians must acquire the new skills as networking and web based technologies, on live searching of electronic database CD-ROM Products e-journals etc.

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Library Automation: An Overview

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INTRODUCTION

Computer has gained its importance in every field of human activity because of its Speed, Accuracy, Storage, versatility, Automation and Diligence. According to the Webster's dictionary "automation is the technique of making an apparatus, a process or a system operates automatically". In other words, it is the machinery that mathematically manages information storing, select, presents and records, input data or internally generated data.

Automation is a technique to make a system automated *i.e.* self-active. Many years ago, libraries used card catalogs, typewriters, and manually assigned due dates. Library automation, an up-to-date method to help libraries and library patrons to effectively use library resources, is now streamlined because of the computers and software.

The use of computer-based systems in libraries both for accessing information and for library management is known as library automation. Library automation means the application of machines (*i.e.* computers, software etc) to perform the different routines, repetitive and clerical jobs which involve various functions and services of the libraries. The development of library automation largely reflects the development of computer technology.

OBJECTIVES

1. To reduce the repetition in the technical processes of housekeeping operations.
2. To provide access to information at a faster rate.
3. To share the resources through library networking.
4. To improve control over the library collection
5. To establish of a well storage & retrieval system.
6. To save time and human power with qualitative services.

PLANNING AND IMPLEMENTATION

Library Authority should make a Planning Team to implement the information technique in library. Planning Team should keep in mind the following points:

- **Strengths:** At present what will library do? In which area library is very capable to provide services to their users?
- **Weakness:** What is the current problem of library?
- **Opportunities:** Forecast of future possibilities as a services will be beneficial to users.
- **Threats:** The Economic, Social, Political and Technical situations should keep in mind that may affect libraries.

NEED FOR LIBRARY AUTOMATION

It was felt that the use of computer in libraries all the work can be done speedily. The following are the reasons for library automation:

- **Information Explosion:** Day by day information is increasing at a large scale. Due to information explosion, librarians and information scientist is facing problem to collect the information. This problem can be solved by the use of computer in library work.
- **Economic Feasibility:** Due to impact of information explosion, the work of printing and distribution is become very costly as a result library work also became costly. By the use of computer in library, the information distribution work can be economic.
- **Increase in Users:** With the growth of literature users is also increased. To solve this problem Current Awareness Service (CAS) and Selective Dissemination Information (SDI) can be provided through computer.
- **Speed:** By the use of computer in library all the work can be done very rapidly.

- **Repeating Jobs:** Many works of library are repeated twice or thrice, as a result both time and labor wasted in the same. These repeated works of library can be done easily by the use of computer with less labor and time.
- **For Resource Sharing:** By the invention of printing press, literature is grown very fast. At present all the published literature cannot be collect by any library. In this situation resource sharing can be used. Resource sharing can be used successful by the help of computer.
- **Organization of Information:** At present information is increasing very speedily and their proper organization is become a typical task. Maximum time of library staff is spent on technical and other work. In this situation the classification and cataloguing work can be done easily and speedy by the use of computer in library.
- **Accuracy:** If the correct data is feeded in computer then it gives hundred percent accurate results.
- **Storage Capacity:** In computerization, the huge portion of information can be stored in a small and compact media.

BENEFITS OF LIBRARY AUTOMATION
- **Reduce Staff:** Minimum library staff is required in library automation system as a result the economic condition of libraries may be good. In India, British Council Library network reduced their staff at a large.
- **Reduce Error:** The error in manual system now became very nominal in automated system. In maximum libraries, to identify a document, barcode scanner or Radio Frequency Identification Device (RFID) technique is used. It Eliminates human errors while performing routine library work.
- **Reduce Unit Cost:** By library automation unit cost is also reduced. For this, catalogue is shared by Online Computer Library Center (OCLC) to avoid the duplication.
- **Improve Speed:** Dr. S. R. Ranganathan forced on law that "Save the time of the user". It can be possible in library automation system. It Eliminates routine and repetitive tasks or performs them more quickly and effectively. It also reduces the amount of time spent on material acquisition, serials, etc.
- **Improve Control:** Through online system all the staff members can know the update information of a particular record and by this control is maintained.
- **Improve Productivity:** By automation work can be done speedily and productivity is increased. Generally library staff members feel that their workload and responsibilities is increased in automation. It increases productivity in terms of both works as well as in service.
- **Content Analysis:** In automation, anyone can extract a abstract of document and through indexing anyone can see or search the information by keyword. It also allows library users to search library's collection from locating outside the library's walls.

AREAS OF LIBRARY AUTOMATION
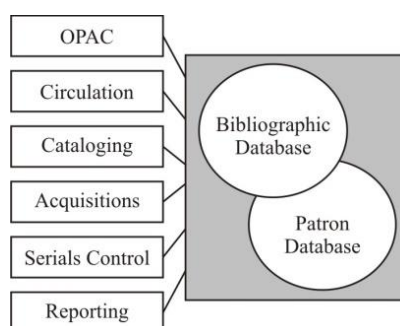
Automation of Library Functions

Computer is used in following activities of libraries:

- **Acquisition:** Many problems faced in manual acquisition system like file, book order etc. Computerized Acquisition system reduces the regular, clerical and repeated work. The ordering and acquisition are the routine jobs in the library and for a single time ordering it requires repetitive operation by different sections. These repetitive operations and the requisite checking can very well be done by the application of the computer system. Both offline and online acquisition can be performed by the use of computers.

- **Cataloguing:** Catalogue card can be generated with the help of computer. Besides, in the cataloguing unit, computer can also be used in various other ways such as producing book plates, book pockets, book cards, spine labels, etc. The MARC project was started in November, 1965 by the Library of Congress, USA. The latest development in the system includes the CoMARC (Co-Operative Machine Readable Cataloguing). The Online Computer Library Center (OCLC), previously known as the Ohio College Library Centre was started in August 1970. All these have successfully used computers for cataloguing of documents.

- **Circulation:** Issue and Return of documents are the main work of any library. It can be done easily with the help of computer. For this, document file and user file is required.

- **Serial:** It is a difficult task as the nature of serial is unpredictable. But by automation the work of serial control can be done easily. Serial control comprises complex operations of library activities because of the vary nature and characteristics of Serial as library material.

- **OPAC:** Online Public Access Catalogue (OPAC) came in 1980s. Boolean search facility is also available in it and user can easily get their desired information. Today, Online Public Access Catalogue (OPAC) or sometimes Web OPAC facility provided by the library and information centres helps in easy retrieval of information. Computers are also used for searching Library Database.

- **User Services:** The library automation also helps to provide Current Awareness Service (CAS), Selective Dissemination of Information (SDI) Services, Indexing and Abstracting Service, Web Based Translation Services, Computer Based Indexing and Abstracting Services, and so on.

- **Digital / Virtual Libraries Collection:** Computers can also be used to build digital or virtual collection or for institutional repository of the library.

- **Library Network:** INFLIBNET, Developing Library Network (DELNET) is the example of taking library automation as its first step for base structure.

SOME LIBRARY AUTOMATION SOFTWARE PACKAGES

- **At National Level:** SANJAY, SUCHIKA, MAITRAYEE, LIBSYS, DELMS, GRANTHALAYA, ALICE FOR WINDOWS, SOUL etc.
- **At International Level:** CDS/ISIS, CAIRS, BASIS PLUS, TECHLIBPLUS, SUPERDOC, WINISIS *etc.*

Barriers

- **Initial and recurring expenses:** Automation costs a lot of money to install and maintain, and libraries often overshooting the budget and running out of funding as a result.
- **Continuous staff training:** To implement the new technology it is essential for library staff to know how to use the technology. For this continuous staff training is required.
- **Hardware and software obsolescence:** There is an apprehension that the technology, both hardware and software would be expensive and unaffordable. The cost of hardware and software depends on the level of automation. Small library cannot afford the budget for the same.

- **Lack of Staff:** There are many benefits to library automation, but one of the major disadvantages is employee cutbacks. With a huge amount of the budget being spent on automation, there is generally not much funding left over for salaries and employee benefits.
- **Retrospective conversion of data:** Retrospective conversion of data is also a problem in library automation. It takes a lot of time and labor.

CONCLUSION

Today, the computers have entered each and every area of a library. The library automation is the application of modern technologies including the application of computer hardware and software, different storage medias, telecommunications, etc. which help the mechanization of any activity in the library. To implement the computer in the library, the selection of proper hardware and software forms an essential part. If proper software is selected, it will automatically generate or create OPAC which will replace the traditional card catalogue of the library. In the present era of Information and Communication Technology (ICT) library automation is the dire need of the hour, as the modern user is tech savvy.

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Promotion of Digital Information in Public Libraries in India

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ABSTRACT

This paper is to discuss to the needs of Promotion of digital information activity in public library towards of Library Products and Services in Today public Libraries and it fruitful effects in the service to the library users. The success of any library we needs for updated information. Advent of information superhighways, handling library budgets, increasing users needs, multimedia tools and online services complexity of information requirements, emphasis on accountability, competition from the private vendors and outflow of information are forcing the information professionals to adopt marketing techniques to optimize the use of digital library resources and services.

INTRODUCTION

We are living in the scientific and the hi-tech age. In this regard it is worthwhile to state that to live in the information age it is of vital importance to be well informed. As we need food to live and survive, information is also required to live intelligently and competitively. To live healthy and fit we need to eat proper nutritious food to satisfy our physical appetite, and for our knowledge and information hunger. We needs for updated information. Advent of information superhighways, handling library budgets, increasing user's needs, multimedia tools and online services complexity of information requirements, emphasis on accountability, competition from the private vendors and outflow of information are forcing the information professionals to adopt marketing techniques to optimize the use of digital library resources and services.

Marketing which for the last two decade has been used successfully by the profit making sectors of the economy to promote demand for products and services has now been considered equally related and relevant to the management of library operations. In fact there are several factors that have compelled the librarians to get themselves involved in a formalized effort of this nature. Librarians and information professionals should understand that there is something more than merely issue and return of Documents. All the services should be user-oriented. Whenever new services are launching users should be taken into confidence. Marketing is the major source of business and source of better living standers in the hi-tech society. Marketing boosts up the sale in the appropriate and effective way. The concept of marketing in the context of library and information services can be understood as:

- Market research and analysis
- Segmentation of users
- Development of product services
- Costs and pricing
- Promotion
- User education
- Dissemination.

BASIC CONCEPT OF INFORMATION MARKETING

Marketing is basically an approach towards consumer satisfaction. To market information products and services, the librarian must be sensitive to the needs of both the staff and the users, and services provider which really meet the patrons' needs. The marketing concept

will fail to work if the environment in which it is applied is not conductive and the librarian is not positive and enthusiastic about it. We are positive change in to the attitude of the librarian/staff and users. Marketing is a prerequisite for making it successful change in the library. Marketing is the management process which identifies and supplies of users requirement efficiently and profitably.

Marketing define the process of planning and executing the conception, pricing, promotional and distribution of ideas, goods and services to create exchanges that satisfy individually and organizational objective. For a library, it may include, creating products that meet user's information needs and then planning ways of information users of these products and services.

MARKETING STRATEGY IN THE FIELD OF INFORMATION EXPLORATION AGE

Marketing strategy is only an articulation of what we plan to achieve. In the field of information marketing strategy is based on a set of key principles:

- **Knowledge based Organization:** The Public Library is a knowledge-based organization. Information is a critical to the Public library success and needs to be managed as a strategic resource. Public Library is open to all type of users systems should enable to create, analyze, publish, and store and archive of information data.
- **Access:** Potential users of information should have ready access to the Information centers, whether in city/town/village or remotely, according to users need.
- **Information Infrastructure:** The Public Library will provide an information infrastructure to facilitate information handling processes across the territory/city and to ensure that they are coherent and coordinated.
- **User of information:** All users should be fully aware of their rights and responsibilities in the handling of information.
- **Communications:** The Public Library will provide a communication system for the rapid distribution of information with staff, and all stakeholders.
- **Ownership:** Each area of information or element of data should have a custodian who will be responsible for ensuring the quality of the data for implanting the access policy.

NEED OF PUBLIC LIBRARY WITH DIGITAL INFORMATION ACTIVITY

A Public library is a social need of information and service providing information to its members. Its traditional functions include selection, acquisition, storage, processing, circulation and reference services. Over a period of time, due to change in the nature of demands by the users, libraries have expanded their document delivery systems. Today translation, editing, publishing and reprographic services have been added to the traditional services mentioned in the following table:

Activities	Information Services/Products
Selection and collection of documents	Bibliographies, Current awareness
Indexing and Abstracting	Indexed Bibliographies, Abstracting bulletins, custom searches
Extraction	Digest Extracts, Descriptive reviews/state of the art report
Evaluation	Critical review of area, critical compilation of data
Other activities	Translation, Editing, Publishing, Reprographic services and online data services

MARKETING OF INFORMATION SERVICES IN PUBLIC LIBRARIES IN INDIA

In the service digital products in Libraries should be offered in combination with information services. Which present an approach to reference, Information and training services concept? This is designed to meet the needs of users of digital libraries. The

approach includes the following aspects: Introduction to the library, online training for OPAC searching, Searching Bibliographic and Subject databases, Finding relevant information on the Internet and evaluating activities. CD-ROM/DVD databases complement the information in the OPAC. In such a situation many users are so frustrated by their fake information retrieval experience that they prefer to do without the Information rather than persevere. This is a clear sign that the library must do something to improve the situation. It is the job of reference librarians and subject Specialists to access to electronic sources for library users. In order to address this situation I suggest the development of user training and services programmed designed to complement the electronic information products of the library and which forms an integrated information packages. This information programmed comprises the following aspects:

OPAC

An OPAC (Online Public Access Catalog) is a computerized online catalog of the materials held in a library, or library systems. The user in the library can search the bibliographic database and find specific information online. The search facility also apprises the user about the availability of each content item for circulation, including current status of individual copies of a title and reserve status. The scope of these services include:

- **Online catalogues:** The catalogues of Title, Author, Subject, Classified, KWIC Index, Publisher and present status are available online.
- **Current Serials:** To provide online information on Holdings of current serials including recent issue received in library.
- **Recent Additions:** To make available new additions to the library, to the users.
- **Multiple Databases:** To support the definition of multiple databases based on types of documents for searching in OPAC.
- **Other Services from OPAC Users:** Updating subject Interest profile for SDI by Users request for acquisition of a document, while browsing/searching various catalogues and facility to develop request online for putting a specific title on reservation.

Web OPAC

Web OPAC is a web based searching platform, developed with advanced information technologies for dissemination of information to the users at the fingertips, regardless of physical location whether the member is in the library or at a remote location. Library services can be made available through Web OPAC:

1. Various online journals database,
2. Popular documents circulation and reservations,
3. Place reservation/hold on certain documents,
4. Outstanding list for renewal facility optional,
5. Procurement request for purchasing of new books and other media documents,
6. Approving document for procurement,
7. Library catalogue updating, New Arrivals, CAS and SDI services,
8. Search facility on entire database,
9. User feedback and so on.

LIBRARY WEB SITE

Promoting the library Activities like Events, Audio, Video, Graphics, Services and Orientation Program display on Web. Web can be very effective tools for reaching online audiences.

- **Marketing Services:** Today hi-tech libraries have already been using blog in various ways for different purposes. The most obvious applications of blogs are for propagating library news, notices and job services, which are needed to be updated frequently and easily.

- **Promoting Library Events:** A blog created for library can promote its regular events and programs. The Regular Search Services (RSS) feed can be set up for the blog to alert everyone in the community to include the headlines of the library on their sites or use an RSS newsreader to see what is up at the library. Through e-mail subscription and Permission-based marketing Library news can be sent regularly straight to the users inbox.
- **Users' supporting Programs:** Most of the library visitors hunt the library online to find out what new materials like books, videos; CD/DVDs have been added to the collection. Regular updating of the information may serve the clients by setting up topics on your blog for each word. But Public Library and information centers can prepare special alerts about new resources for particular user or subject and related topic wise through blog.

CONCLUSION

The Public library can be called an information market and the library user is a consumer of information. Information is a vital resource for national development. Increasing realization of the role of information has resulted in the network of information systems to provide variety of information services and products. Today public Library are acquisition, organization and dissemination must be based on the hi-tech concept of marketing strategies of achieve more users satisfaction. It must endeavor to nurture culture of customer service to enhance its image in the eyes of the users.

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The Role of Digital Library in Present Scenario

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ABSTRACT

In present paper we will discussed about the digital libraries and its Role. As we know that the rising field of digital libraries brings together participants from many existing areas of research. Currently the field lacks a clear agenda independent of these other area. It is tempting for researchers to think that the field of digital libraries is a natural outgrowth of an already known field. From a database or information retrieval perspective, digital libraries may be seen as a form of federated databases. From a hypertext perspective the field of digital libraries could seem like a particular application of hypertext technology. From a wide-area information service perspective, digital libraries could appear to be one use of the World Wide Web. From a library science perspective, digital libraries might be seen as continuing a trend toward library automation.

INTRODUCTION

Now a day, The Digital library is very popular word. It is newly raising perspective in the modern world and its future. Apart from this view there is some truth to these perspectives (as well as others) but none address the field as a whole and its research agenda. The field of digital libraries will be limited if viewed only as a sub field of prior research interests. To realize its full potential, the field must be viewed as a union of sub fields from a variety of domains combined with additional goals, and thus new research issues. Digital library research must both respect the existing tradition of our physical libraries and transcend current practice in developing a new, broader research agenda.

What are the research issues central to digital libraries? One issue might be how to digitize objects and put them on-line. A second might be how to include new forms of information that do not have temporal or tangible representation necessary for inclusion into physical libraries. Another could be how to locate materials in the new digital library. Yet another would be when to use and when to transcend the existing technologies and traditions of the physical library in its digital form. Still other issues stem from the problems of information overload created by new information technologies. This framework presents for thinking about the field of digital libraries and the research issues that are part of it and demonstrates how these issues affect digital library systems. The recent decades have witnessed tremendous advanced in information technology and its application. The latest technologies offer cheaper price computer processing power, mass storage inexpensive access to high speed networks and retrieval devices which gives us the ability to crate, manipulate, store and transfer large quantities of formation in digital form at low cost, electronic publishing and resource sharing activities have become very easy and convenient today. These major changes have led create and develop digital libraries. Digital libraries basically store of materials in electronic format and manipulate large collection of those materials effectively. The key technological issue is how to search and display the desired selections from and across e collections. The main focus of digital libraries should be on issues of access, cost and digitization technology and how to develop the necessary infrastructure for effective mass manipulation of the information network.

WHAT IS DIGITAL LIBRARY?

A digital library is a collection of digital documents or objects. This definition is the dominant perception of many people of today. Nevertheless, Smith (2001) defined a

digital library as an organized and focused collection of digital objects, including text, images, video and audio, with the methods of access and retrieval and for the selection, creation, organization, maintenance and sharing of collection.

"Digital Libraries are organization that provide the resources, including the specialized staff to select, structure, offer intellectual access to interpret, distribute, preserve the integrity of and ensure the persistence over time of collections of digital works so that they are readily and economically available for use by a defined community or set of communities." (DLF 2001)

A digital library is a collection of digital objects. A collection of research papers is a typical example. When this collection gets sufficiently large, users of the digital library cannot examine each paper individually to find if its subject interests them. To address this problem, digital librarians create an interface to stand between the content of the collection and the user. In a traditional library, an example of this would be a card catalog – a collection of small cards that represent the larger objects contained in the collection. These cards are more manageable than the books that they represent. In a digital library, there are a number of ways that we can present the digital collection to the user The first thing that we need to do is to describe each object in a manageable way. This description is called metadata – data (the description) about data (the digital object). This metadata is more manageable than the digital objects that it represents. Metadata is written in a standard format. This allows the metadata to be manipulated using automated tools.

Definitions: According to Don Waters defined that "Digital libraries are organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and economically available for use by a defined community or set of communities"

"A Digital library is a machine readable representation of materials which might be found in a university library together with organizing information intended to help users find specific information. A digital library service is an assemblage of digital computing, storage, and communicating machinery together with the software needed to reprise, emulate, and extend the services provided by conventional libraries based on paper and other material means of collecting, storing, cataloging, finding, and disseminating information." Edward A. Fox "Digital libraries are organizations that provide the resources, including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and economically available for use a by a defined community or set of communities." Says Digital Library Federation.

ELEMENTS OF DIGITAL LIBRARY

Digital library requires well-established and proven information technologies by accessing the database or servers through networks. The following components are very essentials to create digital library:

Hardware requirement

The noted below are the requirement of digital library as follows:
- Computer servers
- Scanners
- Multimedia interfaces
- Storage media: high power hard disk
- Wi fi tower and CDs
- 24 hours Internet connectivity
- Digital camera
- High power Ups
- Converters

- Networks
- LAN or WAN

Software:

The software requirement of the DL as indicated below:
- Digital library software like Greenstone and D-Space
- Linux operating systems
- Editing software

OBJECTIVES OF DIGITAL LIBRARY

The objectives of digital library as mentioned here in:
- To have large digitized databases.
- To provide personalized and retrospective services in efficient way.
- To collect, store, organize and access information in digital form via communication channels.
- To provide coherent view of all information within a library in any format.
- To meet the requirements of patrons by providing better services.
- To save time of library staff by avoiding routine jobs.
- To minimize massive storage and space problem of large libraries.
- To serve widely dispersed communities throughout the network.
- To reduce cost involved in varies library activities.

DIGITAL LIBRARIES FUTURE

There are many thousands of digital library projects currently underway, in all sectors of the library community. The basic concept underlying the digital library is not new. In 1945, Dr. Vannevar Bush of the U.S. Office of Scientific Research and Development discussed a device called a "memex". He envisioned this device being used by individuals as "a sort of mechanized private file and library".

Of these many terms, digital library, virtual library, hybrid library and electronic (or e-) library are most common. In the 1990s, terms such as digital library, virtual library and electronic library became widely used, but considerable uncertainty remains about what they actually mean.

BENEFITS OF DIGITAL LIBRARY

The main advantage of the DL as indicated below:
- Researchers! Information Scientists will get information with minimum time.
- Helps in Resource sharing facilities.
- Helps in inter-library loan (ILL).
- Helps to reach information of their users at faster rate through on-time communication.
- It saves the library manpower and funds.
- It minimizes the duplication of new invention.
- Helps the Libraries to get recent publications from the publishers.
- E-publications provide aids for connectivity, audio visualization, customizability, creation and revision of documents, interactivity and rapid information retrieval.
- Helps to get bibliographical information, retrospective search, union Catalogue, Abstracting and indexing of periodicals.
- E-publications may help in overcoming the restrictions on the length of the paper imposed by many scholarly journals.

DEMERITS

Digitizing of information does help a great deal. However, there are problems for handling and using these large volumes of digitized information. Digital and Electronic libraries are also not without their limitations. Few of these are:

- Compatibility and standardization problems are likely to be faced due to the use of a variety of hardware, software, information collection, and storage and retrieval methods.
- Inadequacy of the libraries to predict the future use of documents, irrespective of its type *i.e.* printed or digital.
- A problem frequently encountered and difficult to overcome will be the one of copyright and intellectual property issues.
- The unrelenting invasion of the viruses will pose another ethical risk.
- Problems in the scholarly publishing
- Some documents are used only when it is seen
- Locating the information on the internet requires good skills.
- Problems of intellectual property rights of the author and publisher, etc.

CONCLUSION

The above paper discussed the Role of digital libraries. We also enumerated the merits and demerits of digital library with high point of view. The emerging of Information Technology with high resolution capture and sophisticated engines and large storage digital contents continue to ability of conform the digital library and in the future digital libraries will be common in every Institutes, College and Universities.

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Skills for the LIS Professionals in ICT Environment

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ABSTRACT

The basic aim of this paper is to show the skills of Library & Information Science (LIS) professionals required in ICT environment. This paper discusses about Impact of the ICT Environment on Library Professionals, Challenges of today's LIS Professionals and emphasis on various basic, managerial and technical skills required for the LIS professionals in fast changing ICT Environment.
Keyword: *ICT; Skills; LIS professionals.*

INTRODUCTION

ICT has reshaped every activity of today's environment it includes business, education, military, transportation, communication, scientific investigation, knowledge management, *etc,*. Even it affects on our human life also. Developments in ICT have brought about an enormous impact on the way we live, work, think and play. These changes are quite widespread in our everyday lives such as the use of e-mail, internet and smart phones at home and in the place of work. Over the last few years, the library and information science environment has changed drastically in terms of collection, organization and services.

The e-resources have taken a significant space in the library collection, the operations and organizations of library materials are fully automated, new web based services are offered by libraries to attract user's involvement in redesigning the library system and services and so on. These changes are mainly due to the development and impact of Information Communication Technology (ICT) in libraries which have also made sea changes in all walks of life. The ICT tools and services are being used in libraries to mange libraries more efficiently and to cater users demand properly. In this changing library scenario, the library and Information professionals must possess adequate ICT skills to manage the modern libraries, more specifically the academic libraries. They need to obtain continuous knowledge and skills on the fast changing ICT environment to provide better library services to users.

IMPACT OF THE ICT ENVIRONMENT ON LIBRARY PROFESSIONALS

Since we graduated as a professional librarian over some years ago our syllabus, training, and teaching methods are outdated, even though our tasks and responsibilities are still the same. Libraries now and in the future will be quite different from the traditional libraries that we know today. In digital environment most of the library functions and services are done and provided using ICT. The role of library professionals has been greatly affected by ICT. The traditional roles remain but the tools and techniques have changed. Library professionals now use electronics hardware and software to create, collect, consolidate, communicate and preserve information. That's why today LIS professionals are given titles such as:

- Cyber Librarian,
- Web Librarian
- Information Officer,
- Information Facilitator,
- Library Manager,
- Knowledge Bankers,
- Information Providers
- Institutional Repositories Developer
- Knowledge Manager / Professional

- Information Architecture;
- Information Scientist/ Specialist
- Information Consultant, and many more.

Thus, LIS professionals are wearing various hats, trying to cope-up with ever changing landscapes of printed as well electronic resources, information utilization and multifaceted, multidimensional, multidirectional and exponential growth of information itself.

CHALLENGES OF TODAY'S LIS PROFESSIONALS

In a fast-changing, expanding diverse global digital information environment, libraries are facing a variety of complex challenges from various sectors of knowledge society in the ICT environment. The major challenges are:

- Information explosion
- Growth and usage of web resources
- Increases the level of technology literacy
- Increases demand for better and faster access to information
- Growth of student/researchers in numbers
- Change in teaching and learning methods
- Emerging new subjects
- Development in research
- Continuous rapid change
- User's expectations.
- The need to manage resources on a value-for-money basis
- The requirement for user oriented, high quality services
- Huge developments in information technology
- Virtual learning environment
- Development of digital, virtual, and hybrid libraries
- Online bookshops and information services
- Virtual educational institutions.

However, libraries and librarians should first educate and equip themselves with the necessary knowledge and skills before they can deal with this enormous challenge.

The tasks of a modern library

- Application of new technologies in libraries & information centres
- Automation of all library operations, resources and services
- Building collection of both print and electronic information resources
- Providing access to the content of local and global resources and services
- Provide guidance and training in the usage of digital resources
- Provide responsive products and services to meet the user needs and expectations.

SKILLS REQUIRED IN ICT ENVIRONMENT

Having professional degrees in library and information science is not enough for LIS professional. There is need for librarians having multidimensional, multidirectional aptitude in the areas of technical work, managerial work and also in providing user oriented services along with soft skills. LIS professional should have key skills new generation of LIS professional of new that they can enhance the functioning of LIS professional more effectively.

- **Basic Skills:** The basic skills of new generation of LIS professional are mentioned below.
- **Ethical Skills:** In the first step of any profession to become a truthful and respectable professional one must follow the ethics of that profession. Ethics plays significance role in library. Responsible behavior is the result of adhering to the values of society. It is important that libraries have policies, procedures, and guidelines in place that address issues related to ethics. Many professions set a standard of ethics for

themselves. *For example*, doctors, lawyers, engineers. Librarians are well aware of their profession's ethical connotations. IFLA's website listed 60 countries giving code of ethics for librarians; strangely India doesn't figure in that list, though countries like Thailand, Sri Lanka and Indonesia find a place there.

- **Communication Skills:** These days, good communication skills are essential for LIS professionals. One has to interact and send written communication to library users, faculty members, researchers, suppliers, publishers, external agencies etc. With this one can achieve lot and solve problems too. Librarians need good technical writing skills for reports, papers, articles, letters, and write-ups for various issues.

- **Presentation Skills:** LIS Professionals should have highly effective presentation skills. If they want to implement a new technology or service for library users, first he must create a proposal for management. They must show what would be the consequence of this new technology, which tool to use to train staff, market the service etc. They must show the role of that new technology currently being used in other libraries. Through presentation skills, they can increase awareness of the role of libraries and librarians in promoting information literacy.

- **Listening Skills:** The library professionals must have good listening skills as he/she has to interact with different types of users all the time. By carefully listening to users' he/she can identify the exact requirement and then provide the service accordingly.

- **Teaching Skills:** This is very important skill for LIS professionals to aware/orient the new user or in case new service is introduced such as online database searching. It also includes encouraging reading habits in users.

- **Enthusiastic:** Having or showing great excitement and interest to make new things and ideas Some other skills to be required such as, helping attitude towards new readers, ability to manage the center in such a way that users find it user-friendly, Flexibility to adjust willingly in different conditions., Adaptability, Assertiveness, Self-confidence, Creativity, Innovation, Analytical skills, Service attitude, Improving one's learning and experience, Customer relationship.

MANAGERIAL SKILLS

For managerial skill I believe that POSDCORB acronym coined by Gullick and Urwick (1937): **P**lanning, **O**rganizing, **S**taffing, **D**irection, **Co**ordination, **R**eporting and **B**udgeting are relevant in today's managerial world. These elements are representing managerial skills for LIS professionals. In Gulick's own words, the elements of POSDCORB are as follows:

- **Planning**, that is working out in broad outline the things that need to be done and the methods for doing them to accomplish the purpose set for the institute;

- **Organizing**, that is the establishment of the formal structure of authority through which work subdivisions are arranged, defined, and co-ordinated for the defined objective;

- **Staffing**, that is the whole personnel function of bringing in and training the staff and maintaining favorable conditions of work;

- **Directing**, that is the continuous task of making decisions and embodying them in specific and general orders and instructions and serving as the leader of the enterprise;

- **Co-Ordinating**, that is the all important duty of interrelating the various parts of the work;

- **Reporting**, that is keeping those to whom the executive is responsible informed as to what is going on, which thus includes keeping himself and his subordinates informed through records, research, and inspection;

- **Budgeting**, with all that goes with budgeting in the form of planning, accounting and control.

Other manager skills are also needed for librarian like Negotiating skills, Stress Management, Time Management, Consumer Analysis skill – user need analysis, behavior analysis.

INFORMATION TECHNOLOGY SKILLS

LIS professional must have aware of emerging technologies. LIS professional must have the knowledge of

- Computer Hardware / Software and Networking
- Library Automation software
- Word Processing, graphics, multimedia, spreadsheets, Power Point for Presentation
- Create and update online databases
- Design and update library websites
- Design and maintain digital library
- Internet searching tools
- Content Management
- Scanning/Printing - troubleshooting
- Digitization and prevention
- Provide online services such as RSS for current awareness service, Instant messaging for reference service, Blog for discussion, SMS or e-mail for communication with the users
- Technical Professional skills like, Standards eg. Z39.50 for information retrieval. It specifies a response protocol between client and server. Metadata Standards eg. Dublin Core, MARC, CCF
- Information Literacy skill can be defined as ability to recognize when information is needed and being able to locate, evaluate and use effectively the needed information
- E-resource management.

CONCLUSION

Though various skills are required but the skill needs depend on role and context of the organization. 21st century is the century of change. The information communication technology has changed our LIS profession and our lives. To stay alive and sustain in the present environment, one has to have combination of conventional and ICT related skills to enhance the functioning of LIS professional more effectively.

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Application of Information and Communication Technology in Academic Library: An Overview

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ABSTRACT

The impact of information and communication technologies has transformed. The entire universe in to a new dimensional structure and the age old barrier of distance and time is having almost vanished. The integrates all the function of the media and become a Powerful multipurpose tool, which will be more useful for resource discovery. So ICT is the use of computing resources (hardware and software) that are delivered as a service over a network (Typically the network).The ICT Concept leads to a platform and application concept for library management services and to Collective innovation. Rapid developments of ICT have changed the traditional concepts of repositories. In this paper discusses the present scenario of ICT in libraries as well as library services and the Concept of ICT is also briefly presented. And also discuss advantage, disadvantages, purpose of ICT in libraries

Keywords: *Information Communication Technology, Library Services, Internet, SNS.*

INTRODUCTION

The impact of Information communication technology (ICT) has transformed. Information communication technology (ICT) has changed significantly the nature of work. Every libraries need information for some purpose or the other work. Information is essential to play a vital resource for society development and valuable service to everyone. Information and communication technology have made significant impact on all spheres of human life. Information Communication and technology shortly known as ICT is not a single technology only, it is the complete system of technologies, time to time this term has been defined by many scholars, learners and learned societies in different ways, but literary meanings of comprised terms are giving more appropriate and authentic idea about ICT.

It is comprises with two strong technologies, one is information technology which deals with the Equipment, infrastructure and software through which information can be received, accessed and disseminates, *for example* phone, faxes, modems, networks, etc. The term 'Information and Communication Technology' (ICT) first appeared in the mid 1980s and was defined as "All kinds of electronic systems used for broadcasting telecommunications and mediated communications", with examples including personal computers, video games, cell phones, internet and electronic payment systems and computer S/W etc. The ICT is made of computer and communication technology. Additionally ICT means a variety of technological applications in the process and communication of information. The word ICT is a combination of two words information, communication and technology. Information means knowledge and technology means use of computer and communication.

DEFINITION

The term ICT can be defined as "the integration of computing, networking and information processing technologies and their applications". "Information and communication technologies in education deal with the use of Information and Communication Technologies (ICTs) within educational technology." "Information

Technology is the use of information in order to meet human need or purpose" tools and as well as means used for collection, capture, process, storage, transmission and dissemination of information". "the application of computers and other technologies to the acquisition, organization, storage, retrieval and dissemination of information. The computers used to process and store data, while telecommunications technology provides information communication tools. Which make it possible for users to access databases and link them other computer networks at different locations? Thus, ICT means a combination of computer applications' and communication technology for gathering, processing, storing and disseminating of Information.

NEED OF ICT IN LIBRARY

The study reveals the drawbacks of the information access through print media. It elucidates the wide growing gap in volume of consumption between print media and electronic media by contemporary professional and Non professional students of colleges studying in Chennai city. The study is confined to the impact of ICT information on the Access pattern of professional and Non professional students of colleges studying in Chennai city. The main aim of the study is to measure the respondents' ICT information needs and their information seeking behavior in collecting ICT resources. Further their attitudes towards ICT information also measured. It also proves how far ICT information make impact on the access pattern among the users of both professional and non professional and the extent of ICT information being increasingly used rather than print resources. In the Information Communication technological world, knowing the respondents' changing attitude towards ICT information is very essential. In this context the study is needed in the present scenario.

APPLICATION OF ICT

Now a days there are several information communication technology for various housekeeping, management and administrative functions of the library, different electronic and digital media, computer aided electronic equipments, networks and internet has provided significant role in retrieval and dissemination of information and playing an vital role for modernization of libraries main of them are:

- **Library Automation:** Library Automation is the concept of reducing the human intervention in all the library services so that any user can receive the desired information with the maximum comfort and at the lowest cost. Major areas of the automation can be classified into two-organization of all library database and all housekeeping operations of library.
- **Library Networking:** Library networking means a group of Libraries and Information Centers are interconnected for some common pattern or design for information exchange and communication with a view to improve efficiency.
- **Library Management:** Library Management includes the following activities which will certainly be geared up by the use of these fast ICT developments, Classification, Cataloging, Indexing, Database creation, Database Indexing.
- **Digital Library:** A digital library is an assembled of digital computing, storage and communication machinery together with the content and software needed to reproduce, emulate and extend the services provided by conventional libraries based on paper and other material means of colleting, cataloging, finding and disseminating information. A full service digital library must accomplish all essential services of traditional libraries and also exploit the well-known advantage of digital storage, searching and communication. It provides access to part of or all its collection, such as plain texts, images, graphics, audio and video materials and other library items that have been electronically converted, via the internet and www.
- **Technical Communication:** Technical Communication consisting of technical writing, editing, publishing, DTP systems *etc.*

ICT BASED USERS SERVICES IN LIB

Some library users are adopting electronic habits, making increasing use of the new ICT including computers, the Internet, the Web, Intranet, Extranet and other technologies. As a result, library users are placing new demands on their libraries. They require access to the latest information, updated information resources and access to ICT facilities that they could use in their work. Use of ICT in libraries enhances users satisfaction. It provides numerous benefits to library users. Some of the benefits are:

- Provide speedy and easy access to information
- Provides remote access to users
- Provides round the clock access to users
- Provides access to unlimited information from different sources
- Provides information flexibility to be used by any individual according to his/her requirements
- Provides increased flexibility
- Facilitates the reformatting and combining of data from different sourcesLibraries are also providing various ICT-based services to their user, including the following
- Provision of Web access to OPACs
- Electronic document delivery
- Networked information resources
- Delivery of information to user desktops
- Online instructions
- Online readers advisory services.

IMPACT OF ICT IN LIBRARY

Computer has brought in a new impact to the library and information usage. In libraries, information technology has assisted library professionals to provide value added quality information service and give more remote access to the inter-nationally available information resources. Today's highly sophisticated information technology to facilitate the storage of huge amounts of data or information in a very compact space. Information technologies promise fast retrieval of stored information and revolutionize our concept of the functions of a traditional library and a modern information center. Recently technological developments have dramatically changed the mode of library operations and services. Modern ICT is impacting on various aspects of libraries and the information profession. Advancements in ICT and the wide spread use of ICT is resulting in digital information sources and digital media replacing and becoming the dominant form of information storage and retrieval. ICT also survives and makes true rules of Library Science 'Every reader his/her book/information', 'Save the time of the reader', 'Library is a growing organism'. ICT with its tremendous information sources, rapid transmission speed and easy access ensures the satisfaction of the user with complex demand, break down the distance barrier and shortened the time required and ensure the right information to the right reader at the right time. It also increases and solves the library's demand of collection development. It is really an excellent tool for the Library information centers.

BENEFITS OF ICT BASED PRODUCTS AND SERVICES

The ICT products & services are beneficial for the libraries in the following ways:

- It provides efficient and accurate services;
- It saves the time, space, energy and resources;
- It helps for controlling the tremendous escalation of information;
- It assist to provide high quality of services and increases the range of services;
- It has invented the ways of resource sharing by co-operation and co-ordination;
- It helps for the betterment of library image by providing better services in modern ways.

ADVANTAGES OF USING ICT

- Using Microsoft word and software like Microsoft Publisher is that you can change the text, mistakes without having to start from the very beginning again.
- Work is easy to save and document, rather than someone keeping them in folders were they can get misplaced.
- Use scanners to scan in pictures form magazine and books.
- User can email letters and document to people all over the world.
- Save the time of the user and organization
- Minimization of human interface
- Information is available 24 hours a day through access on the Internet or home computer files or office/ workshop servers and computer facilities
- Computers can be used to store and process digital data, to read bar codes and carry out automatic stock checks in warehouses and shops.

DISADVANTAGES OF USING ICT

The internet server can go down randomly, so cannot connect to a webpage. Networks can get hacked into. Shopping online leaves shoppers prone to online credit card theft. Viruses can come through the internet damaging the files in computer. Some software can be difficult for some generations and people to learn how to use. The technical skills needed to manage a network are much higher than working on a stand-alone computer Work involving computers may remove employees from social contact with other employees, this change can cause stress Unless sites are filtered it is possible for young children to view unsuitable material on the Internet.

USE OF ICT IN EDUCATION

- Audio
- Video
- Computer, Laptops and Tablets
- Blogging
- Mobile devices
- Learning management system
- Whiteboards.

"Electronic resources" refer to those materials that require computer access, whether through a personal computer, mainframe, or handheld mobile device. They may either be accessed remotely via the Internet or locally. Some of the most frequently encountered types are: 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, E-audio/visual resources.

CONCLUSION

The digital library movement is rapidly increasing and traditional libraries are now on their way to digitization in a phased manner. The financial constraint of different institutions and governments departments creates problem to acquire necessary IT equipment and infrastructure. In India UGC and INFLIBNET Centre have taken steps to develop a consortium where college, university and research libraries can join for subscription to online journals. The library and information professionals have to keep on watch for newer technological developments and noticeable changes in the use of many information platforms such as Internet, multimedia and digital library. The tremendous amount of information is being generated and transmitted from every corner of the world in the form of print materials, research articles, lectures, presentations video conferencing, technical reports, standards and patents etc in this era. Early stages of 20th century, libraries were facing the problems, of how to cater and fulfill the users' demand in minimum span of time. In the present scenario, users can have access to a variety of

information and digital archives of libraries from any corner, as well as can get update activities of libraries by the SMS on their mobile phones. It also helps to users to access, manage, integrate, evaluate, create, and communicate with other users more easily than ever; it can made possible by the emergence of library 2.0. The significant developments in ICT have forever changed the way of information gathering, processing and disseminating. The ICT products and services melt the physical walls of library; it has made library without walls or virtual library.

The present boon of ICT based products and services have a great impact on libraries and the impact is quite perceptible right from the beginning as the libraries started adopting ICT in the form of automation, stage of digital archives, library 2.0, and now we are talking about library services on mobile phones.

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ICT an Essential Tool for Library Automation

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ABSTRACT

The paper defines the word ICT as any device or system that allows the storage, retrieval, manipulation, transmission and receipt of digital information. ICT is changing the work of libraries and information centers. An increased number of users, a greater demand for library resources, an increase in the amount of resources being published, new electronic formats and sources, and the development of new and cheaper computers are some of the reasons for the growing need for ICT in our country. Today library automation means "digitization of library housekeeping operations by computerization". The common library housekeeping operations are acquisition control, serials control, cataloguing and circulation control. The paper describes use and impact of ICT on libraries. The library automation is a technique or a process or a system operates automatically. The paper also discusses the area of library automation and selection of software. Why need library automation? What are the barriers that come in way of library automation? Finally, highlights future plan of libraries.

Keywords: *Libraries, computers and information communication technology (ICT).*

INTRODUCTION

In the 21st century, Information and communication technologies (ICTs) emerged as a most powerful tool which focused on the technological solution for information gathering, processing and distribution of information.

Now academic libraries are interconnected with each other by this technology. All housekeeping operations and services are being performed through ICTs are using as a best tool to performing housekeeping operations.

As well as quick and best services to users. With the advent of ICT library and information centers change in tune with the time and technology and keep the resources on a desktop and retrieves information to the users by using in house database available in any part of the globe.

ICT has revolutionaries the libraries and information services and given access to information at fingertips. ICT on library and information services means as the application of computers and communication technologies to the acquisition, organization, storage, retrieval and dissemination of information process. Convergence of computer and communication technologies and their subsequent application to library and information activities has changed the philosophy of information from unitary to universal access. It enhances easy information retrieval of resources. Retrieval of information from digital resources and internet is simpler, easier and faster in comparison to traditional systems.

The impact of ICT has made revolutionary changes in the field of library and information services. Several services provided by library and information centers with the support of ICT to their users.

Information Communication Technologies are used for accessing, processing, gathering, manipulating and communicating information. The application of Information Communication Technology in the academic libraries is providing new opportunities to the library professionals to improve their sources and services. Now users can avail printed or digital resources according to their necessity. It is important to retrieve the applications of information communication technology in library and information centres in the context of changing user demands. The concept of library automation in our country is not new, but the situation is still not very encouraging.

Information communication technology has transformed all aspects of modern society. Information itself is so vast and resources are numberless. It helps in every field

of life. ICT also, in general, is very essential to the development of resources. Information communication technology facilitates sending digital information from one place to another place, one person to another person or from one institution to another institution globally. In computer language ICT is capturing, processing, storing and communicating information. ICT may covers any resource that will store, retrieve, manipulate, transmit or receive information digitally. ICT Stands for "Information and Communication Technologies." ICT refers to technologies that provide access to information through telecommunications. It resembles with Information Technology (IT), but focuses basically on communication technologies. It has the Internet, wireless networks, cell phones, and other communication mediums. This technology has provided society with a vast array of new communication capabilities as human beings may interact in real-time with others at far distance by using it like instant messaging, voice over IP (VoIP), and video-conferencing. Social networking websites such as Face book, twitter allow users from all over the world to remain in touch and connect on a regular basis.

WHAT IS ICT?

ICT stands for Information Communications Technology. ICT refers to any device or system that allows the storage, retrieval, manipulation, transmission and receipt of digital information. *For example*, personal computers, digital television, email, robots.

The 'C' in ICT stands for communications, and covers all the communications technologies such as: • digital TV • digital radio • e-mail • Internet • broadband • networks (wired and wireless) • mobile phones • GPS (global positioning systems) • videoconferencing • instant messaging • fax.

ICT hardware includes

- Computers
- Scanners
- Digital cameras

ICT covers software includes

- Standard Office Applications
- Microsoft Excel
- Database software
- Presentation software
- Graphics software
- Specialist Applications
- Computer Aided Design (CAD)
- Roadways Customer Relations Management (CRM) Software.

COMPONENT OF ICT NETWORK

There are six components of any ICT system: People, Data, Procedures, Hardware, Software and Information.

DVANTAGES OF ICT IN ACADEMIC LIBRARIES

- ICT makes library work easier, faster, cheaper and more effective.
- ICT helps to manage information overload as information retrieval is made easier in computerized systems.
- Remote access is enabled through networked systems
- Computerization saves space and reduces paper.

IMPACT OF ICT ON LIBRARIES

Library operations and services have undergone quick changes from traditional methods after entering the information communication technologies like.

- It helps in generate Information Writing or Word Processing or Text editing or Character Recognition or Voice Recognition.
- It Store Information Manuscript, Paper as Print Media or Electronic Publishing, Magnetic Storage, , Videotext, Tele-text, CD-ROM .
- It helps Processing, Classification, Cataloguing, Indexing, Artificial Intelligence or Expert Systems of information.
- It retrieves Catalogues, Indexes, and Database Management System of Information off-line and online.
- It Communicates Information Lists, Bibliographies, Abstracts, Hardcopies, E-Mail, Electronic Document Delivery, Computer Conferencing, Teleconferencing etc.
- ICT removes Information Physical Weeding Magnetic Erasers, Optical Erasers, reuse the medium.

USE OF ICT IN LIBRARY AUTOMATION

Library plays an important role in the educational process. Higher education gives a totally different environment to students whose come for higher studies. Normally, In higher education the classes have a large number of students and students get less individual attention from the teachers. So, students have to depend much more on the self-study. The libraries are a place where the students can retrieve the supplement their class room teaching. The libraries are an integral part of teaching programme because the teaching in the classroom is depend more on library than the textbook. So, it is the duty of libraries that provide resources to its learners in very short time and fulfill the demands of students, teachers and researchers. It can be possible by library automation.

Automation of library service is imperative for efficiency and effective working of libraries. Usually, library automation can define as use of suitable machines to perform the functions of library automatically without many manual or mental efforts through people. Today library automation means digitization of library housekeeping operations by computerization. The common library housekeeping operations are acquisition control, serials control, cataloguing and circulation control. Although computers have a major role in library automation but telecommunication and reprographic technology have an equally important role because of the extent of support they offer. Several libraries have started using computers and Information Communication Technologies in organising their collections, housekeeping operations, processing, retrieval and dissemination of information to the end users. The use of ICTs is now visible in libraries that can be due to the drastic reduction or escalation of the cost of hardware and software and their easy availability in the markets with service support from the suppliers or venders.

WHAT IS LIBRARY AUTOMATION?

The automation may be defined as the technique or a process or a system operates automatically. According to the Encyclopedia of Information and Library Science: The automation is the technology concerned with a design and development of the process and systems that minimizes the necessity of human intervention in their operation. In simple sense we can say that library automation is a process of digitization of library operations that are of a routine and repetitive nature. It includes normally housekeeping operations such as acquisition, serial control, cataloguing, circulation, references and administration work. It may be conclude that computerization of all library operation is known as Library Automation.

AREAS OF LIBRARY AUTOMATION

The following are the areas of Library Automation:

Acquisition; Cataloguing and Indexing; Circulation; Serial Control; Library Administration and Management; On Line Public Access Catalogue; CDROM Databases

Searches; Resource sharing through Library; Network/INTERNET; Desktop Publishing (DTP); Office Automation; Information Retrieval.

SELECTION OF SOFTWARES FOR LIBRARY AUTOMATION

The Following are some library application software used for library automation and services: CDS/ISIS (Computerized documentation system/Integrated set of information system) LIBSYS; SANJAY; LIBRARIANS; TULIPS; NIRMALS; SOUL - Soft ware for university library; Library Suit; E-GRANTHALAYA; JOOMLA; KOHA and many more. Selection of library software should be done as per the need of individual library and cost of the software. Before purchase and installation of software, the library professionals should do comparative analysis of various functioning of software and then come to concrete decision for long term benefit of the library.

WHY NEED LIBRARY AUTOMATION?

Libraries are the heart centre of resources. The knowledge is increasing day by day on various subjects and level. There is a great demand to provide such information quickly on demand for which an efficient and accurate devices or tools are needed that is based on digitized process. Today library automation is the need of the time. Use of information communication technology in libraries has become inevitable and the emerging of a wide range of new technologies in order to satisfy changing diverse demands of users.

THE FOLLOWING FACTORS HIGHLIGHTED THE NECESSITY OF LIBRARY AUTOMATION

- Power to catch vast data and information
- Speedy processing of information
- Speedy retrieving of information
- Flexibility in information search;
- Standardization of library procedures
- High rate and better quality in performance
- Avoid or eliminates duplication of works
- Economic implications of latest information technology
- Overcome geographical and other barriers to communication
- Participation in network programming and resource sharing
- Facilitate interdisciplinary nature of research and information
- Improve the quality of existing services & to reduce routine time consuming clerical works.
- Give better bibliographic control at local, regional, national and international level.

BARRIERS OF LIBRARY AUTOMATION

The automation process and networking of libraries is very slow. There are so many factors that are responsible behind this. Some important barriers and the factors that are coming in the way of computerization of libraries:

- Lack of effective planning for ICT activities
- Inadequate Management support
- Inadequate Hardware
- Erratic power supply
- Delay in retrospective conversion of documents
- Delay in barcoding of documents
- Lack of IT trained staff Lack of willingness of staff
- Lack of consultancy service for Digital technology
- Lack of well accepted standard of Library Management Software
- Lack of less expensive standard of software
- Lack of Training facility
- Lack of policy for periodical evaluation and time bound completion og Digital technology projects
- Lack of up gradation of basic infrastructure

- Lack of awareness/hesitation in users of Digital technology
- Low priority to Digital technology
- Lack of control over Library Staff
- Lack of Motivation to staff
- Frequently change in Information Technology
- Inadequate financial resources
- Lack of proper guidelines and planning for automation of library activities
- Lack of well accepted and less expensive Standard software package
- Non-availability of IT trained personal
- Inadequate management support.
- Late implementation of library automation activities
- Non-availability of consultancy services
- Cumbersome purchase procedure for the acquisition of hardware and software
- Non-availability and under utilization of Campus LAN
- Non-availability of heavy-duty UPS and Generators in many libraries
- Resistance of library staff
- Absence of university librarian in many libraries
- Lack of adequate qualified professional staff.

FUTURE PLANS

The libraries should purchase adequate computers to install terminals for users and should to give Computerized SDI services, full text search, OPAC terminals to users. The libraries should set up LAN and installed computer for internet access and digitize all old question papers for users. We should hopeful about library automation, bar coding and digitalization and offering full OPAC, CAS, and SDI to users in near future.

CONCLUSION

ICT advancement will continue to open new path for library and information centers to provide efficient exhaustive information services and to connect with computer networks worldwide.

The information and communication technologies have created a "global village," where people can interact with others globally. ICT is an essential tool to manage and organize the information in proper way and to fulfill the diverse needs of the users.

ICT is changing the work of libraries and information centers. An increased number of users, a greater demand for library resources, an increase in the amount of resources being published, new electronic formats and sources, and the development of new cheaper computers are some of the reasons for the growing need for ICT in our country.

ICT is changing the work of libraries and information centers. All libraries have not made equal progress in library automation. All members as librarians, library professionals, library patrons, management and government should make effort to meet the changing demands of the users. The implementation of information communication technology in libraries is not achieving proper support from their parent body. Still some of the academic libraries in our country even do not have computer facilities and print media is a major source of information. Perhaps that day is not far away when library patron would realize the need of the ICT and start turning to the present day needs.

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Importance and Usage of Internet for Library and Information Professionals

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ABSTRACT

The paper focuses on the impact of lnternet on various library processes, services and products. It also emphasises the challenging role of librarians and information professionals in the present lnternet era. Today the lnternet has revolutionised the traditional library activities viz document acquisition, teclinical processing, circubtion, reference service, resource sharing, document delivery, etc. The paper also emphasises the crucial role of librarians and information professionals in designing and maintaining libraries' web page/website leading to increase in library efficiency.

INTRODUCTION

One of the most significant achievements in the informaticin and communication sector is the introduction of advanced communication network *i.e.,* the Internet, the technology connecting a computer with millioris of computers in the network. The lnternet today has become one of the most important mode of communication and its services are being exploited by people in every walk of life such as business, education, defence, medicine, *etc.* In the field of library and information science, the Internet has become one of the most popular and talked about subject.

In fact the library profession is one that has been mbst intenseiy affected by the challenges of lnternet and theWorld Wide Web (WWW). The shift from collection management to information management, from ownership to access, and the change in nature, boundaries and structure of information all call for a change in mind set of library professionals. The library professi0, nals need to position themselves as leaders not only in information field but also in the field of information technology. One can do it by information organisation and management on Internet and by designing and maintaining library website. Libraries can also project their collections and activities on the site and supplement their services by exploiting the Internet. The scope is unlimited, all that is required is selective and imaginative applications to library activities. Before we see the opportunities the lnternet and the WWW offer to the library and information professionals, it is better to have brief about what lnternet is.

WHAT IS INTERNET?

The term lnternet has been coined from a concept inter-networking trite denotes interaction between networking of computers. It is an umbrella under which different networks, small and big, freely exchange information across the globe. Internet, thus, can broadly be defined as worldwide network of computers communicating via an agreed upon protocol (rules for exchange of information). It provides access to the most diversified source of information hosted by individuals and various organisations worldwide on a vast network of servers. lnternet gives on to the world web, the and interconnections to thousands of servers created by various organisations, commercial establishments, industrial units, academic establishments, various groups, individuals. The web pages loaded on various servers provide variety of information in the form of text, graphics, animation, multimedia, etc. either free of cost or for a modest fee. The main characteristic of Internet and the WWW are:

- Users across the world can connect or access information irrespective of time and space factor.
- Point to point communication, rather than one to many broadcast communication.
- Provides access to large number of databases.

- The facility of hyper linking from one server to another by clicking on a highlighted word which enables the user to directly switch to another data source, on the other side of the world.
- Instant and interactive community creation on a global base.
- The lnternet therefore, is a vast electronic library made up of millions of pages of information stored in hundreds of thousands of linked computers at the globe. The Web has brought to the desk top, not only metadata sources like bibliographic databases and table of contents, but also full text of journals, preprints, technical reports, patents, courseware, *etc.*

NEED OF LIBRARYPROFESSIONALS IN THE INTERNET ERA

Librarians acting as custodians of information have gone through a dramatic change and frorn providing document to their clienteles have switched to be information providers. The role of librarian as information organiser and a navigator has gained importance in the lnternet era.

The library professionals need to focus and seize new opportunities and demonstrate how the tools of lnternet can be gainfully harnessed for improving library services. lnternet can be viewed as the biggest library in the world in which information is not properly and structured organised. Recent/current literature shows that the best search engines on the lnternet allows access to only approximately 30% of the information corresponding to sea & this underlines the inadequate methods used to access information despite the best avaitable search engines.' Moreover, there is no guarantee that same query expressed in the same language using various search engines will give same results. The inforrnation on the lnternet is stored in an unstructured way with innumerable databases, each having its own searching interface, also the volatile nature of .sites, lack af information on these sites will come in the way of accessing the Internet.' Taking into account the current and foreseeable increase in the number of documents or the web sites on the Internet, these issues will become the crucial problems in access to information It is therefore, important to seek a definition of catalogue, indexes and thesauri and help of library professional 'which would provide homogenous access to information and data. Internet has many other drawbacks like lack. of comprehensiveness, coverage, the inability to distinguish between popular material and research work, lack of controlled vocabulary and also a casual approach of the web page designer often makes the web databases more difficult to search. In addition to this, according to a latest report, a search engine covers only 15% of the total database available on the lnternet,' Librarians can play a greater role in identification, listing, and classifying inforrnation sources and providing systematic approach to accessing the required information. This way they can take rightful place as human agent abng side the search engine in searching the Internet. In the due course of time the librarians will have to develop new indexing methods and evaluation techniques to tap inforrnation from the lnternet and also establish the classification modes in a open way to allow for those addition of neirv categories of document that may differ frorn original priorities. Hence, the uncertainties raised by some people that lnternet may be a threat to library and library science profession is no longer true.

IMPORTANCE OF INTERNET TO LIBRARIES

Internet has become a part of library environment today. It has added a great value to the library and information services. According to Gryez, "with the expansion of lnternet a new class of electronic document has emerged, it was at once promising and attractive for its obvious advantage of speed and transmissibility and profoundly elusive and confounding to the library community because of its intangibility and malleability. Within the last ten years, the Internet has become global and ubiquitous. It reaches in hundreds of countries of all continents and is featured daily in the business sections of all

major news papers.a2 lnternet is playing an important role in transforming the library system and the way in which we view the library resources and the library services. With the help of web based library services in developed countries, users are attended round the clock. Internet provides links to various library sites, specializing in almost every topic and they can be accessed directly from any part of the world. As the libraries are going web based more and more libraries' are becoming accessible via libraries' web pages. With an internet connection, a student in any university of India can browse through the documents in computers of US National libraries or elsewhere in the globe. The Net therefore, provides instant access to billions of information sources which include books, reports, journals, video films, sound recording and wide variety of other sources. The library and information professionals have a vital role to play in organising the information and bridging the information gap. lnternet has created some of the following new and different service operations:

- By designing clearly organised, easily accessible and well published library web sites librarians can extend the traditional librarianship to the use of information technology and seize a leadership role in both fields.
- The libraries can initiate Bulletin Board Service which gives complete information regarding services, products, and various events organised by them.
- Ready reference service can be provided with greater speed and in much shorter time.
- Books and journals can be ordered online, technical processing of the documents too can be done without much effort.
- E-mail services can be used for delivering information to the users and communicating with the fellow information professionals.
- E- SDI services can be used for delivering information to the users. Support reference service through search of remote databases, exploiting the catalogue of other institutions, participation in inter-library loan (ILL), ordering books and journals, inter-library loan establishing home page, *etc.* Under these circumstances resource. Sharing and cooperative functioning of the libraries through lnternet has also become vital. The utilization of facilities by them largely depend on getting lnternet connection and exploiting its services and resources for providing better access to global information. The scope is unlimited or rather limited to the imagination of library professionals.

ROLE OF INTERNET IN DIS-CHANCING LIBRARY FUNCTIONS

Internet is playing an important role in discharging the functions of libraries. It is changing the ways; the librarians organise, manage and disseminate information. With more and more documents getting punished electronically and Internet resources growing at 18% a month, libraries of 21st century will have to shift towards electronic means of acquiring, processing and disseminating inforrnation.' Today all sorts of library services from membership registration to document delivery can be offered through the Internet. The trend is quite evident from the web sites of American Business School Libraries that are quite advanced in library and information services arena. Some of the important library services that can be offered through the lnternet are as ~O~OWS:

- **Acquisition of Documents:** Internet has made simple and speedy purchase of information sources/documents like books, iournais and electronic publications. A number of commercial databases are available for the librarians to exploit viz the CAB abstracts, Agricola, Medline, Agris, Biological Abstracts, Compendex, *etc.* of Dialog and BRS Information Technology. Most of the publishers and booksellers have their web sites on the lnternet and place their regular catalogue and leaflets of new publications'. Omen of the publishers of primary journals fike American Chemical Society, IEEE (USA), Elsevier Science publishers are providing their journals online. The IDRC, Canada is providing books on research and development that can be ordered online through the URL http://www.idrc.ca/bookhque. IDRC also publishes its best reports online which are available at web site http://www.idrc.ca. CAB Publishing

has recently launched a series of subject specific online communities catering to the needs of librarians and researchers, each community will feature comprehensive abstract databases with 25 years archive. Examples of some of the useful set of links available through the lnternet for acquisition are:

- **Technical Processing/ Classification and Cataloguing:** Preparing standard catalogue without much effort has become possible due to lnternet and the (WWW). Librarians can check the catalogues of other libraries like that of Library of Congress and confirm the information required for a record which can be easily ascertained from the original document. The library professionals can also access lnternet resources for verification and downloading bibliographical information from other institutions. OPACs via lnternet have become a popular source of bibliographic information. Libraries can use of other institutions by OPACs to get information they need to organise knowledge. Databases of bibliographic utilities will become more comprehensive source of information than has been so far possible by their present catalogues. With advance information retrieval facilities, the libraries in future will have added value by using catalogue of journal articles. Through Internet, the libraries can also provide bibliographical databases via OPACs from libraries of other institutions worldwide. The OPACs may be searched from a terminal within the originating library or from a terminal located at a remote place. Some of the examples of online catalogues are:

Circulation: The lnternet has made the circulation of in house document much easier. After the technical processing, the new books documents can be placed in the OPAC on the day of acquisition itself and readers with lnternet connection at home or at university can browse and reserve the books sitting right at their offices or at home, within seconds after arrival of the book in the library.

Through Internet, the libraries can also provide bibliographical databases via OPACs from libraries of other institutions world wide. The OPACs may be searched from a terminal within the originating library or from a terminal located at a remote place. Some of the examples of online catalogues are:

- Library of Congress. locis.loc.gov
- Catalogues-Catalogue Guide to several OPACs ftp:funet.fi path:/pus/doc/library
- Library, University of Southampton. http://www.soton.ac.uk/library
- University Library, University of Newcastle, The electronic documents required by the readers can also be supplied on demand through the network.

DESIGNING AND MAINTAINING LIBRARY WEB SITE

Libraries can play an important role in disseminating information by creating their *web* site. Through their sites they can inform about various services, products, events, and courses offered by them.

For academic librarians the most important users includes the faculty, students and other librarians. However, depending on the type of library the primary audience may vary. The most important point for libraries in designing a web site is to consider primary audience and provide information relevant to their needs not readily available elsewhere. Since most information is generally available in other sites, the librarians role get emphasized in organizing the information in their web pages by providing links utility as they save time over the print volume and money over the online databases. In essence, combining information or links to other information in ways not previously done can add value to the information and consequently to the library web site. To provide easy access to the libraries' websites the librarians need to heed on some of the following basic rules."

- **Subject-Specific URL:** The Uniform Resource Locator (URL) of the website should be related to the subject\ content, easy to remember.
- **File Size:** The files should be short to ensure fast loading. The web pages often load slowly because the file is too large or contain too many pages in this case the file may be split into multiple files to give easy access to the file.

- **Clarity of Information:** The information in the web pages should be categorized for clarity using headings, breaks, paragraphs, etc. which can be done by using HTML codes. To ensure the audience to quickly ascertain what specific information the library web pages provide, the pages must be provided with the explanatory notes.
- **Information about Content:** The librarians also need to provide brief, clear and informative statement regarding the content of their web pages in the web site so that effective hyperlink can be provided. Librarians while designing their web pages should try to provide as much original material as possible. Although web pages provide list of hypertext link to remote or documents located on other servers can be dangerous as servers may crash or there may be a change of address. Under this situation the users may receive 'file not found'. If there are too many concurrent users on the distant server the audience will have to wait longer to access the file.
- **Interactive Sites:** Librarians should also provide mechanisms for communicating with their users and moving them between their web pages, generally when individuals read books they often have question such as when it was written how to contact the authors, whether new editions are forthcoming or where other similar books are located. This can be done by providing the hypertext links. Finally the library professionals need to effectively publicize their web site through forums to which the users pay particular attention. Newsletter and electronic discussion groups may be used for this purpose. For publicising the web site to diverse audience users, librarians can register their web sites URL with major search engines like Yahoo, Lycos, etc. and providing brief descriptions of their contents.

CONCLUSION

The lnternet has thus integrated nearly all aspects of the library activities, the librarians can now use the Internet for exploiting the catalogue of the other institutions, ordering books and journals online, participate in ILL, use e-mail, and discuss through list serves, support reference service through remote databases and most important of all establish library/home pages to project their collection and services on the site. The scope is only limited to the imagination of library professionals. All that is required by the today's professionals is a thorough understanding of change in concept of librarianship and psychological willingness to look upon the lnternet and the WWW as an opportunity and respond to the challenges of information resource management and information infrastructure development for harnessing the benefit of the much talked about lnternet technology in context of the libraries.

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Management of Library in New Digital Environment

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ABSTRACT

Traditionally library was the only organization that was collecting, organizing and preserving information and knowledge for the society. In the electronic environment concept and nature of library has totally changed, it has brought change in many parameters including collection development policy, form of user needs, medium of information storage, processing and retrieval system, user expectations and behavior etc. Today's users do not have time to sit in the library and refer the library resources to fulfill their information needs. This generation is very fast generations they want everything on the one click of mouse. For the library professionals to bridge the gap between traditional era and electronic era are become very challenging as well as very important task, because this is the question of our survival. New roles and duties have been assigned to librarians as content providers, search strategies, digital cataloguers, information scientists / analysts, knowledge managers and so on. Knowledge of all the tools relating to resource description and discovery, a thorough knowledge of the established metadata standards, an understanding of the existing and new markup languages may be some of the core areas come under his /her purview. In the present paper author discussed three major issues of library system in the digital era. Digitization of library materials, building of e-collection and information literacy in the electronic era.

Keywords: *E-resource Management, Information literacy, Digital library, Digitization, Collection Development*

Information and communication technology has become vital force in the present *era;* it has become indispensable part of human life. Each and every field of civilized society has been affected by this change. Library and information science is also one of the area were sea changes has been occurred because of information technology. Right from collection, organization and dissemination of information to users need, their change pattern of referring library, expectation from the library professional has changed drastically due to the ICT. Traditionally library was the only place that was collecting, organizing and preserving information and knowledge. It is an accepted fact that integral and positive development of any society is highly dependent on its libraries ranging from, school libraries, college libraries, university libraries, public libraries and research and other special libraries (Francis and Sathian 2014).

In the electronic environment concept and nature of library has totally changed, it has brought change in many parameters including collection development policy, form of user needs, medium of information storage, processing and retrieval system, user expectations and behavior *etc.* ICT also helps library professionals to achieve five principals of library science given by S. R. Ranganathan – Books are for use, every book has his or her user, every reader has his or her book, and the most important save the time of user.

Here technology not only saving the time of user however it has also helped to save the time of library staff. The contemporary times have witnessed a paradigm shift in the information generation, publishing, distribution, and access and archiving. Print, that monopolized as an effective medium for nearly four centuries have been superseded by multimedia. Currently library and information centers are in the forefront of digital resource management by extracting and integrating the technologies from diverse fields. Automation of in – house operations, networking of institutions and consortia development processes are gaining momentum. Various tools and techniques have been developed so far to analyze, condense, organize and provide information to the patrons.

Emphasis is laid on content management rather than the tedious process of collection management.

In this scenario role of library and library professionals become more challenging. They have to establish themselves at par in this electronic scenario by managing library and library resources more effectively. Today's users do not have time to sit in the library and refer the library resources to fulfill their information needs, because they want us to work 24*7 and provide them accurate and relevant information in time. This generation is very fast generations they want everything on the one click of mouse. For the library professionals to bridge the gap between traditional era and electronic era are become very challenging as well as very important task, because this is the question of our survival. Libraries in the twenty – first century are not mere huge repositories of secluded physical elements, but an entity having ubiquitous and perpetual access to a wide variety of information resources in multiple forms and formats, ownership of resources is no longer being so important and surpassed by the accessibility concerns. Traditional cataloging and classification shall be replaced by new tools and techniques of content analysis and management. Traditionally librarian is identified as a person located in the library building carrying out the tasks like acquiring, organizing, preserving the printed materials besides helping the readers in locating the information needed by them. This picture has been changed drastically in the last two decades mainly because of the spread and availability of electronic content in large quantities enabled by information and communication technologies.

Today, academic research provides the most – impressive examples of how higher education is exploiting information technology to simplify the document – production pipeline, by publishing their work on internet. Cutting out the traditional publisher intermediary not only dramatically speed up the rate at which new ideas get into "print"; it also cuts publication costs and provides a direct link to readers, who can access the papers from anywhere on the internet as soon as they are available. If libraries existed only to store copies of books and other physical artifacts, and to share them with members of nearby communities, then the preceding examples might suggest that such institutions are in danger of extinction.

New roles and duties have been assigned to librarians as content providers, search strategies, digital cataloguers, information scientists / analysts, knowledge managers and so on. Knowledge of all the tools relating to resource description and discovery, a thorough knowledge of the established metadata standards, an understanding of the existing and new markup languages may be some of the core areas come under his /her purview. Automation of in – house operations, digitization of collection and developing networked information systems demand the intervention of librarians with rich knowledge of metadata principles. In the contemporary era librarians need to give sufficient thought to three major issues of library system with other important issues is Digitization of library materials, building of e-collection and information literacy in electronic *era*.

DIGITIZATION OF LIBRARY MATERIALS

Digital conversion of library materials has advanced rapidly in recent years, prompting some casual observers to believe that everything of importance can be found on the World Wide Web in digital form. But instant access to the entire world's wisdom is still more than a mouse click away. It is important to resist the urge to digitize everything in a library or archival collection and destroy the originals in a mad rush to save space or occupy a place on the cutting edge. Digitization is an excellent way of providing access to library materials, but the technology, in its current state of development, is not adequate for archival preservation. Digitization has proven to be possible for nearly every format and medium presently held by libraries, from maps to manuscripts, and moving images to musical recordings. The use of hardware and software for capturing an item

and converting it into bits and bytes, matched by quickly developing set of practices for describing and retrieving digital objects is giving form to talk of a "library without walls." But such a virtual library has a very real price. Managers of cultural institutions and those responsible for policy matters related to digitization often find themselves struggling not only to understand the new technologies, but also, and more importantly, to grasp the implications of those technologies and to understand what digitization of their collections means for their institution, its patrons, and the public." (Malhotra, 2007).

COLLECTION DEVELOPMENT–E-RESOURCES

The continuous growth of electronic resources has made librarians job extremely challenging, includes decision of selection of correct e-resources from the varied electronic packages offered from different vendors, decision of subscription policy or licensing, access points, utilization and approval of budget for subscribing e-resources and most importantly end user satisfaction.

The factors that are specific to the e-resources and do not apply to the traditional print world include authentication, access, usage, administration and more. Print and electronic resources differ in a manner in which they are acquired, access and licensed (Sadeh, T. and Ellingsen, M. 2005).

The use of ICTs in libraries world-wide provides the fastest and most efficient capabilities and flexibilities for acquiring, processing, sorting, storing, retrieving, dissemination, and utilization of information. In the developed world *for example*, many libraries have access to computer communication such as OCLC (Online Computer Library Center) of the University of Ohio, USA. OCLC avails users to the resources of at least 38,000 libraries across the world using about 75 databases including MARC records with full text access to 7500 journals. This is no doubt a window to the world of information and users can access this gateway from their libraries or remotely (Abbas 2010). There are also other databases accessible across the world that linked several libraries such as; MEDLARS, ERIC, AGRIS, AGRICOLA, EBSCOHOST, SABINET, PRQUEST, SHODHGANGA *etc*.

INFORMATION LITERACY

The Concept of information literacy, used primarily in the library and information studies field, and rooted in the concepts of library instruction and bibliographic instruction, Today's world is into an information society, where information and knowledge resources are considered as critical ingredient for development. But problem is with the effective and efficient use, consumption and evaluation of information resources, Here information literacy can play a vital role in educating the users of libraries on various information and documentary resources, where to start searching of information, what where and how to access them, how to assess and compare retrieved information, how to communicate their information or findings to the general masses and experts, and so on. Librarians must bridge the gap between the technology and the end-user in a manner that enables the end-user effectively and efficiently to use available technology. In order to accomplish this proactive role, librarians must be conversant with the technology, provide user education and assist users in addressing information needs and evaluating the relevance of information retrieved. To achieve these ends, librarians must become educators and not merely custodians of the knowledge of the world.

NEED FOR INFORMATION LITERACY

The need to evaluate the credibility of information is nothing new; most learners could expect to deal with some carefully selected collections of reference materials in the libraries, as well as a fairly limited range of widely accepted authoritative texts in the teaching learning process. However, since anyone can make a Web page, for example, how can you tell if the information is reliable or not? A critical point about using the Internet is that individuals posting information aren't required to pass through traditional

editorial constraints or undergo any kind of fact-checking required in conventional published print media (Literacy Update 1997). To be literate we should know the proper definition or term which can be used to express specific subjects or information in a clear way. Also, literacy requires analyzing of available data and information in a particular way to sort out and find the most appropriate meaning or most relevant information. Then being able to express or explain your subject in a better or more simple, easily understood way. Information literacy is a lifelong learning process, you should verify your information from a reliable source so that you may be assured of the most reliable information that is available to you, which can be used at a later date for reference. Incomplete or unauthentic information is as good as no information. Within today's information society, the most important learning outcome for all students is their being able to function as independent lifelong learners.

CONCLUSION

Advances in information and communication technologies (ICTs), has resulted in coining various terms and nomenclatures for the practitioners (library professional) and services provided by the practitioners. Services such as Selective Dissemination of Information (SDI); Current Awareness Services (CAS); Information and Knowledge Management (I&KM) *etc.* were common, introduced and further enhanced using ICTs by the practitioners in the profession who are often called digital librarians, system librarians or information managers. These unprecedented changes had impacted positively on the quality and quantity of services provided by libraries and also transformed their environment in to "borderless" and completely "inter accessible" thereby creating high level of utilization and maximizes their (libraries) potentials for development and increase in information resources to cater for the dynamic information need of their clientele (Abbas 2010). The continuous adoption and adaption of sophisticated and High Definition (HD) equipment and facilities in libraries by developed nations of the world has made it possible and easier to create a highly responsive library system and environment in order to supplement and complement their knowledge-based and information driven economy.

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Need and Importance of Internet in Resource Sharing

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ABSTRACT

Today we live in ICT era, digital era or in the modern 21st century where from the early morning to late night, we are using technological instruments around us. Library is also one of the major centers at where various sources and services are being explored for its users with the use of innovative technological development. Internet is one of the strong medium through which libraries are growing rapidly, its usage is increasing, and off course resource sharing is became very popular in the LIS profession as well in the user community of library. This paper throws some light on the internet through which how various kinds of resources are being shared and satisfied the need of user.

Keywords: *Internet, www, resource sharing, emerging technology, networking.*

INTRODUCTION

Now in a days, the information environment is being changed. It is becoming digital instead of physical rather we can say that most of the users are using digital information to satisfy their need. The invention of internet is a blessing invention in an academic world.One of the most significant achievements in the information sector is the introduction of IT. The advance communication network means internet, is the technology who connects a computer with millions of other computer in the network. Simply network of networks is internet. Libraries are enriched using internet technology in the present ICT scenario.

INTERNET

According to Internet Society, "The Internet is at once a world-wide broadcasting capability, a mechanism for information dissemination, and a medium for collaboration and interaction between individuals and their computers without regard for geographic location." Thus, internet is a worldwide communication system which links together thousands of computers. It is a network of networks which communicate among themselves using a single set of software which are generally known as protocols. In internet environment such sets are called TCP/IP (Transmission Control Protocol/Internet Protocol). The IP address is a unique set of numbers (such as 202.33.17.100) that defines the computer location. WWW (World Wide Web) made the internet usage more effectively and popular among the users. It is everything that goes over those wires from one computer to another: the email itself, web sites, messenger (such as Yahoo Messenger or MSN Messenger), using whatsapp, phone calls on Skype, messages from an ATM to a bank *etc.*

NEED OF INTERNET

As we know that in today's world we cannot live without internet to connect the world of information and knowledge. For the libraries, it is very essential tool to share the knowledge. Here are some points which shows the need of internet.

- It saves the time of user
- Internet provides an interactive environment for information handling
- User friendly approach
- At a time choice is available to get information in a common topic
- It enables information to be delivered to the desktop of the user

- Now it is available not only in desk top but in laptop and mobile also with 24×7 hours connectivity
- Hypertext linking and navigation features
- Reduced time for publishing, accessing and in resource sharing
- Saves the physical space.
- Availability of public domain information
- Availability of consortium
- Cloud computing is possible for resource sharing of library sources
- E-resources have further facilitated information exchange through internet
- Networking libraries can be accessible
- Consortium benefit
- Open Sources can be available
- Free e-books, e-journals, e-content, video lectures (like NPTEL), are easily accessible
- to satisfy all the needs of its clientele
- to develop the concept of Library Cooperation
- Library Cooperation remained confined to inter-library loan.

IMPORTANCE OF INTERNET

Dr. Ranganathan says in 1930 in his *fifth laws of library science* that library is a goring organism which is truly applicable in the age of internet. We may say that "Internet is a growing organism". The importance of internet in the libraries is very effective and increasing day by day with the emergence of innovation ICT tools and techniques. Here are the some factors which shows the importance of internet for resource sharing in the libraries.

- It provides one to many communication
- End users of information can reach the information producer more easily and directly
- One can share their information free of cost, so it is very cost effective
- In the age of digital information, internet is a powerful tool to share any kind of information through which user can get their required information in the tips of their figure
- Users can find multiple resources of required information
- It promotes the network culture
- Communication became faster through email, ftp, telnet, gopher, blog *etc.*
- Social media like face book, twitter, blog, whatsappetc. plays a crucial role to share the information.
- e-marketing tools plays the vital role in resource sharing of information
- Open source software like for automation and institutional repository has changed the scenario of library. foreg. Newgenlib, KOHA, Dspace etc.
- Such local, national and International networks have facilitated resource sharing with the advent of internet.For eg. DELNET, INFLIBNET, MANLIBNET *etc.*
- User interaction and ILL is applicable
- Publication materials are easily available in digital forms.
- Information retrieval is fast and accurate
- Information exchange of all in-house library activities which is already computerized.
- Sharing of online journals may reduce the cost
- Searching or say Goggling in which user can search in Yahoo, google, altavista, etc.
- With the use of online forum of different library profession groups which is communicate through emails only; we can became more knowledgeable and plenty of useful information may share with each other for user community as well library professionals. foreg. lisforum, mlosc, younglibrarians, corporatelibrns, lispp.google groups.com *etc.*

INTERNET SERVICES

The internet has enabled global connectivity of computers and the development of various tools and techniques for networked information provision and access. The basic utilization tools like email, WWW, FTP etc. There is a various services through which we can share our resources vary easily which are as under. Email: One-to-one, one to many messaging service, Store and forward. FTP: (File Transfer Protocol): It transfers files (text, software, data) from one computer to another. It is a connection oriented protocol. Navigation Tools: No need to know IP numbers/domain names. It is aninformation discovery tools, client-server tools built using the basic service. Telnet (Remote Login): Connection oriented and interactive information access like databases. Gopher: Menubased access to Internet sources. It can connect to other gopher/telnet services. WWW: Hypermedia based navigation service. Hypertext links to information and sources. Multimedia integration is the key factor for this. Also the fastest and growing navigation tool is a unique feature in www. Search Tools:Directories and guides. Itenables identification of information sources by keyword based searching and browsing.

BENEFITS

- The "internet" is a huge library, as well as a world-wide message board, telephone network, and publishing medium also. It is open 24x7 hours a day and we can find anything and from anywherewe want from it.
- Current events and blogs, information about almost any subject is available in depth and up to date. This is incredibly valuable for every subject you can imagine. Almost every college and government research organization is "on the web", along with libraries, educational institutions, associations, and many commercial directories and sites.
- We can communicate easily with our staff, supporters, donors and parties. We can communicate through letters, phone calls, faxes, and meetings. Such additional ways like email, messenger, web pages, mail lists, web site message boards "Publishing" our message to the world. Some great ways like books, journals, brochures, press releases, workshops, conferences, lectures can be available in internet. Also we can explore our website with conference proceedings, PDF files of our publications, blogs, newsfeeds etc. for the benefit of all.
- User support is easily possible with the use of internet. Nothing is better than people with people, interviews, workshops, conferences, classes. We can help them when we aren't there: email, messenger, web pages, mail lists, website message boards. With video-conferencing, podcasting and other great web tools, we can even have workshops and classes online. Now, smart classes, mobile learning, e-learning concepts is applicable with the use of internet in many institutions.
- To do our research work from various sources like news, issues, papers and literature relevant to our cause. Some great ways to find out from books, magazines, journals, papers, websites, search engines to find materials world-wide, mail lists *etc.* and also from many useful websites one can do research work with proper citation which is possible with the meaningful use of internet.
- Increase credibility, exposure, greater quality and quantity inquires, batter service inquiries, increase in donations and sales, increase to access in our information which we have put in websites or blogs through internet.
- We may save our printing cost of brochures, pamphlets, internal correspondence and sharing of routine information though internet.
- We may reduce phone usage, courier expanses, postage costs *etc.*
- We can increase our green rating with the maximum use of non print media for our communication and can save the tree and environment.

Above services is benefited in many ways if used by us in proper way. If we appreciate the richness of the Web and the Internet, and get the benefits our self, then we will be better able to provide batter internet services to our end users and able to share the maximum resources to them. We don't have to know how to do those technical things our self — but if we know what is useful, then we will be able to direct our faculty as well students.

DRAWBACKS

Through internet, we can live very close with the people of world. We can get the information within fraction of second. We can search our required information in a thousands of way. We may explore our resources in the world. We can do publicity of our information, our items, our ideas, our innovations, our activities to the rest of world. With the use of social media and e-marketing tools we can stay in limelight with our nears and dears and explore our knowledge. No doubt, internet is used in Education, Publishing, shopping, advertising, financial and governmental sectors, science and technology, for careers building etc but, still there is some drawbacks of internet which may be as under.

- Internet is widely used in all over the world. But we cannot trust 100% on the information provided from it as there is not a rule to check it out its truthfulness.
- Sometime it happens that we cannot able to find our required information from the world of information, so there is a need of searching skills, otherwise we may waste our time.
- Hackers may hack our useful data through internet and misuse it.
- Crime may take place with the adverse use of internet. We see the misuse of Facebook and whatsapp in which many fake information and many unethical matters may happens.
- New generation specially tin agers and children's are wasting their times in useless surfing and in games.
- Plagiarism may occur with the wrong use of internet.
- Violation of intellectual property rights is also a big issue.
- Low speed of connectivity may stop our important work which costs very high in case of 100% dependence on internet and computer.
- Unnecessary advertisements are disturbing in regular intervals which occupy the space of computer and waste our time also.

CONCLUSION

With the emergence of ICT, print media is now being used very less in libraries compare to digital resources. Library automation and digitization is increasing day by day. Most of us have our own websites as well as current events and blogs, information about almost any subject is available in depth and up to date in internet. This is incredibly valuable for every one of us. Almost every institution, college and government research organization is on the Internet, along with libraries, educational institutions, associations, and many commercial directories and sites are being access through their websites which ultimately one kind of resource sharing of knowledge. Each and everywhere we may find the use of internet, so it is very essential to use the internet to survive in the current academic world. Library plays the crucial role to fulfill such useful information with the optimum use of internet and provides the needy information and resources in such a meaningful way to the users which saves the efforts, cost and time of the users and increased the credibility of library and librarians. As most of the academic librariesare automated and using modern ICT tools and techniques, the entire resources of libraries can be available to each other for the resource sharing purpose which can plays vital role in the overall development of users.In the end, I would like to say that if we use the internet ethically, smartly and with proper intention, we can really progress ourselves, our students and

faculties surrounding with us and can take proud also as a librarian to be a part to build a Shining India and Digital India which is the dream of our Prime Minster Shree NarendraModi.

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Use of Mobile Technology as a New Emerging Phase in Automated Academic Libraries: An Overview

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INTRODUCTION

In last few decades modern libraries had been creating and settling themselves highly multifaceted and also effectively stable in professional world. In this technological era everything began to change, telecommunication services and computers had begun to come in to extensive use. Thus librarians and information scientists are thoughtfully interested in how wireless and mobile technology can enhance the way users learn and cooperate with library professionals. These mobile learning (m-learning) technologies and wireless transmission can potentially provide significant opportunities for learning and research.

Mobile computing is transforming how people look for, collect and interact with information on a daily basis. In just a last few years smart phone ownership has skyrocketed and popular and smart use of e-readers has been progressively on the rise. These advanced mobile tools make available convenient, on the spot access to the world of information, across boundaries of subject and discipline. As per Dr. Rangnathan's five law of library science, 4th and 5th law respectively states "Save the time of users" and "Library is a growing organism" indicate that libraries should adapt all new technologies for their services in this modern era. Now a day's libraries are fully engaged in the process of adapting to increased demand for e-collection, e-resources. In academic libraries most of library users are busy with their teaching, learning and research activities. For those use of mobile library services are very helpful for them. These are challenging times for libraries to take on new technological initiatives, yet librarians across the country and world widely are seeking creative solution to providing mobile library services.

DEFINITIONS

- The definition of Automation is, "to apply the principles of automation to (a mechanical process, office, *etc.* and Automated means to install automatic procedures as for manufacturing or servicing, follows or utilize the principle of automation"[1].
- We also define automation as, "the use of machines and technology to make processes run on their own without manpower or any system or method resembling this in using self-operating equipment, electronic devices, *etc.* to replace human beings in doing routine or repetitive work".[2]
- The definition of mobile is, "a. Capable of moving or of being moved readily from place to place: *a mobile organism; a mobile missile system.*"[3]

MOBILE AND LIBRARY

Before the advent of Information and communication Technologies (ICTs), communication in library was done conventionally through books, newspapers, microforms, slides etc. The use of ICTs in library system can bring more efficiency to library services. With the continuous development in satellite based electronic system mobile phones took place of telephones. Global System Mobile Communication (GSM) has changed the daily lives of individuals. This has resulted to a change in retrieval process of information and it has also influenced the way of disseminating the information. In addition the emergence of smart phone has completely changed the perspective of gathering information and dispersing it. Once Library service was only confined to giving and taking books has now become a warehouse of information. Due to this a vast change has taken place in library operations. In coming years mobile-phone

learning will be effectively and extensively used or accepted for learning purposes by educators and academicians in India. Now in "Make in India Mission', the goal of modern digital. Libraries in India are to support and access to information through mobile devices to support flexible learning space and in development of research which can bring the information on the palms of the users that too without cables and wires.

ACADEMIC LIBRARIES AND MOBILE USERS

We know that advancement has some limitations. This is also applicable to the use of mobile. There is a big debate amongst the educationalist and technologists about the use of mobile whether a boon or a curse. In India many faculty and other educationalist thought that lots of students are wasting their time with technology, especially concerns with mobiles, smart phones etc. and that their use of technology may even obstruct their learning. Sometimes this is true but we all who are associated with educational field should have to teach and guide them what is the right way to use these types of new technology which is our responsibility too. However, some research sponsored by the UK's Joint Information System Committee (JISC) reported that students who are effective learners in the digital environment.

- Use mobile phones, laptops and PDAs to support their learning.
- Use software to create, manipulate and present content.

INTEGRATING ACADEMIC LIBRARY RESOURCES WITH MOBILE APPS

Mobile apps are pieces of software produced by third parties such as businesses or services that people can download onto their smart iphones. Which are typically operated by the owner of the mobile operating system, such as the Apple App Store, Google Play, Windows Phone Store, and BlackBerry App World. Some apps are free, while others must be bought.

Many information resources and portals have created mobile applications as powerful gateways to their online resources. There are variety of mobile Apps for research, reading, writing and other essential tools for studying on the go which can be downloaded from Apple App store or Google Play. Some apps are free, while others are paid. In case of proprietary databases, only institutional library subscribers can access databases using Mobile Apps or mobile browsers.

The following are some of the mobile apps.

- **Library Thing scanner (Free):** Library Thing scanner uses the Barcode scanner app to read the ISBN barcode from a book. The web browser then opens at the Library Thing add book page.
- **Book catalogue (Free):** An open source book cataloguing application. Books can be added manually, by ISBN, or barcode.
- **Codex (Free):** This is an app which helps manage and catalogue, your books library. You can organize your books, manage your book ' loans and even create a book wish list to help you find the best prices for the books you wish to buy /read.
- **World Cat (Free), for Apple (OS):** is a union catalog that itemizes the collections of 72,000 libraries in 170 countries and territories which participate in the Online Computer Library Center (OCLC) global cooperative. It is built and maintained collectively by the participating libraries.   .   .
- **MyBookDroid - books library (Free):** MyBookDroid helps you to find and keep track of books you have read, books you want to VH read/buy, the books you are reading and the books you have borrowed.
- **Barcode Scanner (Free):** Scan barcodes on products then look up prices and reviews. You can also scan Data Matrix and QR Codes' containing URLs, contact info, *etc.*

CATEGORY

Writing:

- **Easy Bib (Free):** Easily create MLA, APA, and Chicago style citations by scanning a book bar code or entering the title. Citations can 4 be exported to EasyBib.com where users can automatically generate bibliographies.
- **Mindiet (Free):** Enter ideas, topics, and concepts into intuitive visual maps that help you quickly organize your thoughts and outline projects.
- **My MLA (Paid):** Mobile app for the MLA Handbook for Writers of Research Papers (7th ed.), offering examples for the general format of MLA research papers, in-text citations, endnotes/footnotes, and works cited.

Reference

- **Dictionarv.com (Free):** Search over one million definitions, synonyms, antonyms without an internet connection. Includes voice Search, audio pronunciation, and word origin and history.
- **Google (Free):** Search the web with the Google search app. The app includes enhanced features such as Voice Search, Search Nearby, and Google Goggles (visual search engine that allows you to snap a photo of a product, book, painting, or landmark to find more information).
- **Google Translate (Free):** Translate words and phrases in over 50 languages. For most languages, you can speak your phrases and hear the corresponding translations.
- **Merriam-Webster Dictionary (Free):** Use voice search to look up definitions in Merriam-Webster's Collegiate Dictionary.
- **Wikipanion (Free):** Mobile app for searching the popular online encyclopedia, Wikipedia. Includes advanced features such as table of contents browsing, history, bookmarking, and in-page searching.
- **JSSRN (Free for Apple iOS):** Search over 260,000 research papers in the social sciences and humanities available from the open access repository of the Social Science Research Network (SSRN).
- **Wolfram Alpha (Paid):** Computational knowledge engine covering a variety of subject areas and offering everything from definitions, biographies, and statistics to mathematical formulas, chemical properties, and stock quotes.
- **World Atlas by National Geographic (Paid):** Detailed interactive world maps.
- **World Factbook 2011 (Paid)** information on over 250 countries around the world including natural resources, industries, GDP, religion, ethnic groups, legal system and much more.

Proprietary Databases

- **EBSCOhost:** Search for articles across all EBSCOhost databases including Academic Search Premier, Business Source Premier, CINAHL, ERIC, and many more. Users on authenticated devices can select and search a wide variety of and figures and graphs from articles as images.
- **SciVerseScienceDirect:** Access to Abstracts and full text of scholarly literature in science, technology, and medicine.
- **SpringerLink:** Abstracts and full text of scholarly articles and book chapters covering every area of science, technology and medicines.
- **Nature Publishing Group:** Nature Journal App is available free for ipads, iphones through Apple App store, while Mobile-optimized website is available for iPad, iPhone, iPod touch, Android devices, Blackberry (latest model), Windows 7 devices and most other tablets.
- **Ebrary:** ebrary'siOS and Android apps, researchers can access content on the ebrary platform, including their institution's eBooks from leading publishers and documents uploaded by librarians with DASH.

- **Emerald insight:** Provides access to Journals through Mobile Apps for Apple iOS and designed mobile browser for use on any mobile device with a web browser, including Apple iOS, Android, Blackberry and other platforms

Reading

- **Free Book Reader (Free):** Book Reader offers free access to thousands of books in all genres and access to multiple book networks .
- **Zinio Magazine Reader (Free):** offers thousand of digital magazines from around the world in a newsstand. It offers access to magazine offline and on the go.
- **Numilog eBook Reader (Free):** Download thousands of eBooks on your Android Smartphone or tablet amongst the largest French eBooks catalog.
- **Over Drive Media Console (Free):** allows you to search for, download, and enjoy e-books and audio books from your public, school or college Library.
- **Amazon Kindle (Free):** Amazon Kindle is a series of e-book readers designed. Amazon Kindle devices enable users to shop for. download, browse, and read e-books, newspapers, magazines, blogs, and other digital media via wireless networking.
- **News hunt (Free):** provides access to regional newspapers.
- **IndiaNewspaper (Free):** Provides access to major Indian Newspapers, magazines and news sites online.
- **BookMobile (Free):** Build your personal library at home or in the store.

MOBILE BASED DIFFERENT SERVICES

Mobile users are using the facilities on mobile phones like SMS, instant messaging, web browsing, e-mail effortlessly and does not require orientation and training to communicate. Most of the features are pre-installed on mobile devices or option for data plan packages Library offers such type of services like.

- Email
- Text messaging
- Instant Messaging
- Network media sharing
- OPAC
- Search Multi media Audio books
- E-Books
- Voice Search
- Audio Books
- Blogging
- RSS Feeds
- Browser news
- Micro Blogging
- Mobile Quick picks
- IPhones only Applications
- IPhones Quick picks *etc.*

Personalised service helps users to interact with library staff to seek specific information or reference away from library.

BENEFITS OF THE MOBILE WEB TO RESEARCHERS

Positive Impacts Use of the Internet has become a part of life of every student and a mean to search for the information as and when it is needed. These days, use of mobile phones for internet purposes has become a routine and number of mobile consumer accessing the Internet is surpassing fixed line internet users. Education The notion and value of education has been exceptional and noble since day one in human history and the efforts to improve the quality of education has been appreciated throughout. With the growing demand of the Internet and high speed browsing the introduction of Smartphone's has taken a further step forward in the world of accessing the information. Researcher

learners and students get educational benefits within their available time irrespective to their location.

In addition to or in place of mobile applications, some companies and organizations also develop mobile versions of their Web site that are better optimized for viewing on mobile devices. Following are some Mobile Website.

- **Encyclopedia Britannica Mobile:** Offers a search box and a list of suggested searches. Results **Mohan Lal Vishwakarma:** IJECS Volume 2 Issue 6 June, 2013 Page No. 1799-*1805* Page 1804 full-text entries with enlargeable images.
- **Medline Plus Mobile:** Produced by the U.S. National Library of Medicine, Medline Plus Mobile provides information about specific diseases, conditions, and wellness issues. The site also contains prescription drug information, medical dictionary, and current health news. Access: http://m.medlineplus.gov.
- **World Cat Mobile:** Search the World Cat catalogue for books, movies, music, games, and more. Results include items available at local libraries.

Following are some examples of Mobile Website.

- **Adelphi University Libraries Mobile (AU2GO):** Offers library hours, library staff contact information, a link to the library's blog "bibliography".
- **Albertsons Library:** Boise State University. Simple text navigation offers various ways to find the library and its contents. An interesting feature is the inclusion of a "Find in Our Building" category, which lists call number locations and popular locations such as study rooms and computers, each linked to an animated floor map. Access: http://library.boisestate.edu/M.
- **University of California Riverside Libraries:** Glossy icons designate many useful categories, including research guides, library workshops, and links to the library's social media profiles. Access: http://m.library.ucr.edu,
- **Virginia Tech University Libraries:** A simple but effective layout offers important information, such as library hours, contact information, catalogue search, and library maps. Access: http://m.lib.vt.edu/.

RESTRICTIONS OF MOBILE WEB

We know that technologies have always some restrictions. In majority conditions we face same type of limitations of technology.

- Slow connectivity: to overcome this, mobile web is offering content as downloadable modules that can be transferred to the mobile device using Bluetooth or a USB data cable.
- Data cost: data cost are high.
- Multiple standards: multiple standards come in different mobiles, with different screen size and operating systems.
- Repurposing existing e-learning materials for mobile platforms.
- Display of large digital content.

FUTURE POTENTIAL OF MOBILE BASED SERVICES IN ACADEMIC LIBRARIES

The developing world overtook the developed world in terms of Smartphone's connections in 2011 and today accounts for two in every three Smartphone's on the planet, according to the new study. It is predicted that by 2020, four out of every five Smartphone's connections worldwide will come from the developing world.

The one bright spot in ICT in India is the explosive growth in use of the mobile cell phone. Currently, mobile phone use amounts to 791 million, approximately 67% of the population (based on a population size of 1.2 billion), with the rural base growing at the fastest rate. Mobile phones have an inherent advantage over traditional ICT. Looking to the fast growing use of Smartphone's it is predicted that the all types of academic library services with M-technology will give the maximum benefits to their users.

CONCLUSION

Librarian should acquire and apply technical skills if they wish to provide mobile based services. The M-Technology has changed every ones workflows of information needs. Many students and scholars now expecting or preferring to go for online for which they would previously required a visit to the library. Since library is able to deliver the digital content to users in their handset devices. Some academic libraries are still not well equipped to meet with today's digital environment hence for such librarians it is a challenging task to cope up with the technological awareness. Still it is necessary to introduce a planned digitalization system in their traditional libraries and for that they need to know about the needs of their users. The application of ICT tools are increasing in Academic Libraries especially in Engineering College and Arts and Science colleges due to the development of technologies. According to the respondent ranking Mobile phone is in 1st position due to easy access at any time anywhere.

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RFID: A Case Study

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ABSTRACT

With rising collection, shortage of time, emergence of interdisciplinary subjects and shortage of manpower, it becomes difficult to handle these responsibilities manually. Similarly library security has always been an area of almost concern to the library management. The government rule also directly or indirectly put management responsible for safety of library collection. There is always a security check up in all types of libraries, but it has remained a manual system where there are human errors many times. Hence library professionals have always wish for a security system which is hundred percent safe, cost effective and user friendly. Vigilance cameras have been put inside many libraries for the same reason and similarly many methods have been used.

Radio Frequency identification technologies are delivering benefits along the entire value chain in The high-technology sector. Industry leaders are using RFID technology to track printed circuit boards, providing visibility and process efficiencies at manufacturing plants.Device manufacturers are utilizing embedded RFID technology to provide new capabilities, such as premise-aware security and in-transit device locking, in order to reduce theft and diversion. Large Data centers and hosting companies are Employing RFID to Track Assets.Designed by RFID was in High Tech RFID Journal to Help companies, product and application Designers, Retailers and electronics today understand How to improve RFID is being USED Operations and Enable Differentiation in the product Highly Competitive World of Consumer electronics

Keywords: *RFID technology, LMS*

INTRODUCTION

RFID is a technology that facilitates non line of sightidentification of items. Basic elements of a comprehensive RFID system for library kind of environment are tags, readers and library management system. Implementing RFID System in libraries will add tasks such as circulation, re-shelving and theft detection, and It has several other important advantages. It can either replace or supplement existing library barcode system. When the cost of labour is taken into consideration mis-shelved items, *etc.,* RFID can prove to be very efficient when compared to traditional barcodes.

In short RFID streamlines workflow in the area of self service, books return, shelf management and inventory.

RFID-A DETAIL STUDY

- **What is RFID?:** Short for radio frequency identification, RFID is a dedicated short range communication (DSRC) technology. The term RFID is used to describe various technologies that use radio waves to automatically identify people or objects. RFID technology is similar to the bar code identification systems we see in retail stores everyday; however one big difference between RFID and bar code technology is that RFID does not rely on the line-of-sight reading that bar code scanning requires to work. Short for radio frequency identification, RFID is a dedicated short range communication (DSRC) technology. The term RFID is used to describe various technologies that use radio waves to automatically identify people or objects.
- **The Technology behind RFID:** With RFID, the electromagnetic or electrostatic coupling in the RF (radio frequency) portion of the electromagnetic spectrum is used to transmit signals. An RFID system consists of an antenna and a transceiver, which read the radio frequency and transfers the information to a processing device (reader) and a transponder, or RF tag, which contains the RF circuitry and information to be

transmitted. The antenna provides the means for the integrated circuit to transmit its information to the reader that converts the radio waves reflected back from the RFID tag into digital information that can then be passed on to computers that can analyze the data.

ANALYSIS AND FINDINGS

20 sets of questionnaire have been asked from different users and on the basis of their response following are found: RFID is a flexible technology that is convenient, easy to use and well suited for use in radio communication. Radio waves are classified by their frequencies which are expressed in Kilohertz. Radio frequencies range from very law a frequency which has range of 10to 30 KHz. To extremely high frequency which has range of 30 to 300 GHz.

Question related to analysis:

Q.1. **Is RFID technology secure and private?**
Ans. Yes.
Q.2. **Problem with RFID?**
Ans. Wear and Tear, Theft in absence of gate.
Q.3. **How RFID saves time?**
Ans. No human interaction. In this it saves our time.
Q.4. **How it is beneficial in library Science?**
Ans. It is helpful in circulation and stock verification as well.
Q.5. **Is RFID better than using barcode?**
Ans. Yes, it is much better than using barcode.
Q.6. **What have the initial benefits of RFID been?**
Ans. It is time saver.
Q.7. **Did you find any advantage of using this technology?**
Ans. It needs no human interaction. It is time saver also.
Q.8. **What is range for a typical RFID tag?**
Ans. It is 50 meters.
Q.9. **How will you rank the benefits?**
        (*i*) **Security?**
Ans. Good
        (*ii*) **Service?**
Ans. Good
        (*iii*) **Time saving?**
Ans. Good

ADVANTAGE OF RFID SYSTEM

- **Rapid charging/discharging:** The use of RFID reduces the amount of time require to perform circulation operations. The most significant time savings are attributable to the facts thatinformation can be read from RFID tags much faster than from barcodes and that several items in a stack can be read at the same time. While initially unreliable, that Anti-collision algorithm that allows an entire stack to be charged or discharged now appears to be working well. The other time savings realized by circulation staff are modest unless the RFID tags replace both the EM security strips RF tags of older theft detection system and the barcodes of the automated library system, *i.e.*, the system is comprehensive RFID system that combines RFID security and the tracking of materials throughout the library. The time savings are less for charging than for discharging because the time required for charging usually is extended by social interaction with patrons.

- **Simplified Patron self – charging /discharging:**
  - For patron using self charging, there is a marked improvement because theydo not have to carefully place materials within a designated template and they cancharge several items at the same time.
  - Patron self-discharging shift that work from staffs to patrons. Staff isrelieved further when readers are installed in book drops.
- **High reliability:**
  - The readers are highly reliable. RFID library system claims an almost 100 Percent detection rate using RFID tags.
  - There are fewer false alarms than with older technologies once an RFID system is Property tuned.
  - RFID system encodes the circulation status on the RFID tag. This is done by designating a bit as the "theft" (EAS) bit and turning it off at time of charge and on at time of discharge. If the material that has not been properly charged is taken past the exist sensors, an immediate alarm is trigged.
- **High Speed Inventory:** A unique advantage of RFID system is their ability to scan books on theshelves without tipping them out or removing them. A hand held inventory reader can be moved rapidly across the shelf of books to read all of the unique identification information. Using wireless technology it is possible not only to update the inventory, but also to identify terms which are out of proper order.
- **Automated material handling:** Another application of RFID technology is automated materials handling. This includes conveyer and sorting systems that can move library materials and sort them by category into separate bins or onto separate carts. This significantly reduces the amount of staff time required to ready materials for re-shelving.
- **Long Tag Life:** Finally, RFID tags last longer than barcodes because nothing comes into contact with them. Most RFID vendors claim a minimum of 1, 00,000transactions before a tag may need to be replaced.RFID technology is used in many different applications, such as television, radio, Cellular phones, radar and automatic identification systems. The term RFID describes the use of radio frequency signals to provide automatic identification of terms. RFID is used in applications such as:
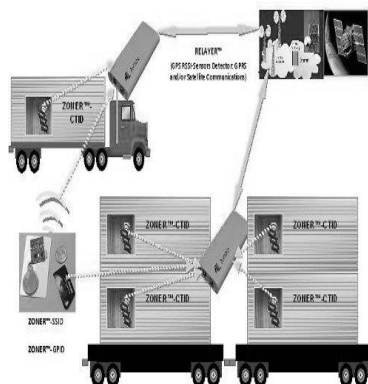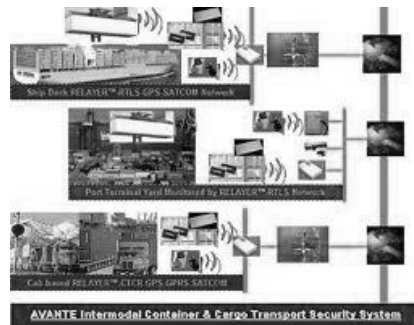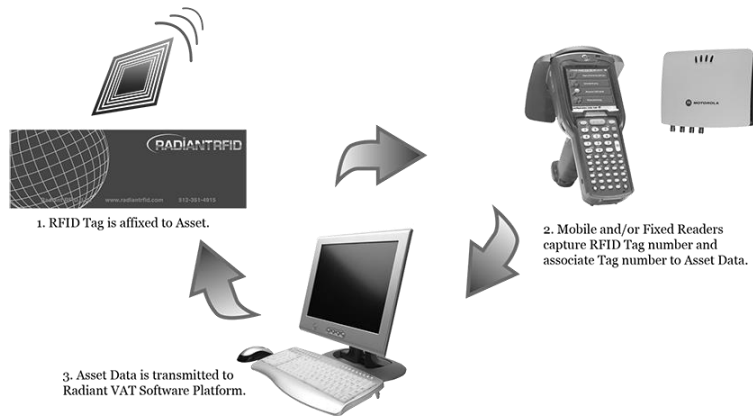 - Electronic toll Collection (ETC)
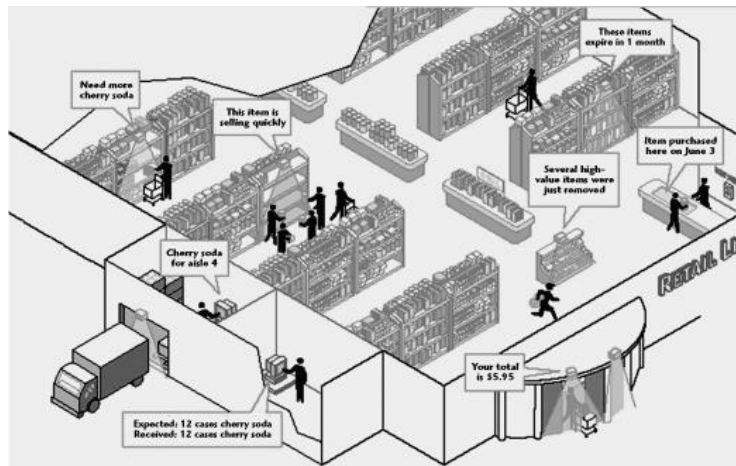 - Railway car identification and tracking
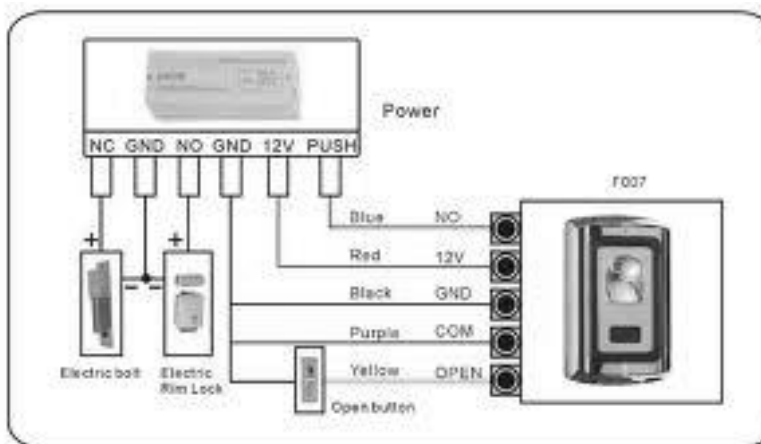 - Intermodal container identification
  - Asset identification and tracking
  - Item management for retail, health care and logistics applications
  - Access control
  - Animal identification
  - Fuel dispensing loyalty program

- Electronic toll Collection (ETC)

- Railway car identification and tracking

- Intermodal container identification

▪ Asset identification and tracking

1. RFID Tag is affixed to Asset.

2. Mobile and/or Fixed Readers capture RFID Tag number and associate Tag number to Asset Data.

3. Asset Data is transmitted to Radiant VAT Software Platform.

▪ Item management for retail, health care and logistics applications

▪ Access control

- Animal identification

- Fuel dispensing loyalty programs

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Use of RFID Technology in Libraries, its Components and Benefits

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ABSTRACT

Library management plays a key role in patron satisfaction. RFID technology can effectively improve the self service and the collection management, which correspondingly leads to improving the patrons' satisfaction with using the library. This paper focuses on introducing RFID technology and the benefits gained from using the technology by looking into each work process in the case library. The paper covers the components and benefits of a modern RFID library system, its advantages and issues related to use of RFID in libraries.

Keyword: *RFID, Radio Frequency Identification, use of RFID in libraries.*

INTRODUCTION

RFID means Radio frequency identification i.e. the technology that uses radio waves to automatically identify individual items. The objective of any RFID system is to carry data in suitable transponders, generally known as tags and to retrieve data, by machine readable means, at a suitable time and place and to satisfy particular application needs RFID enables identification from a distance, and unlike earlier bar-code technology, it does so without requiring a line of sight. RFID offer a number of advantages including inventory efficiency, security to library collections and minimal vulnerability to damage. There is no doubt that RFID technology with its fast registration, wireless data collection, and communication abilities, offers far-reaching benefits to many industries including Library and Information Centers.

RFID USE IN LIBRARIES

Libraries across the world have begun to use RFID technologies to streamline the materials handling, inventory control, and check-out, check-in process. The technology used in libraries is the same technology used in other applications of passive tag RFID. In the library setting, RFID is used to reach two key goals: sightless identification for a variety of applications and theft detection. RFID is a combination of radio -frequency-based technology and microchip technology. The information contained on microchips in the tags affixed to library materials is read using radio frequency technology, regardless of item orientation or alignment.

RFID SYSTEM COMPONENTS

- **Tags:** The RFID tags used in libraries are passive tags so the tags do not need an energy source of their own, and therefore can be quite small. There are three different types of passive tags that can be used in a library, information center, or archive. Each of these types of tags has an antenna etched onto a microchip that has at least a 64 bit capacity. The tags differ in how the information to the tag is written. Read only tags are not re-writable and the unique identification code is encoded when the tag is manufactured. Write once-read many (WORM) tags, can be encoded at the library to match the bar code numbers if those numbers are currently in use. This tag cannot be rewritten but information about the book title and author can be added. Read/write tags are the most commonly used tags for libraries because they have the ability to have information added and changed as needed.

- **Readers:** A receiver device called as reader detects the signal as soon it enters into its radio range and decodes the number for interpretation; Reader interrogates the tags and offers optimum reading performance enabling instant data capture when passed alongside the items in a continuance movement. The devices used within the building

are usually called 'readers' while the ones used at building exits are usually called 'sensors'.

- **Antenna:** The antenna produces radio signals to activate the tag and read and write data to it. Antennas are the channels between the tag and the reader, which controls the system's data acquisitions and communications. The electromagnetic field produced by an antenna can be constantly present when multiple tags are expected continually. Antennas can be built into a doorframe to receive tag data from person's things passing through the door.
- **Server:** The server is the heart of some comprehensive RFID systems. It is the communications gateway among the various components (Boss, 2004). It receives the information from one or more of the readers and exchanges information with the circulation database. Its software includes the SIP/SIP2 (Session Initiation Protocol), APIs (Applications Programming Interface) NCIP (National Circulation Interchange Protocol) or SLNP necessary to interface it with the integrated library software but no library vendor has yet fully implemented NCIP approved by NISO (Koppel, 2004). The server typically includes a transaction database so that reports can be produced.
- **RFID Label Printer:** An RFID printer is used to print the labels with an individual barcode, library logo, etc. When the print is applied, it simultaneously programs the data in to the chip. After this process, the RFID label is taken from the printer and applied to the book.
- **Handheld reader:** It can be moved along the items on the shelves without touching them. It used in stock verification, used in search for book-misshelved, search for individual book on request.
- **Self check-out station:** The Self Check-out station is a computer with a touch screen and a built-in RFID reader, software for personal identification, document handling and circulation.
- **External Book Return/book Drop Station:** Libraries can offer a distinct service, such as ability to return the books when library is closed. It is machine with a slot with a chip RFID Reader integrated into a wall. User identifies him or her then puts the Books into the Slot. Upon Completion of return, user gets a Receipt showing how many and which books are returned.
- **Security gates:** Security gate is an anti-theft system used by libraries. It plays a crucial role in detecting unborrowed or improperly checked-out library document. Theft detection is an integral feature of the chip within the RFID tag which performs both the item identification and antitheft function.

RFID SYSTEM WORKS IN THE LIBRARY

Using RFID in libraries saves library staff's time by automatizing their tasks. The RFID technology works through flexible, paper-thin RFID tags, which can be placed inside the cover of each and every document. Complete information about each document is entered into the Library Management Software. Whenever a user brings a document for issue-return purpose, the RFID reader from the tag reads the information pertaining to that book and transmits the data into the software and document is issued in a few seconds without the assistance of the library staff.

BENEFITS OF RFID USE IN LIBRARY

- RFID improves library workflow by
- Reducing non-value added work processes
- Improves staff productivity
- Improves customer service
- Assist inventory check with ease.
- Easy book identification for shelving process
- Assist traceability of book allocation

- Enhance book return processes by full automation of check-in, EAS activation and system updates completed simultaneously in the self-return chute
- Allow better accuracy in book collection management, resulting in reduced book purchase
- More than one item can be checked out or checked in at the same time.
- Items can be placed on reader without careful placement that it is required for line of sight system (bar code scanner)
- Faster inventory process.

ADVANTAGES OF USING RFID TECHNOLOGY IN LIBRARIES

RFID use can be a controversial topic when libraries choose to convert their collections to be able to take advantage of the technology. Many of the advantages of RFID revolve around the actual use in libraries and using the technology to free up librarians for duties that involve more interaction with the patrons.

- **Reduction of staff duties:** Use of RFID technology in a library can decrease the time needed for circulation duties since more than one tag can be read at a time. Patron checkout stations can additionally free up staff from these duties. The time necessary to complete an inventory of the library collection can be reduced since inventory can be accomplished with a wand reader as the staff member walks through the stacks of the collection.
- **Reliability:** Correctly operating readers and tags can have near 100% detection rates. Since the tags and sensors communicate with the Integrated Library System (ILS) it is possible to know exactly which items are moving out of the library. The high reliability is especially important when RFID is used in theft detection.
- **Tag life and Appearance:** Vendors claim that the tag life can be at least 100,000 transactions or at least 10 years. These tags do not interfere with the appearance of the book, and can even be made to appear as a bookplate.
- **High-Speed Inventorying:** A unique advantage of RFID systems is their ability to scan books on the shelves without tipping them out or removing them. A hand-held inventory reader can be moved rapidly across a shelf of books to read all of the unique identification information.

DISADVANTAGE OF USING RFID TECHNOLOGY IN LIBRARIES

High cost the major disadvantage of RFID technology is its cost. While the reader and gate sensors used to read the information typically cost around 2,000 to 3,500 each; and the tags cost 40 to 75 each.

- **Accessibility to compromise:** It is possible to compromise an RFID system by wrapping the protected material in two to three layers of ordinary household foil to block the radio signal. It is also possible to compromise in RFID system by placing two items against one another so that one tag overlays another. That may cancel out the signals. This requires knowledge of the technology and careful alignment.
- **Chances of Removal of exposed tags:** RFID tags are typically affixed to the inside back over and are exposed for removal. This means that there would be problems when users become more familiar with the role of the tags. In Indian libraries, it is a major challenge to keep challenge to keep the tags intact.
- **Reader collision:** The signal from one reader can interfere with the signal from another where coverage overlaps. This is called reader collision. One way to avoid this problem is to use a technique called time division multiple access, or TDMA. In simple terms, the readers are instructed to read at the same time. This ensures that they don't interfere with each other. But it means any RFID tag in an area where two readers overlap will be read twice.
- **Tag collision:** Another problem readers have is reading a lot of chips in the same field. Tag clash occurs when more than one chip reflects back a signal at the same time,

confusing the reader. Different vendors have developed different systems for having the tag respond to the reader one at a time. Since they can be read in milliseconds, it appears that all the tags are being read simultaneously.

- **Lack of standard:** The tags used by library RFID vendors are not compatible even when they conform to the same standards because the current standard only seek electronic compatibility between tags and readers. The pattern of encoding information and the software that processes the information differs from vendor to vendor, therefore, a change from one vendor's system to the other would require retagging all items or modifying the software.

CONCLUSION

RFID technology is not only emerging but also more effective, convenient and cost efficient technology in library security. This technology has slowly begun to replace the traditional bar-code on library items. The RFID tag can contain identifying information such as a book's title or material type, without having to be pointed to a separate. The information is read by an RFID reader, which replaces the standard barcode reader commonly found at a library's circulation desk. Librarians are always known as early adopters of technology and they have started using RFID to provide more effective and efficient circulation services as well as for security of library collections. Current standards (ISO 15693) apply to container-level tagging used in supply chain applications and do not address problems of tracking and hot listing. Next generation tags (ISO 18000) are designed for item level tagging. The newer tags are capable of resolving many of the privacy problems of today's tags. However, no library RFID products are currently available using the new standard. Both cost and equipment may make RFID prohibitive in developing countries at this time.

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Library Consortia in India:
A Greater Access to the Library Resources

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ABSTRACT

One of the most complex issues facing Library Professionals is as how to manage change with ever growing avalanche of information and ever changing information technology. Since early1960's there are tremendous changes in area of library science. Resource Sharing is one of the largest names in the activities of library co-operation, co-ordination and collaboration between groups of libraries. A consortium is said to be a co-operative arrangement among groups or institutions or an association or society. Consortia are commonly formed to increase the purchasing capacity of the collaborating institutions. This paper discusses the origin, need, advantages and disadvantages of library consortia. This paper also covers various consortia and challenges in India.
Keywords: *Library Consortia/ Library co-operation/ Resource sharing/ Consortia in India.*

DEFINITION

"Consortia essentially consist of group of libraries of various strengths, power, collection, staff experience and specialization can cooperate to share expertise developed in the services of the member libraries" (Vashishth, 2004) A Consortium could be described as a group of organizations who come together to fulfill a combined objective that usefully requires co-operation and the sharing of resources. And need to have a clear mutual goal in order to ensure their success. The aim should be to deliver "more than the sum of the individual parts"

ORIGIN

Consortium is a Latin word, meaning 'partnership, association or society' and derives from consors 'partner', itself from con- 'together' and sors 'fate', meaning owner of means or comrade. (Rao, 2008)

The exact date of the introduction of the term "Library Consortia" is not mention, but the concept of consortia as being an association or partnership has long being a principal of librarianship. The published literature indicates that the concept is not new and it refers to co-operation, coordination and collaboration between libraries for the purpose of sharing information resources, However libraries had not used it widely until 1980's. (Bansode, 2007)

FEATURES OF LIBRARY CONSORTIA

These are the features of library consortia following below:
- It provides each organizations and institutions with the capacity to share their resources without sacrificing the individuality of each member library
- The collections of the Consortium libraries enable each member library to support scholarly research for its users.
- Cooperative research and development in application of information communication and technology enhances service and realizes cost effectiveness.
- Staff development and interaction with quality of service.
- It is the cooperative task to reduce the cost of purchase consortia. As a result, end users can take benefits of more resources than would be available through one library.
- To advance library services are provided with an emphasis on access to new E- resources including databases and services offered through the internet and www.
- To expanding inter library searching at less cost is possible.
- Uncertainties in legal issues are handled with more confidence.

NEED OF LIBRARY CONSORTIA

Several factors and many reasons focus on the adoption of consortia among the libraries as: quality of services enhanced, cost of service reduced, duplication of the stock reduced and more access to information with minimum or optimum payment ensured. Some main reasons are given below:

- **Explosion of literature:** Library material, which has grown in many forms and formats like books, periodical, research articles and non book materials have made it beyond the control of library to acquire all the material which are being produced. It is estimated that new information grows about 30% per annum. The world's total yearly production of (Print, film, optical magnetic) content would thus require roughly 1.5 billion gigabytes of storage.
- **Lack of finance or limited finance:** It is too hard to maintain the subscription of even for core journals dueto the increasing cost of the journal subscription especially international ones by Indian universities which is even less than 300 titles, where as the journal subscription rate of western university is much higher. *For example* in the library of Pune university there is an increase in the budget of periodicals by 5%, but yet the library has to reduce the no. of titles because of the cost of subscription raised.
- **Demand of the different users:** A student may require book of educational purpose but a scientist or a researcher need some advanced literature and research article in the area of research. So no library is self-sufficient to meet all these type of requirements successfully.
- **Changing role of library science to information science:** The value of library consortia has increased when the role of the librarian from 'gatekeeper of information' changed to the 'gateway to information' Thus the professionalization of the library science has influenced the consortia.
- **Reduction or minimization of duplication of stock:** It is also another reason for the consortia. By resource sharing the library can save the time, money and manpower by doing the basic activities like- accessioning, storage *etc.*

LEVELS OF CONSORTIA

Consortia may be formed at many levels:

- **Open Consortia:** This type of Consortia is very flexible and it is the wish of members of consortia can join and leave when they want. Example: INDEST
- **Closed Group Consortia:** This kind of Consortia emerges either by affiliation and collaboration among them. Example: CSIR, IIM, DAE
- **Centrally Funded Consortia:** In this type of model, consortia will depend on the parent body. Example: INFONET, CSIR
- **Shared Budget Model:** In this type of consortium, Libraries take the lead and form the consortium. Example: FORSA IIM
- **Publisher Initiative:** The Consortium member get deep discount price to the participating libraries. *Example:* Emerald Publishing Group (formerly MCB University Press)
- **National Consortium:** National level licensing of products. Example: INDEST, AICTE, UGC Infonet.

LIBRARY CONSORTIA IN INDIA

The Indian context consortia, formation started much later compared to many developed countries. With the beginning of the small group of libraries started coming together and made the highway to access a long amount of information. Many consortia are being run successfully by different organizations in India. Some of them are given below:

- **CSIR:** Council of scientific and industrial research: CSIR has 40 national laboratories carrying out R & D work in the area of engineering, Biological, Chemical, Physical, Environmental and information sciences. The CSIR e-journals consortium provide

accessibility to 4500 electronic journals published by leading publishers and learned societies.

- **INDEST (Indian national digital library in Engineering science and Technology):** The ministry of human resource development has set up the INDEST consortium. The ministry provides funds required for providing differential access to electronic resources subscribed for consortium to core members through the consortia headquarters set up at (IIT) Delhi. Total no of members in the consortia has now grown to 115. INDEST consortia subscribes to over 4000 electronic journals.

- **FORSA (The forum for resource sharing in Astronomy and Astrophysics):** FORSA come in existence in the year 1982, for sharing the resources available in astronomy libraries in the country. In 2004 this group has extended its membership to physics and maths libraries in the country who have common interests to carry forward the aim of FORSA and its activities. FORSA has 12 members. Its main functions are:
  - Catalogue services
  - Collection sharing
  - Electronic content licencing
  - Interlibrary loan
  - Preservation
  - Training and Union lists.

- **IIM (Indian Institute of Management):** IIM consortium has been in existence since last two years. It approaches the publishers of e-journals and database in area of management. "Six Indian Institutes of Management have formed a consortium and jointly approached the publishers of e-journals and databases in the area of Management, Social Behavioral Science source. They have been giving IP enabled access to e-journals. Well renowned publishers like Elsevier (247 titles), Blackwell (268 titles), Kluwer (33 titles), Wiley (3 titles) provide their resources online to the members of the IIM Consortium. Apart from 25 titles free against print subscription, 2,300 titles as a part of EBSCO databases and 800 titles as part of ABI Inform database have been made available to users of IIM libraries electronically". (Bansode, 2007)

- **ISRO (Indian Space Research Organization):** The resource sharing initiatives taken by ISRO libraries by avoiding duplicate subscription to bibliographic database is expected to result in saving of ₹ 41 laces per year, further the amount saved by cancellation of duplicate subscription could be used to provide access to e-journals for the benefits of all the centre's. A move is there to form formal consortium for providing access to e-journals and also J-Gate to custom contents for the consortia. (Bansode, 2004)

- **HELINET (Health science Library and Information network):** It is successfully implemented consortium which is first of its kind in the country. It was started to improve the quality of education and research in health science institutions of the country. Through enhanced access to high quality medical information. Its goal is to deliver information to the user in the exact time period. HELINET's goal is to deliver information to users' desk-top with round-the-clock access. The major benefit of this consortium is expanded access to core international e-journals. Before the launch of the consortium, access to foreign medical journals by each college was limited to around 100. HELINET has made it possible for each college to access and share the contents in more than 600 journals. . Further, HELINET required a mechanism to develop and maintain a common database of journal literature for all the subscribed journals of 30 medical libraries which were largely in print subscriptions.

- **UGC-INFONET:** Lack of funds libraries have been forced to discontinue the scholarly journals. For providing the current literature, UGC has initiated the UGC-INFONET. E-journal Consortium. Under the consortium, about 4,000 full text scholarly electronic journals from 25 publishers across the globe can be accessed. The

consortium provides current as well as archival access to core and peer-reviewed journals in different disciplines. The whole programme has been implemented in different phases. So far 100 Universities out of 171 Indian Universities, which come under the purview of UGC, have been provided with access to these journals and it will gradually be extended to affiliated colleges as well. It covers almost all areas of learning like Arts, Humanities, Social Sciences, Physical and Chemical Sciences, Life Sciences, Computer Sciences, Mathematics and Statistics etc. and other subject areas are to be added in near future. The programme is wholly funded by the UGC and monitored by Information Library Network (INFLIBNET).

ADVANTAGES OF LIBRARY CONSORTIA

Some of the important advantages of the library consortium are as following below:

- Consortia-based subscription to electronic resources provides access to wider number of electronic resources at substantially lower cost;
- Optimum utilization of funds.
- Facilities to build up digital libraries
- Helpful to provide better library services like CAS and SDI
- Cost Sharing for Technical and training support
- Electronic Journals demand neither library space nor shelling costs nor can they be stolen from the library
- The consortium have been offered better terms of licenses for use, archival access and preservation of subscribed electronic resources, which would not have been possible for any single institution; and Available 24/7.
- Less economy expansion.

DISADVANTAGES OF LIBRARY CONSORTIA

Some of the important disadvantages of the library consortium are as following below:

- Absence of a printed copy of Journals
- Require Consortia requires☐training of staffs in handling electronic documents *etc.* high initial investments in licensees and information and communication technology.
- Copyright problems
- Unreliable telecommunication links and insufficient bandwidth
- Lack of archiving and back files availability
- Internet Access id necessary
- Users are not accepting e-journals as per with the printed Journals.

CHALLENGES OR BARRIERS FOR CONSORTIA

It has been proved that consortium is cost effective. With the help of consortia libraries can save a lot of expenditure and saved money can be redirected to enhancing other library services, with the benefits there are some challenges also which are faced by consortia. It prevent the libraries to take up such initiatives.

- **Lack of complete automation:** Many libraries are allowed to jump into the ban wagon of consortia without considering its automation status, with the availability of some internet connectivity libraries but their approach remain inaccessible till complete automation is done.
- **Lack of resources:** The resources of all participating libraries need to be balance to certain limit, without some form of parity of collection of each library there is some loss of one library becoming a lending library while others remain borrowing libraries. A participating library with very few resources is a loss to be the library which has lots to offer.
- **Absence of any culture of interlibrary lending:** Participating library should have a proper system for interlibrary lending. *For example*, working hours of a library.

- **Absence of any kind of union catalogue of libraries:** Without the absence of union catalogue, participating libraries would be left in dark of what is available with the other library.
- **Un-availability of web-environment:** Unavailability of web environment will stop the participating libraries from accessing online subscriptions. Marking each library resources available on line would facilitate greater access.
- **Specific institutional problem:** There may be its own specific problems of an institution as work culture, environmental differences. *For example,* working hours may be limited.
- **Lack of leadership:** Library leadership will begin with enabling everyone who works in library to grow knowledge, and ability. Good image of a librarian is one who knows his staff very well and motivates the staff constantly to work (Eastern academic libraries, library consortium and contemporary scenario of North).

CONCLUSION

Consortia are all about to share resources and improving access to information. These resources can be shared among libraries that have common goals, mission, and common users also. It is the co-operation task to reduce the cost of purchasing information. Hence Library consortia, providing physical and electronic delivery of material.

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Cloud Computing:
Distributed Internet Computing for it

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WHAT IS CLOUD COMPUTING?

- **Buyya has defined it as follows:** "Cloud is a parallel and distributed computing system consisting of a collection of inter-connected and virtualized computers that are dynamically provisioned and presented as one or more unified computing resources based on service-level Agreements (SLA) established through negotiation between the service provider and consumers".

- **Forrester defines cloud computing as:** "A pool of abstracted, highly scalable, and managed compute infrastructure capable of hosting end-customer applications and billed by consumption".

- **Vaquero has stated:** "clouds are a large pool of easily usable and accessible virtualized resources (such as hardware, development platforms and/or services). These resources can be dynamically reconfigured to adjust to a variable load (scale), allowing also for an optimum resource utilization. This pool of resources is typically exploited by a pay-per-use model in which guarantees are offered by the Infrastructure Provider by means of customized Service Level Agreements". Cloud computing is the latest business buzzword, and is also known as cloud technology, cloud application, or cloud-based services. Cloud computing is where apps or data are accessible on the Internet instead of on a single computer or network. Online payment, customer self-scheduling, data storage and accounting software are some example or cloud-based services. Cloud computing is an amazing technology that uses the internet and central remote servers to maintain data and different applications. Cloud computing allows consumers and business to use application without installation and access their personal files at any computer with internet access. This technology allows for much more efficient computing by centralizing data storage, for better processing the bandwidth. The cloud computing technology is also able to access your data from anywhere with an internet connection and the ability to replace irregular heavy overheads on IT with regular and expected outfitted expenses. We have a simple example of cloud computing is Gmail, Hotmail, Yahoo mail or Rediffmail *etc.* All you need is just an internet connection and you can start sending emails and messages.

CLOUD COMPUTING REPRESENTS A CONVERGENCE OF TWO MAJOR TRENDS IN INFORMATION TECHNOLOGY

- **IT efficiency:** Whereby the power of modern computers is utilized more efficiently through highly scalable hardware and software resources.

- **Business agility:** Whereby IT can be used as a competitive tool through rapid deployment, parallel batch processing, use of compute-intensive business analytics and mobile interactive applications that respond in real time to user requirements. Many practitioners in the commercial and academic spheres have attempted to define exactly what "cloud computing" is and what unique characteristics it presents.

- **A recent McKinsey and Co. report claims that:** "Clouds are hardware based services Offering compute, network, and storage capacity where: Hardware management is highly abstracted from the buyer, buyers incur infrastructure costs as variable OPEX, and infrastructure capacity is highly elastic".

CLOUD COMPUTING MODELS

Cloud Providers offer services that can be grouped into three categories.

- **Software as a Service (SaaS):** In this model, a complete application is offered to the customer, as a service on demand. A single instance of the service runs on the cloud and multiple end users are serviced. On the customers" side, there is no need for upfront investment in servers or software licenses, while for the provider, the costs are lowered, since only a single application needs to be hosted & maintained. Today SaaS is offered by companies such as Google, Salesforce, Microsoft, Zoho, *etc.*

- **Platform as a Service (Paas):** Here, a layer of software, or development environment is encapsulated & offered as a service, upon which other higher levels of service can be built. The customer has the freedom to build his own applications, which run on the provider"s infrastructure. To meet manageability and scalability requirements of the applications, PaaS providers offer a predefined combination of OS and application servers, such as LAMP platform (Linux, Apache, MySql and PHP), restricted J2EE, Ruby etc. Google"s App Engine, Force.com, etc are some of the popular PaaS examples.

- **Infrastructure as a Service (Iaas):** IaaS provides basic storage and computing capabilities as standardized services over the network. Servers, storage systems, networking equipment, data centre space etc. are pooled and made available to handle workloads. The customer would typically deploy his own software on the infrastructure. Some common examples are Amazon, GoGrid, 3 Tera, *etc.*

- **Understanding Public and Private Clouds:** Enterprises can choose to deploy applications on Public, Private or Hybrid clouds. Cloud Integrators can play a vital part in determining the right cloud path for each organization.

- **Public Cloud:** Public clouds are owned and operated by third parties; they deliver superior economies of scale to customers, as the infrastructure costs are spread among a mix of users, giving each individual client an attractive low-cost, "Pay-as-you-go" model. All customers share the same infrastructure pool with limited configuration, security protections, and availability variances. These are managed and supported by the cloud provider. One of the advantages of a Public cloud is that they may be larger than an enterprises cloud, thus providing the ability to scale seamlessly, on demand.

- **Private Cloud:** Private clouds are built exclusively for a single enterprise. They aim to address concerns on data security and offer greater control, which is typically lacking in a public cloud. There are two variations to a private cloud:

- **On-premise Private Cloud:** On-premise private clouds, also known as internal clouds are hosted within one's own data center. This model provides a more standardized process and protection, but is limited in aspects of size and scalability. IT departments would also need to incur the capital and operational costs for the physical resources. This is best suited for applications which require complete control and configurability of the infrastructure and security.

- **Externally hosted Private Cloud:** This type of private cloud is hosted externally with a cloud provider, where the provider facilitates an exclusive cloud environment with full guarantee of privacy. This is best suited for enterprises that don"t prefer a public cloud due to sharing of physical resources.

- **Hybrid Cloud:** Hybrid Clouds combine both public and private cloud models. With a Hybrid Cloud, service providers can utilize 3rd party Cloud Providers in a full or partial manner thus increasing the flexibility of computing. The Hybrid cloud environment is capable of providing on-demand, externally provisioned scale. The ability to augment a private cloud with the resources of a public cloud can be used to manage any unexpected surges in workload.

ADVANTAGES OF CLOUD COMPUTING

Specifically, cloud computing offers the following key advantages:

- It dramatically lowers the cost of entry for smaller firms trying to benefit from compute: intensive business analytics that were hither to available only to the largest of corporations. These computational exercises typically involve large amounts of computing power for relatively short amounts of time, and cloud computing makes such dynamic provisioning of resources possible. Cloud computing also represents a huge opportunity to many third-world countries that have been so far left behind in the IT revolution — as we discuss later, some cloud.

- Computing providers are using the advantages of a cloud platform to enable IT services in countries that would have traditionally lacked the resources for widespread deployment of IT services.

- It can provide an almost immediate access to hardware resources, with no upfront capital investments for users, leading to a faster time to market in many businesses. Treating IT as an operational expense (in industry-speak, employing an 'Op-ex' as opposed to a 'Cap-ex' model) also helps in dramatically reducing the upfront costs in corporate computing. *For example*, many of the promising new Internet startups like 37 Signals, Jungle Disk, Gigavox, SmugMug and others were realized with investments in information technology that are orders of magnitude lesser than that required just a few years ago. The cloud becomes an adaptive infrastructure that can be shared by different end users, each of whom might use it in very different ways. The users are completely separated from each other, and the flexibility of the infrastructure allows for computing loads to be balanced on.

- The fly as more users join the system (the process of setting up the infrastructure has become so standardized that adding computing capacity has become almost as simple as adding building blocks to an existing grid). The beauty of the arrangement is that as the number of users goes up, the demand load on the system gets more balanced in a stochastic sense, even as its economies of scale expand.

- Cloud computing can lower IT barriers to innovation, as can be witnessed from the many promising startups, from the ubiquitous online applications such as Facebook and Youtube to the more focused applications like TripIt (for managing one's travel) or Mint (for managing one's personal finances).

- Cloud computing makes it easier for enterprises to scale their services – which are increasingly reliant on accurate information – according to client demand. Since the computing resources are managed through software, they can be deployed very fast as new requirements arise. In fact, the goal of cloud computing is to scale resources up or down dynamically through software APIs depending on client load with minimal service Provider interaction.

SYSTEM MODEL

- **Cloud Computing Benefits:** Enterprises would need to align their applications, so as to exploit the architecture models that Cloud Computing offers. Some of the typical benefits are listed below:

- **Reduced Cost:** There are a number of reasons to attribute Cloud technology with lower costs. The billing model is pay as per usage; the infrastructure is not purchased thus lowering maintenance. Initial expense and recurring expenses are much lower than traditional computing.

- **Increased Storage:** With the massive Infrastructure that is offered by Cloud providers today, storage & maintenance of large volumes of data is a reality. Sudden workload spikes are also managed effectively & efficiently, since the cloud can scale dynamically.

- **Flexibility:** This is an extremely important characteristic. With enterprises having to adapt, even more rapidly, to changing business conditions, speed to deliver is critical.

Cloud computing stresses on getting applications to market very quickly, by using the most appropriate building blocks necessary for deployment.

PRIVATE LOCKER IN THE CLOUD

You can now hoard cash legally on the Internet and use your handset like a pre-paid card or all – purpose recharge coupon.

- **Cloud Computing Challenges:** Despite its growing influence, concerns regarding cloud computing still remain. In our opinion, the benefits outweigh the drawbacks and the model is worth exploring. Some common challenges are:
- **Data Protection:** Data Security is a crucial element that warrants scrutiny. Enterprises are reluctant to buy an assurance of business data security from vendors. They fear losing data to competition and the data confidentiality of consumers. In many instances, the actual storage location is not disclosed, adding onto the security concerns of enterprises. In the existing models, firewalls across data centers (owned by enterprises) protect this sensitive information. In the cloud model, Service providers are responsible for maintaining data security and enterprises would have to rely on them. Cloud Computing.
- **Data Recovery and Availability:** All business applications have Service level agreements that are stringently followed. Operational teams play a key role in management of service level agreements and runtime governance of applications. In production environments, operational teams support
    - Appropriate clustering and Fail over
    - Data Replication
    - System monitoring (Transactions monitoring, logs monitoring and others)
    - Maintenance (Runtime Governance)
    - Disaster recovery
    - Capacity and performance management

    If, any of the above mentioned services is under-served by a cloud provider, the damage and impact could be severe.

MANAGEMENT CAPABILITIES

Despite there being multiple cloud providers, the management of platform and infrastructure is still in its infancy. Features like "Auto-scaling" *for example*, are a crucial requirement for many enterprises. There is huge potential to improve on the scalability and load balancing features provided today.

- **Warranty:** Of the elements of cloud provider T&C analysed by this survey, perhaps the greatest area of commonality was in respect of terms regarding the warranty given by the provider to the customer for performance of the service. Almost without exception, every provider went to considerable – and in some cases extraordinary – lengths to deny that any such warranty existed.
    Where there was a difference visible it was in the approach taken by those providers which asserted the law and jurisdiction of US states and those which claimed to be governed by the laws of a European country. In a clear reflection of differing commercial practices, and of differing approaches to consumer protection, US-based providers were far more comprehensive in disclaiming any warranty. For an example of a very comprehensive disclaimer, see that given by GoGrid in respect of its cloud service:
- **Security Challenges:** Start-up companies often lack the protection measures to weather off an attack on their servers due to the scarcity of resources - poor programming that explores software vulnerabilities (PHP, JavaScript, etc) open ports to firewalls or inexistent load-balance algorithms susceptible to denial of service attacks. For this reason, new companies are encouraged to pursue cloud computing as the alternative to supporting their own hardware backbone. However cloud computing

does not come without its pitfalls. For starters, a cloud is a single point of failure for multiple resources. Even though network carriers such as AT&T believe a distributed cloud structure is the right implementation, it faces major challenges in finding the optimal approach for low power transmission and high network availability; some people believe that major corporations will shy away from implementing cloud solutions in the near future due to ineffective security policies. One problem comes from the fact that different cloud providers have different ways to store data, so creating a distributed cloud implies more challenges to be solved between vendors.

- **Data Security:** Security refers to confidentiality, integrity and availability, which pose major issues for cloud vendors. Confidentiality refers to who stores the encryption keys - data from company A, stored in an encrypted format at company B must be kept secure from employees of B; thus, the client company should own the encryption keys.

CLOUD COMPUTING SECURITY ISSUES

Identified seven issues that need to be addressed before enterprises consider switching to the cloud computing model.

They are as follows:

- **Privileged user access:** Information transmitted from the client through the Internet poses a certain degree of risk, because of issues of data ownership; enterprises should spend time getting to know their providers and their regulations as much as possible before assigning some trivial applications first to test the water.

- **Regulatory compliance:** Clients are accountable for the security of their solution, as they can choose between providers that allow to be audited by 3rd party organizations that check levels of security and providers that don't . data location - depending on contracts, some clients might never know what country or what jurisdiction their data is located . data segregation - encrypted information from multiple companies may be stored on the same hard disk, so a mechanism to separate data should be deployed by the provider. recovery - every provider should have a disaster recovery protocol to protect user data . Investigative support - if a client suspects faulty activity from the provider, it may not have many legal ways pursued an investigation. Long-term viability - refers to the ability to retract a contract and all data if the current provider is bought out by another firm Given that not all of the above need to be improved depending on the application at hand, it is still paramount that consensus is reached on the issues regarding standardization.

- **Security Benefits:** There are definitely plenty of concerns regarding the inability to trust cloud computing due to its security issues. However, cloud computing comes with several benefits that address data security. The following sections looks into addressing concepts such as centralized data, incident response or logging. Centralized Data refers to the approach of placing all eggs in one basket. It might be dangerous to think that if the cloud goes down, so does the service they provide, but at the same time, it is easier to monitor. Storing data in the cloud voids many issues related to losing laptops or flash drives, which has been the most common way of loosing data for large enterprises or government organizations. The laptop would only store a small cache to interface with the thin client, but the authentication is done through the network, in the cloud. In addition to this, when a laptop is known to be stolen, administrators can block its attempted access based on its identifier or MAC address. Moreover, it is easier and cheaper to store data encrypted in the cloud that to perform disk encryption on every piece of hardware or backup tape. Incident Response refers to the ability to procure a resource such as a database server or supercomputing power or use a testing environment whenever needed.

CONCLUSIONS AND FUTURE DIRECTIONS

This introductory chapter has discussed Cloud Computing's basic principles and reference frameworks, and has surveyed the main computing paradigms that gave birth to the Cloud Computing. The Cloud Computing paradigm is still evolving. New additions and refinements to the cloud models, characteristics, and technologies occur on a daily basis. Fortunately, the plethora of existing reference models, architectures, and frameworks, as well as those underdevelopment are a sign that Cloud Computing is on its way to maturity.

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Library Consortia in Modern Era: An Overview

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ABSTRACT

The role of college Librarian is totally changed in present scenario. As Librarians Added Audiovisual Material to their collections and then electronic materials, they moved from selection as an individual activity to selection as a group activity. Librarians made every effort to mainstream the resulting selection process and incorporate it into the existing library organization. However, with the advent of the internet and the ability to simultaneously share virtual resources, cooperative collection development, through consortium arrangements, became popular once again. The ability of consortia to purchase products at a better price than individual libraries can has made them very popular with funding agencies. However, the result is that the role of the selector has been diminished. As the purchase of virtual resources accelerates, particularly through consortium agreements, the autonomy of the local library will fade and the roles of librarians will change drastically. Academic libraries in India have been affected by an uncertain financial environment in which resource buying has been restricted, causing them to look at ways of extending their purchasing capabilities to compensate for reduced budgets. In electronic information age, a library consortium is gaining more importance. In last five years, the consortium movement has entered in libraries and has revived attention from the information producing community.

Keywords: *Internet, E-Publishing, Consortia, Academic Libraries, Digital Libraries.*

INTRODUCTION

A group of organizations who come together to fulfill a combined objective that requires co-operation and the sharing of resources is called library consortia. And need to have a clear mutual goal in order to ensure their success. A library Consortium formation can be local, regional, state, national and inter institutional level. There are likely two main reasons for the increase in consortia numbers. Firstly the growth of information technology and the resulting decline of the role of print in library collections have made sharing much more viable. In 1960s consortia begun by sharing biographical data; in the current era, library items need have no physical location and access can be instantaneous from any participating library. The second region is the serial crisis. The spiraling cost of resources, particularly journals, has forced library to band together in order to mitigate the damage. The libraries are committed to providing and making accessible the best possible international, educational, Research, cultural, and recreational materials to serve the academic and research community in the country. The libraries most important technology goal is to give all citizens access to information regardless of format, and regardless of where the information is stored. The secondary goal is to make that access available from anywhere in the community in so far as possible. Network is essential partner in this exercise as it facilitates access to vast information services. Networks have potential to improve library services in several ways. The continuous improvement in the networking and Internet technology helps libraries to reduce the cost of information provision, thus creating new opportunities for the libraries to play their role in information provision to its end users.

To solve these problems library co-operation started long ago. Several new dimensions of the library cooperation evolved, viz, library networks, ILL, document-delivery, library consortium etc. The more accepted system of resource sharing is library consortia. Library consortia in today's digital age are quite different from that of library

networks in yester years. The resources that are shared in today's consortia environment as predominantly in electronic form such as electronic journals and databases.

DEFINITION OF LIBRARY CONSORTIUM

Consortium means an association, typically of several companies for a common purpose. It is an association of similar type of organization who are engaged for producing and servicing the common things for providing services for a specific purpose of its users. *Oxford English* **Dictionary***:* An agreement, combination, or group (as of companies) formed to undertake an enterprise beyond the resources of any one member - ***Webster Dictionary***

A consortium is an association of two or more individuals, companies, organizations or governments (or any combination of these entities) with the objective of participating in a common activity or pooling their resources for achieving a common goal. A Consortium could be described as a group of organizations who come together to fulfill a combined objective that usefully requires co-operation and the sharing of resources. And need to have a clear mutual goal in order to ensure their success. The aim should be to deliver more than the sum of the individual parts. A library Consortium formation can be local, regional, state, national and inter institutional level.

NEED FOR CONSORTIUM

Access to resources is now considered more important than collection building. The consortium facilitated the libraries to get the benefit of wider access to electronic resources at affordable cost and the best terms of licenses. A consortium with the collective strength of resources of various institutions available to it is in a better position to address and resolve the problem of managing, organizing and archiving the electronic resources. Researchers, their patience and their willingness to accept services that is available on demand. Universities and colleges are finding it hard to maintain the subscriptions to even for core journals due to ever increasing cost of the journals subscription and also shrinking budget. Improving the quality and standard of research bringing it to a level of global recognition by improving the access-base of literature to them is essential. Whole world is moving towards electronic publishing and the cost of the electronic publishing is much cheaper than that of the print version. Last ten years there has been substantial increase the production of E – Journals the world wide. A statistics collected from leading publishers over one lakh fifty thousand serials published every year the world over, more than seventy thousand cover scholarly communications, and among these more than twenty thousand titles are electronic journals and are accessible in the internet. More than twenty five hundred among these scholarly journals are free for all, which comprise a vast treasure of scholarly content from around the world. At the same time users community also has been influenced by these technologies to such an extent that there has been demand from users for providing such electronic information services in the libraries.

WHAT IS LIBRARY CONSORTIA?

A consortium is a group of libraries that want to have a central place to store content in centralized manner and distribute to all associated libraries. Consortia is a generic term to indicate a group of libraries that are working together for a common goal whether to expand co-operation on traditional library services such as collection development of electronic media. The aim of the consortia is to achieve what the member of the group cannot achieve individually. A consortium supports resource sharing and provides services to users through programmers in co-operative acquisition; access to electronic resources and access to physical collection, enhanced inters library loan and document delivery.

OBJECTIVES OF LIBRARY CONSORTIA

The main objectives of library Consortia are as under:

- To develop co-operative and consortia solutions to the challenges faced by members, in the acquisition, processing, preservation, exploitation, dissemination and delivery of information and library materials, for the benefits of their institutions.
- To develop co-operation with other institutions to reduce the subscription cost and maximize utilization of resources.
- To develop technical skill of library staff in using electronic resources.
- To guarantee local storage of the information acquired for continuous use by present day and future users.
- To assist libraries in the Consortium to pursue and achieve their own institutional objectives.
- To identify the methods and models of consortia suitable for Indian environment.
- To develop technical capabilities of the staff in operating and using electronic publication databases.
- Strategic alliance with institutions that have common interest resulting.

ADVANTAGES OF LIBRARY CONSORTIUM

- It provides each institution with the ability to share resources with out sacrificing the individuality to each member library.
- Co-operative research and development in application of information technology enhances service and realize cost efficiencies.
- Consortium acts as an agents for all member libraries and negotiates a purchase price that a lower than that available to individual institution.
- Allows Remote Access, Availability 24x 7x 365 formula.
- Reference linking: Facility to move easily and swiftly between related articles.
- At the same time many users able to consult the same journal.
- A comprehensive collection is possible, Building communication among different libraries.
- Avoid duplication of core collection especially for core journals, Scope of electronic archives.
- Save the time of the user (Fulfillment of Ranganathan's fourth law).

TYPES OF CONSORTIA

The types of consortia identified are generally based on various models evolved in India in verity of forms depending upon participations' affiliation and funding sources.

- **Local:** Several libraries within a physical location may band together to cooperation with each other in a limited geographical area.
- **Regional:** The regional could be several cities, a certain geographical area, several states or provinces. These libraries often have a common goal to serve a population.
- **Multi Regional:** Several institutions within a geographical area have banded together to provide expanded services to the clientele. Greater bargaining power develops and as more institutions learn about the consortium other institutions, often in smaller consortia themselves, join and create an expanded consortium. As far as public libraries is concerned join in one of the three types of above consortia.
- **Specific area of focus:** Individual libraries containing specialized materials, such as medicine, engineering, nursing or law, may band together.
- **Level of membership:** Generally large consortia create different classes of membership. All institutions joining the consortia gain the advantage of expanding their individual collections when taking advantage of the other material of the different collections.

LIBRARY CONSORTIUM MODELS OF LIBRARIES IN INDIA

- **Open Consortia:** This type of consortia is very flexible and it is the wish of members of consortia to join and leave at any time when they please. INDEST Consortium is an example to this.
- **Closed Group Consortia:** It is within defined group either by affiliation and collaboration, among them like CSIR, DAE, IIM Consortium and the formation and operation of the consortia guidelines and its administration are fairly simple and easy.
- **Centrally Funded Model:** In this model, consortium will solely depend on the parent body. A few examples are INFONET by UGC, ICMR, CSIR by DSIR.
- **Shared-Budget Model:** In this model, the participating libraries take the lead and form the consortium. IIM and FORSA are examples of this model.
- **Publisher Initiatives:** The Emerald Full-Text Library published by the Emerald Publishing Group (formerly MCB University Press) is recent example. Here, consortium members will get deep Discount price to the participating libraries.

CONCLUSION

In present scenario consortium has become a very important feature of the academic library. Even with all the advantages, finding and negotiating purchases for library consortia is not an easy process. Forming a consortium of libraries, way of life to maximize resources based to meet the genuine needs of users. Participating library needs to take active In the fast changingpart, Major publishers are willing to come forward society, coming together and serving better - wise & economical way. Our libraries face resource crunch, to optimize the infrastructure and access to INFLIBNETinformation through consortia. & Participating libraries work The developments in electronic publishing andtogether to achieve set goals. the new models offered by publishers displays a number of opportunities if library managers dare to take the necessary decisions.

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Library Consortium in the Current Era of Communication

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ABSTRACT

The cost of foreign journals has been increasing with an alarming rate. Shrinking of library budgets has led to resource sharing and interlibrary loans between libraries and establishment of various library consortia. In this paper we study library consortium, its need, importance, library consortia of India and some worldwide library consortia. We study utilization of the e-resources and role of consortia for effective use of electronic resources in libraries.

Keyword: *Library consortium-resources, digital resources, internet, ICT.*

INTRODUCTION

In the current era of information technology, knowledge is the most powerful asset of any country. Libraries are playing a key role in education, research and development. Information and Communication Technology (ICT) have revolutionized the publication criteria and resource sharing. Due to wide use of internet, and variety of networks, accessibility of e-resources increased and led to increase demand for digitalized form of resources, online full text journals and electronic resources. ICT facilitated the establishment of library consortia.

WHAT IS CONSORTIUM?

According to the **Online Dictionary for Library and Information Science (ODLIS)**, the **Consortium** is defined as "An association of independent libraries and/or library systems established by formal agreement, usually for the purpose of resource sharing. Membership may be restricted to a specific geographic region, type of library (public, academic, special), or subject specialization. In the United States, two leading examples are the Orbis Cascade Alliance, serving member colleges, universities, and community colleges in Oregon and Washington, and Ohio LINK, serving the college and university libraries of Ohio and the Ohio State Library. Plural: *consortia*. Compare with network."

A consortium is a group of two or more individuals or organizations to participate in a common activity and to pool their resources for achieving a common goal.

NEED FOR LIBRARY CONSORTIUM

- increases in prices of journals
- shrinking library budgets
- cuts in subscriptions to journals over the years
- serial crisis
- explosion of information.

Indian library professionals are facing a big challenge to cope with the proliferation of e-resources. There have been efforts by different groups of libraries in forming consortium.

The consortiums in our country are serving the R&D sector and to the research and development system of our country.

ADVANTAGES OF CONSORTIUM

- Consortium offers flexible pricing and in result researchers, students and faculty get access to multi Journal, multiyear license access to electronic journals on cheaper price.
- Increment in knowledge resource basedespecially through journals.

- To enable countrywide integrated resource sharing.
- To enhance the knowledge resource base comparable to worldwide leading institutions.
- To hold down the increasing cost of journals.

FIRST LIBRARY CONSORTIUM IN WORLD

The first ever library consortium came into existence is OhioLINK came into existence in the year 1987. It is a cooperative venture of University libraries and the Ohio Board of Regents grew out of a recommendation by the board of library committee.

In 2013, OhioLINK was brought under the Ohio Technology Consortium. OH-TECH provides administrative support to Ohio's statewide technology infrastructure, which includes OhioLINK, the Ohio Academic Resources Network (OARnet), the Ohio Supercomputer Center (OSC), e-Student Services and the newly established Research and Innovation Center. It is funded by the Ohio General Assembly through the Ohio Board of Regents and OH-TECH reports to the Chancellor of the Board of Regents.

Ohio Library and Information Network (OhioLINK) and its member libraries provide access to:
- nearly 50 million books and other library materials
- nearly 85,000 images, videos and sounds
- nearly 50,000 theses and dissertations from Ohio students
- more than 150 electronic research databases
- millions of electronic journal articles
- over 100,000 e-books.

UGC-INFONET DIGITAL LIBRARY CONSORTIUM

The UGC-Infonet Digital Library Consortium was started in December, 2003 by UGC through INFLIBNET (Information & Library Network) for providing access of e-resources to the universities. All universities are covered under Section 12B of the UGC Act, 1956 are eligible to get access to the e-resources through theConsortium.

The programme is wholly funded by the UGC and executed by the INFLIBNET (Information and Library Network) Centre, Gandhinagar, Gujarat.The Consortium provides current as well as archival access to more than 7500+ core and peer-reviewed journals and 10 bibliographic databases from 26 publishers from different disciplines. The University Grants Commissionprovides funds through INFLIBNET required for providing access to various e-resources subscribed by the Consortium to selected member institutions.

INDEST-AICTE

- **Indian National Digital Library in Engineering Sciences and Technology:** In 2003 Ministry of Human Resource Development (MHRD) established the INDEST Consortium to provide the access of e-resources to leading scientific and technical institutions ofIndia:
  - Indian Institute of Science (IISc)
  - Indian Institute of Technologies (IITs)
  - Indian Institute of Managements (IIMs)
  - National Institute of Technology(NITs)
  - few other institutions.

The consortium headquarters is situated at IIT, Delhi.

The idea of the library consortia INDEST, came in "National Seminar on Knowledge Networking in Engineering and Technology Education and Research" held at IIT Delhi in December 2000 under the Ministry of Human Resource Development. The seminar was coordinated by Dr. Jagdish Arora.

The INDEST Consortium was re-named in 2005 as INDEST-AICTE Consortium for providing access to electronic resources to all AICTE affiliated institutions.

- **National Knowledge Resource Consortia (NKRC):** The National Knowledge Resource Consortium (NKRC) has been established in 2009. It is a network of libraries and information centers of 24 DST and 39 CSIR institutes. Over the period of time, the Consortium grew in number of resources as well as in number of users. NKRC facilitates access to more than 5,000 e-journals of all major publishers, citation, patents, standards, and bibliographic databases. Apart from licensed resources, NKRC also provides access to open access resources. The Consortium envisions emerging as a leader to serve the R&D sector with much needed information to strengthen the research and development system in the country.
- **Ministry of Communications and Information Technology:** Ministry of Communications and Information Technology (MCIT) consists of mainly three departments namely Department of Information Technology (DIT), Department of Telecommunication (DOT), and Department of Post (DOP).
- **Status:** It is a non-profit making and an Association of Library, Documentation and Information Centre under the Ministry of Communications & Information Technology.
- **DeLCON-DBT e-Library Consortium:** DBT e-Library Consortium (DeLCON) is an Electronic Journal Consortium which is established on January 2009.

  Currently the consortium includes:
  - 16 DBT Institutions including ICGEB, New Delhi
  - 18 North Eastern Region (NER) Institutions
  - The Biotechnology Industry Research Assistance Council (BIRAC), New Delhi.

  Now, there are around 34 members of DeLCON.

  Around 926 Journals and SCOPUS database are covered under DeLCON. These all are accessible by the DeLCON Consortium Members through the DeLCON Portal (http://delcon.gov.in). Others can also view and access abstracts of papers as free of costs.

  The consortium headquarter is at the National Brain Research Centre, Gurgaon, Haryana and Department of Biotechnology (DBT). It functions under a DeLCON Steering Committee for inter-institutional coordination. Government of India provides funds required for the subscription of e- resources for Universities/Institutions and take decisions on policy issues under the overall policy directions.
- **CeRA- Consortium for e-Resources in Agriculture:** Consortium for e-Resources inAgriculture (CeRA) was established inNovember2007 forfacilitating accessibility of scientific journals to all researchers/teachers in the National Agricultural Research System. CeRA is providing access toonline journals which play an importantrole in research and teaching. Currently 147 institutions in NARS have 24×7 online accesses to important journals. In CeRA access to journal is through IP authentication. Thomson Web of Science for Science Citation Index (SCI) has been made available to the Lead Institute (IARI), but the facility is available to all members of CeRA.

N-LIST

The Project N-LIST entitled "National Library and Information Services Infrastructure for Scholarly Content (N-LIST)" is jointly executed by the UGC-INFONET Digital Library Consortium and INDEST-AICTE Consortium

N-LIST provides access to e-resources tofaculty, students and researchers from colleges and other institutions through servers installed at the INFLIBNET Centre. The authorized users can download articles required by them directly from the publisher's website.

Current Status: TillMarch, 2015 around 4455 colleges havegot registered with the N-LIST programme including 4050 Govt./Govt. aided colleges covered under the section 12 B/2F of UGC Act as well as Non-Aided colleges.

HELINET

HELINET stands for "Health Science Library and Information Network" adopted by the Universities and successfully implemented, which is first of its kindconsortium in the country. The main aim and vision underlying the consortium was to improve the quality of research and education in the health science institutions of the state through the enhanced access of high quality medical information.

The main benefit of the consortium was expanded access of reputed international e-journals. Before the launch of this consortiumthe access of foreign medical journals to any particular college was restricted to around hundred journals. It may be noted that after the existence of HELINET it has become possible for any college to access and share more than 600 journals, withthe effect of increased access by 6-times.

FORSA

Indian astronomy library professionals have formed a group namely "Forum for Resource Sharing in Astronomy and Astrophysics" (FORSA), which comes under "Open Consortia", in which the participants are affiliated to the various government departments and organizations. It can be noted that in this consortia the professionals willingly come forward and actively support to the consortia formation. As a result there are now four consortia such as Nature Online Consortium, Indian Astrophysics Consortium for physics/astronomy journals of Springer/Kluwer, Consortium for Scientific American Online Archive and Open Consortium for Lecture Notes in Physics Springer.

INTERNATIONAL COALITION OF LIBRARY CONSORTIA (ICOLC)

The International Coalition of Library Consortia (ICOLC) is a self-organized group, consisting of around 200 library consortia in the North and South America, Australia, Europe,Africa and Asia. The main feature of the group is that the member consortia serve almost all types and sizes of libraries. The group ICOLC supports participating consortia byorganizingeffective discussion on the burning issues of common interest.

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Library Consortium in India: An Overview

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ABSTRACT

Library consortia concepts came first time from academic libraries formed consortia for the primary purpose of sharing printed materials. Recently, academic libraries are having consortia to provide common access to electronic resources across the Internet, and they are forming these consortia on a statewide basis Library This task is very difficult for a single library. However, by forming a consortium among libraries, it becomes possible to purchase information in stabilized and reasonable prices. Library consortia are really helping the researchers, faculties and the students to retrieve the information and save their time. It, providing for physical and electronic delivery of materials, and integrating the collection-development process are all distinct and crucial steps in moving toward the twenty-first century library

Keywords: *Library Consortia, Library Consortia Concept, Library Consortia Features, Need of Library Consortia, India- Library Consortia.*

INTRODUCTION

A library consortium is a group of libraries who partner to coordinate activities, share resources, and combine expertise. The International Coalition of Library Consortia is an informal discussion group of such consortia. Library consortia offer significant advantages to increasingly strapped libraries. The sharing of resources and collaboration on shared goals often enable libraries to deliver higher quality services than they would be able to deliver on their own.

Consortia may be formed at a local, regional, national or international level, on a functional or format basis, or on subject basis. Majority of the libraries particularly in developing countries are thinking today about the co-operative purchasing for any group of libraries. Thus, Consortia are constituted for often being useful for establishing a formal structure regarding resource sharing with formal agreement by each participant library.[1]

DEFINITION OF CONSORTIA

A consortium is an association of two or more individuals, companies, organizations or governments (or any combination of these entities) with the objective of participating in a common activity or pooling their resources for achieving a common goal. Consortium is a Latin word, meaning 'partnership, association or society' and derives from consors 'partner', itself from con- 'together' and sors 'fate', meaning owner of means or comrade.

A library consortium is any local, statewide, regional, or interstate cooperative association of libraries that provides for the systematic and effective coordination of the resources of schools, public, academic, and special libraries and information centers, for improving services to the clientele of such libraries.[3]

CONCEPT OF LIBRARY CONSORTIA

Library consortia concepts came first time from academic libraries formed consortia for the primary purpose of sharing printed materials. Recently, academic libraries are having consortia to provide common access to electronic resources across the Internet, and they are forming these consortia on a statewide basis Library This task is very difficult for a single library. However, by forming a consortium among libraries, it becomes possible to purchase information in stabilized and reasonable prices.

Historically, the common platform of library co-operation was the sharing of union catalogue, document delivery services, storage facilities, collection development and human resources at local, national and regional level. Another form of co-operation was

based on inter library loan services where cooperating libraries agree to share their resources among the member libraries. This form of cooperation enabled libraries to borrow books, periodicals and other reading materials which were not available locally. The sending of requests and delivery of materials through the postal, fax and courier services. However, the real drive for co-operation was seen after when more and more libraries started getting automated and used computers for libraries all house - keeping programs.

FEATURES OF LIBRARY CONSORTIA

The features of library consortia are below:
- It provides each organizations and institutions with the capacity to share their resources
- without sacrificing the individuality of each member library.
- The collections of the Consortium libraries enable each member library to support scholarly research for its users.
- Cooperative research and development in application of information communication and technology enhances service and realizes cost effectiveness.
- Staff development and interaction with quality of service.
- It is the cooperative task to reduce the cost of purchase consortia. As a result, end users can take benefits of more resources than would be available through one library.
- To advance library services are provided with an emphasis on access to new E-resources including databases and services offered through the internet and www.
- To expanding inter library searching at less cost is possible.
- Uncertainties in legal issues are handled with more confidence.[5]

NEED OF LIBRARY CONSORTIA

Several factors call for the adoption of consortium among libraries. Some of the major factors are:
- **Literature Explosion:** The voluminous growth of literature has made it impossible for a library to attain self-sufficiency. Library materials, which have grown exponentially in many forms and formats like books, periodicals, research papers and non-book materials have made it beyond the control of a library to acquire all the materials which are being produced. It is estimated that new information grows about 30% per annum. The world's total yearly production of print, film, optical, and magnetic content would thus require roughly 1.5 billion gigabytes of storage. This is the equivalent of 250 gigabytes for each man, woman, and child on earth.
- **Limited Finance:** Crunching funds is another factor has lead libraries to go for consortia development activities. Libraries are finding it hard to maintain the subscription to even for core journals due to ever increasing cost of the journal subscription especially international ones by Indian Universities which is even less than 300 titles, where as the average number of journals subscribed by the western countries is much higher.
- **Users Demand:** Access to Information differs from user to user. Students may require books for educational purpose but a scientist or a specialist needs some advanced literature in his area of research. To meet all these requirements successfully by a single library is quite impossible. No library, however big, is in a position to claim self-sufficiency in these multitude and mass sources of knowledge. The demand of the user is changing and ever increasing with newer revolutions and developments.
- **Professionalization:** The professionalization of library service has the most important influence on consortia. The changing role of librarian from `gatekeeper of information' to manage 'gateways to information 'has enhanced the value of library consortia.[6]

ADVANTAGES AND DISADVANTAGES OF LIBRARY CONSORTIA
Some of the important advantages and disadvantages of the library consortium are as following:

Advantages of Library Consortia
- Consortia-based subscription to electronic resources provides access to wider number of electronic resources at substantially lower cost;
- Optimum utilization of funds.
- Facilities to build up digital libraries
- Helpful to provide better library services like CAS and SDI
- Cost Sharing for Technical and training support
- Electronic Journals demand neither library space nor shelling costs nor can they be stolen from the library
- The consortium have been offered better terms of licenses for use, archival access and
- Preservation of subscribed electronic resources, which would not have been possible for any single institution; and Available 24/7.
- Less economy expansion.

DISADVANTAGES OF LIBRARY CONSORTIA
Some of the important disadvantages of the library consortium are as following below:
- Absence of a printed copy of Journals
- Require training of staffs in handling electronic documents etc.
- Consortia require high initial investments in licensees and information and communication technology.
- Copyright problems.
- Unreliable telecommunication links and insufficient bandwidth.
- Lack of archiving and back files availability.
- Internet Access ID necessary.
- Users are not accepting e-journals as per with the printed Journals.[7]

LIBRARY CONSORTIA IN INDIA
Library consortia in India are below:
- **CSIR Library Consortia (Council for Scientific and Industrial Research, New Delhi)** (http://www.niscair.res.in/ActivitiesandServices/MajorProjects/ majproj.htm# ejournalcons): The Council of Scientific and Industrial Research has 40 national laboratories carrying out R & D work in the areas of Engineering, Biological, Chemical, Physical, Environmental and Information Sciences. The CSIR e-Journals consortium has envisaged providing accessibility to > 4500 electronic journals published by leading publishers and learned societies.
- **INDEST (Indian National Digital Library in Engineering Sciences and Technology, New Delhi)** (http: //paniit. iitd.ac.in/indest): The Ministry of Human Resource Development has set up the, Indian National Digital Library in Engineering Science and Technology Consortium. The Ministry provides funds required for providing differential access to electronic resources subscribed for the consortium to the core members through the consortia headquarters set-up at the Indian Institute of Technology (IIT) Delhi. The total number of members in the consortia has now grown to 115. The INDEST Consortia subscribes to over 4000 electronic journals from a number of publishers and aggregators.
- **FORSA (Forum for Resource Sharing in Astronomy and Astrophysics)** (http://www.iiap.res.in/library/forsa.html): The Forum for Resource Sharing in Astronomy and Astrophysics, the consortia of Raman Research Institute, Indian Institute of Astrophysics, Tata Institute of Fundamental Research, Inter University Centre for Astronomy and Astrophysics, National Centre for Radio Astrophysics,

Physical Research Laborotory, Nizamiah Observatory and State Observatory provides access to 25 e-journals from Kluwer to their users with the payment of 12.5% over and above the Print subscription. This consortium has successfully negotiated with publishers of NATURE to provide access to its e-version at a price of almost 1/3 of the list price.

- **HELINET (Health Sciences Library & Information Network, Banglore)** (http://jgateelinet. informindia.co.in/about/about.asp): Health Science Library and Information Network is a successfully implemented consortium which is first of its kind in the country. The consortium was started with a vision to improve the quality of education and research in the Health Science institutions of the country through enhanced access to high quality medical information. HELINET's goal is to deliver information to users' desk-top with round-the-clock access. The major benefit of this consortium is expanded access to core international e-journals. Before the launch of the consortium, access to foreign medical journals by each college was limited to around 100. HELINET has made it possible for each college to access and share the contents in more than 600 journals, increasing the access provision by 6-times.

- **ICICI Knowledge Park (Industrial Credit and Investment Corporation of India)** (http://www. iciciknowledgepark.com/): The Knowledge Park at Hyderabad has signed an agreement with Informatics India Ltd provide access to J-Gate Custom Contents for Consortia service to four Hyderabad based and one Pune based R & D Institutions. Initially this service is free for the members with the objective of making it self-sustaining in the later stage.

- **IIM Consortia (The Indian Institute of Management):** Six Indian Institutes of Management have formed a consortium and jointly approached the publishers of e-journals and databases in the area of Management, Social Behavioral Science source. They have been giving IP enabled access to e-journals. Well renowned publishers like Elsevier (247 titles), Blackwell (268 titles), Kluwer (33 titles), Wiley (3 titles) provide their resources online to the members of the IIM Consortium. Apart from 25 titles free against print subscription, 2,300 titles as a part of EBSCO databases and 800 titles as part of ABI Inform database have been made available to users of IIM libraries electronically.

- **UGC-Infonet (University Grant Commission, Delhi)** (http://web.inflibnet.ac.in/ infohigcinfonet/ugcinfonet.jsp)**:** UGC-Infonet E-Journals consortium initiative was undertaken by the Indian University Grants Commission (UGC) to facilitate free access to scholarly journals and databases in all fields and disciplines by the research and academic community across the country. All universities who are under the purview of UGC have been provided UGC-infonet Connectivity and access to scholarly e- Journals and Databases. 122 universities are accessing resources from the programme. The access is based on IP range. This effort has had a noticeable impact on the research and academic community. It covers almost all areas of learning like Arts, Humanities, Social Sciences, Physical and Chemical Sciences, Life Sciences, Computer Sciences, Mathematics and Statistics etc. and other subject areas are to be added in near future. The programme is wholly funded by the UGC and monitored by Information Library Network (INFLIBNET).

- **ICMR (Indian Council Of Medical Research)** (http://vvww.jecccmr.informindia. co.in/about/about.asp)

As part of modernization the Indian Council Of Medical research has under taken many new initiatives like subscribing to JCC@ICMR and Full Text Electronic Databases *i.e.* ProQuest. To keep pace with the rapidly changing information technology scenario, the Council entered into the e-journal arena through developing an e-journal consortium. The ICMR has identified five core bio-medical journals and subscribes for e-version in consortia mode to all ICMR institutes. These include Lancet, Science, BMJ, NEJM, and

Nature. This e-journal consortium will be beneficial for cross sharing of information among the ICMR Institutes.

CONCLUSION

Library consortia is really helping the researchers, faculties and the students to retrieve the information and save their time. It, providing for physical and electronic delivery of materials, and integrating the collection-development process are all distinct and crucial steps in moving toward the twenty-first century library. It benefits the libraries to procure more electronic resources in the library with limited library budget and this is what the libraries require in the present scenario. India should also take initiatives to establish national archival centers like United States. The mission of the national archival centre could be to build archival collection of important scholarly journal literature and to fill the gap in the library collections of journal back volumes and also help to reduce long term capital costs associated with storage.

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The Concept of E-Consotium: In Indian Perspective

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ABSTRACT

Consortium is an association of similar type of organizations/ institutions who are engaged for producing and servicing the common things for providing services for a specific purpose of its users The present paper explore the concept of consortium, definition, national consortium, international consortium, objectives, functions, type of consortium. The paper also explore the various consortia in various discipline.

INTRODUCTION

All types of libraries information centers are not in a position to subscribe all the information resources required by their users. Not even a single library can meet the thrust of knowledge required by all the readers from its stock of information to the full extent. The aim of consortia is to achieve what the members of the group cannot achieve individually. Journals play a major role in the Research and Development but unfortunately the number of journals and their costs have increased by three folds approx. every in 15 years and 226 percent, respectively during the last 20 years in terms of dollars, which may be further compounded by currency conversion whereas the increase in library budget was only 110 percent during the same period.

DEFINITIONS OF CONSORTIUM

The word consortium has been derived from Latin, mean 'association' or 'partnership'. In the language of law, it means the partnership or relationship between a husband and wife. There are various definitions in different dictionaries on consortium. Broadly the meaning is same in the context of library; an e-journal consortium means the collaborative acquisition of accessing rights to electronic databases and journals.

According to Oxford English Dictionary "Consortium means temporary cooperation of a number of powers, companies etc. for a common purpose. It is an association of similar type of organizations/ institutions who are engaged for producing and servicing the common things for providing services for a specific purpose of its users."

According to Webster's 19th new collegiate dictionary "Consortium is an agreement or group formed to undertake an enterprise beyond the resources of any one member."

TYPES OF CONSORTIUM

There are many types of consortia. Formation of a particular type of consortium depends upon many factors. Broadly there are following groups with different features:

- **Open Consortium:** In these types, libraries are to join and leave as and when they please. Member libraries are usually homogeneous in nature and require cross-sharing of the resources in a specific subject area *for example* INDEST (Indian National Digital Library in Science and Technology) Consortium of MHRD (Ministry of Human Resources Department), Government of India.
- **Closed Consortium:** As the name indicates, these types of consortium are formed by coalition, affiliation, and collaboration. Among exclusive member libraries, *for example*, Council of Scientific and Industrial Research, DAE (Department of Atomic Energy) and IIM (Indian Institute of Management) Consortia.
- **Centrally Consortium:** In this type, a parent body or the coordinating agency will have the financial responsibility for running the consortium *for example*, CSIR (Council of Scientific and Industrial Research), INDEST (Indian National Digital Library in Science and Technology), UGC- INFONET and ICMR (Indian Council of Medical Research) consortia etc.

- **Shared Budget:** In this type, management of funds and other aspects are handled individually by the member of libraries *for example*, IIM, and Forum for Resource Sharing in Astronomy and Astrophysics (FORSA).
- **Publisher's Initiative:** Certain publishers are also encouraging consortium formation by giving a deep discount in prices to the member of libraries *for example,* Emerald's publishing.
- **National Consortium:** This is a model perceived at national level which includes member libraries from one country.
- **International Consortium:** The end of this model is at International level.

CONSORTIUM IN INDIA

India is a developing country; due to economy, it is not possible for all universities to procure all documents, to subscribe journals and CD-ROM data basis. As a result, library networks started with the initiative of National Information System for Science and Technology (NISSAT) in forming Calcutta Library Network (CALIBNET) in 1986, Developing Library Network (DELNET) in 1988 and other networks subsequently. The University Grants Commission (UGC) set up Information and Library Network (INFLIBNET) in 1988.The following are the main consortia in India:

FORSA (1982):- The Indian Astrophysics Consortium called Forum for Resource Sharing in Astronomy (FORSA) is a typical example of homogenous group of members wherein the libraries have common area of interest and establishing the consortium is slightly easier than from heterogeneous type of members. The FORSA consortium consists of five members who joined the consortium for negotiating licensing for astronomy journals and identified a subscription agent as a supplier of journals. Under the consortium, Nature journal was also subscribed by six libraries which are committed to share the license fee to access the nature electronically.

- **CALIBNET (1986):** The Calcutta Library Network is a government of India project launched by the National Information System for Science and Technology (NISSAT).
- **INFLIBNET (1988):** Information and Library Network (INFLIBNET) is a versatile, integrated library and information system created in 1991 to support teaching and library research in higher education. The information and library network centre will network 135 universities, 35 institutions, 6,189 colleges, and 235 libraries affiliated to other organizations through UGC. It promotes automation, creates union catalogues, provides access to information sources, provides training etc.

  INFLIBNET has initiated interlibrary loans and document delivery services from the comprehensive collection of subscribed journals under JCCC@UGC- INFOMET. ILL is also known as Inter- Library Lending. INFLIBNET has designated most of the libraries to fulfill ILL request from the users, affiliated to 200 approx. universities covered under UGC. The ILL libraries together subscribe for 2000 plus journals that is not available through consortia. Universities can request for articles from the journal holdings of those libraries wherever they find useful articles in JCCC search, that are not available in that library.

  UGC-INFONET (2003) UGC-INFONET is an ambitious programme of UGC to interlink all the universities in the country with state-of-the-art technology. The network will overlay on ERNET backbone and provide internet and intranet services. It is providing internet connectivity to 150 universities in first phase. INFLIBNET is responsible for executing and monitoring the entire project. University Grants Commission (UGC) has initiated a programme called the UGC-INFONET E-Journals Consortium to provide online access to electronic journals and databases in all disciplines to the universities in India. Indian Universities constitute one of the largest educational systems in the world. Fast changing curricula, frequent introduction of new subject, globalization of education and competitive research, has increased the demand for scholarly journals over the years. But due to insufficient funds, which

affects the research and academic activity. Realizing the need for a common mechanism for access to scholarly information, University Grants Commission (UGC) set the priority for providing access to scholarly journals. UGC INFLIBNET and ERNET were came together to meet the challenges that may face the education community with respect to real time information. It covers almost all arrears of learning like arts, Humanities, social sciences, Physical and Chemical Sciences, Life Sciences, Computer Sciences, Medical, Mathematics and Agricultural science etc., and other subject areas are to be added in the near future. The programme is completely supported and funded by the UGC and monitored by INFLIBNET (Information and Library Network) Centre, Ahmadabad.

- **DELNET (1988):** DELNET (Developing Library Network) is a major resource-sharing library network in South Asia which covers a wide spectrum of member-libraries and their resources connecting more than 1659 libraries in 31 States and UTs in India and 20 overseas countries. Started in1988 at the India International Centre in New Delhi it was registered as a society in 1992. DELNET is committed to pool the information about resources scattered in the libraries in the country and consolidate information through union catalogues, lists and other databases. This is being done to satisfy the major information requirements of students, researchers, scholars and the public in the country. DELNET is extensively providing Interlibrary Loan and Document Delivery facilities used and popular services of DELNET. DELNET databases have crossed more than the six million records. DELNET has moved to its newly constructed building in JNU Campus in October, 2005.

  DELNET has been actively engaged with the compilation of various Union Catalogues of the resources available in member- libraries. It has already created the Union Catalogue of Books, Union List of Current Periodicals, Union Catalogue of Periodicals, CD-ROM Database, Database of Indian Specialists, Database of Periodical Articles, Union List of Video Recordings, Urdu Manuscripts Database, Database of Thesis and Dissertations, sample databases of language publications using GIST technology and several other databases. The data is being updated in each of these databases

- **TIFR (1999):** TIFR Library, Mumbai tools a resource sharing initiative in 1999 among the centers (five) and field stations (six) libraries of the 'Institute'. These centers (HBCSE, NCRA, CML, NSBS, & TIFR Bangalore Centre for Mathematics) and field stations (HEGRO, GMRT, CRL, RAC, and Gravitation Laboratory and Balloon Facility station) are the constituent part of the TIFR Institute. Initially they started consortia- based subscription from AMS (MathSciNet)) & Springer Link. TIFR members are experiencing with some common problems (location, funding, negotiation, access to achieves, cancellation of print subscription) to believe that their consortia initiatives seem to have bright future.

- **HELINET (2002):** HELINET stands for Health Science Library and Information Network conceived by the University. The major benefit of the consortium was expanded access to core international e-journals. HELINET has made it possible for each college to access and share the data on tent in more than 600 journals.

- **JCCC (2003):** The J-Gate Custom Content for Consortium (JCCC) is a virtual library of journal literature created as customized e-journals access gateway and database solution for the INDEST consortium. It acts as one- point access to 4,000+ subscribed currently by all the IITs and IISc and available online. The service offers the following facilities and benefits to users.

  Table of Contents Browsing: Users can select journals of their choice by searching journal title words and / or subject categories and browse the table of contents for the latest issues of the journals.

  Database Searching: JCCC@INDEST acts a comprehensive database of journal articles published in the journals subscribed by all IITs and IIsc (about 4,000). The articles

are indexed with subject keywords and are searchable by- Author, title words, abstract words, subject keywords, Institutional name or city to which the author belongs to.

A Union catalog of e-journals of these institutions can be browsed through JCCC@INDEST, and status of these journals can be seen just parallel to the abbreviations F (Free) C.S. (Consortia Subscription), L.S. (Library Subscription). It will help a lot to users to know the availability of journals.

INDEST (2003): The Ministry of Human Resources Development (MHRD) has set-up the "Indian National Digital Library in Engineering Sciences and Technology (INDEST) Consortium" on the recommendation made by the expert group appointed by the ministry under the chairmanship of Prof. N. Balakrishnan. The Ministry provides funds required for subscription to electronic resources for (48) institutions including Indian Institute of Science (IISc), Indian Institute of Technology (IITs), National Institute of Technology (NITs), Indian Institute of Management (IIMs) and a few other centrally-funded Government institutions through the consortium headquarters set-up at the Indian Institute of Technology, Delhi. Bedsides, (60) Government or Government- aided engineering colleges and technical departments in AICTE. Moreover, the INDEST-AICTE Consortium, as an open- ended proposition, welcomes other institutions to join it on their own for sharing better terms of agreement with the publishers. All electronic resources being have an active mailing list and a website. The consortium has an active mailing list and a Web site hosted at the IIT Delhi.

CSIR (2005) The Council of Scientific and Industrial Research (CSIR) in India has 40 scientific laboratories involved in basic and applied research in various disciplines. Many of the laboratories have well quipped libraries, and some of them act as the main information centers in different subject's functioning as consultant libraries at the national level. Access to electronic form of the libraries is belonging to these laboratories. Each of the laboratories has a well-established library documentation centre that is also backed up with strategic information support from the National Institute of Science Communication and Information Resource (NISCAIR), a constituent establishment of CSIR formed with the merger of INSDOC and NISCOM.

IIM Library Consortium: Six Indian Institute of Management (IIM) have formed a consortium and jointly approached the publishers of e-journals and databases in the area of management, social and behavior science source.

CONCLUSION

All types of libraries information centers are not in a position to subscribe all the information resources required by their users. Not even a single library can meet the thrust of knowledge required by all the readers from its stock of information to the full extent. So the need of consortia is purposeful. Second reason is that there is lack of ICT related infrastructure in Indian universities and consortia required a sound based ICT infrastructure. UCG should compulsory the membership of such useful consortia and should arrange a series of training and awareness programs to increase the use of such useful consortia.

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Effective Use of E-Resources by the Students and Faculty Members: A Study of Jesus and Mary College Library, University of Delhi

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ABSTRACT

In the present 'information age' information handling activity has become so prominent that a library is being called "Library and Information Centre". Electronic publishing of material is having a huge impact upon libraries and librarianship and it solve many problems of users related their information search.

This study discusses the concept of e-resources advantages, awareness and uses in the JMC library and also analysis that how Electronic information sources are becoming more and more important for the academic purpose.

Key Words: *E-resources, E-journals, E-books, E-database, Information Technology, CD ROM/DVDs.*

OBJECTIVES OF THE STUDY

- To know the frequency of the users for using e-resources.
- To study the use of different types of electronic resources.
- To know the purpose of using of electronic resources.
- To identify the problems faced by the users to use the ICT/Internet accessing.
- To study the availability of the existing Library Resources & Services.
- To ascertain the level of satisfaction among the users with the available library resources and services.
- To suggest recommendations to improve the electronic resources and services for the users.

JESUS AND MARY COLLEGE (JMC) LIBRARY: A PROFILE

JMC library occupies three floors of a four-storeyed building with a total area of **1686.81 sq. meters**. It is a well-organised, expertly maintained and fully computerized library and has 51,365 books and 95 journals and other reading materials. The total sitting capacity being about 210 with provision for adding more, with reading halls on all the floors. The library has been organized as follows:

The ground floor of the library has circulation counter, OPAC (Online Public Access Catalogue), Text Books and Encyclopedias, JMC faculty publications, Newspapers, Magazines and Journals. The first floor is dedicated to the Text-Book Section and a big Reading Hall.

Second floor- consisting the Reference Books, Book Bank Section, Seminar Room, Language Lab, Counselor Room, **e-Learning center** (Internet-Centre for the students and faculty members for searching the E-resources) are available on the second floor.

JMC library is automated with Troodon, integrated software which is developed by COMTEK Service Pvt. Ltd., New Delhi. This is fully integrated multi-user software designed to run on a variety of platform. It uses CCF to facilitate resource sharing among libraries. There are five modules in this package: Acquisition, Maintenance, Circulation, Serial Control, OPAC

The database maintenance use CCF to store bibliographic data and is based on ISO 2790. The report generation facility is also there. The package has an extremely user friendly interface with very good search facility.The Library provides facilities like OPAC and Book Transactions. Barcode technology is being used for the library in-house transactions. Library users can search for/and reserve the books through the OPAC

(Online Public Access Catalogue). High speed broadband connection with powerful Wi-Fi connectivity is also available in the library for the students as well as teachers. The library has a rich collection of Electronic resources, Internet, Audio visual collections, previous question papers are in e-form, Total 95 periodicals (Including National and International) and subscribing more than 150,000 e-books and 280 e-journals through N-list (INFLIBNET).

OBJECTIVES OF JESUS AND MARY COLLEGE LIBRARY

The aim of JMC library is to produce enthusiasm and eagerness of learning among the students and faculty members and help them to make use of available resources. The main objectives of JMC library are:

- To introduce students and teachers to vast resources of knowledge.
- To stimulate and guide the students to make proper use of their leisure time.
- To promote and create reading habit.
- To help the students to develop critical thinking, judgments and appreciation of reading materials.
- To widen the mental horizon of the students and make them to think independently.
- To shape the career of our student by providing right information.
- To offer variety of services such as news clipping, bibliographies, access to database and the Internet.

ELECTRONIC INFORMATION RESOURCES: MEANING

The resources which are available in electronic formats are known as electronic information resources. This information can be searched with the help of a computer. Electronic Information may be broadly defined as "The information stored in a medium, which requires an electronic device to read/access its contents". Information stored in different electronic media such as Floppies, Magnetic tapes, CD-ROMs/DVDs, Pen Drives, Hard Disk, OPAC, Online documents including online Journals, etc. constitute Electronic Information. Libraries offer many types of electronic resources, including subject research guides, indexes, electronic books and texts, electronic journals, library catalogs, reference sources, statistical sources, bibliographic databases, library website pages, sound recordings and image databases. Some information resources are accessible automatically via the particular College's IP address, whereas others are password restricted, and the passwords are only accessible to those who are on the same College network. It will not normally be possible to access these links from outside the particular college network. Unrestricted links will, of course, be accessible from anywhere. The Library makes available a range of electronic information resources – these include e-journals, e-books, online databases and listings of many useful web links.

TYPES OF ELECTRONIC INFORMATION RESOURCES

- **E-Journals (electronic journals):** The journals which are available in electronic formats are called **e-journals**. Some e-journals are entirely free where as some are subscribed by the Universities. The e-journals services subscribed by Delhi University include: Sage Journal Online, JSTOR.
- **E-Books (electronic book):** The books which are available in electronic formats are called **e-books.** An e-book is digital reading material and textual information that a user can view on a portable device. These books are published in digital form and can be purchased by any library. The method of searching e-books remains the same as in printed books by using title and author or any other related information. .e-books can be accessed and used on desktop computers and also on a wide variety of digital devices, *e.g.*, laptops, mobile phones and tablet PCs. E-books include reference books, Monographs and textbooks.

- **E-databases:** Database is a computer based data/information handling system having organized collection of data/information/records accessible to multiple user's through internet.
- **E-Services:** The revolution in Information Technology offers unparalleled opportunities for an instantaneous information communication through a number of services which include E-mail, online database search, CD-search, OPAC, resource sharing through networking, tele-conferencing. These advancements have contributed to the development of a new electronic information society. ICT helps us to meet these functions with improved efficiency in terms of time, human resource, usage and costs.

ADVANTAGES OF E-RESOURCES

E-resource is a term used to describe all of the information products that a library provides through a computer network. E-resources are plays a vital role in all the field of education to provide better services and easy access. The main advantages of e-resources are:

- **Speed:** We may access electronic resources very quickly.
- **Storage and Preservation:** e-resources may be preserved for long time and having ability to store and retrieve large amount of information. There is no need of physical storage space.
- **Multi-User Access:** The accessibility of information is made available for multiple users at a time with their terminals.
- **Huge Content** e-resources can storage and contain a vast amount of information in digital format.
- **Economical:** One time initial expenditure on infrastructure (Computer, printer, Scanner, Internet *etc.*) is high but maintenance of these electronic resources is very economic.

DISADVANTAGES OF ELECTRONIC RESOURCES

- Difficulty in reading
- Highly expensive resources
- Beginning high infrastructure
- Needed adequate infrastructure
- Skilled manpower required
- Need special equipment's to access
- Excessive printing of documents
- Copyright management and royalty issues with authors are
- Adding their might to problems of marketing.

ACCESS TO ELECTRONIC RESOURCES

There are two kinds of electronic resources i.e, Paid electronic resources and Free electronic resources and both electronic resources can be access by the users:

- **Direct access resources:** These are resources which can be used at any time/anywhere, Example: Databases available in CD form.
- **Remote access resources:** In this the publisher hosts e-resources at his website. When the library subscribes these e-resources, it provides access terminals to user through library LAN or campus LAN. The subscriber gets a user ID and password by which they can use the various available e-resources.
- **Selection of Electronic Resources:** Librarian and faculty cooperate to develop the library collections. Recommendations for the purchase of e-resources are accepted from faculty members as well as students, via librarian but final responsibility for the selection of library resources is totally depends upon the members of the library committee meeting.

ICT REQUIREMENT FOR ACCESSING ELECTRONIC RESOURCES

For accessing the electronic resources a minimum level of hardware and software are required.

- **Hardware Requirement:** Most e-resources subscribed by the consortium are web based, subscribing institution should have a full feature and configured system with high speed internet connectivity to get better access to e-resources.

  Most publishers prefer to make their e-resources accessible on campus network of subscribing institutions on dedicated IP addresses/range of IP address. Subscribing institutions should have campus network spread over their entire campus so as to maximize the usage of electronic resources.

  Moreover, institutions subscribing to e-resources should have sufficient number of PCs so that faculty, researchers and students get easily access the available e-resources.

- **Minimum Software Requirement:** Most electronic resources offered through the consortium requires an internet enabled multimedia PC equipped with an internet browser like internet explorer or Netscape navigator as their clients. With the availability of sufficient software e-resources can be accessible easily.

- **Internet Connectivity:** Institutions should have 528 kbps (preferably 2 mbps or more) connectivity to internet for improved access of electronic resources depending upon the total population of users.

E-RESOURCE MANAGEMENT TOOLS AND TECHNIQUES

- **Library website/Portal:** Majority of libraries delivering E-resources through their website/ portal. The library professional are creating list of the Journal Titles with URLs and organising e-resources according to alphabetical and/or subject wise for easy access. It is considered trouble-free tools for the library professionals and as well as library users.

- **Library OPAC (On line Public Access Catalogue):** This is a tool which offers a single platform /gateway for the access of all the available libraryresources. The users can access information regarding all the print as well as electronic resources through the OPAC. Few libraries also develop a database related to article indexing, and it can also be accessed through OPAC.

- **Library management software:** It is observed that the various software available in the market for the e-resource management like ERMSS, Libsys,Troodon, Netlib etc. These software facilitate to management all kind of information related the e-resources.

STEPS OF MANAGING ELECTRONIC RESOURCES

Various facets involved in the management of electronic resources,Some of them are:
- Requirement assessment
- Interacting with vendors
- Acquisition and negotiation of site licensing
- Updating the institutional/library website
- Providing training and user support
- Monitoring usage
- Cancellation criteria.

METHODOLOGY

For the present study, the survey method and Statistical Techniques is adopted. To collect the needed data, a well-structured questionnaire was developed and a total of 600 questionnaires were distributed to the users of Jesus and Mary College library to know the use of electronic resources. For Data Analysis and Interpretation the simple percentages and tables are used.

Table 1: Distribution of Questionnaires and Response

Respondents Questionnaires Distributed and Questionnaires Received Percentage

Questionnaires Distributed	600
Faculty Members	50
Students	550
Response Obtained	576
Response Obtained %	96%

The above Table 1 shows that 50 Questionnaires were distributed to faculty members and 550 distributed to students of all the disciplines and **576** were received. The response rate is **96%** which is quite enough to study the subject.

Table 2: Frequency of Using Electronic Resources

	Daily	**2-3 times in a week**	**2-3 times in a month**	**Once in a month**
Total Users in nos.	461	103	12	0
Percentage (%)	80%	17.88%	2.08%	00%

The table 2 presents the frequency of using electronic resources. It shows that the majority of the users *i.e.*, **80%** are using electronic resources daily, **17.88%** are using electronic resources 2-3 times in a week and **2.08%** user use these resources 2-3 times in a month.

Table 3: Using of Various E-Resources by the JMC Users

E-Resources	**100% Users**	**75% Users**	**50% Users**	**25% Users**	**0% Users**
E – Books	180	100	46	220	30
E – Journals	445	50	48	33	0
E- Databases	150	110	120	130	66
Websites	510	66	0	0	0
CD-ROM/DVDs	310	130	90	46	0
E-Mail	500	50	26	0	0

Table 3 shows the use of e-resources by the Jesus and Mary College users. As per this table we say that Most used e-resources are: websites, e-mail, e-journals and e-books.

Table 4: User's Awareness to Various E-Resources

E-Resources	**100%**	**75%**	**50%**	**25%**	**0%**
E – Books	210	140	110	66	50
E – Journals	436	72	68	0	0
E- Databases	220	150	120	61	25
Websites	480	72	24	0	0
CD-ROM/DVDs	410	110	56	0	0
E-Mail	560	16	0	0	0

The table no. 4 shows the Jesus and Mary College library user's awareness towards various e-resources and with the help of this table the calculations of rating for the knowledge of using e-resources are shown in Table-5.

Table 5: Rating for the Knowledge of Using Electronic Resources

E-Resources	100% Knowledge	75% Knowledge	50% Knowledge	25% Knowledge	0% Knowledge
E – Books	36.45%	24.30%	19.09%	11.45%	8.68%
E – Journals	75.69%	12.50%	11.80%	00%	00%
E- Databases	38.19%	26.04%	20.83%	10.59%	4.34%
Websites	83.33%	12.50%	4.16%	00%	00%
CD-ROM/DVDs	71.18%	19.09%	9.72%	00%	00%
E-Mail	97.22%	2.77%	00%	00%	00%

Table 5 shows the Jesus and Mary College user's awareness percentage (%) towards various e-resources.

Table 6: Opinion of the users about E-Resources

Reasons for using e-resources	Yes (%)	No (%)
Time Saving	532 (92.36%)	44 (7.63%)
Easy to Use	388 (67.36%)	188 (32.63%)
More Informative	410 (71.18%)	166 (28.81%)
More Expensive	380 (65.97%)	196 (34.02%)
More Useful	420 (72.91%)	156 (27.08%)

Table 6 shows the different opinion of the Jesus and Mary College users about e-resources. As per this 532 (92.36%) say that e-resources are time saving and 388(67.36%) say that it is easy to use and 410 (71.18%) say that the e-resources are more informative and 420 (72.91%) say that it is more useful but 380 (65.97%) users says that the e-resources are more expensive as compare to print materials in the library.

Table 7: Purpose of Using Electronic Resources

Purpose	Yes (%)	No(%)
Subject Related Material	546 (94.79%)	30 (5.20%)
Research Activity	22 (3.81%)	554 (96.18%)
Other Activity	8 (1.38%)	568 (98.61%)

The table 7 shows that a majority of the users 546 (94.79%) using of electronic resources for their subject purpose, 22 (3.81%) of the users using for research purpose and remaining 8 (1.38%) of the users using for other activity.

Table 8: Problems faced by the users while Accessing the Electronic Resources

Problems	Yes (%)	No(%)
Internet Connectivity	126 (21.87%)	450 (78.15%)
Lack of Infrastructure Facility	80 (13.88%)	496 (86.11%)
Skills and Training	48 (8.33%)	528 (91.66%)

The table 8 shows that 126 users (21.87%) facing the Internet connectivity problem while using electronic resources, 80 users (13.88%) are not satisfied with the infrastructure facility and 48 users (8.33%) feels that they had less skills and Training as an barrier of accessing the electronic resources.

CONCLUSION

The study shows that the use of the Internet and electronic resources has created a great impact upon users of Jesus and Mary College. Majority of the users are very much aware about the e-resources and they are using the various e-resources along with the print resources to their academic purpose. The study proves that the various users prefer to use the e-resources but some of the users are still untrained and unaware about the facility of e-resources. This study helps to improve the facilities and services related to On-line access to E-resources.

SUGGESTIONS

Based on the findings of the study and problems faced by the library users, the following suggestions are put forward to improve the usage of e-resources by the faculty members as well as students of JMC library

- Proper infrastructure in the library are also required for the use of internet and e-resources.
- Existing staff should be deputed for extensive hands on computer training not only for the computed application but also for the basic hardware and software training so that most of the technical problems will be solved including the major technical problems of daily routine which will no longer be headache on the part of library administration, thereby making library independent of such minor problems.
- Instead of only giving the user education programmed in the session starting period, it should be held at least thrice a year because there is a need to create more awareness of the e-resources among the users.
- There should be one permanent staff member to help the users to maximize the use of all the e-resources available in the library.
- Software should have multi lingual support system and integrated for effective searching.
- The UGC should allocate more funds/grant for modernization of these libraries as per new electronic era.
- The level of computers access and internet connections at the JMC library revealed a need for improvement with regard to connecting to a campus network, internet use is maximized by availability of networks.
- Library should increase the number of computer systems and these systems should be of latest available configuration.
- Library should increaser the data speed of internet connectivity.
- Jesus and Mary College library should purchase more e-resources related to the syllabus so the students and faculty can get the more information in a minimum time.

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Remote Access of Electronic Resources for Library Capacity Building: An Experience of National Law University Delhi

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ABSTRACT

Remote access of electronic resources has become necessity of the day. Research is a tedious task and ideas can be clicked anytime and anywhere. The boundary less information services can only be rendered to patrons through providing access of electronic resources beyond the library wall. The paper gives overview on various types of electronic resources. It analyses a number of options facilitating remote access of electronic resources subscribed by a university and accessible within the IP ranges. Different types of applications and software available for remote access facilities are discussed in the paper to fulfil the five laws of Sir Ranganathan. Selection and implementation of Remote Access Software in National Law University Delhi has been discussed with various reports for better future planning and management reporting.
Keywords: *Electronic Resources: Database; Remote Access; Remote Login.*

INTRODUCTION

Electronic resources popularly known as E-Resources are those resources which can be accessed by the help of electronic devices i.e. Computer, Mobile and tablets etc with internet. E-resources are a very broad term and include a variety of different publishing materials like e-journals, e-books, OPACs, e-reports, and e-database. E-Resources are electronic products that deliver a collection of data referring to full text, e-journals, image collection and other multimedia products and numerical and graphical data. Some of the common types are: indexing and abstracting databases; e-newsletter / magazine; electronic thesis and dissertations; full – text databases; e-journals; e-books; e-monographs; numeric and statistics databases; reference databases like dictionaries, encyclopaedias, directories etc. E-resources may be delivered in the form of DVD, CD-ROM, Hard Disk, Magnetic tape and on internet or web portal and so on. E-resources are basically of two type *i.e.* online e-resources; and offline e-resources. U.S. National Library of Medicine defines e-resources as in sub sections:

- **Access:** The ability to locate, to gain entry, and to use an electronic resource.
- **Acquired:** Refers to electronic resources, online or physical, which the Library receives through formal acquisitions processes, or to which the Library provides access through contractual, licensed, or other official agreements. These electronic resources may or may not be owned by or housed at the Library.
- **Collected:** Refers to electronic resources owned by, created by, or archived by the Library and selected for the permanent collection. This category also includes works which are stored elsewhere, but to which the Library has permanent ownership rights.
- **Electronic resources:** Works which are encoded and made accessible through a computer, online or in a physical format. This category includes an ever-growing array of electronic journals, monographs, reports, articles, databases, digital collections, still and moving images, sound, and interactive resources.
- **Link:** A pointer from the Library's Web resources or bibliographic records to an electronic resource. To link is not to acquire or to collect.

- **Online-only resources:** Works which are "born digital" and for which there is no counterpart in print or on physical media.
- **Physical media:** Tangible objects, such as disks, which store computer data.
- **E-Resources in the context of Library are:** "An electronic resource is any information source that the library provides access to their users in an electronic format".

E-RESOURCES, NEED AND IMPORTANCE

The reasons for use of electronic resources are generally because of the ease of usability, readability, affordability and accessibility. E-Resources have a number of benefits over the print media viz speedy information; no time limit; multi access; remote access; hyperlinks and multimedia; content; search facilities; e-mailing; e-mail alert; maintenance; physical space saving; security; and economical.

A Library subscribes to many electronic information resources in order to provide e-resources to their users free of charge. E-Resources of a library include lots of things: full-text journals, newspapers, company information, e-books, dictionaries, encyclopaedias, economic data, digital images, industry profiles, market research, career information, *etc*.

Many of databases allow users to create a personal profile in order to keep track of new content via email or RSS feeds. As a member of the Library, Users are provided with 24/7 access to library e-resources on campus or remotely via the library's proxy server.

Utility and Usability of Electronic Databases: A Past Experience: Dr. Manoj Kumar Sinha & Anupam Chnada (2014) state in his study "Usage of E-Resources by the Scientific Community Library Users of Assam University, Silchar A Comparative Study" describe about the usage of E-Resources available under the UGC-INFONET Digital Library Consortium and DeLCON Consortium by the scientific community Library Users of Assam University, Silchar representing from Bio-Medical Sciences and Ecology and Environmental Sciences. Survey method has been used using questionnaire as a data collection tool and Interview in some cases. Altogether 150 questionnaire was distributed and 117 responses received. The study was conducted during January 2013 to May 2013 only. This is a comparative study of utilisation of e-resources available under the above mentioned two important consortia.

Iqbal Bhat and Mahesh V. Mudhol (2014) stated in his study "Use of E-resources by Faculty Members and Students of Sher-E-Kashmir Institute of Medical Science (SKIMS)" describe Electronic information sources are computer-based information sources. There are several forms and types of electronic resources which are available on the internet. Some of the popular ones that are gaining ground are the electronic journals, standards, technical specifications, reports, patents, full-text articles, trade reports, and hosts of other document sources. This paper presents the findings of a survey about the awareness and use of electronic resources by medical students available in the medical institute libraries. The subjects chosen for this study were faculty members and medical students of Sher-E-Kashmir

Institute of Medical Science (SKIMS), Jammu and Kashmir, India. For evaluating study questions and data collection, the questionnaire was distributed to a random sample of 300 faculty members, MD/MS (*i.e.*, PG) and MBB final year (*i.e.*, UG) students. The results of this survey are presented and discussed in this paper.

K. Chandra *et a.l* (2014) stated in his study "A Study on Use Pattern E-Resources among Faculty Members in Arts and Science Colleges in Chennai "that an attempt to investigate the awareness of e-resources, experience level in using e-resources, time spent on using e-resources, purpose of using e-resources, use of various online sources and the most preferred place for accessing e-resources by the Associate Professors and Assistant Professors of Arts and Science Colleges in Chennai.

Nirmal Singh (2014) stated in his study "Consortium for e-resources in agriculture: qualitative and quantitative perspectives" describe Consortium for e-Resources in Agriculture (CeRA) is the palpable effort of the Indian Council of Agricultural Research to facilitate access to select scientific literature to the academic and research society in the National Agricultural Research System. The consortium provides access to articles from nearly 3000 journals in the broad spectrum of agricultural sciences, including 194 journals in the subjects of animal husbandry, livestock management and poultry sciences; animal nutrition, feed, feed additives and manufacture; dairy technology; fisheries and aquaculture and eterinary science. This article is an attempt to assess the journal collection of CeRA in the above-mentioned subjects. The review status of journals, impact factor, National Academy of Agricultural Sciences rating of scientific journals 2012 (effective from 1 January 2013) and access to archives, are the parameters used for assessment of the journal collection of the consortium.

Sarah Buck Kachaluba et al (2014) the Article "Developing Humanities Collections in the Digital Age: Exploring Humanities Faculty Engagement with Electronic and Print resources" describe about quantitative and qualitative research examining humanities scholars' understandings of the advantages and disadvantages of print versus electronic information resources. It explores how humanities' faculty members at Florida State University (FSU) use print and electronic resources, as well as how they perceive these different formats. It was carried out with the goal of assisting the authors and other librarians in choosing between electronic and print formats when performing collection development responsibilities.

REMOTE ACCESS OF E-RESOURCES

Automated library provide access of E-Resources through their library web portal. Library provide User ID and password to their users to access all E-Resources of the library. For access of E-Resources of library from outside the campus, the user can access the resources of the library by the same User ID and password. There is no need of other user id and password for access the library e-resources from outside the library. The user should open the link of the library and login by their user id and password in the space provided for login and start access the library E-resources.

Purpose and Statement of Problem under Consideration: The main purpose of the study is to aware library fraternity supporting patrons with no time and place limit with the help of remote access facility implementation. The current study relies upon the statement as under:

The academic/ research institutions spend a big part of its financial resources subscribing electronic databases. For the sake of better utilization of resources, the access of electronic database must be accessible to the patron to satisfy the laws of Sir Ranganathan as modified:

 (*a*) Researchers must access required database anytime and anywhere.
 (*b*) Electronic Databases must be in reach of its needier researchers.
 (*c*) Subscribed Electronic database must be available every time.
 (*d*) Research must be free to be present in the wall of the library to access electronic database to save time.
 (*e*) Database as a collection of bunch of information are expended with new information time to time and must be well informed to the patrons with greater accessibility.

METHODOLOGY

The paper includes the data collected during the implementation of Remote Access software for imparting wider access of electronic databases subscribed by the National Law University, Delhi. The study accesses the usage of electronic databases on various criteria. The usage data collected for first fifteen days *i.e.* 25th February, 2015 to 12th

March, 2015 revealing the number of users, number of login, data used by various categories of users are presented, evaluated and concluded for the paper.

- **Remote Access Technology around the World:** Remote Access of electronic databases is not a new concept around the world. A number of Universities provide such facility to its patrons through proxy server, virtual private network and commercial software players.
- **Proxy Server:** Proxy Server system is used to access private network of an institution from a remote location. Under the system a public IP is used to access the internal server through user name and password issued to remote users. Libraries maintain dedicated servers and provide its access through username and password via public IP authentication to its patron. Stanford University provides remote access of its databases through proxy servers. UC Barkley University Library, University of Washington, Perdue Libraries, Texas Libraries and GGS IP University are other libraries using proxy servers for remote access facility.
- **Virtual Private Network (VPN) Software:** Virtual Private Network or popularly known as VPN is a technology which allows to download a software to a computer terminal. After installation of VPN software a username and password is reset in the computer terminal which directly connects with the server of university automatically for providing access of each and every electronic resources accessible through IP ranges of aforesaid University. VPN System of remote access of electronic databases is very useful and secure mechanism; however it has certain limitations also. Users require identifying particular computer for downloading and installing VPN software. It is required to download VPN software every time while using different computer. It is also a chance to misuse of the access facility if the authorized user install and configure VPN software with password in computers not pertaining to his/her personal possession.
- **Commercial Software:** A number of commercial software is also available for supporting remote login facilities. EZproxy, Athens, Shibboleth and RemoteX are some major example of such software.

EZproxy is commercial software providing proxy server facility to libraries accessing private networks from outside of the Library. It facilitates IP authentications to the remote users. Electronic databases authenticate to accessing in IP Ranges of a university libraries could be accessed through user name and password allocated to the users through EZProxy software. The vendor claims that it gives a number of services like remote access facility, aggregation of all databases provided by different vendors, facilities like LDAP, SIP and Shibboleth. Currently Cloud based facilities has also started by EZproxy.

Athens is another identical service for single signon of electronic databases from remote location. Athens provides a number of services to libraries like to use single singing for accessing web resources and minimize administration involvement of the library. A user can create and manage user name for signing to access protected web resources.

Shibboleth is open source software based on Security Assertion Markup Language Protocol (SAML). It is known for separating the functions of authentication and authorization. Major goal of shibboleth is to allow users to access internal and external resources seamlessly using a single, institutionally controlled identity. (T. Sunitha, T and M.G. Sreekuma, M.G., 2012)

RemoteX is a cloud based remote access software services. It enables optimize usage of electronic databases subscribed by institutions. It provides secured access of electronic databases subscribed by the institution under one roof. It provides a single webpage visualizing commercial as well as open access resources to come in a single place for wider access. It is not required to purchase, maintain hardware infrastructure of eMail servers, central service, bandwidth costs, IP address registrations etc. It is not required

much administrative involvement of the library personal in issuing, managing and controlling username and password functionality.

IMPLEMENTATION OF REMOTE ACCESS SOFTWARE IN NATIONAL LAW UNIVERSITY DELHI

National Law University is currently subscribing 23 electronic databases which are accessible through IP ranges of the University. Being a leading law university it was in much demand to provide access of electronic databases due to various reasons as under:

- Effective and utmost utilization of Electronic databases subscribed by the University.
- Usage of electronic databases while the students are outside the University for participating in various national and international competitions.
- Use of Electronic databases during the academic vacations.
- Facilitating access to faculty members, LL.M. Students and Ph.D. scholars not residing in the University Campus.
- Justifiable use of electronic resources spending big financial resources.

Quotations were called among the service providers for providing services and supply of software supporting remote access of database subscribed by National law University Delhi. It is very interesting to share the technical views considered during the selection of the software. It was considered to procure cloud based application instead of server based application which could be costly in future aspects due to maintain new server and technical support and minimal involvement of library management while creating username and password. The use of cloud based application was also preferred due to reduction of technical problems may be faced after duty hours and during off days.

After carefully consideration the library committee considered and approved to procure RemoteX software. An IP Address was provided by the service and the same was included and updated in the list of IP ranges of the Universities with database service providers.

Analytical reports and statistics of first fifteen days (25th February, 2015 to 12th March, 2015) are provided for facilitating analytical views of the remote access of database by various user categories of National Law University Delhi.

STATISTICAL VIEWS OF USER REPORTS

RemoteX Software serves a number of reports like user statistics per day remote access usage of electronic resources, category wise usage of resources and per resources usage of electronic resources. The data is based over the use of last fifteen days.

- **User Statistics:** User statistics give over view of number of users are currently active and the number of requests pending of new users. Figure 1 shows that 97.4 % *i.e.* 534 users are already registered for accessing RemoteX software for accessing electronic resources, however 2.6% *i.e.* 14 users are under approval of requests for creating username for accessing the databases through RemoteX.
- **Per Date Total Data Usage:** Figure 2 shows a calendar view of days during 2015 using electronic resources for last fifteen days. The figure shows the usage of electronic databases from 25th February, 2015 to 12th March, 2015. The most darken view is the day on which the electronic resources were used and data were used by maximum of users.

Table 1 is a tabular representation of users and logins during last fifteen days. Table shows that on 25th February, 2015, 26 users used electronic resources, however on 12th March, 2015, 15 users used electronic resources. It has been observed that 01st March, 2015 is marked using the electronic resources by most of the users *i.e.* 27 users.

Table 1: Per Day Total Usage - 15 days report till 2015-03-12

Date	Users	Logins	Data Used (MBs)	Pct.
2015-02-25	26	37	123.11	6.03 %
2015-02-26	20	33	136.36	6.68 %
2015-02-27	23	38	119.81	5.87 %
2015-02-28	15	28	87.46	4.28 %
2015-03-01	27	47	111.51	5.46 %
2015-03-02	20	39	276.42	13.53 %
2015-03-03	18	36	99.27	4.86 %
2015-03-04	20	42	87.16	4.27 %
2015-03-05	12	22	71.88	3.52 %
2015-03-06	20	45	135.86	6.65 %
2015-03-07	19	42	136.64	6.69 %
2015-03-08	20	34	165.70	8.11 %
2015-03-09	26	42	136.59	6.69 %
2015-03-10	24	48	137.69	6.74 %
2015-03-11	20	38	84.69	4.15 %
2015-03-12	15	22	132.20	6.47 %
TOTAL		593	2042.35	

During the period, electronic 593 users made login for accessing electronic resources. It has been observed that 47 users login on 1st March 2015 which is highest in period under study. Table 1 also shows that during the period 2042.35 MB data was used during while using electronic resources. However 2nd March, 2015 is noted at maximum use of data among the period of observation. 276.42 MB data was used by 20 users and they have made login the remote access portal 39 times. 13.53% of total data used in fifteen days is used on the day.

Per Category Total Data Usage: The users have been categorized on the basis of designation and course of the study in NLU, Delhi. Table 2 indicates categories used for making users accessing electronic resources through remote access portal.

Table 2: User Categories of National Law University Delhi

S.No.	Description	Code Used
1.	Faculty Members	Faculty
2.	B.A. LL.B. 2010	UG 2010
3.	B.A. LL.B. 2011	UG 2010
4.	B.A. LL.B. 2012	UG 2010
5.	B.A. LL.B. 2013	UG 2010
6.	B.A. LL.B. 2014	UG 2010
7.	LL.M.	PG 2014
8.	Ph.D.	PhD
9.	Others including Non-Teaching Officers	Default

Table 3 implies a graphical presentation of per category total data usage during the period under survey and consideration. B.A., LL.B. 2014 batch *i.e.* UG 2014 has used electronic resources through remote access portal more as compare to other categories. However, only 1.9% usage has been used by PhD students. Faculty members have used electronic resources by 8.6%. It has been observed that the remote access portal has been utilized mostly by the B.A., LL.B. students under UG categories during the period of stud

LL.M. students under PG 2014 category stand second in using remote access facility for using database outside the University. In the volume of it is found that B.A. LL.B. 2014 batch under the code UG 2014 has used 448.74 MB data.

Table 3: Per Category Total Usage - 15 days report till 2015-03-12

Category	Users	Logins	Data Used (MBs)	Pct.
Default	4	16	30.23	1.46 %
Faculty	10	43	178.73	8.61 %
PG 2014	8	35	417.03	20.10 %
PhD	2	6	40.31	1.94 %
UG 2010	8	77	217.56	10.49 %
UG 2011	14	31	153.69	7.41 %
UG 2012	24	130	353.95	17.06 %
UG 2013	20	77	234.69	11.31 %
UG 2014	23	166	448.55	21.62 %
TOTAL		581	2074.74	

Table 3 gives detailed statistics of users, logins and data used by respective categories with percentage useful for administrative evaluation.

Per Resource Data Usage: National Law University Delhi subscribes and provides access of 23 databases. It is very informative to know about the usage of resources. Figure 4 show that Hein Online has the edge compared to other databases. 37% users access Hein Online for their day to day legal education and research activities. JSTOR is the second in this category. However it is not justifiable to quote the less used database.

Table 4 shows the number of users used various databases during the period Manupatra was used by 57 users which is maximum usage of a database used by users. Indiastat and Hart books by igroup are least used by only 4 users each. It is very useful to know that Manupata was used exclusively while made login by users. Hein Online stands second in unique session usage.

Table 4: Per Resource Total Data Usage

Resource	Users	Unique Sessions	Data Used (MBs)	Pct.
heinonline.org	36	110	768.11	37.02 %
www.jstor.org	53	183	539.10	25.98 %
manupatrafast.in	52	167	237.37	11.44 %
www.scconline.com	39	93	152.75	7.36 %
westlawindia.com	37	66	99.70	4.81 %
www.lexisnexis.com	34	57	79.49	3.82 %
kluwerarbitration.com	8	45	63.76	3.08 %
www.oxfordscholarship.com	21	25	28.64	1.38 %

www.epw.in	19	32	23.47	1.13 %
manupatra.com	57	157	20.64	0.99 %
ebooks.cambridge.org	16	21	15.74	0.76 %
taxmann.com	7	9	11.18	0.54 %
www.indiastat.com	4	5	8.35	0.40 %
igpublish.com	4	4	7.06	0.34 %
sagepub.com	8	8	4.65	0.22 %
www.tandfebooks.com	5	6	4.18	0.20 %
www.worldtradelaw.net	3	3	2.80	0.13 %
www.tandfonline.com	5	6	2.14	0.10 %
manupatrafast.com	10	13	1.68	0.08 %
hartpub.co.uk	4	4	1.45	0.07 %
www.claonline.in	6	7	1.40	0.07 %
kluwerlawonline.com	3	5	1.07	0.05 %
TOTAL		1026	2074.73	

However, the Table shows that 768.11 MB data was used by the 36 Users during the period which is highest among the use of data accessing 23 databases. However being a specialized subject based database, Kluwer Online has been used by only 3 Users with 5 unique sessions. Only 1.07 MB database has been used to access Kluwer Online.

FINDING AND VALUES OF THE STUDY

The paper evaluates the needs and purpose of providing remote access facility for accessing databases for which a big financial bucket is spent. The paper states that it is the duty of the librarian to provide greater visibility of electronic resources. The following findings are revealed during the study of the paper.

- Librarians have the greater responsibility for wider dissemination of database for better utilization.
- Librarians have greater role in adopting remote login mechanism with minimum administrative involvement and less expenses on hardware and technical issues.
- Users must be provided with a mechanism to manage usage through single sign-in facilities.
- The statistical reports must be provided a number of statistics revealing the number of users, volume of data use, category wise details of usage and the per resource usage data for better future planning.
- Statistical reports are useful for management reporting for aware about the usage of database. It also helps in facilitating more databases awareness programmes for less used databases for best and proper utilization of all databases.

CONCLUSION

The paper emphasises over the issue of accessing electronic resources subscribed outside the walls of the institutions. Librarians have greater responsibilities to disseminate the electronic database among patrons through implementation of various technologies for wider access of information from anywhere and anytime. We are now living in age of planning and management and there is no scope of better output without future planning. Librarians have to play role as a manager for accessing the needs and utility of information for better utilization of financial resources of their prenatal institution. Statistical records of the use of subscribed resources are very useful to access the usage

of such resources. Reporting of less use or no-use resources can be reported for better training facilities for use or for discontinue reducing cost.

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Open Educational Resources: An Overview

Poonam Sharma

ABSTRACT

Open Educational Resources (OER) are teaching, learning or research materials that are in the public domain or that can be used under an intellectual property license that allows re-use or adaptation (e.g Creative Commons). The potential of opening up educational resources for use and adaptation by everyone, especially those in resource-poor environments, is a great opportunity to achieve quality education for all. Now, High quality open educational resources are available that will drastically change the paradigm of teaching and learning in schools and universities. This paper will discuss the Open Educational Resources along the opportunities and challenges.
Keywords: *OER, Teaching and learning Paradigm.*

INTRODUCTION

Open Educational Resources are the free and open digital publications of standard quality that are organized as courses which include lectures, related reading materials, snapshots of discussions, assignments, evaluations, etc that are prepared by concerned experts. Access to these resources radically breaks down the barriers to quality education and allows everyone to get access to course materials.

The OER objective is to enhance the quality of engineering education by developing curriculum-based video and web courses for the students. Faculties from these various institutions are involved in developing their classroom course material in electronic form.

The OER also provides an opportunity for teachers and students from rural areas to learn from these high quality lectures and improve the quality of teaching in these rural colleges. This paper also illustrates how OER help in democratizing lifelong learning spaces that eventually help in skills development. Although the paper identifies external as well as internal factors that are shaping up OER movement in this emerging knowledge economy, this paper mainly focuses on country-level initiatives and the challenges faced at the institutional level as well as user levels. This paper also helps in understanding how world society embraces OER in order to attain social justice and empowerment through sustainable educational development.

The vision behind creating OER is to lower the cost of educational materials, develop innovations and improve the quality of content. There are many web platforms which provide us with the best OER sources.

Open Educational Resources are teaching, learning or research materials that are in the public domain or released with an intellectual property license that allows for free use, adaptation, and distribution. Open educational resources include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials, or techniques used to support access to knowledge.

OPEN EDUCATIONAL OPPORTUNITIES

The OER initiative has been a vehicle for building a culture of sharing. OER be leveraged within a broader initiative—an international Open Participatory Learning Infrastructure (OPLI) initiative for building a culture of learning. There are now major e-science, cyber science, or cyber infrastructure-enhanced science initiatives under way in most every developed region of the world, e-infrastructure, refers to computer and communication technology–based resources (tools, services, information) together with the people and institutions supporting them for OER.

A theme and implicit goal of OER model is to build a community so that the emerging OER movement stimulated. The Hewlett Foundation, will create incentives for a diverse set of institutional stakeholders to enlarge and sustain this new culture of contribution.

CHALLENGES

- **Systematic Reliable Infrastructure:** As digital OER content grows, so will the need for systematic reliable infrastructure for crating and preserving access. The Internet Archives has made pioneering contributions in this area. Fortunately, academic libraries and major and cultural heritage institutions..
- **Increase cost of routine courseware:** OER collections are not as distinct from the courseware environment for the formally enrolled students but as a low marginal cost derivative of the routinely used course preparation and management systems. Increase the amount of course preparation and management systems that service closed and open institutional courseware.
- **Object Granularity and Format Diversity:** By granularity, we mean the size of the objects that can be individually tagged, referenced, found, and re-used under appropriated attached terms and conditions. Is the entire document the smallest accessible/usable object (not decomposable), or can one access and use sub-components such as images, videos, simulation applets, etc. "object format diversity" means the diversity of representations and encodings of digital objects (often signified by a file name suffix: .pdf, *for example*) and how this diversity effects interoperability between digital objects composed into more complex objects.
- **Intellectual property issues:** Intellectual property issues are at the heart of OER. The majority of existing educational content is protected under traditional copyright with terms and conditions that must be honored within the "open" paradigm. In opening up course material to the world, institutions must invest the time and expense to scrub the material to be sure that materials licensed for use in their formal Community are not available to world.

CONCLUSION

There are many critical issues surrounding access, quality and costs of information and knowledge over the Internet as well as on provision of content and learning material. As it becomes clearer that the growth of Internet offers real opportunities for improving access and transfer of knowledge and information from universities and colleges to a wide range of users, there is an urgent need to clarify these issues with special focus on Open Educational Resources (OER) initiatives.

There is also a need to define the technical and legal frameworks as well as business models to sustain these initiatives. That is the background to the OECD/CERI study which aim to map the scale and scope of Open Educational Resources initiatives in terms of their purpose, content, and funding and to clarify and analyses.

Four major Questions arises trough it:

- How to develop sustainable costs/benefits models for OER initiatives?
- What is the intellectual property right issues linked to OER initiatives?
- What are the incentives and barriers for universities and faculty staff to deliver their material to OER initiatives?
- How to improve access and usefulness for the users of OER initiatives?

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Use of E-Resources by the Faculty Members of the YMCA University of Science & Technology

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ABSTRACT

The present study explores the awareness and use of e-resources by the faculty members of the Y M C A University of Science & Technology. A questionnaire was designed to collect the data from the faculty members. Total 70 questionnaires were distributed and 60 were received after filling the information. The result of the study showed that most of the faculty members are using e-journals, e-books and e-theses/e-dissertation mostly for their research work, preparing lectures/assignments and writing research papers. The mostly used e-resources are Science Direct, IEEE-ASPP and Springer Link. The training in the use of e-resources is needed for the optimum utilization of e-resources. Most of the faculty members are almost satisfied with the use of e-resources.

Keywords: *E-resources, Online journals, EIR.*

INTRODUCTION

Use of ICT in libraries has brought new concepts to the library systems and services. All libraries are experiencing a tremendous shift in content from print to electronic or digital. The libraries are adopting all new technologies and techniques which are useful and helpful to improve their library services and provide better services to their users.

Electronic resources are growing exponentially in popularity and use. There is a competition to deliver new digital products and services to the millions of users. The electronic information has provided many opportunities to provide quick access to the information to the users. This has helped to enhance the speed of delivering the information, serving great number of users at the same time and enabling innovation in teaching. E-resources are the electronic representation of information. These e-resources are available in various forms like e-journals, e-books, e-magazines, e-newsletters, subject gateways, online tutorials, CDROMs, e-discussions, data archive etc.

Y M C A UNIVERSITY OF SCIENCE AND TECHNOLOGY

The YMCA University of Science and Technology, Faridabad erstwhile YMCA Institute of Engineering, Faridabad was established in the year 1969, as a joint venture of the National Council of YMCAs of India, Govt of Haryana, and the Central Agencies for Development Aid, Bonn, Germany. It started as an Indo-German project with an aim to impart technical education to a developing India on German pattern. In 1996, State Govt. of Haryana took complete control of the Institute and upgraded it to university status in December 2009. The university offers 4-year B. Tech. degree course in six disciplines i.e. Computer Science; Information Technology; Electronics and Instrumentation Control; Electronics and Communication Engineering; Electrical Engineering; Mechanical Engineering. University also offers M.C.A, M.Tech. (Computer Engineering, Electrical Engineering & Mechanical Engineering), M.Sc. (Physics and Maths) and Ph.D. Right from the very beginning at institutional level, it has emphasized greatly on practical work related to industry. The sophisticated equipments/machines in the workshops and laboratories enable the students to operate various machines independently so as to acquire thorough knowledge and develop competence in their respective skills.

UNIVERSITY LIBRARY

YMCAUST Library is a modern library meant to fulfil the information needs of students, Research Scholars, faculty and staff of various Departments of the University. It is housed in a fully air conditioned single story building. The magnificent library building is centrally located within easy reach from all the Departments, hostels and residential areas. The University Library building has a total area of 7200 sq. ft. The Library has two Reading Halls.

It is well equipped with modern technology like Internet, Bar Code technology, digital library etc. The library is automated with the Library Automation Software Libsys. The library is member of INDEST, UGC INFONET and DELNET Consortium.

LEARNING RESOURCES

The library is having following learning resources:

Books	67000
Print Journals	100
Magazines	32
Newspapers	13
CD ROMs (excluding Book CDs)	101

Access of E-resources

IEEE-ASPP; Science Direct; ASME; SpringerLink; Taylor & Francis; Nature; JSTOR and Oxford University Press.

OBJECTIVES OF THE STUDY

The major objectives of the study are:

- To measure the awareness of e-resources among the faculty members of YMCAUST.
- To identify the various sources of information used by the faculty members of YMCAUST.
- To identify the different purposes for which the e-resources are used by the faculty members.
- To assess the training needs of the faculty members to utilize the e-resources.
- To know the overall satisfaction level of the faculty members with available e-resources.

RESEARCH METHODOLOGY

To get the desired data on present study, the researcher used questionnaire method. The questions were designed in keeping view of the objectives of the study. Professors, associate professors and assistant professors were taken as a sample for the study. The collected data were organized and tabulated to get the desired result. The present study is confined to the faculty members of engineering and technology only.

DATA ANALYSIS AND INTERPRETATION

Total 70 questionnaires were distributed among faculty members. Out of which 60 (85.71%) were filled and returned. The data collected through the questionnaires was edited, classified and tabulated for better understanding and clarity.

Table 1: Response of the faculty member

Questionnaires distributed	Response received	Percentage
70	60	85.71

Table 2: Awareness of e-resources

Type of e-resources	Yes	Percentage
e-journals	60	100
e-books	60	100
Local EIR (CD ROMs, etc.)	45	75

e-theses/e-dissertations	41	68.33
e-magazines	43	71.67
e-newsletters	39	65
Full Text databases	38	63.33
Bibliographic databases	38	63.33
Online curriculum resources	37	61.67

The above table shows that 100% faculty members are aware about the e-journals and e-books. Table also shows that most of the faculty members are aware about the other type of e-resources.

Table 3: Types of e-resources used by faculty members

Type of e-resources	Yes	Percentage
e-journals	60	100
e-books	49	81.67
Local EIR (CD ROMs, etc.)	21	35
e-theses/e-dissertations	43	71.67
e-magazines	25	41.67
e-newsletters	27	45
Full Text databases	24	40
Bibliographic databases	21	35
Online curriculum resources	23	38.33

The faculty members were asked by the investigator about the e-resources used by them frequently. It was found that all faculty members (*i.e.*100%) were using e-journals. 81.67% were using e-books. Other e-resource which were being used by most of the faculty members (*i.e.* 71.67%) was e-theses/e-dissertation.

Table 4: Purpose of using e-resources by the faculty members

Purpose	No. of faculty members	Percentage
Course work/study	36	60
Write research articles	45	75
For research work	57	95
Prepare lectures/assignments/notes	57	95
To support academic work	31	51.67

It was observed during the study that 95% faculty members were using e-resources for their research work or for preparing lectures/assignments whereas 75% faculty members are using for writing research articles.

Table 5: Awareness of specific types of e-resources

Specific e-resources	No. of faculty members	Percentage
IEEE/ ASPP	57	95
Science Direct	51	85
Springer Link	54	90
Oxford University Press	33	55

Taylor & Francis	42	70
JSTOR	24	40
Nature	24	40
DELNET	17	28.33

It is explicit from the above table that most of the faculty members are aware about the availability of specific e-resource packages.

Table 6: Use of specific e-resource package by the faculty members

Specific e-resources	No. of faculty members	Percentage
IEEE/ ASPP	38	63.33
Science Direct	45	75
Springer Link	27	45
Oxford University Press	11	18.33
Taylor & Francis	21	35
JSTOR	09	15
Nature	10	16.67
DELNET	11	18.33

Above table shows that Science Direct (75%); IEEE/ASPP (63.33%) and Springer Link (45%) are among the most used e-resources by the faculty members of engineering and technology.

Table 7: Benefits of using e-resources

Nature of benefit of EIR	No. of faculty members	Percentage
Access to current up to date information	55	91.67
User friendly interface	23	38.33
Easier access to information	38	63.33
Faster access of information	44	73.33
Continuing professional development	38	63.33
Access to e-archive	29	48.33
Save Time	40	66.67

The respondents were asked about the benefits of using e-resources and the response are shown in table number 7. 91.67% faculty members think that the current up to date information is the major benefit of e-resources followed by faster access of information (73.33%). Time saving, easier access and continuing professional development were also highlighted as benefit by the faculty members.

Table 8: Methods of accessing e-resources

Method	No. of respondents	Percentage
Trial and error	21	35
Guidance of colleagues/friends	35	58.33
Self taught	48	80
Guidance of library staff	15	25

It is observed that 80% of faculty members are using the e-resources by self taught method and 58.33% are using with the guidance of colleagues/friends whereas 35% are using by trial and error method.

Table 9: Place of access to the e-resources

Place of access of e-resources	No. of faculty members	Percentage
Library	21	35
Department	51	85
Home	08	13.33

The table number 9 shows that the favourite place of the faculty members for using e-resources is their department.

Table 10: Obstacles in using e-resources

Obstacles	No. of respondents	Percentage
Lack of computer terminals in the library	0	0
Slow access speed	37	61.67
Lack of awareness about e-resources	19	31.67
Lack of support of trained library staff	07	11.67
Lack of guidance regarding availability of e-resources	16	26.67
Low rate of e-resources in library	0	0
Lack of time to access the e-resources	15	25
Difficulty in finding relevant information	20	33.33

The above table shows that most of the faculty members think that the slow access speed of the Internet is the major obstacle in using the e-resources.

Table 11: Assessing need of training programmes to use of e-resources

Agree	Percentage	Disagree	Percentage
20	100	0	0

It is clear from the above table that 100% faculty members feel that there should be training programmes for the optimum utilization of e-resources.

Table 12: Frequency of arranging training programmes

Frequency	No. of Respondents	Percentage
Monthly		
Quarterly	19	31.67
Half yearly	30	50
Once in a year	11	18.33

Most of the faculty members were of the view that the library should conduct training programmes regarding using of e-resources at least twice in a year or quarterly.

Table 13: Satisfaction level of faculty members

Satisfaction level	No. of respondents	Percentage
Fully Satisfied	08	13.33
Almost satisfied	35	58.33
Least satisfied	17	28.33

The investigator tried to know about the satisfaction level of the faculty members and found that 58.33% faculty members were almost satisfied with e-resources whereas 28.33% were least satisfied.

CONCLUSION

Use of Information and communication Technology in library and resource centres during last few years have increased exponentially and have brought many changes in the way of collecting and organizing information. This is very important to know for every library about the information use pattern of its users, the methods by which they access the information and the problems they face while accessing these e-resources and their training needs.

Result of this study shows that the faculty members of Y M C A University of Science and Technology are aware about the e-resources. They are using e-journals, e-books and e-theses for their research work, preparing lectures and writing research papers. But the slow speed of Internet is major obstacle to use these e-resources. Thus, the speed of Internet/ Wi-Fi needs to be improved.

The efforts by the library professionals should be made to create awareness on availability about e-resources. Training programmes are needed to train the faculty members about the way of getting more specific information.

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Introduction to Library Automation: Issues and Challenges

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ABSTRACT

Automation of libraries will give them altogether a new life. They become tremendously potential. Computerized cataloging enormously enhances access to book and magazines. Automation of Library functioning streamlines the whole library functioning in favor of the reader. Networking of libraries vastly widens the student access. They can read rare and precious books sitting at their own place. Concludes that things are changing for the better as library automation in libraries is now being regarded as a urgent need.
Keywords: Library Automation (Area, planning), problem and challenges.

INTRODUCTION

Library Automation refers to the use of computers to serve the needs of library users. The operations of a library get a quantum jump with the introduction of computers. The computers help to provide fast and reliable access to the resources available in the library as well as elsewhere. Automation to a greater extent can reduce pressure of library workload. It also shelter from work stress and fatigue. It not only offer efficient services and opens a new era in bibliographical control but provide access to required database in the country and abroad as well.

Computers are not only used as a tool for processing the data, but also for data storage and accessing. Planning for an automated system, no matter how big or small, should be part of an overall long-range plan for the library. Automation should always be used as a means to achieve overall better patron service. Careful planning for technology will assure that your automation project is "sustainable", *i.e.* enhance the organization's ability to meet its service mission with out disrupting the organizational stability of the institution.

WHAT IS LIBRARY AUTOMATION?

Traditional library work consisting of acquisition, technical processing, serials control, circulation and reference service all entail time consuming manual work. Though these activities are essential to proper functioning of a library, they consume professional staff time that might otherwise go towards user services and library development. Library computerization is now gaining importance necessitating the establishment of profession-wide Standard. Comprehensive studies of library computer system world over include discussions of machine-managed acquisition, cataloguing, serials control, circulation and bibliographic service modules. In general, librarian are looking to maximize the benefits of automation by spreading computer use to as many aspects of library activities as possible by taking advantage of development in computer hardware and software and telecommunication.

NEED FOR LIBRARY AUTOMATION

From the above definition, we can say that the need of library automation has several reasons. Need of computer is present in all areas depending upon its usage. They are also used for library manager's evaluation of Reports, Statistic, etc. Even though this question seems to be very fundamental it is essential to emphasize this aspect, as the library automation is yet to take off in majority of the Indian libraries. Secondly, while justifying

need for library automation more than cost-effectiveness the benefits derived by the library users become the major consideration. To appreciate the advantages it becomes necessary to highlight the different levels of library automation.

IMPORTANT FACTORS FOR LIBRARY AUTOMATION
- Information explosion
- Increase in the collection of libraries
- Advances in the computer and communication technology
- Wastage of user / staff time in locating the information
- Provide wide access to resources with in libraries and elsewhere
- Better access
- Quality in service
- Cooperative efforts.

AREAS OF LIBRARY AUTOMATION
As a first step in a planning process, it is desirable to formulate a model for computerization listing all itemized and prioritized information system being maintained on a manual basis by the library. For this exercise it is necessary to break down these procedures into their constituent parts. When further subdividing these activities, each item is to be considered of its functional elements, The systems and subsystems listed below are only indicative and may very with differing library system environments.
- Acquisition
- Technical services
- Cataloguing
- Circulation
- Serials Control
- Reference Services
- User Tools
- Bibliographic Utilization
- Reprography
- Inter-Library Communication.

PLANNING OF LIBRARY AUTOMATION
Planning for library automation has been defined as planning for "integrated system" that computerizes an array of traditional library function using a common database. While this is still generally true, rapid technological change is forcing a reexamination of what it means to "automate the library." As physical, spatial and temporal barriers to acquiring information are crumbling, libraries must plan for a broader and more comprehensive approach to providing automated service.

ISSUE OF LIBRARY AUTOMATION
Modern society is characterized by an increasing need for specialized institution in various field of activity for the performance of their day-to-day functions as well as research and consultancy work. These institutions require speedy access to qualitative published information Exposure, the methods of storage and dissemination of information are changing fast, so no library can store all published information and can provide efficient services with its old manual operation. Therefore," Automation" is important and necessary to handle the vast amount of information and for providing faster, accurate, precise, efficient, and effective information and services as well. Computerized library service is likely to be beset with technological, economic and attitudinal problems peculiar to most developing countries. There are some problems raised in library automation as bellows:
- **Technological Problems:** Technological problems include both the hardware, *i.e.*, the computer as an instrument for information processing and the software, *i.e.,* the

methodology which is applied. The major problems faced today in terms of the hardware are due to the variety of computers being used in different types of research and business institution. The computers, manufactured by various firm are not compatible. Developing countries sometimes receive sophisticated technology like computers as gift from more developed countries; these often become obsolete from the manufacturer's point of view.

- **Economic Problems:** The major obstacle for any innovations in developing countries is the lack of resources. The initial cost of establishing a computer system is beyond the reach of most organization and institutions. Library and information processing is done either with spare computer capacity made available by the institution itself, or with computer time hired from another institution. The cost of hiring computer time and storage space is very high and often cannot be justified at the management level by cost-benefit analysis.

- **Attitudinal Problems:** Computers appear very awesome to developing countries. They are powerful machines which can perform many functions and therefore offer a solution to the many types of manual inefficiency which often plague the developing countries. Among librarians there are two groups often give insufficient thought to the real value of the computers to the organization/institution and make uneconomical, haphazard use of the facility.

CHALLENGES OF LIBRARY AUTOMATION

This paper outlines the challenges of library automation in general and those confronting the libraries in the East Asian countries in particular by tracing the causes that accelerated library automation. The challenges elicited by human (sociological), technological, policy and standards issues are presented with concluding remarks for deliberation. National information policies and some international information guidelines are suggested to be the foundation on which efficient and effective library automation should be built.

- **Human factors:** Librarians' insufficiency in technical know-how and system concept: Most librarians, being oriented in the humanities and social sciences, have little background in computer technology. Librarians are usually not knowledgeable enough to illustrate or quantify their needs in order to make the system analysis and specification writ in feasible.

- **The fear of replacement:** Certain librarians resist library automation because of a false conception – they are afraid of being replaced by machines and as a result are resisting it.

- **Technological Factors:** In the East Asian countries, not only should we think how we handle materials of our own languages, we have to incorporate resources of Roman-language as well. The magnitude of librarian materials in various different languages and the various libraries operational needs call for a piece of all-purpose hardware and a multi-function software package which are hard to find.

CONCLUSION

Automation of library is of vital importance in ending end users to search through large quantities of information effective resource sharing now a days requires an infrastructure which permit users to locate materials of interest in both print and electronic format. Automation and networking of Libraries are still in their formative stages in India. Their full impact on libraries and library resources will be knows in the course of time.

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E-Resources: As Revolutionize Instrument in Present Scenario

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ABSTRACT

E-resources are becoming to be anticipated in the present scenario. It is possible to access information sources from anywhere at any time. Searching of e-resources is more easy and swift than conventional resources. More than one user can use it simultaneously. It saves physical storage space. E-resource allows the user to analyze the content in various ways and techniques. User can search by different search engines to get more and more information. One can access lectures, lessons, audio, video clips any time anywhere.
Key words: *E-resources, Internet, Information.*

INTRODUCTION

E-resource is a computer and network enabled transfer of skills and knowledge. It includes electronic data available by remote access and direct access. Remote access refers to the use of e-resources via computer networks. Direct access refers to the use of e-resources via carriers (*e.g.* discs, cassettes, cartridges, *etc.*) designed to be inserted into a computerized device or its auxiliary equipment. These may be delivered on CD-ROM, on tape, via internet and so on. So it includes both online data and electronic data in physical formats. Today we are live in an educational and informational society. But without a proper information and knowledge infrastructure, education system can't achieve their goals and objectives. Computer plays a vital role to spread information and education in society. In the context of Library, in modern age users have been demanding broader varieties of information services. They are also demanding better quality of library services. So the role of library include identification and selection of information its organization, management, storage, retrieval and dissemination to right user at right place and right time. In the Present Scenario (21st century) the next generation messaging will be seamless, familiar, immediate, individual, simple, minimal and short. E-resource has also changed the recruitment policies of the company as well as Government sectors that social networking is one of the most sought for sourcing and recruiting employees in companies as it offers an exciting means for linking employers and potential employees. However, keeping in view the above mentioned facts we can easily claim that e-resources are the revolutionize instrument of 21st century.

MEANING OF E-RESOURCE

An electronic resource is defined as any work encoded and made available for access through the use of a computer. E-resource is a computer and network enabled transfer of skills and knowledge. Anything that is accessible in the electronics form whether is a book, journal, any type of study materials, news, social interaction, and even online shopping, e-Disha, e-reservation, e-ticketing, Blog, *etc.* is termed as e-resource. E-resource is a combination of technology with information and meaningful learning design. E-resource in audio-visual aid such as CD, DVD, which help the learners to experience global problems experienced by the students of other universities.

TYPES OF E-RESOURCE

- **E-Books:** An e-book is an electronic book. It is a file that you download to your computer. E-books are the electronic version of printed materials that is being published in the form of books but e-books can and do exist without any printed materials equivalent. An e-book that gives extra information whenever it is needed.

The book may be downloaded to any pc in very minimum time and its procurement is very easy in second you may purchase e-books. The e-book may be downloaded in many formats *i.e.* CBZ, CBR,CBC, CHM, DJVU, DOCX, FB2, EPUB, HMTL, HTMLZ, LIT, LRF, MOBI, ODT, PDF, PRC, PML, PDB, RB, RTF, SNB, TCR, TXT, TXTZ. etc. But PDF Format is widely used. Some e-books provide on cloud free of cost and some are payment basis. E-books are capable of overcoming the barriers due to its importance and use in the field of education.

- **E-Journal:** With the emergence of IT application particularly internet there has been a shift from traditional print journals to electronic journal (e-journal). In view of many advantages of the latter *i.e.* fast easy, anywhere anytime accessibility, split ability, hyperlink facility to relate texts, cost effectiveness and obviation of the storage problem encountered in the case of print journals. As a result a number of e-journals are fast growing.

- **World Wide Web:** This is great revolution in the field of virtual contents. Through this can access data of any type and download the same without any limitation. After inventing the same the world has shrink and human being started to share the information even a communication agency given a slogan *viz.* "Stay connected with people" means peoples whether they are living in any part of the country, if they have internet connection they can do conversation and see the views of any place without going their (virtual tour). Through WWW any revolution and any agitation can gets its success without wasting money, time and physical labor. So it's a great revolution in the history of internet. This is responsible for every change of the society like tradition, festivals, rituals, religion etc. Only due to web paperless society can exist.

- **Electronic Database:** Electronic database is a collection and store house of information, documents, audio-visual, graphic materials stored in a variety of media ranging from printed books, periodicals, posters and microfilms, reports, slides, films, video audio disks, audio tapes, optical disks, magnetic tapes, etc. Electronic database of the future is likely to be part of the network. Electronic database is the boon for mankind. It involves the application of computers and communication technology in the task of information handling and information flow from the generation to the utilization levels.

- **E-Consortia:** Consortium is defined as a group of organization that brings users together to fulfill their combined objective and similar need of sharing the resource that cannot be as effectively undertaken individually. It usually refers as co-operation, co-ordination and collaboration among the libraries for the purpose of sharing information and resources electronically. In brief consortium is a co-operative arrangement of resources among group of institution.

DIFFERENT CONSORTIA IN INDIA

- **Forsa:** Forum for resource sharing in astronomy and astrophysics. Forsa was established in 1981. It is a spring board of sharing and exchange of information in the field of astronomy and astrophysics.

- **CSIR Consortium:** The concept in the country was conceived at the meeting of head of CSIR libraries and information centre held at NAL Bangalore during 1993. These consortia provide e-journals in the field of scientific research and development. CSIR has 40 laboratories involved in research and developments in science and technology NISCACICR and other CSIR laboratories have worked to from CSIR Consortium.

- **UGC-Infonet:** UGC-Infonet was set up in Dec 2003 by Honorable Dr. A P J Abdul Kalam, the President of India soon after providing the Internet connectivity to the universities in the year 2003 under the UGC-Infonet programme. The Consortium proved to be a recipe to university libraries which have been discontinuing subscription of scholarly journals because of "Serials Crisis". The term "serials crisis" refers to exponential and continuing increase in subscription cost of scholarly journals.

It is a scientific society under the ministry of communication and information technology. UGC facilitate free access to scholarly e-journals and database in all fields and disciplines. It is the largest academic library consortia. UGC infonet is a joint partnership of UGC, Inflibnet and ernet. These e-resources covers almost all subjects disciplines including art, humanities, social sciences, physical sciences, chemical sciences, life sciences, computer sciences mathematics and statistics etc. The access is based on IP-range. The Consortium provides current as well as archival access to more than 7500+ core and peer-reviewed journals and 10 bibliographic databases from 26 publishers and aggregators in different disciplines. The programme has been implemented in phased manner. In the first phase that began in 2004, access to e-resources was provided to 50 universities who had Internet connectivity under the UGC-Infonet Connectivity programme of the UGC. In the second phase, 50 more universities were added to the programme in the year 2005. So far 209 Universities including 14 National Law schools and central universities that come under the purview of UGC, have been provided differential access to subscribed e-resources. The programme is wholly funded by the UGC and executed by the INFLIBNET (Information and Library Network) Centre, Gandhi nagar.

The benefit of subscription to e-resources would also be extended to the colleges, to begin with the College for Potential with Excellence (CPE) and autonomous colleges. The Consortium has also launched its "Associate Membership Programme" For private universities and other research organizations to join the Consortium for selected e-resources.

- **E-Resources@n-List:** The Consortium subscribes to the following resources for the colleges. All electronic resources subscribed under N-LIST Programme are available from the publisher's Web site.

- **E-Journals (Full text)**

American Institute of Physics (18 titles)	http://journals.aip.org/
American Physical Society (10 titles)	http://publish.aps.org/browse.html
Annual Reviews (33 titles)	http://arjournals.annualreviews.org/
Cambridge University Press (224 titles)	http://journals.cambridge.org/
Economic and Political Weekly (EPW) (1 titles)	http://www.epw.in/
Indian Journals (180+ titles)	http://www.indianjournals.com/
Institute of Physics (46 titles)	http://iopscience.iop.org/
JSTOR (2500+ titles)	http://www.jstor.org/
Oxford University Press (206 titles)	http://www.oxfordjournals.org
Royal Society of Chemistry (29 titles)	http://www.rsc.org/Publishing/Journals/
H. W. Wilson (3000+ titles)	http://search.ebscohost.com

- **E Books**

Cambridge Books Online (1800 titles)	http://ebooks.cambridge.org
E-brary (83000+ titles)	http://site.ebrary.com/lib/inflibnet
EBSCoHost-Net Library (936 titles)	http://search.ebscohost.com
Hindustan Book Agency (65+ titles)	http://portal.igpublish.com/iglibrary
Institute of South East Asian Studies(ISEAS) Books (382+ titles)	http://portal.igpublish.com/iglibrary

Oxford Scholarship (1402+ titles)	http://www.oxfordscholarship.com/
Springer eBooks (2300 titles)	http://link.springer.com.
Sage Publication eBooks (1000 titles)	http://knowledge.segepub.com.
Taylor Francis eBooks (1800 titles)	http://www.tandfebooks.com.
Myilibrary-McGraw Hill (1124 titles)	http://lib.myilibrary.com/

(Source: http://nlist.inflibnet.ac.in/eresource.php)

INDEST-AICTE CONSORTIUM

The "Indian National Digital Library in Engineering Sciences and Technology (INDEST) Consortium" was set up in 2003 by the Ministry of Human Resource Development (MHRD) on the recommendation of an Expert Group appointed by the Ministry. The IIT Delhi has been designated as the Consortium Headquarters to coordinate its activities. The Consortium was re-named as INDEST-AICTE Consortium in December 2005 with the AICTE playing a pivotal role in enrolling its approved engineering colleges and institutions as members of the Consortium for selected e-resources at much lower rates of subscription. The Consortium enrolls engineering and technological institutions as its members and subscribe to electronic resources for them at discounted rates of subscription and favourable terms and conditions. The Ministry provides funds required for subscription to electronic resources for 62 centrally-funded Government institutions including IITs, IISc Bangalore, NITs, ISM, IIITs, IIMs, NITTTR's and few other institutions that are considered as core members of the Consortium. The benefit of consortia-based subscription to electronic resources is not confined to its core members but is also extended to all educational institutions under its open-ended proposition. 60 Govt./Govt.-aided engineering colleges are provided access to selected electronic resources with financial support from the AICTE and 102 universities/institutions have joined the Consortium under its self-supported category in 2012. The total number of members in the Consortium has now grown to 1235.

The INDEST-AICTE Consortium is the most ambitious initiative taken so far in the country. It is the biggest Consortium in terms of number of member institutions in Asia. The Consortium attracts the best possible price and terms of agreement from the publishers on the basis of strength of its present and prospective member institutions. The Consortium subscribes to over 12,000 electronic journals from a number of publishers and aggregators.

ACCESS OF E-RESOURCE THROUGH INDEST- AICTE CONSORTIUM

All E-Resource subscribe through the consortium are accessible through the publisher web site. We can access the E-Resource on IP address of institute. If the institute has not any IP- Address then the publisher would allocate login ID and password to institute for accessing the e-resource. Subscriber institute access the number of electronic resource including full text and bibliographic database through the INDEST-AICTE Consortium. We can visit consortium website (http;//Paniit.iitd.ac.in/) for complete list and description of e-resources.

E-RESOURCE AVAILABLE THROUGH INDEST-AICTE CONSORTIUM

S.No.	Full Text Resources	Web Site
1.	ACM DIGITAL Library	http://www.portal.acm.org/portal.cfm
2.	American Society of civil engineers online journals	http://asme.org/pubs/journals
3.	American society of Mechanical Engineers Journals	http://asme.org/pubs/journals

4.	ASTM international standard and journals	Standard: http://enterprise.astm.org Journals: http://journalsip.astm.org
5.	Capitaline	http://www.capitaline.com
6.	Ei Compendex Plus	www.engineeringvillage2.org
7.	Engineering science data unit (ESDU)	www.esdu.com
8.	IEEE/IEE Electronic Library Online(IEL)	http://ieeexplore.ieee.org
9.	Indian standard MathSciNet	http://www.ams.org/mathscinet
10.	Nature	http://www.npg.nature.com/libraries
11.	Proquest Science Journals	http://www.il.proquest.com/pqdaeto
12.	Science direct	http://www.sciencedirect.com
13.	Springer Link	http://www.springerlink.com
14.	Web of Science (IEC,BCRC,and GREENER)	http://webofknowledge.com

(Source: http://paniit.iitd.ac.in/indest/)

CD-ROMS

A CD-ROM is a pre-pressed optical compact disc which contains data. An acronym stands for "Compact Disc Read-Only Memory". Computers can read CD-ROMs, but cannot write on the CD-ROMs which are not writable or erasable. The mid-2000s, CD-ROMs were popularly used to distribute software for computers and video game consoles. Some CDs, called enhanced CDs, hold both computer data and audio with the latter capable of being played on a CD player, while data (such as software or digital video) is only usable on a computer (such as ISO 9660 format PC CD-ROMs). It is the Yellow Book is the technical standard that defines the format of CD-ROMs. One of a set of color-bound books that contain the technical specifications for all CD formats, the Yellow Book, created by Sony and Philips in 1988, was the first extension of Compact Disc Digital Audio. It adapted the format to hold any form of data.CD-ROM capacities are normally expressed with binary prefixes, subtracting the space used for error correction data. A standard 120 mm, 700 MB CD-ROM can actually hold about 737 MB (703 MiB) of data with error correction (or 847 MB total). In comparison, a single-layer DVD-ROM can hold 4.7 GB of error-protected data, more than 6 CD-ROMs. CD-ROMs have also changed the storage style of any material. We can store at a time near about 65-70 e-books in a CD and can carry very easily.

FEATURES OF ELECTRONIC RESOURCES
- The users can get the required information from anywhere
- High compact storage
- Inclusive of everything
- Do not require physical space
- Ease of reproduction, multiplication, manipulation and transmutation
- Ease of migration of contents from one medium to another
- Sophisticated and multipronged searches through key words, free text, Boolean operators, etc.
- Hyperlinks lead the users to the required information sources
- More than one person can read e-documents at the same time
- Speed and cost constraints are not a problem in search strategies

ADVANTAGES OF ELECTRONIC RESOURCES
- Searching of e-resources is more easy and speedy than traditional resources.

- More than one user can use it simultaneously.
- It saves physical storage space of offices, library, banks, railway, etc.
- It is easy to download, copy, save and print or send by e-mail.
- It allows the user to analyze the content in various ways and techniques.
- User can search by different search engines to get more and more information.
- One can access lectures, lessons, audio, video clips any time anywhere.
- Promotes reading habits.
- E-resources help in providing the churning material on respective topics.
- Flexible hours of learning and research.
- Enriching the higher education as the scope of knowledge is limit less.
- Opportunities to interact at global platform, accessing international standard learning material and indulging in cross-cultural and social activities worldwide.
- It can be subscribed in consortia format thus reducing the cost with same benefit.

SHORTCOMINGS OF E-RESOURCES
- Recently technology is not fully VIRUS proof and data security cannot be ensured.
- Students may feel out-of-the-way or miss social interaction; this may lead them to psychosocial disorders as learning requires concentration and reflection.
- Instructors may not always be on demand.
- Trainer and learner both should be well aware of the new technology and its applications, if one fall short then there will be a lacuna in the process of learning.
- Technology which meets present requirements may fail to compete future scenario of advanced technology.
- Cost of upgrading the hardware to compete with new technology may not be finance efficient.
- Lazy Learner with poor study habits may fall behind.
- The matter or data may fall short in well developed met Cognitive skills.
- Cellular phone and wireless devices have major disadvantages with relation to screen size, keyboard size, memory capacity and better backup.
- The bandwidth and delay factor are the main network restrictions.

CONCLUSION

Today we are live in an educational and informational society. But without a proper information and knowledge infrastructure, education system can't achieve their goals and objectives. Challenges of implementation of e-resources in all our India is still a far-away vision as rural India is still suffering from technological backwardness where ensuring even the basic infrastructural facilities is a big challenge for the facilitators. Technology must be cheaper and in the range of a layman so that they can purchase effortlessly and can use the same. Human Resource Ministry (Govt. of India) tacking such initiatives but success rate is not up to expectation. No doubt the picture is improving day by day as EDUSET programs run by governments. Consortia are tools, which will aid in exploiting the features of the e-journals as well as in effecting savings. So we can say that E-resources play a vital role to spread information and education in society.

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Use of E-Resources and Services in Jawharlal Nehru Library, Kurukshetra University

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INTRODUCTION

The convergence of information and communication technologies as embodied in the Internet has transformed the present day society into a knowledge society. Earlier, information and knowledge were passed by word of mouth or through manuscripts and communication was a slow process. Today it is passed from one individual to an infinite number of other users through a number of media and formats which makes rapid and widespread dissemination of information possible. New technologies bring us unparalleled flood of information. Internet is considered the most valuable of the many computer technologies available to the society today

Libraries are the lighthouses of information dissemination, an important component of any educational institution and a hub of learning activities where students, researchers and teachers can explore the vast amount of information resources. The present age is regarded as the 'age of information' and information has become the commodity in today's context of information explosion where we are living in the information society. Information has become an essential requirement for every ones life. Each one of us requires information for our day-to-day activities. In this context, Library and Information Centers (LIC) are playing an important role in extending the required latest information services quickly to their users, especially through the e-resources.

The contemporary notion of the library of today is fundamentally different from its old conception. In the past library was considered nearly a repository of book. Its use was restricted to a chosen few. The public had no access to the books. Actually, the common person was so illiterate and ignorant that the written word was beyond his reach. Therefore, in those days the main idea was the preservation of books rather than their functional part of public education. It is an indispensable agency through which mass education is imparted on a universal scale. The object of the library is not to collect and preserve the books but to promote the free use of the books. Knowledge for all is the message of new age of democracy. Libraries according to the nature of their collection; work and service are broadly classified into public, academic and special libraries. The academic libraries are further divided as school libraries, college libraries and university libraries. School libraries are at the foundation level of education and university libraries are at the apex level. All these libraries are to cater the need of academic community for supplementing the study and research program of the institution and help conserve disseminate knowledge. Although these academic libraries share some common features and attributes but they differ in several ways. A university library is a part of a university set-up. Therefore, it exists to serve the objectives of its parent organization. It also aims at the advancement of the functions of its university. The library, which is still a combination of the past (print collections) and the present (e-resources), must be viewed with a new perspective and understanding if it is to fulfill its potential in adding value to the advancement of the institution's academic mission and in moving with that institution into the future.

This rapid advancement of ICT has revolutionised the university library resources and services. It resulted that now various options are there to handle the E- resources and services conveniently and effortlessly. ICT has changed the world and it becomes the tool

for browsing and retrieving the information even in millionth part of second. The E-resources have acquired a major portion of library collections. The value and use of e-resources have increased with the time. Therefore, there is needed to make a study on the different aspects of e-resources and issues related to the use of e-resources by users.

OBJECTIVE OF THE STUDY

The main objective of this study is to indicate the use of E-resources and services provided by Jawaharlal Nehru Library Kurukshetra University, analyze the patterns of use, the impact of the e-resources on their academic efficiency and problems faced by them in using the resources. The other major objectives of the study are as under:

1. To identify users awareness about e-resources.
2. To identify the different purpose, needs, frequency for which the e-resources used.
3. To identify the satisfaction of the users with regards to the e-resources and library services.
4. To find out the different types of e-resources used by users.
5. To know the problems in using the e-resources.

METHODOLOG

The survey method, using questionnaire, was used for the study to cover the maximum response from the respondents within the limited period. The information so obtained compared and studied to determine their responses. Keeping in view the objectives of the study, a structured questionnaire was designed and randomly distributed among 60 users out of which only 44 responded. The data is collected by personally visiting the library, personal communication with users and through observation. University Librarian has also been interviewed for taking the information regarding library.

- **Library Profile:** University library of Kurukshetra University is named after 1st Prime Minister Mr. Jawaharlal Nehru The library is open from 8.00 A.M. to 8.00 P.M. (midnight). It is also open on Sunday and Holidays. The library has total staffs of 86 members which includes 26 professional staff.

  The University Library is centrally located and is an air conditioned three storey building having 106730 sq. feet plinth area and its extension as Golden Jubilee Reading Hall having plinth area of 57,500 sq. feet is also under progress. It has seating capacity of 1270 users at a time and remains open on 360 days from 9.00 a.m. to 12.00 midnight.

- **Collection of the Library:** The University Library has a rich collection of 375030 books on different subjects, it includes thesis, manuscripts and rare books in the stream of Sciences, Management, Social Science, Commerce and Humanities too. It subscribes to more than 358 national and 72 International journals. In addition to this, under U.G.C.-INFONET E-Journals consortium library provides an access to 8453 scholarly journals. More than one thousand non-books material is also available in the library. The library collection of Punjabi books is 10919.

- **Services of the Library:** The library provides the following services: lending, reservation facility, Inter-library loan facility, reference service, orientation programmes for the users, bibliographic and documentation services, reprographic services.

  The Library ERNET Centre with 100 computers for the faculty members, students and Research Scholars has an internet connectivity of 10 mbps leased line. Library has also provided internet connectivity to almost all the teaching and non-teaching Departments, Hostels and the entire Campus through WI FI internet connection. The Library has automated its in house activities such as library membership, circulation of documents, holdings of periodicals, catalogue as Online Public Access Catalogue (OPAC).

ANALYSIS AND INTERPRETATIONS

Table 1: Frequency of using e-resources

Frequency of using e-resources								
Frequency	UG	%	PG	%	M.Phill	%	Ph.D	%
Daily	2	28.6	10	45.5	4	57.1	3	37.5
Once a week	1	14.3	7	31.8	2	28.6	2	25
Twice a week	0	0.0	3	13.6	1	14.3	1	12.5
Thrice a week	3	42.9	2	9.1	0	0.0	2	25
Once a month	1	14.3	0	0.0	0	0.0	0	0

It is observed from above table that majority of users with 42.9 % of UG uses e-resources thrice a week followed by 45.5 % of PG users, 57.1% of M.phil and 37.1 % Ph.D scholar are using e-resources daily. This shows that M.phil scholars usage frequency of e-resources is higher than others users.

It is observed from the figure-I that majority of UG and PG users are using e-resources for updating information with 71.4% and 68.2 % respectively. However 85.7 % Mphil and 75% Ph.D users are using for academic work only

Table 2: Need of E-Resources

E-resources – need								
E-resources	UG	%	PG	%	M. Phill	%	Ph.D	%
E-Journals	2	28.6	8	36.4	4	57.1	3	37.5
E-Books	4	57.1	17	77.3	7	100.0	4	50
E-Data Archives/ www	0	0.0	6	27.3	2	28.6	2	25
E-Manuscripts/ E-Maps	0	0.0	5	22.7	2	28.6	1	12.5
E-Thesis	0	0.0	5	22.7	3	42.9	3	37.5
E-Magazine/ E-Newspapers	4	57.1	13	59.1	5	71.4	3	37.5
E-Mail	3	42.9	9	40.9	5	71.4	3	37.5
E-Research Report/ E-Bibliographic	0	0.0	3	13.6	3	42.9	2	25
CD-ROM/DVD-ROM	1	14.3	5	22.7	1	14.3	0	0

It is noticed from the table 2 that all users are in need of various types of resources simultaneously. Although UG and PG users indicated E-magazines/E-newspapers as most needed resources on the other hand majority of M.Phil and Ph.d scholars shown their need in E-books.

It is clear from above figure No. II that all users from M.Phil and Ph.D *i.e.* 100% agree with needs fulfillment through e-resources. However 14.3% UG users and 18.2 PG users are having the opinion that e-resource not fulfilling their needs.

Table 3: Favourite Search Engine

Search Engine used							
Search Engine	**UG**	**%**	**PG**	**%**	**M. Phill**	**%**	**Ph.D**	**%**
Google	7	100.0	22	100.0	7	100.0	8	100
Yahoo	1	14.3	4	18.2		0.0		0
Alta Vista	0	0.0	1	4.5	1	14.3	0	0
Rediffmail	0	0.0	2	9.1	1	14.3	0	0
Ask.com	0	0.0	2	9.1	1	14.3	1	12.5
Any Other	0	0.0	0	0.0	0	0.0		0

Table 3 represents that 100% user searching their needed information through Google search engine besides that sometime other engines also.

Table 4: Problem in using E-resources

Problem in using E-resources							
Problem	**UG**	**%**	**PG**	**%**	**M. Phill**	**%**	**Ph.D**	**%**
Low Speed	2	28.6	11	50.0	3	42.9	5	62.5
Time Consuming	0	0.0	9	40.9	3	42.9	1	12.5
Lack of Training	1	14.3	3	13.6	0	0.0	1	12.5

It is found from table 4 as indicated by users that low speed of Internet is the main problem in accessing e-resources.

Table 5: Kind of information searched in the library.

Kind of Information searched in the Library				
Kind of information	**UG%**	**PG%**	**M.Phill%**	**Ph.D %**
Historical/Background information	14.3(1)	9.1(2)	42.9(3)	12.5(1)
Current information	85.7(6)	90.9(20)	42.9(3)	62.5(5)
General information	28.6(2)	50.0(11)	28.6(2)	25(2)
Literature search	0	22.7(5)	85.7(6)	62.5(5)

Respondents were asked to express their opinion about the kind of information they usually search in the library. Even though the opinions are many, table 5 reveals that Research Scholars mainly search for literature search Ph.D users opined 62.5% and M.Phil 85.7%. However the users of UG and PG indicated with 85.7% and 90.9% respectively that they use for current information

Figure III: Usage of different categories Electronic information sources.

Figure-III reveals the usage of different e-resources by users, it is clear that UG,PG and Ph.D users are most frequently using websites and e-books. However M.Phil users are most frequently use websites and e-journals.

It is observed from figure –IV that majority of users of all categories are satisfied with the availability of e-resources in the library. A very few percentage of users are not satisfied with the same.

Table 6: Level of satisfaction regarding services in the library.

Level of satisfaction regarding services in the library.								
Services	UG	%	PG	%	M. Phill	%	Ph.D	%
(*i*) Very Satisfied	1	14.3	3	13.6	2	28.6	1	12.5
(*ii*) Satisfied	6	85.7	14	63.6	4	57.1	7	87.5
(*iii*) Not Satisfied	0	0.0	2	9.1	1	14.3	0	0

The respondents were asked to indicate the satisfaction level of library services. Table 6 and Figure-V shows that majority of all types of users indicate their opinion as satisfied. However a few users are not satisfied. It is also noticed that some users were very satisfied.

Figure VI above indicate the opinion of all type of users regarding conducting of orientation programme. It is observed from responses that Ph.D (75%) and M.Phil (71.4%) users indicated that no programme conducted by the library followed by PG (50%) and UG (42.9%).

A question was asked from the users about the level of satisfaction of users with the library staff. It is observed from figure VII that majority of users satisfied with the library staff *i.e.,* UG (85.7%), PG (63.6%), M.Phil (71.4%) and Ph.D (85.5%)

MAJOR FINDINGS OF THE STUDY
- 100% users are having the awareness of e-resources in the library.
- Majority of users are using e-resources for updating information and academic purpose.
- Majority of users are in need of e-books.
- Majority of users using e-resources minimum within a week.
- Users are satisfied with the library services, staff and resources.
- Majority of users are using Google search engine for searching information.
- The Speed Of Internet Is Not Satisfactory.

SUGGESTIONS
- Study on the use and usability of e-resources by the user's needs to be conducted time to time.
- Speed of internet should be improved.
- Awareness of e-resources should be spread among the users by conduction orientation programmes.
- Library should conduct trials of various e-resources for specific users group.

CONCLUSION
The e-resources are dramatically changing scenario in the library systems and making the same accessible globally. The implementation of e-resources in library is very useful for users and library professionals for speedup the accessing and maintain of the library information as well as the automation of the libraries. Increasing demands from users for access more and more information are accelerating in this era. More and more information are available in electronic format. The many of the users will resort to electronic resources if more orientation programmes are conducted. The library plays a leading role in conducting training for use of library e-resources. If efficient and effective use is to be made of library's resources, then user training should increased in both intensity and coverage. It is important to remember that the ability of library staff to keep up to date is necessary.

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Cloud Computing: A Perspective Study and its use in Educational Institution

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ABSTRACT

Cloud computing emerges as a new computing paradigm which aims to provide reliable, customized and dynamic computing environments with guaranteed QoS for end-users. Cloud computing has become an adoptable technology for many of the organizations with its dynamic scalability and usage of virtualized resources as a service through the Internet. It seems to be promoted as heavily as the "Grid" was a few years ago, causing broad discussions on the differences between Grid and Cloud Computing. The first contribution of this paper is thus a study of the Cloud computing paradigm from various aspects, such as definitions, distinct features, enabling state-of-the-art technologies and the different characteristics of Grid Computing and Cloud Computing. Cloud Computing will likely have a significant impact on the educational environment in the future. Cloud computing is an excellent alternative for educational institutions, especially the ones which face shortage of budget, in order to operate their information systems effectively without spending any more capital for the computers and network devices. Universities take advantage of available cloud-based applications offered by service providers and enable their own users/students to perform business and academic tasks. To this end, we will review what the cloud computing infrastructure will provide in the educational arena, especially in the universities where the use of computers are more intensive and what can be done to increase the benefits of common applications for students and teachers.
Keywords: Cloud Computing, Virtualization, Grid Computing

INTRODUCTION

Now-a-days, the term "cloud computing" has been an important term in the world of Information Technology (IT). Cloud computing was coined in late of 2007, and currently it emerges as a hot topic due to its abilities to offer flexible dynamic IT infrastructures, QoS guaranteed computing environments and configurable software services. Cloud computing is highly scalable and uses virtualized resources that can be shared by the users. Users do not need any background knowledge of the services. A user on the Internet can communicate with many servers at the same time and these servers exchange information among themselves . Cloud Computing is currently one of the new technology trends that will likely have a significant impact on teaching and learning environment. Rising business demands are forcing responsible IT people to consider new ways to reallocate their limited internal resources to better support their corporate priorities. This is driving them to rely more heavily on third-party services to increase their in-house capabilities and better satisfy the needs of their end-users, as well as their customers and strategic partners. The cloud platforms of today such as "Microsoft" and "Google" are providing free services to students and staff at educational institutions which include email, contact lists, calendars, document storage, creation and sharing documents and the ability to create websites. Sclater surveyed in different companies from different industries who have built custom applications in the cloud and analyzed how cloud computing affected their operations in three important areas: Security, Integration, and Time-to-Value. Cloud provides the opportunity of flexibility and adaptability to use the computing resources on-demand. Contrary to having only one service provider, different providers use different interfaces to their compute resources utilizing varied architectures

and implementation technologies for customers. Although this creates a management problem, a common architecture facilitates the management of compute resources from different Cloud providers in a homogenous manner . Mitchell provided an overview of existing learning architectures, and raised questions about how educational institutions are managing the cloud computing resources. He also brought reasonable explanations for the challenge of indexing web resources for optimum discoverability by students and educators. After this brief literature review providing the context from the infrastructure, application and services aspect of cloud computing, this paper refreshes the concept of Cloud Computing and explores the educational usage of the cloud services.

DEFINITION OF CLOUD COMPUTING

Cloud computing is becoming one of the next IT industry buzz words: Users move out their data and applications to the remote "Cloud" and then access them in a simple and pervasive way. This is again a central processing use case. Nowadays the Cloud computing comes into fashion due to the need to build complex IT infrastructures. Users have to manage various software installations, configuration and updates. Computing resources and other hardware are prone to be outdated very soon. Hence, outsourcing computing platforms is a smart solution for users to handle complex IT infrastructures. At the current stage, Cloud computing is still evolving and there exist many definitions of it. Based on our experience, we found the following definition complete in all aspects: "A computing Cloud is a set of network enabled services, providing scalable, QoS guaranteed, normally personalized, inexpensive computing infrastructures on demand, which could be accessed in a simple and pervasive way."

Although, the Cloud concept is still changing, yet the minimal definition of Cloud Computing can be formulated as: Clouds are a large pool of easily usable and accessible virtualized resources (such as hardware, development platforms and/or services). These resources can be dynamically re-configured to adjust to a variable load (scale), allowing also for an optimum resource utilization. This pool of resources is typically exploited by a payper- use model in which guarantees are offered by the Infrastructure Provider by means of customized SLAs. The set of features that most closely resemble this minimum definition would be scalability, pay-per-use utility model and virtualization. For Boss et al. , "a Cloud is a pool of virtualized computer resources". They consider Clouds to complement Grid environments by supporting the management of Grid resources. In particular, according to Boss et al., Clouds allow the dynamic scale-in and scale-out of applications by the provisioning and de-provisioning of resources, e. g. by means of virtualization; the monitoring of resource utilization to support dynamic load-balancing and reallocations of applications and resources.

FUNCTIONAL ASPECTS OF CLOUD COMPUTING

Conceptually, users acquire computing platforms or IT infrastructures from computing Clouds and then run their applications inside. Therefore, computing Clouds render users with services to access hardware, software and data resources, thereafter an integrated computing platform as a service, in a transparent way.

- **Hardware as a Service (HaaS):** Hardware as a Service was coined possibly in 2006. As the result of rapid advances in hardware virtualization, IT automation and usage metering & pricing, users could buy IT hardware, as a pay-as-you-go subscription service. The HaaS is flexible, scalable and manageable to meet your needs. Examples could be found at Amazon EC2, IBMs Blue Cloud project, Nimbus and Eucalyptus.
- **Software as a Service (SaaS):** Software or an application is hosted as a service and provided to customers across the Internet. This mode eliminates the need to install and run the application on the customers local computers. SaaS therefore alleviates the customers burden of software maintenance, and reduces the expense of software purchases by on-demand pricing. Googles Chrome browser gives an interesting SaaS

scenario: a new desktop could be offered, through which applications can be delivered (either locally or remotely) in addition to the traditional Web browsing experience.

- **Data as a Service (DaaS):** Data in various formats and from multiple sources could be accessed via services by users on the network. Users could, for example, manipulate the remote data just as it operates on a local disk or access the data in a semantic way in the Internet. Amazon Simple Storage Service (S3) [14] provides a simple Web services interface that can be used to store and retrieve, any amount of data, at any time, from anywhere on the Web. The DaaS could also be found at some popular IT services, *e.g.*, Google Docs and Adobe Buzzword .

- **Infrastructure as a Service (IaaS):** Based on the support of the HaaS, SaaS and DaaS, the Cloud computing in addition can deliver the Infrastructure as a Service (IaaS) for users. Users thus can on-demand subscribe to their favorite computing infrastructures with requirements of hardware configuration, software installation and data access demands. The Google App Engine is an interesting example of the IaaS. The Google App Engine enables users to build Web applications with Googles APIs and SDKs across the same scalable systems, which power the Google applications.

EDUCATIONAL USAGE OF CLOUD COMPUTING

The Cloud delivers computing and storage resources to its users/customers. It works as a service-on-demand policy. Recent interests offered new applications and elastic scalability with higher computing parameters. These positive effects have shifted to outsourcing of not only equipment setup, but also the ongoing IT administration of the resources as well . The results of a survey that have been completed in 2009 by Gartner „Analysts about the IT trends (especially cloud computing) show that it is being used more in the areas of finance and business when compared to other sectors [8]. Many technologies that were previously expensive or unavailable are now becoming free to anyone with a web browser. This is true for all web sites, blogs, video sharing, music sharing, social sharing, collaboration software, editing/presentation and publishing, and computing platforms in the "cloud". Students are already using many of these technologies in their personal lives. In the professional world, the trend of discovering and using technologies in our personal life is called "consumerization". This means we should demand and consume the required services. Our education system should take advantage of this same trend, which will both enrich our students technology-enabled education, and importantly, reduce the budget impact in academic institutions. University management should identify and leverage emerging technologies that are cost effective, and strive for the broadest feasible and equitable access to technology for students and staff. The need for hardware and software isn't being eliminated, but it is shifting from being on-premises to being in the cloud. All that is needed is a cheap access device and a web browser, broadband in the schools, perhaps wireless hotspots. Cloud computing as an exciting development is a significant alternative to todays educational perspective. Students and administrative personnel have the opportunity to quickly and economically access various application platforms and resources through the web pages on demand. This automatically reduces the cost of organizational expenses and offers more powerful functional capabilities. There can be an online survey to collect the required data for the use of cloud computing in the universities and other governmental or private institutions in the region. This will help us review the current status and probable considerations to adopt the cloud technology. Beginning with the outsourcing of email service seems attractive. The gradual removal of software license costs, hardware costs and maintenance costs respectively provides great flexibility to the university/corporate management.

CONCLUSION

"Cloud" computing builds on decades of research in virtualization, distributed computing, utility computing, and more recently networking, web and software services. It implies a service oriented architecture, reduced information technology overhead for the end-user, great flexibility, reduced total cost of ownership, on-demand services and many other things. This paper discussed the concept of "cloud" computing, its features, issues it tries to address, and also focused on giving a clear distinction between Cloud Computing and Grid Computing by identifying a catalogue of criteria and comparing both paradigms. Finally, a perspective on the usage of cloud computing in educational institutions was presented. Although our encompassing definition is overlapped with many grid concepts, our generalized definition highlights the major features of Clouds that make them different to Grids. Virtualization is the key enabler technology of Clouds, as it is the basis for features such as, on demand sharing of resources, security by isolation, *etc.* Usability is also an important property of Clouds. Also, security enhancements are needed so that enterprises could relay sensitive data on the Cloud infrastructure. Finally, QoS and SLA enforcement will also be essential before ICT companies reach high levels of confidence in the Cloud. Usability and virtualization could also be applied to grids to ease their usage, enhance their scalability, and allow on demand services. From the points of advantages provided by cloud, there is a great advantage for university IT staff to take them away the responsibility of the maintenance burden in the university. Cloud provides instant global platforms, elimination of H/S capacities and licenses, reduced cost, simplified scalability. Adopting cloud network redundancy eliminates disaster recovery risks and its high costs. There can always be new tools and applications to improve IT features. There are of course some disadvantages too. The cloud computing services needed to deliver the majority of IT services needed by customers do not yet exist. There are still problems and constraints with application offerings, service-level agreements, more importantly security issues. All of the cloud providers do not have the same capability for their technological levels.

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Cloud Computing and Libraries

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ABSTRACT

Cloud computing is a type of computing that relies on sharing computing resources rather than having local servers or personals devices to handle applications. As library acts a knowledge resource centre in the present era of knowledge society. For smooth and effectively functioning, many more techniques related to ICT are being applied by the librarian in their respective libraries. It is now proved that the library professionals are shown keen interest in applying new technology in the library. In view of this, the paper discusses the present need of cloud computing in library as well as library services. And the concept of cloud computing is also briefly presented with its advantages and disadvantages.

Keywords: *Cloud Computing, Cloud Services, Cloud Models*

INTRODUCTION

Today we are living in the era of Information and Technology (IT) and IT play an important role in library science. Library is well known treasure-house of knowledge. Since last few years Internet has revolutionized the concept of library in terms of its shape and the way of extending the services. Libraries have become automated which is the basic need towards advancement followed by networks. The new technology of e-publications, digital libraries, internet-usage and consortium practices leads to the further development in library profession. Cloud computing is one of the most emerging technologies for the modern age. In this technology, data is permanently stored on the internet servers and it can be cached by the users temporarily. This application is created using resources from more than one service and from more than one location.

Cloud computing can be understood as a way to use off-site computer processing power to replace content creation and servers that were traditionally hosted onsite. The main use of cloud services by libraries is either taking advantages of freely available applications for internal use in the library or for social networking purposes within their own community.

MODELS OF CLOUD COMPUTING

US National Institute of Standards and Technology (NIST) listed four models:

- **Public Cloud:** When the cloud service provider provides cloud services to the general public on Internet, such a service provider is known as 'Public Cloud Service Provider' and the model is called Public Cloud. Some examples of public cloud is – Amazon, Google App Engine and Rackspace Cloud.
- **Private Cloud:** The individual organization develops the cloud for its different services purpose and section; it is called as Private Cloud. This kind of model is useful to the large organizations such as Railway, Bank, Post office *etc.*
- **Community Cloud:** Community cloud shares infrastructure between serval organization from a specific community with common concerns *i.e.* jurisdiction, security, compliance *etc.* whether managed internally or by a third party and hosted internally.
- **Hybrid cloud:** Hybrid clouds are a combination of clouds *i.e.* private, public which remains bound without losing its original characteristic. Flexibility of this variation is enhanced because of change in degrees of association of the third party cloud provider depending upon the need of the organization.

ADVANTAGES OF CLOUD COMPUTING

Following are the main benefits of cloud computing for a library.

- **Sold on Demand:** It is sold on demand, typically by the minute or the hour.
- **Availability:** The most important part of the cloud providers should have the latest hardware, software and bandwidth that are needed for their libraries. Their clients want high speed access, large storage space and applications to run their services.
- **Mobility:** Users have the ability for the user to access data and applications from around the globe.
- **Efficiency:** This model helps to minimize the cost so the libraries get an opportunity to utilize the savings in some innovation and research and development.
- **Resiliency:** The service providers should make an arrangement by which they guarantee to provide the services even in case of natural disaster. They should ensure that they are capable enough to sustain through any kind of unexpected scenario.
- **Elasticity:** The environment transparently manages a user's resource utilization based on dynamically changing needs. A user can have as much or as little of a service as they want at any given time.
- **Virtualization:** Each user has a single view of the available resources, independently of how they are arranged in terms of physical devices.
- **Risk Reduction:** Users can use the cloud to test ideas and concepts before making major investments in technology.
- **Feedback:** The ability for the user to obtain the statistics on usage levels.
- **Cost effective:** Cost of cloud computing is very reasonable and updates are never a problem. Cloud computing is cost effective whereas using the proposition of traditional software development for the need of the organization.
- **Immediacy:** The cloud based service provides us application in relatively lesser time rather than the traditional approach.

CLOUD COMPUTING SERVICES

Cloud Computing can be divided into following three areas:

- **Software as a Service (Saas):** In SaaS, organizations can use the business-specific capabilities developed by the third parties in the "cloud". WAN enable application services (*e.g.* Google Apps., Salesforce.com and WebEx).
- **Platform as a Service (PaaS)):** Foundational elements to develop new applications (*e.g.*, Coghead, Google Application Engine, Yahoo).
- **Infrastructure as a Service (IaaS):** (infrastructure-as-a-service): Providing computational and storage infrastructure in a centralized, location-transparent service (*e.g.*, Amazon).

LIBRARIES AND THE CLOUDS

This approach to computing can help libraries save time and money while simplifying workflows. This is a new approach to managing computing infrastructure and there is no server required in the library and also no device to configure. It can also create a powerful, unified presence for libraries on the web and give users a local, group and global reach. It is fully supported and managed by the service provider. Example Google Docs is not a cloud but an application running on cloud infrastructure and the resources are the cloud.

Online Computer Library Center (OCLC) has been functioning as a cloud computing vendor. They provide cataloguing tools over the internet and allow member institution to draw on their centralized data store. World Cat is another example of cloud computing architecture drawing on the union catalogue infrastructure they have built up over the year.

BENEFITS OF CLOUD COMPUTING FOR LIBRARIES

There are following main benefits of cloud computing for the smooth functioning of a library is as:

- To use the cloud computing technology in the field of the libraries, the services can be made strong.
- Sharing of database is possible.
- Cloud computing is very reliable, saleable and poses privacy concerns.
- Backup and recovery of date is much simpler than other traditional methods of data storage in the libraries.
- Cloud computing is also helps in improving the utilization of the IT infrastructure to large extent.
- Information store in the cloud gives the unlimited storage capacity.
- Cloud computing technology is user centric.
- It improves document format compatibility.
- Latest version availability.

DISADVANTAGES OF CLOUD COMPUTING

Cloud computing also has some challenges. The most important among them is the security, *i.e.* how secure is our library data in the cloud? Some other disadvantages are:

- In cloud computing data may be lost and there is risk of data loss.
- Quality problems with cloud service provider.
- Failure in compliance.
- Dependency.
- Constant connectivity required and does not work well with low-speed connections.
- Time and budget constraint.

CONCLUSION

In this information and communication technology era, the library must constantly be improved through the introduction of new technology. The use of cloud computing in library will be a new development in the near future. From Indian perspective the concept of cloud computing is not much accepted in libraries as there are many issues concerned. But it will help libraries to maintain more control over the applications and data stores that contain sensitive, private information. Thus, libraries will create more knowledge benefits for our country with the help of cloud computing.

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Study on Cloud-Based Mass Data Storage of Libraries

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ABSTRACT

In modern era, Clouds are distributed technology platforms that sophisticated benefits technology innovations to provide highly scalable and resilient environments that can be remotely utilized by powerful ways. Also, library application of mass data storage model based on cloud computing makes appear new twist on traditional library management status. Cloud computing environments data storage system has obvious characteristics of low cost, dynamic, high-capacity, etc., but there are some network information security risks, which require managers to strengthen the related fields on the basis of the digital library management system.

OVERVIEW OF CLOUD MANAGEMENT IN DIGITAL LIBRARY

Cloud Computing Data Storage: Cloud computing is a dependent on the popularity of Internet applications derived from the computing and storage technologies. Hardware and software resources or information in this way can be passed to the shared network to other devices. Library of mass data storage system applications cloud computing essentially means generalized cloud computing services, build a variety of services through the network interoperability channels, expanding information storage resources in the field, to establish a new information service network.

Digital Library: All sectors of society to promote the extension of network information technology, cloud computing industry toward a deeper underlying framework, there is a digital library of information technology and network technology combined with data storage products, bringing people a new experience. Digital library system is a multimedia production of distributed information management system. It will be information and data resources stored in different regions of space utilized, and the orderly spread or metastasis. Cloud computing is one of the very important key technologies for the normal operation of the entire digital library mass data storage process, played an indispensable role. But at the same time, the use of digital libraries in the cloud computing model for management of the process, there have been some inevitable problems, through the implementation of the relevant technical means, will deal with the many negative issues in the bud, so as to ensure a cloud computing environment the normal operation of the library massive information storage system.

CHARACTERISTICS OF DATA STORED IN CLOUD COMPUTING ENVIRONMENT

Low Cost: In a traditional library, a wide variety of books is obvious, the placing of the rows of books not only requires more storage space, also requires a fixed arrangement of search methods to be managed. With the accumulation of social resources, modern library management is facing larger challenges, the previous storage technology has been unable to meet the rapid dissemination of digital information and storage requirements, operational pressures growing library management system, if the use of the old management tools for library management, management costs will increase, but this time the emergence of cloud storage technology for digital library resources to provide effective storage solutions

Large Capacity: Library of mass data storage system belongs to a branch full of knowledge positioning system, which is based on the current Internet information management environment. After the application of cloud computing data storage technology, the information capacity of the digital library has been further expanded, and

can be widely applied in the field of social, cultural, education and training, media, consulting, e-government, it has the function of an information transfer station.

This is a library of mass data storage technology features of the role of large capacity. While cloud storage network technology has many advantages in practical applications, but to establish a complete digital library data storage system, but also need to consider a number of issues. Various types of storage systems and storage devices in a cloud functioning premise, can be physically distributed into a single virtual storage device, so that the capacity is changed, save system resources. This is a virtual storage technology cloud computing environment can be further implemented to ensure storage and display system information turned functions. In order to provide a unified, secure data access mechanism library can be stored in the network cloud random physical server connections, and are stored in the system by the middle layer of virtualization to build a single access network equipment to enhance operational efficiency of digital systems. Mass storage data library in order of precedence in the cloud storage environment, user-friendly resource to find the required data in the shortest time, which enhances the actual function of the modern data library mass data storage systems.

High Ability of Automatic Fault Tolerance: Up to now, the development of cloud computing storage technology is more mature, lower storage costs, but higher degree of loss of storage components. In the cloud computing environment, the occurrences of abnormalities have occurred, such as: loss of data storage, transfer failure, etc., find information stored abnormal function allows users to use the system. Especially in the digital library network platform often taken around the clock operation mode and this requires that library mass data storage system with automatic error correction function. In this case, cloud vendors in the software layers have been adjusted beforehand appropriate technology, Enhanced cloud data storage technology automatic fault tolerance, enabling the system even when the fault-tolerant hardware itself skill problems, and to be without any hinder the implementation of mass storage instructions to ensure the system can play the biggest advantage of cloud computing technology.

Information Storage Stability: Data storage system based on cloud data is stored in the form of information resources, storage space is a web-based platform, accompanied by the presence of a variety of forms, respectively, which are stored in different servers to enhance the information storage stability. Cloud storage not refer to a particular storage device, it is a collection of multiple storage devices and servers. It is because of the unique way of cloud data storage, independent of any physical storage facilities, so it's relatively more favorable stability.

Cloud Storage – Issues: Manage different components of cloud computing and its application in digital library storage technologies, to further enhance its management efficiency, the library's resources are expanded. Compared with previous library resources, digital library has its own unique resources to gain an edge. From a storage perspective, data library of cloud storage technology to meet existing storage requirements, and cloud computing technologies are continually replaced, promotes the development of digital library. But there are considerable problems in practice. In order to ensure effective implementation of library management system based on cloud computing technology, you need to handle the problems that exist to ensure the system's safety performance and actively create a new pattern of data network services, to strengthen information management.

Safety Issues - Storage System Environment: Library of data storage technology in a cloud computing environment must not only have a powerful storage capabilities, as well as more flexible data transfer capacity also need to be able to guarantee the safety and reliability of library system. In practical applications, distributed data in cloud computing to the physical network integrated management information, filter on the different sources of information, so as to guarantee the security of information resources. In addition, at the same time maintain system stability, can realize the concept of

homogeneous access to heterogeneous data in the network. This is based on the unique advantage of libraries and mass data storage for cloud computing. Since the digital library is set up with the development of network information technology, there must be some risk of transmission from the network exists. This process needs to be strengthened in the management of modern libraries in the network hackers barrier, build a firewall to safeguard the security of the library system, omission of material information and avoid waste of resources.

Innovation Information Service: Under the current level of technology, cloud computing data processing mode to take parallel distributed processing network processing and combining the first major application in the business world, is a relatively new information-sharing platform. The future of cloud computing data storage technology is applied in modern library management process, through the effective implementation of the cluster application, network and IT functions such as distributed systems, library management network in large amounts of data collection and classification, to improve management of modern digital libraries, data information services make people have a more intuitive understanding, promote the further development of the sector. But in the end, mass data storage library based cloud computing model is essentially an information service, rather than simple data storage. It needs to be completed at any time allocation and transfer of information. Seen the development of library storage technology still relies on innovative service content. Only library service project meets the requirements of the times, the appropriate technology can be effectively realized.

Strengthening Information Management: Cloud storage model framework to achieve effective integration between databases and libraries, data resources and material resources will unify applications, making the storage costs of library resources to reduce and improve the level of actual operations Modern Library. With the development of network information technology, information resources in proportion to the growth of digital libraries, information and data showing a massive scale. Under the deal with cloud computing, cloud storage and use of data channels, the main functions of the module entire library management system together, and strengthen the timeliness and security of the information. This is extremely beneficial for the development of a library of modern management model. At the same time, we can learn practical techniques of mass data storage foresee some problems, such as: When the number of visitors to the library network platform more, how to maintain the normal operation of the system. Based on this, to play its dynamic cloud storage technology to solve this problem, so that system resources are configured with a high dynamic. Digital Library based on cloud computing cloud computing server as the core, and dynamic deployment of virtual hardware service equipment. Users in the application of digital library network platform to connect using the Web cloud, cloud storage to improve the actual energy efficiency. As a result, both to ensure the user instant access to network resources requirements, but also to take into account the stability of the digital library system, strengthen the management of massive data information under the cloud computing environment.

Cloud data storage technology revolutionized the operation of modern library management, especially for traditional resources and information service delivery methods had a profound impact. This is a new era of change brought about by the opportunity, but also a product of modern society, science and technology development. After the construction of modern digital library system marks the era of network information technology field of scientific obtain further extend and enhance the quality of people's work and life, and promote the development of modern information service industry.

CONCLUSION

Cloud computing technology is to build a modern digital library system. With the further development of cloud computing, and cloud computing concept is widely accepted user-based cloud computing platform will become one of the most important choices. Cloud computing is currently in a digital library application is still in the start-up and exploration stage, there are several problems to be solved such as privacy issues, data security issues, intellectual property protection.

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Free and Open Source Software

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INTRODUCTION

Open-source software is software that allows users access to its source code. It allows users to modify the program according to need and to develop new code that improves the application. A common misconception about Open-source software Open-source software is that it is **free-of-cost**. While this is sometimes the case, the cost of open-source software is often found in support services rather than in product acquisition. This fact sheet provides information about the value and potential cost associated with adopting open-source software, discusses the relationship between open-source software and open government, and provides questions to be asked when evaluating open-source software.

FREE AND OPEN SOURCE SOFTWARE

One could illustrate the idea of free and open source software compared to proprietary software with a situation where a person buys a house. Upon purchasing the house he also receives technical drawings and blueprints so that he can make changes himself to the structure. One alternative would be for the seller to retain ownership. All drawings would remain in his possession and therefore all changes to the house would have to be made by the same vendor or seller.

Another case could be the purchase of a car, where only the dealer's repair shop retains all car manuals and repair guides for exclusive rights to repair or make any changes in the performance of the car.

Richard M Stallman: founder of Free Software Foundation, uses the illustration of cookery and food. How would we experience the world around us if recipes were not freely available or free to change and modify? What would it be like if we committed a crime every time we made a copy of the recipe or gave it to someone else? Free and open source software means that source code is freely accessible, that the software can be freely used, changed, improved, copied and distributed by all who wish to do so.

Free and open source software does not have to be free of charge. Besides being able to construct business models around the software based on commercial aspects, a company can receive direct payment by the use of a large number of licensing schemes and models. These models can also be included in the overall definition of what we mean by free and open source software. What is important here is that the source code is available to the customer.

EXAMPLES OF PRODUCTS

There are a large number of products based on free and open software. At Source forge, one of the most popular portals for the publication of free and open source software, there are over 60,000 different projects of which 7,000 are adapted toWindows95/98/2000.
The most popular and successful projects also have their own web sites.

- **Linux:** is probably the most well-known example of open source software, but there are also a large number of other successful software products. A few examples:
- **Apache:** is one of the world's most utilized web servers. Apache is used in more than65% of all web servers on the Internet today.
- **Bind:** is without question, the most widely used name server (DNS) on the Internet. A name server's foremost task is to translate computer names (*e.g.*) www.statskontoret.se) to IP addresses and vice versa.
- **DHCP:** is software for automatic configuration of nodes on an IP-based network

- **Frees/WAN:** is a popular open source application for building VPNs (Virtual Private Networks). It uses IPSec and common encryption algorithm such as 3DES and AS along with the option to compress data in traffic.
- **GIMP:** is used for picture editing. It can be used for editing and touching up of pictures from digital cameras, but also as a general purpose drawing program and for converting graphics files between different formats.
- **Mozilla:** is a web browser which has some program code identical to that within Netscape Communicator Mozilla is a complete suite of programs with support for both Linux and Windows.
- **MySQL:** is an SQL based database server with accompanying applications for administration, control and clients. MySQL is the most frequently used open source database on the Internet. Support for almost all platforms including Linux and Microsoft Windows is available.
- **OpenOffice.org:** is a complete office suite for word processing, presentations and Spreadsheet. Representatives from Sun administer the project and Sun contributes to a large part of the development. The project has developed their own XML-based file format and also support for MS Office file formats, although not 100%. Works on both Linux and Windows platforms.
- **Samba:** is a product which emulates an NT 4-server on a Unix-based platform. Samba works as both a file and a print server for both Windows and Linux clients.
- **Send mail:** is the most common of all mail servers on the Internet. Sendmail includes functions such as mail routing, mail relay, anti-spam and also supports protocols such as SMTP, POP and IMAP. Send mail can also function as a client e-mail server.

THE VALUE IN MODIFYING SOURCE CODE

Software is not programmed to address every situation; even sophisticated commercial, closed-source software may be limited by the scope of a developer's vision of what it should do. Overcoming limitations is one of the reasons why closed-source software developers release new versions. While new versions help meet users 'needs, buying another version every few years can be expensive, and it can take time and training to master the updated product. Open-source software communities modify source code to address changing needs as those needs arise. Thus, if someone using Libre office, an open source alternative to Microsoft Office, finds that Libre office lacks a useful tool, users may access the source code and build a tool to address this need. Alternatively, if a user finds that something is missing from Microsoft Office, s/he must wait for Microsoft to release aversion that includes the needed feature.

USING FREE AND OPEN SOURCE SOFTWARE

Several different studies show that Linux is becoming more and more common as an operating system within companies and government agencies all over the world. In the first place, Linux replaces proprietary Unix and Windows platforms on servers. Studies show that Linux is the fastest growing operating system on the market today. Major systems suppliers and integrators, such as Hewlett-Packard and IBM, put Linux on an even par with earlier traditional operating systems and offers support and consultancy services at the same level. IBM goes as far as choosing Linux as a Unix19 (24) based operating system for certain system solutions instead of its own AIX. Most often as sort of partnership is established with one of the leading Linux distributors such as Red Hat or Mandrake Soft and tests are carried out to ensure that applications and hardware are compatible and work together without any glitches. Both IBM and Predicate considerable resources in the development of Linux. Even other application providers develop Linux based versions of their own software. Oracle is one such example. At Oracle it is considered just as important to make available software versions for Linux as well as any other operating system. In some areas, Linux dominates the market for Internet servers:

Web servers and large server clusters with stringent requirements for calculation capabilities.

Recent developments in better user interfaces and office programs such as Open Office have made Linux a viable alternative even for desktop computers in the workplace. The following areas of use are of interest, partly because they represent a considerable portion of software already used within government agencies and partly because there already are competitive free and open source software alternatives or they could easily be set up and effectuated within these areas.

- Infrastructural applications – name servers, catalogue servers, network servers, mail servers,
- Server operating systems
- Workplace computers (PC)
- Office applications incl. e-mail
- Web servers and browsers
- Development environments
- Databases
- Business-specific systems
- Security software.

ADVANTAGES OF FREE AND OPEN SOURCE SOFTWARE

The following advantages of free and open source software were mentioned in the floss report:

- Higher stability
- High level of security
- None or low licensing fees
- Possibility to modify source code
- Ample access to IT specialists
- Independence from major software vendors.

One considerable advantage of free and open source software is of course that one can customize and modify a product for a certain target group of users, *i.e.* make the software simple and functional. For example, a specific development environment can be created, an application for electronic services aimed at the general public can be developed or a desktop computer with adapted functionality can be set up. The products are extremely dependable in production and easy to administrate and maintain. There is an initial cost of development, but running costs are very low and the total cost is considerably lower than comparable proprietary alternatives. The working group for this project has identified a number of positive and negative effects surrounding the introduction of free and open source software within public Administration in Sweden.

POSITIVE EFFECTS

- Simpler license management
- Reduced dependence on a product, less risk for "locking in" effects
- Lower costs overall
- Increased competition
- Increased quality and stability
- Increased activity on part of local/domestic businesses
- Increased security
- Open formats simplify communication with general public.

NEGATIVE EFFECTS

- Possible need for extensive migration
- Could lead to higher demands for in-house competence and maintenance within the agency or authority itself
- Could be difficult finding the right product

- Possible interoperability problems with proprietary software
- Fewer available consultant and support services on the market at present time
- Psychological resistance among decision makers

Several of the negative effects could take place at an initial stage and are dependent on both volume of use and the number of services offered.

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Zotero: A Reference Management Software

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ABSTRACT

We all know every day some new coming out in the area of information technology. For example iPhone6 which contains all the latest technology. These technologies have also affected the researcher's information need. Every researcher is now seeking their information on their fingertips. Researchers are now looking for their own separate library which contains information related to their research area. But is it possible? Yes…!!! In this internet enabled world to help researcher the position has come-out "Reference Management Software". In the 20th century for typing people were using typewriter and 21st century people are using word processor or Personal PC. Same way in 20th century researchers were managing Citation notes and in 21st century they are using Reference Management Software.

Keywords: *Reference Management Software, Citation Software, Zotero*

INTRODUCTION

Information for research is emerging as a big challenge. Reference management software helps researcher, whether a student, librarian or professor to saves huge amounts of time and effort. The ongoing research project is never the only plate spinning at any given moment. So the reference management software gives a scholar a complete system for gathering sources, organizing and citing them. Reference management software helps researchers from much of the mindless clerical process of formatting citations, so that they can focus on the research itself.

REFERENCE MANAGEMENT SOFTWARE

Definition: Reference management software, citation management software or personal bibliographic management software is software for scholars and authors to use for recording and utilising bibliographic citations .

The reference management software *also titled citation management software, citation manager or personal bibliographic management software.* The aim of this reference management software is to save search results and publications. These citations management systems allow users-researchers, scholars, authors to saving citations, making bibliographies, storing and also organizing digital documents.

There is a different type of commercial reference management software like *EndNote,* **RefWorks and Procite**. Commercial reference management software is findings difficult to use with many catalogues and databases. Open-source web browser Firefox provided the solution of this limitation of commercial reference management software. Firefox is designed to allow programs called "add-ons" to expand the way it works, adding new features not intended by the Firefox developers. This Add-ons can allow the browser to create an own library for the researcher/ librarian/ educator/ author. And Zotero is the one from among the open-source software and firefox add-on. Firefox was the first platform for which Zotero was developed.

Description and Importance of Zotero: "Zotero [zoh-TAIR-oh] is a free, easy-to-use Firefox extension to amend you accumulate, handle, and cite your explore sources. It lives starboard where you do your output - in the web browser itself."

Zotero is citation management application that allows you to easily collect, manage, and save bibliographic information about the items you find on the Web. It is also help you to create your personal library with a single click. It also works with word processing programs to help you easily cite your sources as you write.

Zotero installation is a one-click installation from anywhere. Because it's free, there is no problem with passwords or logins or accidental trial versions. It is not only work for online catalogues and databases, but also to import and export to and from as many other different formats as possible. Users can not easily work in commercial management software. Users have to buy this software.

ADVANTAGES OF ZOTERO

Different types of reference management software are available on the internet. Zotero is also the one of them. Following are the advantages of Zotero:

- The whole research can be accessed in a single click.
- Bibliographic information automatically downloads, and also web page snapshots, related PDF files from hundreds of admitted sites.
- Easily make bibliographies in different formats.
- Research collections are organized in multiple "folders"
- Annotate references and add attachments
- Organise related references into collections, and tag references with keywords
- It is easy to citations in research work. Users can direct insert citations in their research work.
- Use Zotero's Group functions for collaborating with colleagues or student group projects
- Easy backups of any web page for offline viewing or archiving
- It works on Firefox and other web browsers.
- Zotero synchronizes the user's library with the Zotero servers and also access the same library on multiple computers and across multiple operating systems.

PROCEDURE FOR INSTALLING ZOTERO

Firstly, install the Zotero. Installing Zotero is very easy. There are two versions of Zotero.
1.   Firefox application and it doesn't require running a separate program to work
2.   Standalone version and it's a separate application that runs in its own window.
Differences between the two versions:
- Zotero for Firefox has a single version that runs on any operating system. Standalone Zotero has separate versions for each operating system (Windows, MacOS and Linux).
- Zotero only works with Firefox. Standalone Zotero works with the Chrome and Safari.
- Zotero for Firefox requires installing the word processor toolbar as a separate add-on. Standalone Zotero includes word processor toolbars bundled with the software.
- Zotero for Firefox automatically detects citations without any need for a connector. Standalone Zotero requires installing a connector.
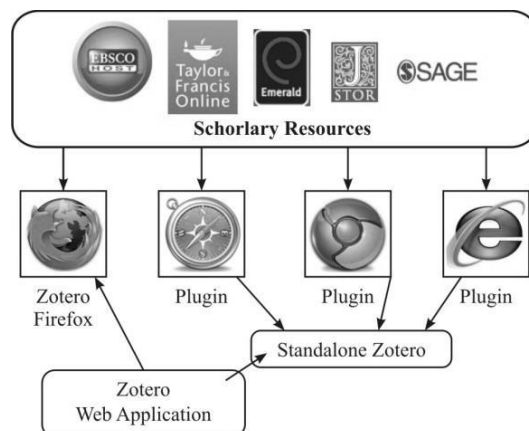
Fig. 1

INSTALLING ZOTERO FOR FIREFOX

1. Open Firefox and go to Zotero.org website. And click the large red "Download" button. (Fig. 2)
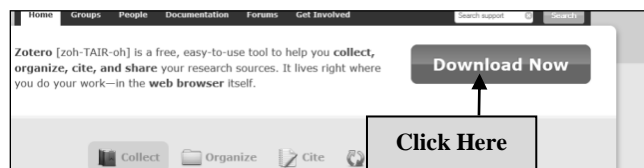
Fig. 2

2. Firefox will open a notification says "Firefox prevented this site" (www.zotero.org) from asking you to install software on your computer. Click the "Allow" button to continue. (Fig. 3)
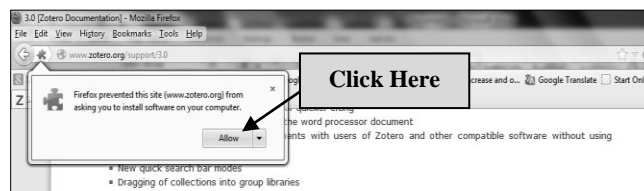
Fig. 3

3. A new window "Software Installation" appears. Click the "Install Now" button to install Zotero. When download is finished, a "Restart Firefox" button appears. Don't click it yet. (Fig. 4)

Fig. 4

4. Again open Zotero.org website. Below the Download button you'll see a link "Download word processor plugins". Click this link to go to the "word processor plugin installation" page. There are separate versions of the word processor plugin. It is depending on your program which program you use. There is a version for Word for Windows, one for Word for Mac OS, and so on. (Fig. 5)
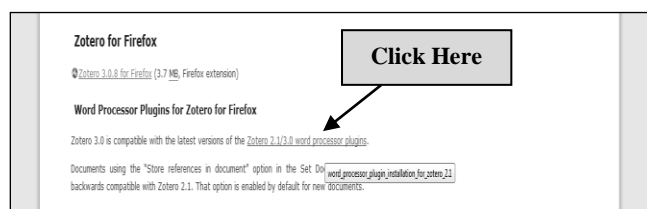
Fig. 5

5. Follow the same steps when installing Zotero. Click the appropriate Install link, click Allow, Install, and wait for the progress bar.
   This time, Click the 'Restart Firefox' button. (Fig. 6)
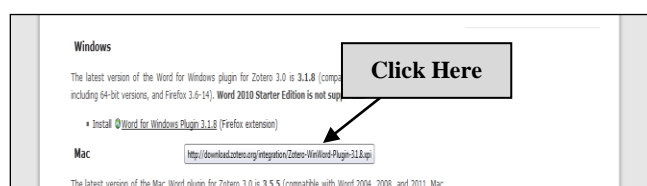
Fig. 6

6. Open your word processor. See the word Zotero in the last menu of the top of the browser window- name- Add-Ins. (Fig. 7)
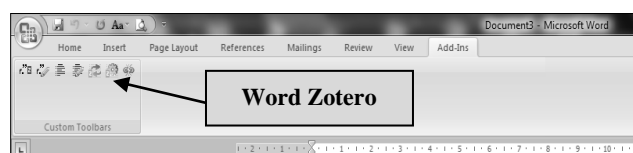
Fig. 7

INSTALLING STANDALONE ZOTERO

Standalone Zotero is the new version of Zotero that runs as a separate application, not as a Firefox plugin.

1. Open Zotero.org/support/standalone and download the version of Zotero for your operating system.
2. Download the connector for your browser from the Zotero Connectors list. Like the Firefox version, downloading and installing only takes a few seconds.
3. Run the Standalone Zotero program. This software allows the two programs to save items to the same library both Zotero Firefox and Standalone Zotero. Standalone Zotero and Zotero for Firefox will each have their own separate library.
   If the two programs share a library, only one program can be active at a time. At this point, Zotero for Firefox is the more stable version and in much wider use.

Navigating the Zotero: Open Zotero in four ways:
(*i*) Open Firefox & go to the Tools menu and choose Zotero.
(*ii*) Click on the Zotero logo in the bottom right corner of your browser.

Fig. 8

(*iii*) Open browser's toolbar & click on the Zotero icon.
(*iv*) Shortcut key to open Zotero. Press Ctrl + Alt + z for a PC, or for a Mac Shift + Apple + z.

Fig. 9

Zotero windowpane layout: There is a three different windowpane in the Zotero for your references.

(*i*) **Left windowpane:** It shows the zotero libraries and collections, and also shows "tags" at the end of the windowpane.
(*ii*) **Middle windowpane:** It shows the items, which you select from the left windowpane of the library collections.
(*iii*) **Right windowpane:** It shows the information, which you select in the middle windowpane.

Left windowpane   Middle windowpane   Right windowpane

Keywords/Tags
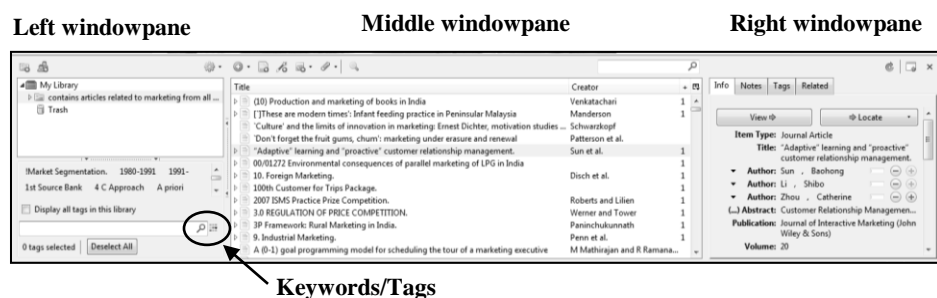
Fig. 10

Creating personal library using Zotero: When you research each research citation, we need to remember and difficult to write. Zotero will help you to work for your research. Zotero captures the information and stores it for your future reference. Whenever you need the same source for a future paper you will have it! Zotero can automatically save bibliographical information from many websites, including the Proceedings.

Five different ways to creating personal library:

• **Creating and editing citations manually:** Click on the New item icon ( ) menu in the middle windowpane. And select the citation type that you would like to cite.
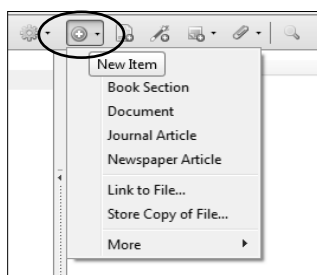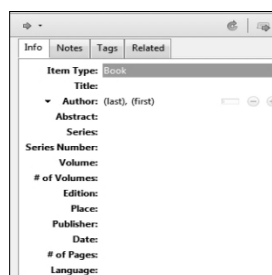
Fig. 11   **Fig. 12**

In the right windowpane you will see the citation information fields that the type of source you selected. Fill the information for your personal library. (Fig. 12)

- **Saving citations:** Zotero allows you to save citations with a single click.
  Click on the rightmost end of the address barwhere you should see small icon ([ ])
  This is a "capture icon" which you show in the following figure.
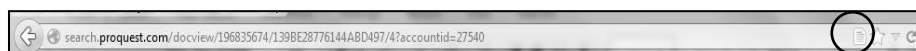
Fig. 13

Or you can also save your search result from the web pages on the following way
If there's no Zotero capture icon in the address bar (Figure. 14), but you can save the
citation using the 'Create New Item from the Current Page' icon in the middle
windowpane (Figure. 15). Search result will automatically be saved into your library.
You can also edit the information which you have saved by clicking on each field in
the Right windowpane.

Fig. 14
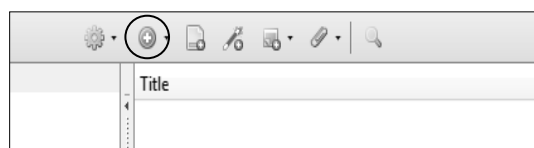
Fig. 15

- **Save several citations at once:** A page containing a list of search results instead of a
  single item, Zotero indicates the capture icon to a folder (Fig. 16).

Fig. 16

Click the folder button. A list of all the references on this page opens, each with a
checkbox (Fig.17) Check off each item you want to save to you library and click 'OK'
(Fig. 18)
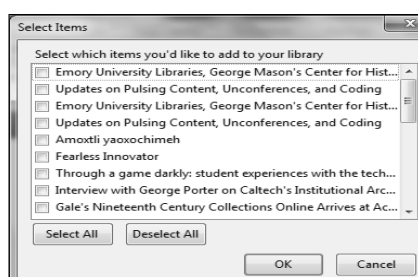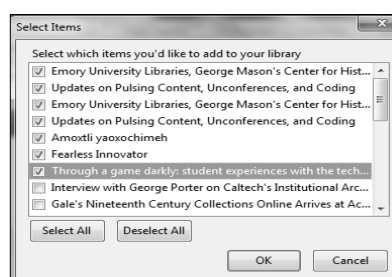
Fig. 17   **Fig. 18**

- **Saving the citations from saved Zotero library or other citation program:** You can
  also import your saved citations from the other program or Zotero library. Click on the
  'Actions icon' ([ ]) menu and select import. Give a path where you saved your
  citations and click on 'Open'. Your selected file will appear in the left windowpane in
  a separate folder.

- **Saving citations by number:** If you have a book with an ISBN or an article with a DOI or PMID, Zotero can automatically capture all its citation information. In the middle Zotero windowpane, to the right of the 'Create New Item From Current Page' button, you will see a small button (Fig. 19).

Fig. 19

Click on that button and type or copy and paste the number (Fig. 20). Zotero will search your book or article citation and it should appear in your library (Fig. 21)
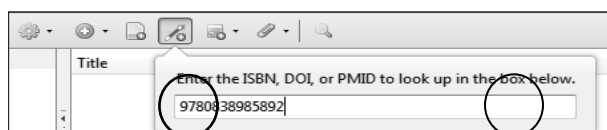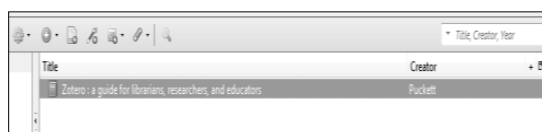

Fig. 20

Fig. 21

- **Organizing personal library:** Zotero allows you to manage your citations, change the locations of citations, names of collections, and also add tags, links, & notes.

COLLECTIONS

- **New collection:** A collection is simply a list of library items. You can create a many collections as you need, and an item can be in more than one collection at a time if needed. To create a new collection, click on the 'New Collection' button at the top of the Zotero window in the left windowpane (Figure. 22). It looks like a yellow folder. Type a name and click 'OK'. Your new collection will appear in the left windowpane of the Zotero window.
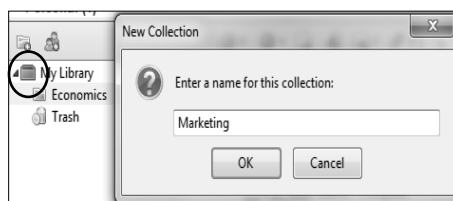
Fig. 22

- **Adding items/citations to the collection:** You can also add items/citations into your new collection from your library or middle windowpane. Click the middle windowpane collection which you want to save in your new collection and drag them to the collection in the left windowpane. If you see the highlight yellow colour collections that means that items already includes in your new collections.
- **Rename the collection:** You can also rename the collections. Right click the collection folder and type in the new name. Then click OK button.

- **Deleting items/citations:** If you want to delete an item or citation from your library or collection you can do it. Select the item or citation and press the delete key on the keyboard. The item or citation will delete from the collection but it will still be available in the library. If you want to delete it from the library, right click on the item or citation and choose 'Delete Selected Item from Library'.
- **Tags:** Tags simply add additional information to a library item for easier searching, grouping or organizing. Select any citation in your saved library and click the Tags tab in the right windowpane. Tags on this item display here. You can also add your own tags by clicking the Add button.
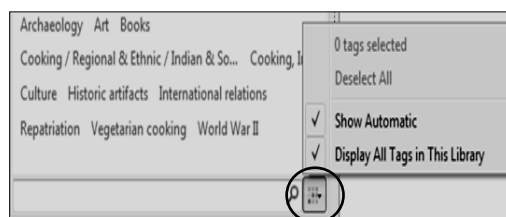
Fig. 23

- **Attachments, Notes & Snapshots:** You can also attach a PDFs, Notes & Snapshots with the citations. A citation with attachments has a plus sign or arrow next to it in your library list. To create a new attachment, select a citation in your library. Click the "Attachment" button. From here you can attach a snapshot of the current page, a link to the current page, a stored copy of a file, or a link to a file (Figure 24).
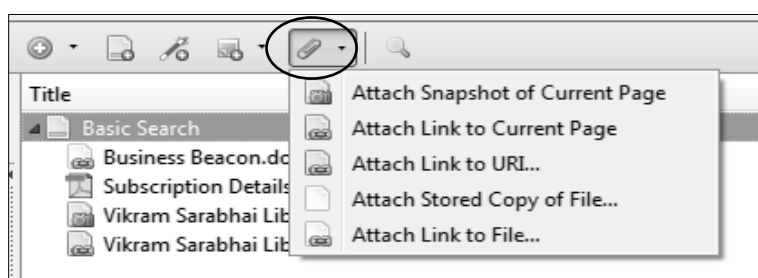
Fig. 24

- **Searching in personal library:** After saving all your research materials into a library there is a one advantage. You can easily find them with Zotero search option.

BASIC SEARCH
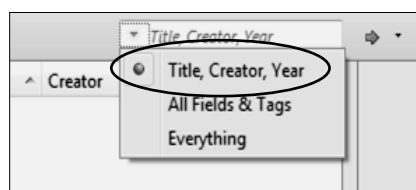Type a word or name into the search box at the top of the middle windowpane (Figure 25).

Fig. 25

ADVANCED SEARCH

1. Click on the search button.

Fig. 26
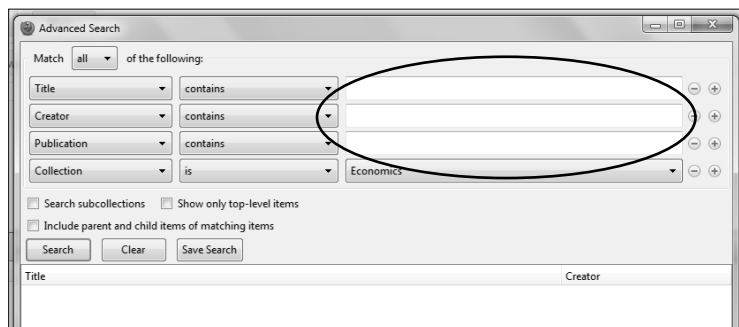
2. Type word or name into the search box.

Fig. 27

CREATING BIBLIOGRAPHIES IN ZOTERO

You can also create a bibliography of the saved data. First right click on the "Create Bibliography from Selected Items".
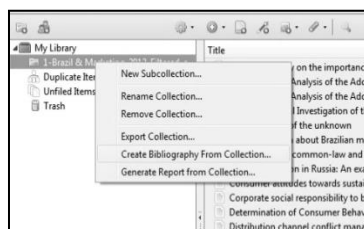

Fig. 28

There is one window open after that, you can write in any style you like. If you do "Save to clipboard"; you need to paste in word document so that bibliography can be create.
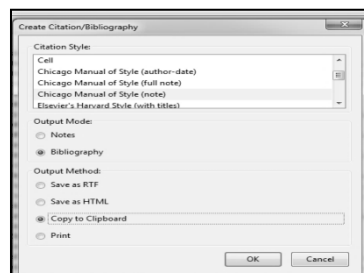

Fig. 29

ONLINE ZOTERO

If you want to work on multiple computers, you aware require opening an account in Zotero. You can work on multiple computer as well as online work after create an account in Zotero. You can set your Zotero client to sync automatically in the preferences panel under "Sync".

CONCLUSION

Researchers can use many resources for their research but finding ways to manage them efficiently becomes a major challenge. Managing these literatures involves providing the researcher with convenient ways to find and access them and providing researcher with the tools to keep track of them. This article has attempted to introduce the key features of Citations/Reference management tools and how to use their basic principal for managing the citations.

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Changing Role of Librarians in Digital Library Era and Need of Professional Skills, Efficiency and Competency

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ABSTRACT

The emergence of a vast storehouse of information on the Internet poses a different kind of conundrum Librarians, the traditional gatekeepers of knowledge are in danger of being bypassed, their skills are ignored, their advice unsought. Search engines send user straight to the information they require – or so users may think – without any need for an intermediary to classify, catalogue, cross-reference, advice on sources.

The location and provision of information services has dramatically changed over the last ten years. There is no need to leave the home or office to locate and access information now readily available on-line via digital gateways furnished by a wide variety of information providers (e.g. libraries, electronic, publisher, businesses, organisations, individuals). Information is electronically accessible from a wide variety of globally distributed information repositories.

Information is no longer simply text and pictures. It is electronically in a wide variety of formats, many of which are large, complex (i.e. video & audio) and often integrated (i.e. multimedia).

TRADITIONAL LIBRARY

Libraries are where the access points such as, library catalogues as well as library collections are print based and their management is by and large manual.

AUTOMATED LIBRARY

A library where access points and house keeping operations are computerised is called an automated library. The graphic records are still print-on-paper publication.

ELECTRONIC LIBRARY-DIGITAL LIBRARY

The access point as well as the graphic records are in electronic/digital form when these electronic/digital libraries are connected via various networks, particularly the INTERNET, this is called virtual library.

Digital library is not only digitization of physical resources, but also thoughtful organisation of electronic collection for better access. Such organisation 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 organisation and access of a large information repository. In all probability, digital libraries are likely to augment traditional libraries, such as an on-line card catalogue augments, rather than strictly replacing, a book collection. The reason for this could be than the digital medium tends to be better for searching, and the physical medium better for reading. Lets us know about digital library and the skills required to build up digital collection

Definition: According to Wiederhold "A digital library is popularly viewed as an electronic version of a library where storage is in digital form, allowing direct communication to obtain material and copying it from a master version".

"Digital Library is a combined technology and information resources to allow remote access, breaking down the physical barrier between resources".

Winensky viewed that 'the digital library will be a collection of distributed information services, producers will make it available, and consumers will find it through the automated agents.'

Digital Library is a "Collection of digital object (text, video, audio) alongwith method for access and retrieval, [as far as users are concerned] and also for selection, organisation, and maintenance (from the point of view of librarian). Ian Whitten.

The digital library is not merely equivalent to a digitized collection with information management tools. It is also a series of activities that brings together collections, services and people in support of the full life cycle of creation, dissemination, use and presentation of date, information and knowledge.

ADVANTAGE OF DIGITAL LIBRARY

Digital library has certain characteristics, which make them different from traditional library. It has expansive and accurate system of searching with large volumes of text, image and audio-video resources. Digital libraries do not need physical space to build collection and it can be accessed from anywhere, any time. Different people can access same source at the same time. The advantages of digital libraries are mentioned herein below:

- Preserve the valuable documents, rare and special collections of libraries, archives and museums.
- Provide faster access to the holding of libraries world wide through automated catalogues.
- Help to locate both physical and digitized versions of scholarly articles and books through single interface.
- Search optimization, simultaneous searches of the Internet make possible, preparing commercial databases and library collections.
- Offering online learning environment.
- Making short the chain from author to user.
- Save preparation/ conservation cost, space and money.
- Digital technology affords multiple, simultaneous user from a single original which are not possible for materials stored in any other forms.

DISADVANTAGE OF DIGITAL LIBRARY

New technology has brought many advantages but simultaneously it also has certain disadvantage

- Costly affair
- Technology obsolescence (Hardware & Software)
- Storage media relate
- Dominance of data creators and publishers
- Trained manpower
- User education and training
- Security against hacking and sabotage.

TYPES OF RESOURCES

The resources provided by the digital libraries can be classified into in-house resources and external resources. In-house resources are those resources that are stored in the web server locally and made accessible through the network. E-books, course notes, and application notes etc. are examples of the in-house resources.

The external resources are those materials that are not stored in the web server. External resources includes online journals, online detabases, online e-books etc. External resources are provided by different publishers - ASME, ACM, IEEE, Oxford University Press Journal (OUP) and many more are there. The publisher provides access to their full text materials by two methods:

(*i*)   Username and password

(*ii*) Internet Protocol (IP) address based Access Control Method

CHANGING ROLE OF LIBRARY PROFESSIONAL IN DIGITAL AGE

The ready availability of information on the Internet, and its widespread use, really presents Librarians with an opportunity, not a threat. Technology Savvy users realise they need help, which Librarians can provide. Librarians now face difficulties and complicity challenges due to new trends in information access.

In the present technological/Internet era the professionals have to change themselves as the information profession is being changed. Now information specialists have to work as e-information resources in which various professional groups are expected to map strategies that leads to produce, manage, maintain and service the information. Information professional has to work as:

- **Librarian**: In addition to being library manager, they also act as collection development, technical processors and so on, taking care of information quality.
- **Information Manager:** To meet information need of the user they should know how to manage and deliver appropriate information services.
- I**nformation adviser/instructor:** Ensure that user/staff know how to access relevant sources of information (literacy).
- **System and Networking:** For delivery of information to their users in an appropriate manner develop and design appropriate systems.

SKILLS, KNOWLEDGE, COMPETENCIES REQUIRED FOR LIS PROFESSIONALS

The basic goal of library and information profession has always been to provide access to information to those who need it. The activities realizing this goal have evolved and transformed over the years. This includes - Available technology, and need of an evolving information society. Information activities have been guided by the developments in the field of storages, presentation and archiving of knowledge, collection development and organization of knowledge, information explosion and computers in information retrieval. Librarian and information professional involved in information gathering, storage, retrieval and dissemination on one hand and on the other hand the computer specialists who supports the library and informational professionals in this endeavor. For successful implementation of Digital Library, it is essential that LIS professionals are well trained and possess requisite knowledge and skills in this respect.

Knowledge and Skills: Librarians need to know understand
- Knowledge resources (books, journals, *i.e.* resources, Internet)
- Teleological facilities and resources (computer, online catalogues, websites, LANs file servers etc.)
- Financial resources (Budget) Human resources (Skills for manpower training)

Competencies that required to possess in LIS professional:
- Acceptance of change.
- Knowledge of user interaction with knowledge resources.
- Provide quality service.
- Be adoptive, flexible and resistant.
- Be resourceful
- Possess excellent communication skills, constantly update personal knowledge base by keeping in touch with the latest development
- Create awareness among the users, make them accept the changes
- Be an information management strategist, etc.

Technical Knowledge required:
- Operating systems - Windows, UNIX, LINUX.
- World processing, Graphics, Spread sheet & Presentations.
- Database Management Systems including the skills in Bibliographic Database Management Systems.
- General purpose programming, Networking
- Web page Development and Content Management

- Information Retrieval software for online, CD-ROM and Internet.
- Library software packages, acquaintances with Digital Library Tools.

CONCLUSION

The world of information is undergoing rapid change. An information age at a great turning point in the history of civilization. The day has arrived when it is most important to learn to access, analyze apply and evaluate such information. As traditional custodians of information, librarians need to be aware of the implications of these changes and develop technological and managerial skills, which will enable them to make effective use of information and to meet their organizations changing information need.

Development of information technology is playing a crucial role in restructuring of the libraries. Shift from human dependent operations to machine dependency, mechanization (data processing) to knowledge processing, stand alone system to network computing, local LAN to wireless access protocol systems. Document centered information to user (Access) centered information; print media to electronic (Access) media, data capture methods, human to machine oriented. Library automating (in-house) to web-enabled services (WAN Access), Online information retrieval to CD-ROM Databases to Internet. These prolonged shift in application of innovative IT to library and information profession can be attributed to the changes emanated in the last 2 decades.

The role of librarian has changed in the digital library era. It is, therefore pertinent on the part of the librarian to acquire new skills required for developing and managing the digital libraries. The library and information professionals are required to acquire such knowledge and skills as the library is one of the highly IT influenced service profession. The empowerment of library and information professionals with IT skills is aimed at providing services that are expected of from the clientele in the new environment.

Digital age has brought a tremendous change in the way information is stored and accessed. This has brought about a change in the concept of librarian, their collection and services. Many new terms *viz.* Digital Librarian, Libraries without walls, virtual libraries, are emerging to describe the libraries of digital age.

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Collection Development of Academic Libraries in ICT Based Environment: Issues and Challenges

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ABSTRACT

The main objective of a library is to provide information and knowledge those who seek them, through a document collection. Selection policies and practices play a fundamental role in developing storage collection. Collection development involves a number of activities by which a library acquires materials of all types by implementing the selection policy and the plans for document acquisition. Collection development is a dynamic and continuous activity. This article reflects the impact of information technology on collection development and collection management.

Keywords: Collection Development, Information Technology, Environment, Challenges, Issues.

INTRODUCTION

The world is changing every minute and growing as a tremendous speed due to the emergence of the web based information and communication technology (ITC), globalization of networks and internet. This plus-minus operation involves a host of intricacies and is regarded as an operation of paramount importance in offering efficiency, responsive patrons' services in a library, information storage and retrieval system, or other bibliographic databases with similar objectives. No wonder, there has been a general belief that there is a positive correlation between the collection size of a library and its performance in terms of patrons' satisfaction. Thus the collection development is a continuous process in all types of libraries worldwide. If a library ceased adding fresh materials to its collection, it would soon relegate into a dead collection affecting adversely the performance of a library. All types of libraries, therefore, draw a sound acquisition program with a sound acquisition policy and procedure, and most important, a selection policy. A standard selection policy is a sine quo non for a judicious, balanced and robust collection development. It specifies the objective of the collection, authority for selection, procedure for overseeing the proposed selection

COLLECTION DEVELOPMENT IN ICT BASED ENVIRONMENT

A question pertaining to the future of collection development in libraries and knowledge storing institutions needs to be answered at the earliest. In this context, it is pertinent to mention the functions relating to collection development/ collection management specifically selection, acquisition, preservation, policy makings, collection evaluation etc. In this context, one cans see that while collection while collection development is perceived as a concept more appropriate to earlier times of expansion in higher education and academic libraries and implies building and growing, dealing with selection and acquisition of library materials. Collection management now is a more demanding concept which goes beyond a policy of acquiring materials, to policies on housing, preservation, storage, weeding and discard of stock. Rather than selection and acquisition, collection management emphasizes the systematic maintenance and management of library's existing collection. Current concerns and constraints: Continuing economic constraints, together with such factors as curriculum changes, research selectivity, the expansion of higher education, the information explosion, and the growth of new information media, lead to a higher priority being accorded to planned and coordinated collection management and stock revision than used to be the case.

IMPACT OF IT ON COLLECTION

Impact of IT on collection is very significant on library operations would be stating obvious and is indisputable. In this context of collection development/management, the impact of IT has been quite pronounced whether it relates to collection development policy, selection and acquisition of information materials, resource sharing/networking collection, evaluation, *etc.*

Collection development Policy: In an It-based environment, the entire approach and philosophy of collection development needs to be changed as simply duplicating the collection practices evolved for print materials in the new information environment does not seem responsive to current needs or capabilities. Nevertheless, collection development, whatever form it takes, still would require policies that would govern the acquisition of both electronic resources and traditional forms of documents. In this context, probably, the obvious challenge would be the problem of how to integrate both.

On the basis of a survey on the extensive literature generated on changing collection development patterns, the key issues identified for redefining a collection development policy include:

- Balancing ownership and access;
- Cooperative efforts; and
- Evaluation.

Ownership vs. Access: In recent years, there has been a perceptible shift from library as a storehouse model to library as a gateway model. Echoing similar views, Dougherty and Hugh say that the concept of Hie virtual library, *i.e.*, a library that provides access to electronic and print materials from many sources, both local and remote has achieved a widespread popularity, while Michalko stresses that the "research library must move with minimal disruption from a library model directed primarily at ownership of materials to one in which access and delivery play central role." A similar line of thinking can be seemed in Dowlin v comment for 'the need to transform the library from a fortress to an information pipeline.

COLLECTION DEVELOPMENT METHOD

Collection development methods relate to the procedures of selection and acquisition of materials for an expanding collection and decisions on the material to be included in the collection. While selection and acquisition methods to be adopted for traditional/ conventional printed materials are well known, what one is not familiar is the uses of electronic facilities for collection development activities. The use to networks for collection development related activities in special libraries are given below:

Use of Networks for CD-related Activities

- Requesting/providing missing issues, duplicate and exchange
- Requesting/providing ILL to other libraries
- Requesting/ordering library materials
- Identifying document sources
- Getting quick copyright mission
- Communicating with venders and customers
- Accessing electronic journals and newsletters
- Subscribing to electronic publications
- Searching remote catalogues and union lists
- Searching online systems
- Scanning journals tables of contents
- Retrieving files via FTP
- Receiving documents and technical data
- Searching files for acquisition lists and articles.

RESOURCE SHARING

Resource sharing is a very old and noble tradition. But in recent times, has become a central focus of interest to the librarians and information professionals and a likely direction for future development. This can be seen from statements, such as "pride in collection has got to be supplanted by pride in patronage"; libraries should think materials as community resources rather than with a simple institutional orientation, local ownership to collective access Etc. While developments in information technology and its widespread availability in support of networking, the world over, is the most significant factor in the growth of RS activities that RS as an operational concept has not gained sufficient ground in India.

Perhaps, it is time, that information professionals realize that provision of access to information is more important that collection building. Therefore, a necessity has risen to strike a balance between local ownership and network access which should be reflected in the collection development policy statement. Consequently, librarians must shift the focus of their acquisition policy from the collection of materials by and for an individual library to policies that weight the merit of acquiring the same resources by consortia of local libraries, regional library cooperative and/pr state library networks. Internet is a very good example of network which facilitates selection and procurement of information materials, document delivery and access electronic journals and specialized materials.

CHALLENGES OF COLLECTION BUILDING IN IT-BASED ENVIRONMENT

The most pressing and pervasive issues and challenges that the library and information science professionals face in the present digital era for providing digital information service to knowledge society are:

- New generation of learning learners
- Copyright
- Privacy/Confidentiality
- Online/Virtual crimes and Security
- Technology Challenges
- Manpower
- Collection of digital e-resource
- Preservation/archiving of digital e-resources.

CHANGE THE ROLE OF LIBRARIAN

The very important role that emerges from our librarians is a redefinition of their role as information mediators. To make these role even more important, librarians need to add value to the information as it moves through this chain. The added value does not come from passively relaying the information we receive from the producers on to the consumers. The added value comes from insisting on quality products at reasonable prices and from value added by the library's own organizing, linking, and retrieval and access systems. In this changing scenario, libraries and librarians will continue to play an important role in handling traditional/conventional and electronic resources. Unless this is recognized and acted upon, other professions and professionals will usurp own roles and functions. Libraries must be quick to recognize and realize the advantages of IT and must try to adapt and adopt it for their operations. It not amenable, some rethinking on the whole design and operation of the existing system should be done. In other words, a reappraisal of the existing system vis-à-vis new technology should be undertaken.

CONCLUSION

The invaluable collection policy statement, provides a means by which the library selects and manages its collection of information resources. These guidelines are, in effect, a contract between the management library and its students, supplying a framework within which complex decisions are made with consistency and reason. While a special

librarian's collecting is most often governed by practical concerns more so than on collection development theory or criteria, the general consensus deems collection policies useful as librarians aim to describe their collections in terms of depth and extent of coverage, types of materials collected, exchange agreements, and the many other special considerations that Institution librarians tend to encounter. In the context of collection development and management, it should be remembered that the key issues to be considered would relate to: ownership vs. access, cooperative efforts, and evaluation. Ownership implies building up of collections and there need not be any doubt about this activity as printed materials will always be a part of library collections, but the shift towards networked and local electronic resources presents exciting possibilities for reengineering collection development and acquisition processes. In other words, libraries will need both ownership and access.

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Copyright Infringement in India

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ABSTRACT

Intellectual property denotes knowledge or information which has a commercial value.Among these copyright is relevant for library and information work.Copyright constitutes an essential element in the development process. Indian Copyright Act Copyright Act confers a long–lasting right in a dramatic, literary, artistic and musical work. Information Technology Act 2000, facilitating electronic communications and e-commerce, the law aims to curb computer crimes.
Keywords*: Intellectual Property Rights; Copyright; Copyright Infringement.*

INTRODUCTION

Intellectual property denotes knowledge or information which has a commercial value. Intellectual property Rights (IPRs) can be defined as mix of ideas, inventions and creations on which society is willing to bestow the status of property. IPRs cover patents, registered designs, copyright and trademarks etc. Among these copyright is relevant for library and information work.

Copyright constitutes an essential element in the development process. Experience has shown that the enrichment of the national cultural heritage depends to large extent on the level of protection accorded to literary and artistic works. The better the protection, the greater the number of production in literature and the arts, in the book, record and entertainment industries; the greater the number of a country's intellectual creations, the higher its renown. Encouragement of intellectual creation is one of the basic prerequisites for social, economic and cultural development(Copyright and Neighboring Rights, 1997). Governing the protection, use and exploitation of such intellectual creations of the human mind are a set of laws which form part of intellectual property. This task of governing is done through two basic principles, that is:

- Protecting creators by providing them with rights over their creations and
- Preventing, prohibiting and punishing others from violating (or infringing) such rights.

The true challenge of IPRs and for that matter, copyright, lies in balancing of (*i*) protection of the rights (of the) owners with (*ii*) interests of the users, through the beneficial spread of such creations which can ensure progress of the society we live in. By providing rights and effective protection to creators, intellectual property laws encourage creators to devote more time and effort to their activities, and to invest in their dissemination. By doing so, more knowledge is spread more easily and the society as a whole will benefit.

For a work to be subject to copyright, it needs to meet the following three criteria:

- It must be original;
- It must be fixed in some way;
- It must be created by an author from a country which recognizes copyright (Cornish, 2009).

Most countries throughout the world have copyright laws that protect the rights of their nationals. However, 'international copyright law' does not exist to automatically protect an author's writings throughout the entire world and protection in a particular country depends on the national laws of that country. Most countries in the world do offer protection to foreign works under certain conditions (International Copyright Relations of the United States, 2015). Over the years, these conditions have been greatly simplified by

international copyright treaties and conventions. The first international recognition of the copyright was the Berne Convention for the literary and artistic works issued in 1886. Before this, works by foreign nationals were not protected outside of their country of origin, so a work published in France, for example, could be freely reproduced in the UK. The US did not sign up to the Convention because it would have required major changes to its copyright laws. However, in 1952 in Geneva, UNESCO developed the Universal Copyright Convention (UCC) to cater for those countries, such as the US, that did not adhere to Berne.

INDIAN COPYRIGHT ACT

Copyright Act confers a long–lasting right in a dramatic, literary, artistic and musical work.

Dramatic work (any piece for recitation, choreographic work or entertainment in dumb show, the scenic arrangement or acting form of which is fixed in writing or otherwise but does not include a cinematograph film) Copyright Act, 1957 sec.2 (h)

Literary work (Computer programme, tables and compilations including computer (database)) Copyright Act, 1957 sec.2 (0)

Sec.2 (hh) defines the term duplicating equipment to include floppy drivers, electronic copying on the Internet to increase the quantum of fine and enforcement mechanism to take into account the Internet. The Indian Government is taking steps to make Copyright Act, 1957 in accordance with the WIPO treaties so that all interests are well balanced.

Artistic work (painting, sculpture, drawing (map, chart or plain), engraving or photograph) Copyright Act, 1957 sec.2 (c)

Musical work (The person who composes the music regardless of whether he records it in any form of graphical notation) Copyright Act, 1957sec.2 5(p)

The Indian Copyright Act was enacted and amended as follows:

- Indian Copyright Act 1914 (based on U.K. Copyright Act, 1911)
- The Copyright Act 1957 (14 of 1957) (w.e.f. 21-1-1958).
- The Copyright (Amendment) Act, 1983 (23 of 1983) (w.e.f. 9-8-1984).
- The Copyright (Amendment) Act, 1984 (65 of 1984) (w.e.f. 8-10-1984).
- The Copyright (Amendment) Act, 1992 (13 of 1992) (w.e.f. 28-12-1991).
- The Copyright (Amendment) Act, 1994(38 of 1994) (w.e.f. 10-5-1995).
- The Copyright (Amendment) Act, 1999(23 of 1999) (w.e.f. 15-1-2000).

Section 74 Registrar of Copyrights and Copyright Board shall have the powers of a civil court when trying a suit under the code of civil procedure, 1908 (5 of 1908) in respect of following matters, namely:

- summoning and enforcing the attendance of any person and examining
- him on oath;
- requiring the discovery and production of any document;
- receiving evidence on affidavits;
- issuing commission for the examination of witness or documents;
- requisitioning any public record or copy thereof from any court or office;
- any other matter which may be prescribed

Section 63 describes offence of infringement of copyright or other rights conferred by this act. Any person who knowingly infringes or abets the infringement of

- the copyright in a work, or
- any other right conferred by this act.

Shall be punishable with imprisonment for a term which shall not be less than six months but which may extend to three years and with fine which shall not be less than fifty thousand rupees but which may extend to two lakh rupees: Provided that [where the infringement has not been made for gain in the course of trade or business] the court may, for adequate and special reasons to be mentioned in the judgment, impose a sentence of

imprisonment for a term of less than six months or a fine of less than fifty thousand rupees (Indian Copyright Act, 1957).

INFORMATION TECHNOLOGY ACT 2000

With the enactment of Information Technology Act 2000, India became the twelfth country to have comprehensive cyber law. Besides facilitating electronic communications and e-commerce, the law aims to curb computer crimes.

Section 43(b) downloads, copies or extracts of any data, computer data-base or information from such computer, computer system or computer network including information or data held or stored in any removable storage medium.

Section 43(h) charges the service availed of by a person to the account of another person by tampering with or manipulating any computer, computer system, or computer network, he shall be liable to pay damage by way of compensation not exceeding one crore rupees to the person so affected.

In Section 65 of the Information Technology Act 2000 there is provision of punishment for unauthorized use of computer related work. Tampering with computer source documents, and hacking a computer system will be liable for imprisonment up to three years or with fine up to Rs.2 lakhs or both(IT Committee Report). Copyright infringement is the unauthorized use of copyrighted material in a manner that violates one of the original copyright owner's exclusive rights, such as the right to reproduce or perform the copyrighted work, or to make derivative works that build upon it (Mali).

CONCLUSION

The Copyright Law of India is comparable to that of developed countries(Study on Copyright Piracy in India, 1999). Poor enforcement and lack of awareness on copyright issues are the main reasons behind copyright infringement.

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The Changing Shape of Collection in Libraries in Electronic Age

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ABSTRACT

The present paper covers the concept of knowledge in changing environment in different shape. The present paper also cover the changing collection format (CD, DVD, E-Journals, E-book, e-database, e-mail etc.) in libraries. Libraries should purchase these type of e-resource according to needs of their users and librarian play an important role in this selection. The duties of librarian also defined in this paper at the end.

INTRODUCTION

Civilization has grown in many ages with new inventions as fire, wheel and papers. Now this Age is of knowledge and every country of the world is investing a very large amount of funds on research and development to extract the information, data and knowledge for the benefit of people of their Nation. This is also true, which country have or earn more information (useful and meaningful) that country will dominate other countries. University and research center are the creator of knowledge and libraries are disseminator of this knowledge. Thus libraries play an important role to connect this knowledge, information and data to concerned user or society. Now the ICT has been entered in every field of knowledge. Information management is the collection and management of information from one or more sources and the distribution of that information to one or more listeners. This sometimes involves those who have a stake in, or a right to that information. Management means the organization of and control over the structure, processing and delivery of information. The core of the collection should consist of books and media in the library general stacks. Collection should include monographs, annuals, videos, DVD's and other media. The Reference collection should support the reference librarians in answering patron questions in a timely, systematic way. The collection should focus on e-books that are encyclopedic, statistical and current trends. The periodicals collection must contains current and back issues of all serials published more frequently than annually and now this be hosted on library home page with linkage to the concerned publisher.

CHANGING COLLECTION IN MODERN AGE

The amount of digital information is increasing faster than most librarians would have predicted. According to Nicolas Negroponte in *Wired Magazine* the Web doubled in size every fifty days in 1996, with a homepage added every four seconds, now this situation will be unpredictable. Despite this phenomenal growth, research libraries, for reasons stated above, are still largely dominated by print resources, both in acquisitions and collection management. It is unlikely that more than 10 to 15 percent of a research library's collection budget is used today to purchase or provide access to digital information in libraries and information center. Now electronic resources are increasing in every type of library. The definitions of e-resources are as under:

- **Electronic Resource**: "A publication in digital format which must be stored and read on a computer device. There are two types: Direct access: These are physical objects such as CD-ROMs, diskettes, computer tapes, and computer cards, containing text, images, software, *etc.*"
- **Electronic Resource**: any library material that is made available electronically, such as an eBook, database or journal article. The some main e-collection in shape of e-book, e-journals *etc.* are as under:

- **E-Book**: also known as an "Electronic Book." An electronic book (variously: e-book, eBook, e-Book, eBook, digital book, or even e-edition) is a book-length publication in digital form, consisting of text, images, or both, readable on computers or other electronic devices. Electronic books offer creative possibilities for expanding access as well as changing learning behavior and academic research. These e-books are easy access through Internet and may be very useful to e-learner community. Contents of e-books can always be accessible, regardless of time or place, to be read on PCs or on portable book readers. One can carry several titles at once on a portable reader and, over time, build a personal library. Features such as full text searching, changeable font size, mark-up, citation creation, and note taking will enhance usability.

- **Electronic Journal**: also known as an "E-Journal" a journal published in an electronic format, which may be published in print then made available electronically. Some electronic journals are online-only journals; some are online versions of printed journals, and some consist of the online equivalent of a printed journal, but with additional online-only (sometimes video and interactive media) material. Most commercial journals are subscription-based, or allow pay-per-view access. Many universities subscribe in bulk to packages of electronic journals, so as to provide access to them to their students and faculty.

- **The Compact Disc** (also known as a **CD**) is an optical disc used to store digital data. It was originally developed to store and playback sound recordings exclusively, but later expanded to encompass data storage (CD-ROM), write-once audio and data storage (CD-R), rewritable media (CD-RW), Video Compact Discs (VCD), Super Video Compact Discs (SVCD), Photo CD, Picture CD, CD-i, and Enhanced CD. Audio CDs and audio CD players have been commercially available since October 1982. Standard CDs have a diameter of 120 millimeters (4.7 in) and can hold up to 80 minutes of uncompressed audio or 700 MB (700×2^{20} bytes) of data. The Mini CD has various diameters ranging from 60 to 80 millimeters (2.4 to 3.1 in); they are sometimes used for CD singles, storing up to 24 minutes of audio or delivering device drivers.

- **A DVD:** is an optical disc storage media format, invented and developed by Philips, Sony, Toshiba, and Panasonic in 1995. DVD originally stood for Digital Versatile Disk, or Digital Video Disk. The acronym was dropped after DVD proved to have more uses than just storing video content. DVDs offer higher storage capacity than Compact Discs while having the same dimensions.

- **Blu-ray Disc** (official abbreviation **BD**): is an optical disc storage medium designed to supersede the DVD format. The disc diameter is 120 mm and disc thickness 1.2 mm plastic optical disc, the same size as DVDs and CDs. Blu-ray Discs contain 25 GB (23.31 GiB) per layer, with dual layer discs (50 GB) being the norm for feature-length video discs. Triple layer discs (100 GB) and quadruple layers (128 GB) are available for BD-XL Blu-ray re-writer drives. Currently movie production companies have not utilized the triple or quadruple layer discs; most consumer owned Blu-ray players will not be able to read the additional layers, while newer Blu-ray players may require a firmware update to play the triple and quadruple sized discs. The first Blu-ray Disc prototypes were unveiled in October 2000, and the first prototype player was released in April 2003 in Japan. Afterwards, it continued to be developed until its official release in June, 2006.

- **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. Full-text databases contain the whole content of an article such as citation information, text, illustrations, diagrams and tables. Bibliographic databases only contain citation information of an article, such as author name, journal title, publication date and page numbers.

- **The Internet:** is a global system of interconnected computer networks that use the standard Internet Protocol Suite (TCP/IP) to serve billions of users worldwide. It is a

network of networks that consists of millions of private, public, academic, business, and government networks, of local to global scope, that are linked by a broad array of electronic, wireless and optical networking technologies. The Internet carries a vast range of information resources and services, such as the inter-linked hypertext documents of the World Wide Web (WWW) and the infrastructure to support electronic mail.

- **Website:** A website (also spelled Web site) is a collection of related web pages, images, videos or other digital assets that are addressed relative to a common Uniform Resource Locator (URL), often consisting of only the domain name (or, in rare cases, the IP address) and the root path ('/') in an Internet Protocol-based network. A web site is hosted on at least one web server, accessible via a network such as the Internet or a private local area network. Web pages are accessed and transported with the Hypertext Transfer Protocol (HTTP), which may optionally employ encryption (HTTP Secure, HTTPS) to provide security and privacy for the user of the web page content. The user's application, often a web browser, renders the page content according to its HTML markup instructions onto a display terminal. All publicly accessible websites collectively constitute the World Wide Web. The pages of a website can usually be accessed from a simple Uniform Resource Locator (URL) called the homepage. The URLs of the pages organize them into a hierarchy, although hyper- linking between them conveys the reader's perceived site structure and guides the reader's navigation of the site.

- **E-mail:** Electronic mail, commonly called email or e-mail, is a method of exchanging digital messages across the Internet or other computer networks. Originally, email was transmitted directly from one user to another computer. This required both computers to be online at the same time. Today's email systems are based on a store-and-forward model. Email servers accept, forward, deliver and store messages. Users no longer need be online simultaneously and need only connect briefly, typically to an email server, for as long as it takes to send or receive messages. An email message consists of three components, the message envelope, the message header, and the message body. The message header contains control information, including, minimally, an originator's email address and one or more recipient addresses. Usually descriptive information is also added, such as a subject header field and a message submission date/time stamp. Originally a text only (7 bit ASCII and others) communications medium, email was extended to carry multi-media content attachments, a process standardized in RFC 2045 through 2049. Collectively, these RFCs have come to be called Multipurpose Internet Mail Extensions (MIME). The history of modern, global Internet email services reaches back to the early ARPANET. Standards for encoding email messages were proposed as early as 1973 (RFC 561). Conversion from ARPANET to the Internet in the early 1980s produced the core of the current services. An email sent in the early 1970s looks quite similar to a basic text message sent on the Internet today.

- **E-magazine:** 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.

FEATURES OF ELECTRONIC RESOURCES

E-resource' is a term used to describe all of the information products that a library provides through a computer network. This includes electronic books and journals, bibliographic databases, and library website pages. E-resources are plays a vital role in all the field of education especially Library and Information science to provide better

services and easy access to user of the library. The characteristics of e-resources are as follow:

- **Speed:** we may access, extract, integrate and browse electronic resources very quickly. In hard copy prints takes much time even sometimes many weeks for processing.
- **Storage and Preservation:** e-resources may be preserved for long time and having ability to store and retrieve large amounts of information
- **Multi-user access:** The accessibility of information is made available for multiple users at a time with their terminals.
- **More Search facilities:** in comparison to traditional document e-resources have different search options like simple or quick, advance search and Boolean- logic search.
- **Huge Content:** e-resources can storage and contain a vast amount of information in digital format.
- **Economical:** One time initial expenditure on infrastructure (Computer, net printer etc) is high but maintenance of these electronic resources is very economic.

RESPONSIBILITIES OF LIBRARIANS

Librarian and information officer should be accountable for collection assessment including evaluation of current collection and development of collection goals for specific subject areas. Collection should maintain by the libraries such as weeding, evaluation of gift materials for inclusion in the collection. Working with the library web team should evaluate and recommend internet sites for inclusion in the library web pages. Faculty should work with the collection development librarian to determine appropriate electronic and serials resources needed for specific subject areas. The Collection Development Librarian is responsible for organizing and developing collection assessment and development activities. These responsibilities include updating and revising the collection development policy as needed, providing planning, information and support to subject experts as they evaluate specific subject collections, responsibility for implementation of overall collection assessment. These accountabilities of library depend on the budget and cooperation of the authority and attitude of managing authority toward the library and library professionals. Thus librarians play an important role in selection of good collection according to needs of their users.

CONCLUSION

Now libraries should acquire books, electronic information sources, newspapers, periodicals, pamphlets and other material which may reasonably be needed by users and their faculty in connection with their teaching subject, or which is needed by library and research staff in connection with their information and research work. Online and hard copy information should not be considered in isolation but as complementary resources. Within this general approach it will help to classify subject areas according to how comprehensive a collection is desirable. A collection is therefore, likely to focus on subjects such as chemistry, electrical, mechanical, electronics, politics and government, the social sciences, science policy issues, and books on engineering discipline on foreign countries.

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Models of Information Seeking Behaviour

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ABSTRACT

Information needs of individuals in an organization differ depending upon their respective functions and tasks, the level of their knowledge and experience (in the specific field of specialization and in the use of information systems and services), their particular interest and need to satisfy which they seek information, on the breadth and depth of their interest profiles, and on the nature of the subject or field of specialization or interest.

Keywords: *Theories of information seeking behaviour, Information needs, Users Characteristics, General process models,*

INTRODUCTION

Information needs — the type, coverage, depth — of a user may differ considerably depending upon the his/her activity at the moment — for instance, when entering a new field of research as compared to when seeking a solution to a specific problem in a field already familiar to the person. A n information seeking behavior of a user may result from the recognition of some information need. Fig. 1 shows the interrelation among the areas usually covered in user, studies.
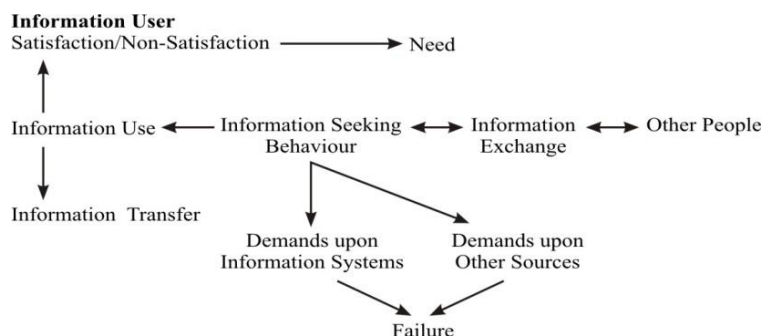

Fig. 1. Interrelationships among areas in the fields of user studies

THEORIES OF INFORMATION SEEKING BEHAVIOUR

The concept of information needs has been coined by an American information scientist Robert Taylor10 in 1962 and is beautifully discussed in his work entitled 'The process of asking questions' published in the Journal of American Society of Information Science (JASIS) now know as Journal of American Society of Information Science and Technology (JASIST). Menzel11 interprets the results of several recent studies of the total information seeking activity of scientists and technologists in terms of complementary relationship between an extremely flexible and many-sided interpersonal communication system, on the one hand, and a formal communication system, on the other hand. The formal system is able to compete with the informal system with respect to only a few of the many information needs of the individual. Among the information needs identified are: 'promptness of acquisition of certain information, selective dissemination of communications, screening and evaluation of communications, indication of implications, retention of unscholarly but subtly important details in digest,

and rapid feedback'. Newly initiated and proposed activities such as information analysis centers and selective dissemination of information are seen as moves to formalize and improve upon functions long served by information communications.

INFORMATION NEEDS

The information need (or need for information is a factual situation in which, there exists an inseparable interconnection with 'information' and 'need'. the information originates and is generated because there exists a need or an interest. The content of information is of primary concern. The basic objectives of studying information needs and use may be:

(*i*)   the explanation of observed phenomena of information use or expressed need;

(*ii*)   the prediction of instances of information use and

(*iii*) the control, and thereby improvement of the utilization of information manipulation of essentials conditions.

USER CHARACTERISTICS

In order to maximize the impact of library services and maximum use of library resources it is essential to LIS Professionals that they should know about their users properly so that they can deliver content based information services. The user characteristics are an important component of the communication systems in any information system are for their use. The user characteristics are innumerable and could be clustered in different groups in various ways. Among the pioneering information workers, Rosen bloom and Wolek29 pointed out the users characteristics factors such as experience, seniority, educational level, professional activity and orientation, are all potentially related to information seeking behavior. Line30 argues that users can be considered as individuals or as groups or communities. According to him, the individual characteristics, which are associated with information use and needs, include the following: age, experience in research or job, background, seniority, *etc.* The psychological dimensions of individual characteristics include: persistence, thoroughness, orderliness, motivation, independence, breath approach and information threshold. Slater and Fisher31 mentions three clusters of factors which are: (*i*) psychological factors; (*ii*) effectiveness of available services; and (*iii*) characteristics of user and his environment. Whereas Vickery32 suggests that institutional environment and work activity have major impact of information seeking behaviour. Ellis and Haugan33 have reported on the information seeking patterns of engineers and industrial research scientists. Their description is embedded within a detailed account of different project types and project phases in their findings, they identify eight major information seeking activities or characteristics that are: surveying, chaining, monitoring, browsing, distinguishing, filtering, extracting and reveling.

GENERAL PROCESS MODELS

General process models are those models that focus on micro-processes of daily life, in particular, cultural contexts and social settings (Leckie 2005:158). The models that are grouped into this category are Wilson's (1981) and (1996) Models of information behavior (in Wilson 1999), Ellis's Model of information-seeking (in Ellis and Haugan 1997), Kuhlthau's Information search process model (in Kuhlthau 1993, 2004, and 2005).

WILSON'S (1996) MODEL OF INFORMATION BEHAVIOUR

Wilson made major revisions to his 1981 model of information behavior. In his 1996 model (in Wilson 1999:257), shown in figure 2.3, he drew upon research from a variety of fields other than Information Science (Ingwersen and Järvelin 2005:67; Wilson 1999:256). These fields include decision-making theory, psychology, innovation, and health communication and consumer research. The model 40 pictures the cycle of information activities, from the rise of the information need (context of information need) to the phase when information is being used (information processing and use).The basic framework of the 1981 model persists, in that the person in context remains the focus of

information needs, the barriers are represented by intervening variables and information-seeking behavior is identified. However, there are also changes: the use of the term intervening variables serves to suggest that their impact may be supportive of information use as well as preventive; information-seeking behavior is shown to consist of more types than previously, where the active search was the focus of attention; information processing and use is shown to be a necessary part of the feedback loop, if information needs are to be satisfied; and three relevant theoretical ideas are presented: stress/coping theory, which offers possibilities for explaining why some needs do not invoke information-seeking behavior; risk/reward theory, which may help to explain which sources of information may be used more than others by a given individual; and social learning theory, which embodies the concept of self-efficacy, the idea of 'the conviction that one can successfully execute the behavior required to produce the {desired} outcomes'.

Thus, the model remains one of macro-behavior, but its expansion and the inclusion of other theoretical models of behavior makes it a richer source of hypotheses and further research than Wilson's earlier model.

ELLIS'S (1994) MODEL OF INFORMATION –SEEKING BEHAVIOUR

Ellis' model of information-seeking behavior was tested on engineers. Ellis first described his model of information-seeking behavior in 1984 and has since then developed the model in information-seeking studies of various groups of researchers, including engineers (Ellis 2005:138-139). Ellis (in Ellis & Haugan 1997:385; Ellis 2005:140; Ingwersen and Järvelin 2005:63) derived eight generic characteristics of the information-seeking patterns of social scientists. Ellis later extended this work to physicists, chemists and engineers. Figure 2.3 is a stage process version of Ellis' model.

The eight characteristics of Ellis' model of information-seeking behavior represents types of activities, rather than stages that the users of information systems might want to accomplish through the systems and do not directly provide any design specifications for the systems (Ellis 2005:39; Ingwersen and Järvelin 44 2005:64). These are starting or surveying; browsing, chaining, monitoring, differentiating, extracting, filtering or verifying and ending.

KUHLTHAU'S (1993) MODEL OF INFORMATION

Information search process model Kuhlthau's information search process (ISP) model focuses on the affective and cognitive aspects of the information search process. According to Pettigrew, Fidel and Bruce (2001:49) her study is "a landmark study" which set the scene for researchers "within the cognitive framework." Fidel (1993:224) maintains that "the study is one of the best examples of holistic research in which three realms were incorporated: the affective (feelings), the cognitive (thoughts) and the physical (actions) that are common to each stage of the information search process." The model has also been employed in a number of later empirical studies, most of them dealing with relevance criteria or web information retrieval (Ingwersen & Järvelin 2005:83). Kuhlthau's ISP model is based on George Kelly's personal construct theory and as such depicts information-seeking as a process of construction (Kuhlthau 2005:230). The model was developed around the following hypothesis (Kuhlthau 2004:30): • Is information-seeking a process of construction in which students may expect to be confused and anxious? • Is the bibliographic paradigm inadequate for mediation within the constructive process? 48 A series of empirical studies provided the basis for Kuhlthau's ISP model. The first was a small-scale study to develop the model which was then tested and verified in longitudinal and large-scale field studies (Kuhlthau 1993; Kuhlthau 2004; Kuhlthau 2005; Ingwersen and Järvelin 2005:82). The ISP model inspired other researchers also concerned with interactive information retrieval during the 1990s (Ingwersen and Järvelin 2005:199).

The different stages identified by Kuhlthau (2005:230-231) in the ISP model are task initiation, topic selection, prefaces exploration, focus formulation, information collection, search closure, and starting writing.

CONCLUSION

Models of information behavior do not all attempt to describe the same set of phenomena or activities: some, as in the case of Ellis are concerned with behavioral patterns in the actual search activity, others, like Kuhlthau present stages of activity, within which the behavioral patterns may occur. The model presented here is of this second type in that it presents problem solving as the overall framework for the activity of information seeking and shows that Kuhlthau's model may fit within the various stages of the information seeking process. We can also suggest that Ellis's behavioral model is a set of activities within what Kuhlthau calls collection and that all three of these are nested within Wilson's 1996 model of information behavior in general.

The various models of information behavior, information-seeking behavior and information searching represent different aspects of the overall problem: they are complementary, rather than competing, as Figure 4 suggests. The key questions for research, therefore, are:

- To what extent are the different models complete, or reasonably complete representations of the reality they seek to model?
- In what ways are the models complementary; that is, how does knowledge of one level of analysis aid another?
- Specifically, in the case of information-searching behavior; how does knowledge of modes of information-seeking behavior aid our understanding of the search process, if at all?

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Evaluation of Information Literacy Program in College Libraries of Uttar Pradesh: A Study

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ABSTRACT

The present study highlights the concept of information literacy in general and information literacy program is evaluated in college libraries of Uttar Pradesh. For the present study 10 college selected and from each college 70 questionnaire distributed, thus 700 questionnaire distributed and return back 548 (78.28%) filled questionnaire. The related questions framed in questionnaire for the purpose. Some suggestions and recommendations are made after analysis the received data from users.

INTRODUCTION

Information literacy mean literate to user of information use. There are no universally accepted definitions for the terms 'user education' and 'information literacy'. In general, however, user education is a process involving a situation-specific response to a particular information need and is similar to the long-established practices of 'bibliographic instruction'. In contrast information literacy is a learning outcome focusing on the lifelong ability to recognize the need for, locate, evaluate, and effectively use information (ALA, 1989). The origins of IL can be found in both information science and bibliographic instruction (Johnston & Webber, 2003) and the concept now features in a very wide cross-section of education related academic literature.

Issues relating to user education and IL have been widely debated for many years and over 5000 related articles have been published over the last three decades (Rader, 2002). Such debates have been associated with a worldwide shift in the philosophy of education from an emphasis on teaching styles, to one focusing more on student-centered learning (Kuh & Gonyea, 2003). During the 1980s this change was evident in the re-conceptualization of "library instructional efforts as information literacy" (Grassian & Kaplowitz, 2001). The magnitude of this transformation represents a 'paradigm shift' in educational philosophy (Thompson, 2002), and today IL represents a cornerstone of librarianship (Marcum, 2002).

Education in India is constantly shaped and reshaped to cope with a changing scenario. With present day developments in globalization, liberalization and privatization, higher education is slanting more towards commercialization in which competition has become inevitable. Uttar Pradesh have more population, more school and more universities and colleges in India. There are many reputed and old universities (Central, State, Deemed, Private etc.) and affiliated college to these universities and Government of India is spending a huge amount on these institution and their libraries. Libraries are disseminate the knowledge created by these education institute. The purpose of this study to know the users of these institute are getting information or they required a training to use these information products.

REVIEW OF EXISTING LITERATURE

The Review of the literature has been done through many Journals of Library Science, proceedings of conferences/seminars, books etc. Some of the search engines (Alta Vista, Rediff, Google, khoj and Yahoo etc.) were used to find the relevant matter on net. Some details of review of related literature as follows:

Keshva and Kiran Savanur provides information about University of Agriculture Science (UAS) and its library. Authors also describe information needs and information seeking strategies of users of UAS library.

Jitendra Shrivastava defines user education, describes need of user education programs, objectives of user education program, the network environment and NIT libraries, also trace origin, history and development of REC's in India (Now named as NIT's).

Bruce, C. S. provides an introduction to the relational approach to information literacy and discusses some possible implications for information literacy research in her paper 'the relational approach: a new model for information literacy.

Bruce, Christine Susan also explain that the libraries' role in information literacy must of course be implicit not only in the strategic planning documents and business plans of the library and any division of information services to which it belongs but must also be given due authority in the planning documents of the wider institution. Bruce goes on to state that whether librarians are involved as teachers or not they must be involved in the "development, implementation and evaluation of curricula.

OBJECTIVES OF THE STUDY

- To ascertain the awareness of users of library with the ethical and legal issues regarding information use.
- To identify that users are able to access the needed information effectively and efficiently or not in electronic environment.
- To find the solutions of problems faced by users of libraries in retrieval systems of libraries in electronic environment

SCOPE

- The study is confined with the evaluation of information literacy program in college libraries of Uttar Pradesh. The total 10 reputed degree college randomly selected for the purpose. These college are renowned in Uttar parades most of the grant of the UGC and state is utilized by these college.

DATA ANALYSIS

For the present study 10 college selected and from each college 70 questionnaire distributed, thus 700 questionnaire distributed and return back 548 (78.28%) filled questionnaire. The related questions framed in questionnaire for the purpose. The data analysis is made under as in tabular form:

General**:**

Table 5.1.1: Total respond

Total No. of Quest Distributed	Total No. of Received	%
700	548	78.28%

Table no. 5.1.1 indicates that total response from different category of user 78.28% which is quite a good response for the study.

Table 5.1.2: Status of Users of Libraries

S.No.	Status of Users of Libraries		
1	Teacher	Non-Teaching	Student
2	108	74	366
%	19.70%	13.50%	66.78%

The table no 5.1.2 shows that mostly users are student *i.e.* 366 (66.78%) then teacher 108 (19.70%) and 74 (13.50%) are non-teaching.

Aware with the Use of Information Resources (Information Literacy)

Table 5.2.1: To what extent do you familiar with open access contents?

S.No.		To full extent	To great extent	To some extent	To little extent	Not at all
1	Familiar with the concept of open access?	65	75	316	96	00
2	Familiar with options for making own research output open access?	98	297	84	59	00
3	Familiar with methods for finding open access content?	39	81	290	92	46

The table no 5.2.1 show that 316 (57.66%) users say that they are 'familiar with the concept of open access to some extent. 297 (54.19%) users say that they are 'Familiar with options for making own research output open access to great extent. 290 (52.91%) users say that they are 'familiar with methods for finding open access content' to great extent.

Table 5.2.2: To what extent the following resources provided by the university library increase your understanding toward open access?

S.No.	Resources	To full extent	To great extent	To some extent	To little extent	Not at all
1	Display of promotional material such as posters	65	78	309	96	00
2	Seminar or lectures on open access	98	87	294	59	00
3	Resources discovery tools on the library website	39	46	285	92	86
4	Discussion about open access with departmental library representatives	56	65	313	114	00
5	Promotional materials focusing on your university repository	58	309	96	85	00
6	Open access has never been promoted to me in any ways	65	78	96	309	00

The table no. 5.2.2 shows the following:
- 309 (56.38%) users say that 'display of promotional material such as posters' to some extent to them in their library for search material.
- 294 (53.64%) users say that 'seminar or lectures on open access' to some extent in their library.
- 285 (52%) users say that 'resources discovery tools on the library website' to some extent in their library.
- 313 (57.11%) users say that 'discussion about open access with departmental library representatives' to some extent in their library.
- 309 (56.38%) users say that 'promotional materials focusing on your university repository' to great extent to them in their library for search material.
- 309 (56.38%) users say that 'promotional materials focusing on your university repository' to little extent to them in their library for search material.

Table 5.2.3: How much % do you use the library website?

S.No.	Library Website	100%	75%	50%	25%	Not at all
1	Search the library's home catalogue	65	109	318	56	00
2	Search the catalogue of other libraries	58	85	101	304	00
3	Request inter library loan	65	78	90	315	00
4	Request document delivery	56	132	295	65	00
5	Search electronically for journal articles using online database	65	78	313	92	00
6	Access electronic reserves	98	80	301	59	00
7	Ask research / reference questions	39	86	285	92	46
8	Learn about finding information	56	65	305	122	00
9	Obtain accurate citation information	58	85	93	312	00
10	Learn about library hours, location and services	65	78	319	102	00
11	Arrange for information literacy instruction	56	65	283	144	00

The table no. 5.2.3 shows the following:
- 318 (58.02%) users say that they 'search the library's home catalogue' upto 50% through library website.
- 304 (55.47%) users say that they 'search the library's home catalogue' upto 25% through library website.
- 315 (57.48%) users say that they 'request inter library loan' upto 25% through library website
- 295 (53.83%) users say that they 'request document delivery' upto 50% through library website
- 313 (57.11%) users say that they 'search electronically for journal articles using online database' upto 50% through library
- 301 (53.36%) users say that 'access electronic reserves' upto 50% in their library.
- 285 (52.00%) users say that 'ask research / reference questions' upto 50% in their library.
- 305 (55.65%) users say that 'learn about finding information' upto 50% in their library.
- 312 (56.93%) users say that 'obtain accurate citation information' upto 25% in their library for search material.
- 303 (55.29%) users say that 'learn about library hours, location and services' upto 50% in their library for search material.
- 283 (51.64%) users say that 'arrange for information literacy' upto 50% in their library for search material

ATTITUDE OF LIBRARY STAFF

Table 5.3.1: Attitude of Library staff

S.No.	Library Staff	To full extent	To great extent	To some extent	To a little extent	Not at all
1.	Friendly and easy to talk	56	114	313	65	00
2.	Accessible	58	96	309	85	00
3.	Available when I need them	65	78	309	96	00
4.	Willing to leave the chair to help	56	313	65	114	00
5.	Has indifferent attitude	65	309	78	96	00
6.	Demonstrate & teach use of catalogue, reference book, electronic resources	56	65	313	114	00
7.	Give accurate answer of your query	65	78	309	96	00
8.	Encourage you to come back again	98	87	294	59	00
9.	Mention about Inter-Library-Loan (to obtain material from other library)	39	46	285	92	86

The table 5.3.1 shows the following:
- 313 (57.11%) users say that library staffs are friendly and easy to talk to some extent.
- 309 (56.38%) users say that library staffs are accessible to talk to some extent.
- 309 (56.38%) users say that library staffs are willing to leave the chair to help to some extent.
- 313 (57.11%) users say that library staffs are friendly and easy to talk to a great extent
- 309 (56.38%) users say that library staffs has indifferent attitude to a great extent.
- 313 (57.11%) users say that library staffs demonstrate & teach use of catalogue, reference book, electronic resources to some extent.
- 309 (56.38%) users say that library staffs give accurate answer of their query to a great extent.
- 294 (53.64%) users say that 'library staffs encourage them to come back again' to some extent in their library.
- 285 (52.00%) users say that 'library staff mention about Inter-Library-Loan (to obtain material from other library)' to some extent in their library.

Table 5.3.2: To what extent do you agree that library staff has helped you

S.No.	Library Staff helps to	To full extent	To great extent	To some extent	To little extent	Not at all
1	Choose or define a topic for a paper	58	91	89	310	00
2	Define or refine research questions	65	78	96	309	00
3	Identify the type and amount of information that I need	56	65	313	114	00
4	Find books, journal articles and web resources	65	78	309	96	00

5	Critically evaluate information from books, journals and websites	56	65	313	114	00
6	Cite sources appropriately in my research paper and presentations	65	78	309	96	00
7	Explore subjects of interest outside of class	65	78	309	96	00
8	Use online / electronic resources	56	65	114	313	00

The table 5.3.2 shows the following:
- 310 (56.56%) users say that library staffs helps to choose or define a topic for a paper to a little extent.
- 309 (56.38%) users say that library staffs helps to define or refine research questions to some extent.
- 313 (57.11%) users say that library staffs helps to identify the type and amount of information that we need to some extent.
- 309 (56.38%) users say that library staffs helps to find books, journal articles and web resources to some extent.
- 313 (57.11%) users say that library staffs helps in critically evaluate information from books, journals and websites demonstrate & teach use of catalogue, reference book, electronic resources to some extent.
- 309 (56.38%) users say that library staffs help in cite sources appropriately in my research paper and presentations to some extent.
- 309 (56.38%) users say that library staffs help to explore subjects of interest outside of class cite sources appropriately in our research paper and presentations to some extent.
- 313 (57.11%) users say that library staffs helps in the use of online / electronic resources to little extent.

RECOMMENDATION AND SUGGESTIONS

Most of the users of college libraries are not familiar with the use of e-resources this show that user education and information literacy program of the libraries are not effective. **It is recommended** here that users education program and information literacy program of the libraries should be more effective.

Most of the user are not using the services of the library like DDS (Document Delivery Services), searching services and accessing available databases etc. **It is recommended** here that libraries should organize workshop, training program for the users of their libraries so that maximum use of the service may be occurred.

Library users say that that the attitude of staff is indifferent and library staffs do not mention about the library services like ILL (Inter-Library- Loan) etc. Library staffs do not encourage the students to come back library again. **It is recommended** here that library staff should be polite and be ready always for answer the queries of the users of the library. Library staff should give the accurate answer the queries of users and education the users about the library services and program through an effective information literacy program.

Library staff helps the users in searching techniques to some or little extent only. It is recommended here that library should help the user to full extent.

CONCLUSION

Information literacy is a key component of lifelong learning in higher education to improve the quality of student learning, and to empower students to be perpetual learners after they graduate. It also has been an important factor in the development of librarian-faculty partnerships. As partners in the classroom, academic librarians attempt to integrate information literacy into the teaching and learning process. College librarians

can play a role in teaching information literacy in higher education institutions in which student-centered approach through web-based instruction has been increasingly emphasized.

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Transmuting Libraries in Electronic Environment

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INTRODUCTION

Now, Information Technology (IT) is a driving force for change in libraries. The strategies for building 21st century libraries and librarians must focus on the ability of Librarians and Libraries to not just adapt to change, but to prepare for it, facilitate it, and shape it. Recent rapid advances in information and communications technologies (ICT) have not only posed a variety of new challenges for libraries but also brought enormous change in library technical operations, functions, information resources, information products & services, staff competencies and user's expectations leading to the evolution of new generation of libraries. Libraries are suffering enormous changes due to application of new technologies. The magnitude and speed of technological change in recent years has been phenomenal which may likely to continue at much faster rate in the foreseeable future. The rapid technological change and transformation has tremendous impact on organization's decision makers, library operations, information resources information products and services, staff competencies and user's expectations. A very rapid rate of technological innovations has made it imperative to consider technology as the crucial factor influencing the sanctioning and management of modem library. Information technology is transforming libraries at a speed unimaginable just a few decades ago. The most pronounced difference between the digital/virtual/hybrid library of today and the traditional library of yester years is the result of rapid pace of technological change taking place in libraries. Technological changes have been of such magnitude that it is difficult for individuals and often institutions to follow them. In several technological sectors such as the information sector, more changes have occurred in the last few decades than in the previous few thousand years. Information technologies today are characterized by their very dynamic development and increasing complexity. The new technologies allow completely new solutions to old problems, and consequently old services are displaced by new service. In the current turbulent phase of information technological development, this process of displacement of old solutions by new ones is particularly difficult to steer. The main characteristics of the information society have been defined as ….. changed perceptions of the importance of the role of information; the growth in the amount of information now available and the wide variety of formats; the size and continued growth of the information sector in modern economies; and the rate of technological change in the impact of technology.

NEW CHALLENGES

In a fast changing; expanding diverse global digital information environment, libraries are facing a verity of new challenges from multiple sectors of the information society. The major challenges are:
- Information Explosion;
- Information and communication Technology (ICT) revolution;
- Explosive growth and usage of internet and web resources;
- Dwindling library budgets;
- Escalating cost of printed documents;
- Heightened level of user's expectations;
- Changing education and learning environment;
- Evolution of virtual educational institutions;
- Changing nature and number of information resources;
- New patterns of scholarly publishing and communication;

- Development of digital, Virtual and Hybrid Libraries;
- Online bookshops.
- These challenges have called for reorientation reengineering and transformation of traditional libraries into new generation of libraries.

NEW GENERATION LIBRARIES

Today, the concept of library has been denoted by several different terms such as automated library, computerized library, electronic library, digital library, cybrary, virtual library, library without walls, transformed library and so on. The definitions of the important and relevant terms of the new generation of libraries are given as under;

Digital Library: Cleveland has given working definition of digital library as: Digital libraries are libraries with the same purpose, functions, and goals as traditional library's collection development and management, subject analysis, index creation, provision of access, reference work, and preservation. A narrow focus on digital formats alone hides the extensive behind-the-scenes work that libraries do to develop and organize collections and to help users find information. Cochrane says; five years ago, the library at my laboratory used to occupy, several large rooms employ 30 people. It has been replaced by a digital library that is now ten times bigger-and growing fast. This digital library is staffed by only 12 of the original librarians who are now amongst the best html programmers in the company. This digital library has become an essential part of our lives and the work output has gone up tenfold in 10 years.

Virtual Library: Dr. Gupta says; Virtual library is a library with little or no physical collection of books, periodicals, reading space or support staff, but one the disseminates selective information directly to distributed library, usually electronically. It is a library without walls, spread across the globe from where one is able to retrieve the whole world of information through a properly network workstation. Here the user gets the impression as if he is moving through a large library though library does not physically exist, yet the user is able to retrieve the information needed by him. Each virtual library is designed to prove users with online access to an extensive array of full-text document on a topic of current high interest or critical concern. The Virtual Library usually takes the form a web page containing a series of hyperlinks arranged in a hierarchical manner for easy searching. A virtual library provides a hyperlink to the documents it catalogues.

Hybrid Library: Hybrid means combination or mixture of two elements. Hutton Said, A hybrid is a library is a library where "new" electronic resources and "Traditional" hardcopy resources co-exit and are brought together in an integrated information service, accessed via electronic gateways available both on site, like a traditional library, and remotely via the internet or local computer networks.

FUNCTIONS OF NEW GENERATION LIBRARIES

The ultimate structural changes caused by information and communication technologies not only affected the administrative, technical operations of libraries but also transformed the library's roles, functions and services significantly. Libraries are undergoing a profound transformation reflecting a sea change in the nature and type of their roles, functions and services due to the application of new technologies.

According to Cohn the four basic functions of libraries in an electronic age are:

- Providing access to the content of local resources (*e.g.* books, periodicals, media, electronic resources) that are part of the library's collection.
- Offering gateway access to remote resources (*e.g.* books, periodicals, media, and electronic resources) including the ability to obtain copies in printing and electronic formats.
- Facilitating off-site electronic access to local and remote resources from users' homes, offices and schools.

- Providing access to human assistance in locating information. The main function of new generation libraries is to provide the most convenient access to a wide range of global information resources in all types and formats as needed by the users in a timely and cost effective manner.

NEW TRENDS

Today, all libraries are functioning in a highly energetic and frequently turbulent technological environment. The nature and speed of change taking place in libraries is unimaginable due to the speedy rate of technological advancements. The potential and complexity of emerging technologies will continue to increase at much faster rate in future. They will have greater impact on all aspects of libraries. Libraries should have a vision to embrace change and must always be on the lookout for implementation of emerging technological innovations that can offer new opportunities to provide better quality solutions and value added user services. This will require a higher level of technologically competent and skilled staff to deal with dynamic complex technology. In a dynamic environment of fast-paced technological change, library manager's role expands beyond the traditional role of managing the optimum use of available to a new role or managing technological change in libraries successfully. Accessing right information on the internet is becoming very difficult for end-users due to lack of systematic structured organization of information resources and also paucity of adequate effective search engines. The need for experts in identifying and evaluating potential web resources, designing interfaces and finding relevant information on the web has tremendously increased. Librarian being the intermediaries between the information resources and users have to act as technological gatekeepers to develop catalogue of websites, resources and design interfaces that provide direct access to information to the uses at their desktop, library professionals will need to keep abreast of the new technological developments and act as an information consultants advising and – users on the best use of access tools, search engines, techniques, methods and ways to deliver high quality of need based information services. The fast-tracking pace of new technological developments, emergence of virtual/ hybrid libraries, distributed electronic information resources and development of digital reference services demand different types of managerial, professional, technological presentation and communication skills for library professionals. Technology is changing so rapidly that what you know today will be outdated tomorrow. The explosive growth and wide usage of web resources has made it imperative for the library staff to equip new skills in the use of latest techniques, tools and strategies needed for the development of a virtual library. Each library must serve as intelligent and innovative gateway to access the global network of information resources and services. As technology continues to advance at phenomenal speed, one needs to keep up-to-date and learn new set of skills to keep pace with and ahead of the technological developments. An utmost attention needs to be given to upgrade staff knowledge and skills in improving their ability to identify, evaluate, select and pool the relevant electronic information resources frame the web. They should have good knowledge of the latest trends in emerging technologies, and be aware of innovative ideas and intelligent strategies for effective exploitation of the full potential of future technologies in libraries. Otherwise, there will be no good prospects for librarians in the emerging digital/virtual/hybrid libraries of the future, Librarians must take the role of technological gatekeepers, navigators, intermediaries and trainers actively involved in helping the users in accessing and making the best use of the web resources. The library profession must attract, retain and retrain the individuals who can master the increasingly complex information technology skills and manage the new generation of libraries in a challenging and ever changing dynamic technological environment.

ROLE OF LIBRARIAN

The Library is 'what the librarians make it'. So in the changing environment the role of librarian is very important in developing the library according to users' need and challenges thrown by ICT. The librarian is not only simply to get budget for books and journals on print media but also make arrangements to modernize the library keeping in view of the changing need of the society. Modernization of the library includes automation of library activities, building digital resources and Internet connectivity with adequate speed for accessing online information. Thus the librarian should have knowledge and experience regarding the use of library automation software, networking and digital library software. Without the knowledge to handle a modern technology the librarian will not be able to cope with changing ecology of library. If he is not able to deliver the goods to meet the changing needs of the librarian because he is the leader and role model for the staff. He is not only to set an example for others to work but also to make significant contribution on adopting the technology, which is useful for library and users as well. Ranganthan in this context has rightly said, "Library is a growing organism". The main objective of this law is that the library should not only grow in terms of books, building, and staff but also take advantage of technology, which may empower the library and users to access the information speedily and effectively. Therefore the librarian should not hesitate to avail the facility wherever it is, for the development of library and whatever the hurdles come in the way. Than main hurdle in developing the library may be finance. He should able to convince the authority in getting the necessary funds to make the library a place where everyone should like to visit not for the sake of visit but also be tempted to sit for study.

CONCLUSION

Now libraries are transforming form traditional form to new innovative form with application of ICT. The new technology has not only empowered the users but also the librarian to monitor the activities of budget, cataloging, classification, digital collection, latest information on net etc. Hence the role of the librarian is like a pivot around which all the activities of the library revolve. In future, if libraries are to be successful in managing change, they have to be more proactive to the technological advancements, manage the complex challenges and exploit the opportunities offered by the new technologies in order to meet the changing and rising user's expectations for delivering more sophisticated high quality information services at their desktop. In future libraries will be in flourish form without wall and any constraint of distance.

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Role of Library Personnel in New Digital Environment

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ABSTRACT

This paper mainly focuses on the concept of librarian who is working in digital library. The various characteristics, need and role of a digital librarian have also been discussed. The digital information systems have changed the way the librarian acquires, processes, stores and delivers information to users.

Keywords: *Five rules of librarianship, Changing role of librarians, Needed changes, Use and need for consumption skills-journals and p-journals, Sharing and Collaboration, Librarians and Intelligent agents, The challenges inhibiting library leadership, Online public access catalogues, Digital librarian's interface functions and roles in the management of DIS.*

INTRODUCTION

Today mostly information is increasingly being produced in digital formats. Almost everyone involved in the knowledge production process, and give the preference of electronic form. These actors could be creators of knowledge, the publishers of knowledge and the people that are finally responsible for permanently storing the resulting knowledge. It is very attractive to the author, publisher, vendor and libraries for this simple reason that give the revolutionized the way of knowledge which is produced and disseminated to end user, usually in a fast, timely and efficient way. Nowadays, role of a librarian have completely changed in digital environment.

FIVE RULES OF LIBRARIANSHIP

Librarians have been adapting to the digital environment to make meaning of Ranganathan's five rules of librarianship. These five rules are as relevant today which he wrote them many years ago. These are:

- Books are for use
- Every reader has his/her book
- Every book of its reader
- Save the time of the reader
- Library is a growing organism.

Noruzi (2004) revised these laws in the context of what they would mean for information provision in today's digital environment (Kanyengo, 2006).

- Web resources are for use
- Every user his/her web resource
- Every web resource its user
- Save the time of the user
- Web resource is a growing organism.

CHANGING ROLE OF LIBRARIANS

In an era of digital information, electronic technology, www's growing popularity and the tremendous growth of CD-ROM products, digital libraries offer a huge range of multimedia information, everything from movies, speeches, images and photos to sounds, text and beyond. The amounts of online, CD-ROMs and other digital sources of information are exploding and infrastructure for accessing material improves almost daily (Sreenivasulu 2000: 18)

In this situation librarian, became a predominantly online worker, supporting the citizen/worker by selling services. Finding relevant information faster than the

competitors, faster than a non-information-worker can find it, and surviving on the basis of superior knowledge of the networks and digital information resources available through them. In an age of great change in information formats, delivery models and technologies, and important new role emerge for the librarian. So, presently a librarian is called as a digital librarian, digital information professional, cybrarian and information broker *etc.*

NEEDED CHANGES

Academic libraries must take advantage of the leadership opportunities in our institutions. To do this, we must change our focus from things and our own activities to a focus on our customers, their needs, and the mission of the institution. We must begin defining quality through customer satisfaction and customer value added assessments rather than numerical input indexes and abstract professional standards. We also must do a thorough assessment of our organizations and our activities. We must go back to basics and question all of our present activities and work assumptions. We must return to a definition of the business of the library as maximizing the social utility of the graphic record (*Shera 1965;16*) rather than cataloging, reference, acquisitions, interlibrary loan, circulation, and management of buildings and print collections. We must see education and knowledge management as our primary work without getting locked into maintaining specific activities to achieve that work and we must be wary of our activities and functions becoming ends rather than means to achieving outcomes for our customers. We must flatten our organizations and eliminate the bureaucracies that make us inflexible and slow in our response to our environment and the opportunities that are constantly presented. We must be able to create new services and eliminate old ones in very short time cycles. We must streamline our organizations and eliminate redundancies, unnecessary complexity, and non-value added work and we must create structures that allow us to achieve breakthrough performance and dramatic improvements. We must eliminate competition and turf protection with our organizations. To stretch our resources, we must create strategic partnerships. Within the institution we must identify units that complement our strengths and allow us to leverage our resources. With vendors and suppliers, we need to strike "win-win" relationships that get us what our customers need, not what the vendor has to sell at the vendor's price. We must also identify non-traditional sources of partnerships outside the library or publishing markets. We must expand donor interest and donor "pools" to encourage them to assist us with the investment in new technologies.

USE AND NEED FOR CONSUMPTION SKILLS

The second factor 'ease of use' is a concept, which is more subjective and person dependant in digital environment. It varies widely from accessing specific information to a large collection of digital documents and databases. As such varied degrees of consumption skills are required to effectively access and use different sources of information. Need for information consumption skills and information literacy also vary widely among users and with respect to tools and services. Using Television does not need much of consumption skills, but using a database or a digital library does need.

E-JOURNALS AND P-JOURNALS

While the unpublished and the semi-published (gray) literature is receiving high attention in the digital world, the real e-publishing is happening at a slower pace than expected. The e-publishing models look like extension of traditional book publishing models. Only priced models of print replacements are talked about. Like systems theory definition of a system, anything and everything has become a model. Growth of e-journals is neither rapid nor significant as was initially expected. Today's e-journals are not real ejournals. Only paper replacements of societies and hybrid e-journals of commercial publishers (both require least social and cultural changes) are flourishing without full 'electronicity'

journals. In case of e-journals, without backward compatibility, libraries are at the mercy of continually changing digital world. It has been well established that a typical researcher (scientist) uses 5 to 15 journals. But the consortia deals are boasting that they provide access to thousands of journals, usually 10 to 20 times more than the number of journals subscribed by a library. Like information on the Internet, this makes the useful to access ratio of journals (and information) drastically low when all our efforts of resource sharing is to optimize the use of resources. As far as libraries are concerned, access management consisting of handling license agreement, price negotiation, offer evaluation, usage assessment, etc. become important. Alongside risk, tolerance for litigation has also become necessary. Incidentally, e-books are yet to take off. DRM is the main issue. Having not been able to resolve the copyright issue, more and more gray literature like theses and dissertations and copyright-free old books are getting digitized.

SHARING AND COLLABORATION

Sharing and collaboration are more dependent on people than technology. ICT has also greatly facilitated information sharing and collaborative working. Cost of sharing and distribution of information is low and negligible in digital environment. But sharing is a complex human process subjected to psychology of individual and his professional and cultural predisposition. According to a recent survey, one important barrier in sharing corporate information is lack of common information retrieval tool (73 per cent). Extensive sharing of information and collaboration are ok. Hither to popular 'technological gatekeepers', 'communication stars' and 'invisible colleges' are losing ground and yet another kind of disintermediation; beyond ICT and libraries social sharing is negligible. The forces and objectives behind resource sharing among libraries and library consortia include: unutilized spare capacity of resources, optimum utilisation of resource; budgetary crunch; and duplication. In view of content boom (Web pages double every three months), enormous unutilized capacity of resources and duplication as well as huge additional expenditure incurred by agencies centrally paying towards consortia subscriptions It is difficult to say that the objective behind resource sharing have been better achieved in the new digital environment. Though ICT has enabled information sharing and collaborative working, the collaborative evaluation of the content in the Internet has become a marketing tool. Amazon uses evaluation and views of customers to rate books and present to others to further its commercial interest. Imitating collaborative evaluation on Web, personalizing contents and product customization based on usage and observed user behaviour are being attempted. What information management community requires is that technology learns users' likes and dislikes over time in order to dynamically and consistently deliver the right content.

LIBRARIANS AND INTELLIGENT AGENTS

The rapid growth of unstructured data on Internet and World Wide Web has created significant problems related to the efficiency and accuracy of information retrieval. In addition, information repositories on Internet are heterogeneous, inconsistent and sometimes incomplete (Bowman *et.al.,* 1994). To make effective use of this wealth of information, a number of resource discovery tools have been created. In Internet browsing, the user follows the hypertext links to locate the information. When the size of the Web increased beyond few sites and a small number of documents it became clear that manual browsing through a significant portion of the hypertext structure is no longer possible (Koster, 1995). To solve this problem and locate information required by the user search engines have been developed. Many of the search engines use the concept of a 'robot' or 'spider', an automated browsing program. A web robot is a piece of program that traverses the Web's hypertext structure by retrieving a document, and recursively retrieving all documents that are referenced and develops huge index database. When a user performs a search on a topic or keyword, Web search engines returns several

thousands of hits, many of which may not be relevant to the user's enquiry. The size and wide coverage of such a database can make it difficult to quickly and effectively track down relevant information using the limited searching features that are available (Stanley, 1997). In order to provide a solution to this problem, Intelligent Agents have been developed.

THE CHALLENGES INHIBITING LIBRARY LEADERSHIP

If you asked any academic librarian to enumerate the challenges of the current environment that could inhibit or make taking on the role of institutional leadership difficult, "inadequate funding for the task" would undoubtedly be the number one response. Libraries have insufficient resources both for the initial purchase of hardware and software for both public and staff use and for the ongoing costs of technology including software and hardware maintenance, equipment replacement, computing supplies, and technical staff to install equipment and software and keep systems up and working. Also, there is not enough staff to maintain the current services and activities while taking on and devoting the time necessary to the new education and knowledge management tasks that are required for success in the digital environment. Clearly in today's libraries, the prevailing philosophy is that the faculty and students will not allow us to stop doing anything and thus, we need to maintain current services that are based on print collections for the indefinite future. Therefore, new activities require new personnel for which there is no new money.

Second, a response might also be the inability of personnel to deal with the rapid pace of change. There is too much to learn, too little time, not enough formal and informal training opportunities or time to just "digest" and "absorb" the potential of the new technologies. How can we learn the new technologies fast enough to teach them to faculty and students and to make effective use of them in the classroom and knowledge management work? The combination of too much change, too much to learn, too little staff to do it all, and no new money generally means that library personnel are worn down and demoralized rather than excited and energized. Further, we have learned a lot about the kind of organizational change we believe is necessary for a successful transition to the digital library. We have learned that the literature is correct in its prediction that it takes five to ten years to make real changes in the culture and climate of an organization. We know we must be prepared to invest for the long term, accepting short term difficulties and even periodic declines in service. It is with a few others of these learnings that I would like end since these are often insights that are not generally shared during presentations.

- **Communication:** There is never enough communication. Many staff still feel uninformed and do not yet have a shared vision for the organization although every member of the staff has email, access to almost all budget and organizational information, receives biweekly updates on the organizations progress toward its goals, and has had multiple opportunities to participate in the development of the mission, vision, values, and goals development processes. Complaints about not knowing about specific decisions or priorities abound while at the same time staff feel information overload and, to cope, simply do not read many communications or attend meetings. Having eliminated a layer of bureaucracy and turned department heads into team leaders, we have eliminated some of the information filters that helped staff focus on what is important. It takes time for individual staff members to learn the necessary skills to select and use information effectively.
- **Organizational Support Systems:** Many of the traditional personnel systems including those dealing with compensation, rank, development, and performance management and evaluation are not adequate and do not support the kind of organizational behaviors required in the digital environment. Traditional job descriptions are too narrow. Pay systems reward people for control and turf and

isolated expertise, not the ability to work across a range of duties and adopt to new demands. Merit systems create disincentives for team work. Staff Development has focussed on training and teacher centered workshops. Radical new systems are necessary which reward continual growth, the ability to adapt to constant change, a willingness to eliminate needless complexity and work, cooperation, and the development of team work skills.

- **Continual learning and Staff Development:** It is exhausting to be engaged in continual learning. It takes a new mind set. It is also a waste of time to offer just-in-case education or training programs. Until individuals feel a need to know, are faced with problems they are committed to solving, and have an opportunity to immediately practice or implement a new skill or knowledge effective learning will not take place.

- **Creating Self-Managing Teams and Team Accountability:** It takes a great deal of training to create effective teams and team members. It takes even more time and practice to become self-managing and able to make good decisions in reasonable time frames. We have become used to jumping to solutions without data-based analysis or consideration of diverse viewpoints. We see meetings as process impediments rather than means for accomplishing work. Finally, we are not used to being personally accountable for our actions and decisions. Hierarchical structures have supported selective accountability--at the top. Providing regular reports on progress and accepting responsibility for finding solutions, rather than excuses for work not getting done is a radical change in behavior and feels threatening and uncomfortable. Learning to give constructive, helpful feedback is difficult.

- **Focus on Customers**: Keeping our customers interests first, and having the goal of exceeding customer expectations, is harder than we expected. This is especially true when customer needs require, for example, that we introduce a new data base before we have mastered it, do work that we would rather not do, eliminate our favorite tasks for those duties that we at least feel competent in and comfortable with, or work hours that are nonstandard or not convenient. We often assume that we know what customers want or that customers don't know what they need. It is hard to break the habit of being the expert, and, instead asking and listening.

- **Driving fear out of the organization**: We are perfectionists and fear making mistakes. We also fear that if we truly eliminate our tasks through process improvement we will lose our jobs. We also fear data and diverse opinions and using data and expanded viewpoints to make decisions. These fears are not overcome easily and by logic, or rational approaches. It takes years of support, encouragement, practice, and repeated positive experiences to overcome fear.

- **Diversity**: It is often easy to say that we will deal with the value issue of diversity or diversifying our staff when we have accomplished our harder organizational imperatives. However, it is critical that we recognize the need to have a diversified workforce to serve an increasingly diversified customer base. Diversity is hard to achieve. It is hard to truly value difference. Yet we can't succeed without a multicultural workforce that finds our institutions hospitable.

In closing, I would like to say that despite the challenges and difficulties, it is exciting to be a librarian in these future defining times. We each have the power to make the academic library more central and meaningful to our institutions and to ensure the success of the learning processes for the next generation--the digital generation. Individuals do make a difference in the digital world and librarians will make a tremendous difference.

ONLINE PUBLIC ACCESS CATALOGUES

The good old card catalogues have given way to online catalogues. Unfortunately so called OPACs, in spirit, are card catalogue replacements with closed, rigid and intricate outlooks. Like card catalogues, they are also used mostly to access specific items rather

than information retrieval. Severe subject search problems remain unattended. To list a few, partial match, relevance ranking, feedback based alert, auto suggestion of keywords, auto correction of spelling errors, intelligent stemming, term weighing, 'find similar search', etc. are still not found. Even Wikipedia has 'disambiguation' provision in searching. Library automation in general and OPAC in particular should have continued to receive serious attention of the profession and users alike. As a matter of fact, the current surge of digital library initiatives should have been logical extensions of OPACs.

DIGITAL LIBRARIAN'S INTERFACE FUNCTIONS AND ROLES IN THE MANAGEMENT OF DIS

A fundamental role of a DL in digital libraries is to act as an intermediary who brings together users and information. Digital library access tools are the right set of tools used in novel ways to tackle a plethora of challenges and opportunities for information access technology and faster access.

CONCLUSION

Digital librarian plays a very vital role to manage and organize the digital library and mange the digital information resources. In the age of digital information, librarians and information professionals should be trained to be experts to information searching, selecting, acquiring, organizing, preserving, repackaging, disseminating and serving and a librarian should be theoretical and practical experiences in designing and implementing information system and become proficient and competent in several fields such as be able to guide and educate users, project management, metadata etc.

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Total Quality Management in College Libraries: A Lis Perspective Approach

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ABSTRACT

The paper describes the significance of Total Quality Management in Libraries (TQM) and particular with College libraries Any Learning/ Service Organization like College Libraries are the ideal places to implement TQM. There is a consistent gap between user's expectations regarding Information Quality and the perceived quality of the information they are using. In order to face these challenges it is a right time for College Libraries has to implement of their organizations. This can be done best by activity management. Therefore, It is a systematic process, which focuses on understanding customer needs and improving customer services. However, the LIS Professionals are liable to adopt this new management for the age of digital environment will bring the necessary changes to satisfy their users promptly.

Keywords: *Total Quality Management, Librarianship, Library Management, ICT, Higher Education.*

INTRODUCTION

In the age of electronic/ digital environment the IT and ICT revolution with the Web, the multiplication of information and knowledge is expanding vertical as well as horizontally, the quality of training for LIS professionals demand top priority in educational institutions. Today, all organizations are becoming service organizations to survive in this world. So, they need to provide quality of products and services to their clients. Total Quality Management (TQM), provides the applications and the direction to improve quality.

Libraries have always been committed to provide a high quality of services to its users. In the past, consuming more resources, buying more books, and moving to large premises are considered as improving quality. One of the good solutions to improve quality is to provide right information to a right user at right time. This requires a through change in the approach based on user requirements and user satisfaction; this can be done best by effectively implementing TQM efficiently. Thus, TQM approach is now getting popular in today's libraries. TQM is a way of management helps to improve the effectiveness, efficiency, flexibility and competitiveness among the campus as a whole by way of involving everyone in the organization towards improving the standard/quality of services to satisfy the users.

CONCEPT OF TQM

The concept of TQM is an emerging new management technique used in most of the disciplines and the LIS is not an exception to it. Its application in service organizations like LIS started in the late 1980's is an American response aiming at customer satisfaction by way of meeting the requirements and expectations of customers. The application of TQM in LIS seems to be a recent origin in the Indian context wherein Dr. S.R .Ranganathan, Father of LIS stated in his IV Law "Save the Time of the User" has direct implementation to what is advocated in TQM approach.

TOTAL QUALITY MANAGEMENT

It is an approach that any organization adopts for improving its performance on systematic and continuous basis. This is achieved by involving all employees throughout the organization in satisfying all requirements of every customer. Therefore, TQM is a "system of continuous improvement employing participative Management and centered on the needs of customers" A library should always focus on providing the best services possible, and be ready to adopt new changes voluntarily for today's environment.

- **Total:** Everyone in the organization is involved in creating and maintaining the quality of the services and the products offered.
- **Quality:** The organization through individual and collections focuses on meeting customer needs, recognizing that customer perception identities quality.
- **Management:** In managing the system, the emphasis les on continuously improving his system in order to achieve the best results.

WHY SHOULD ADOPT TQM IN COLLEGE LIBRARIES?

Libraries are the most ancient social institutions which functions with fundamental operations. Ancient Libraries as well as modern have a body of information recorded on them could be retrieved when required. The accessibility of information requires good organizational ability from those who are structure of the organization where desired information is retrieved and made accessible efficiently and in a timely manner to the users. Creation and maintenance of such a structure requires an effective management process that facilitates work towards the goal. The transformation of traditional information to print form to electronic media to digital media. Today's situation the libraries should adopt TQM for a better solution for both quality services as well as effective management.

The emerging technology of IT and ICT with Web has reshaped our life style of the society. The new knowledge societies has changed their methods at workplace as well as home with Web and with learning /virtual communities flexible and feasible The most important stakeholders in the library are customers, providers of subsidies, staff and other libraries. These stakeholders are interested for various reasons, in the introduction of TQM. The introduction of TQM makes great demands on the staff. The following factors in particular need to be taken into account.

- TQM involves a process of change and therefore requires of staff that they be ready to play a constructive role in that process.
- TQM requires a basic re-orientation from the media stock towards customer and markets. For TQM a result-oriented approach, not the input of resources, is of vital importance.
- A strongly hierarchical organization with fragmented responsibilities is not well suited to the introduction of TQM since all staff needs to feel a responsibility for influencing quality.
- The effort necessary for implementing TQM is at the same time rewarding for both staff and the institution: Improvement of the organizations in which they work a strengthening of that organisations position, and more opportunity of staff to influence their own work.

In this context, that permits the reality of the information service is essential to better adequate and quality proposals.

STEPS TO TOTAL QUALITY MANAGEMENT IN LIBRARIES

According to Demirs outlined 14 steps that managers in any types of organization can take to implement a total quality management programmed including Libraries:

- Create constancy of purpose for improvement of product and service. Constancy of purpose requires innovation, investment in research and education. Continuous

improvement of product and service, maintenance of equipment, furniture and fixtures and new aids to production.

- Adopt the new philosophy management must undergo a transformation and begin to believe in quality products and services.
- Cease dependence on mass inspection. Inspect product and services only enough to be able to identify ways to improve the process.
- End the practice off awarding business o price tag alone. The lowest priced goods are not always the highest quality.
- Improve constancy and forever the system of product and service. Improvement is not a one-time effort; management is responsible for leading the organization into the practice of continual improvement in quality and productivity.
- Institute training and retraining. Workers need to know how to do their jobs correctly even they need to learn new skills.
- Institute leadership: Leadership is the job of management. Managers have the responsibility to discover the barriers that prevent staff from taking pride in what they do. The staff will know what those barriers are.
- Drive out fear people often bear reprisal if they "make waves" at work. Managers need to create an environment where works can express concerns with confidence.
- Break down barriers between staff areas. Managers should promote teamwork by helping staff in different areas/departments work together. Fostering interrelationship among departments encourages higher quality decision-making.
- Eliminate slogans, exhortations and targets for the workforce. Using slogans alone, without an investigation into the process of the workplace can be offensive to workers because they imply that a better job could be done. Managers need to learn real ways of motivating people in their organization.
- Eliminate numerical quotas. Quotas impede quality more than another working condition they leave noncoms for improvement. Workers need the flexibility to give customers in level of service they need.
- Remove barriers to pride of workmanship; give workers respect and feedback about how they are doing their jobs.
- Institute a vigorous programme of education and retaining. With continuous improvement, job descriptions will change. As a result employees need to be educated and retained so they will successful at new job responsibilities.
- Take action to accomplish the transformation. Management must work as a team to carry out these above 13 steps.

BENEFITS/SERVICES OF TQM IN LIBRARIES
According to "Sirkin" pointed out certain ways a library might use the principles of TQM to enhance high quality of library services.
- Create service broachers and information kits.
- Conduct a user survey about library services.
- Improve signage.
- Change hours of operation.
- Provide a more convenient material return.
- Simplify checkout of material.
- Use flexibility in staff assignment.
- Co-operate with local government.
- Ask vendors to give products demonstration.
- Give new staff a through orientation.
- Create inter departmental library advisory groups.
- Improve the physical layout of the library.
- Track complaints.
- Develop an active outreach programme.

- Open satellite offices.
- Publicize new or changes services.
- Develop user and staff training materials
- Target services o specific groups.
- Offer electronic document delivery.
- Follow the mission statement.

POTENTIAL CHALLENGES OF TQM IN LIBRARIES

According to "Jurow" and "Barnnard" has identified four barriers to the adoption of TQM in libraries. Though TQM clearly has positive aspects implementing it can have potential challenges:

- **Vocabulary:** objections to terms such as "total" "quality and "management" which imply that high standards are not already being met.
- **Commitment:** TQM takes several years to implement and requires a long term commitment by library managers
- **Process:** Our culture tends to be impatient and we try to solve problems quickly, contrary to TQM 'careful process analysis; and
- **Professionalization:** Professional can be resist to turning over their practices and services to what they perceive as the "uniformed whims of the customer."

CONCLUSION

Many libraries are practicing quality in the form of Quality Assurance, Continuous Quality Improvement, User Satisfaction, etc., but not in the form of TQM completely. The success of TQM will differ from one library to another library. The realities of the current library situation indicates that quality improvement is essential not only for survival but for facing major changes. The growth and development of library has required to reshaping the society's future. Therefore, Quality can be described right time as well as doing it right from the beginning of its organization and it requires continuous improvement. In this context any library can be described as:

Q - Quest for excellence of knowledge.

U- Understanding the user's demand.

L - Leadership quality for librarian.

I - Involving all staffs.

T - Team spirit for achieving common goal.

Y - Yardstick to measure progress.

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Role of Total Quality Management in Academic Library

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ABSTRACT

Quality Management is one of the management challenges in libraries. Library and Information Science is no exception to it and hence they also engage in the attempt to satisfy the stakeholders of all kinds seeking the learning resource centers. Almost majority of libraries across have begun to implement Total Quality Management Systems in their organizations and started to continuously improve their services to the User. TQM is one of the most power tools which act as a management tool which methodically come into sight to offer outstanding quality products and services to stake holders. Academic libraries have been necessarily forced to learn the methods and materials of different formats to exhibit excellent performance to satisfy their User through fulfillment of their needs of information. All the efforts in quality improvements and excellence in performance shall be successfully achieved with the help of highly competent library professional and other human assets involved in the process. The paper is an attempt to make the readers to understand the importance of TQM, an effective system that could enhance the performance of academic libraries with the aid of earlier research and literatures.

INTRODUCTION

Total Quality Management is concerned with integration all efforts in organization toward quality and customer care. The word quality has diverse definitions, ranging from the conventional to those that are strategic quality usually describe a quality item as one that wears well, is well constructed and will last for long time .Everyone person is involved directly or indirectly in the production of an item in the performance of service responsible. Today all kind of organization are becoming customers oriented organization to survive in this world. They need to provide quality products and services to their customers. TQM provides the tools and direction to improve quality. One of the good solutions to improve quality is to provide right information to the right user at right time. TQM is the application of quantitative methods and human resources to improve all the processes with in an organization and exceed customers need in future.

WHAT IS QUALITY?

The quality is customer satisfaction through product or by service. The customer in the academic library is the user/reader/student. Here the customer is not an outsider, but part of the academic community. The primary purpose of an academic library is to support the teaching, research, and other academic programs of its parent organization. An academic library is part of a service organization which delivers products personally to the customer. Total Quality Management in the Academic Library.

A school, a college, and any university of a society can never alone impart education; each of them is dependent upon a library—a centre of wholesome education for concrete and ultimate knowledge. The Indian Higher Education System comprises 210 universities and a single mode open universities. The universities have more than a hundred years of tradition and many have international recognition as centres of excellence in specific disciplines. The Academic libraries have been to provide a high quality of services to its users. Many academic libraries against all odds are trying to improve their services. Total Quality Management (TQM) embody the management system of modern academic libraries. TQM embodies certain values and approaches which are common and already established concepts in libraries. Nowadays library users

demand faster and better service .The success of an academic library depends on delivering excellent service to its users.

APPLICATION OF ACADEMIC LIBRARY

There are a number of privet and Government Academic Library in Haryana and Delhi . Academic library refers to a library that supports a college or university. Colleges and universities may have more than one library. Ansal Institute of Technology – Gurgaon, Apeejay College of Engineering – Gurgaon, Amity Education Valley, Pachgaon, Manesar, Gurgaon, Haryana , Kamrah Institute of Information Technology – Gurgaon, World College of Technology And Management – Gurgaon, IILM Intitute of Higher Education – Gurgaon, ICFAI Business School – Gurgaon, Womens Institute Of Engineering And Technology Address: Purkhas Road, Near Sugar Mills, Vill Jawahari,Sonepat-13100, CR State College Of Engineering Address: Murthal, Sonipat , Bhagwan Parsuram College Of Engineering Address: Gohana- Kharkhoda Road, Village Bali-Brahmanan, Gohana (Haryana),Sonepat,India-131301 FORE SCHOOL OF MANAGEMENT, NEW DELHI, Apeejay School of **Management**, **Delhi,** Post Graduate Diploma in *Total Quality Management* (PGDTQM) in *Delhi and,* **Indian** *Institute* **of Technology** *Delhi , IIBM Institute of Business Management*.

QUALITY CONCEPT

As a response of this challenge of quality, India's University Grants Commission (UGC) has set up NAAC (National Accreditation and Assessment Council). NAAC conducts audits and inspections on the quality of service provided by educational institutions, including library service. Grants are linked to the outcomes of these assessments. In light of this, academic libraries must develop systems, philosophies, and strategies for managing quality. In a service organization like an academic library, customer satisfaction means fulfilling expectations. Librarians must find out what readers want and concentrate upon providing it. Designing an appropriate service means asking

Who are the User?

What do they want?

What can the organization provide?

In a library there are basically two types of User: those who are in a hurry and those who want to kill time. An academic library has to identify these and serve them accordingly. Quality is concerned with meeting the wants and needs of user. One of the key and enduring definition is that "Quality is fitness for purpose"

REVIEW OF LITERATURE

Pandi and Rao (2007) have explained about the application of TQM for achieving global quality in technical institutions Thus till date there were research papers which give the outline of various quality improvement concepts such as ISO 9001:2000 QMS and TQM in technical institutions. In this paper the authors tried to find out through librarians perception the consequences of practicing TQM in technical institutions. Kaushik, Khanduja Sarda *et al.,* (2006) have explained the role of six – sigma in technical institutions for the continual improvement of the student that the ISO 9001-2000 certified engineering indtitutions are moving towards the path of TQM offering better quality of service than the non –ISO certified intuitions. Shererikar and jange (2006) conducted survey by distributing 1200 questionnaire to the user community of 10 university libraries of Karnataka. The quality dimension in the light of SERVQUAL, *viz.*, Reliability, Assurance, Communication, Empathy and Security have been applied and results indicated that the service quality dimensions applied to university libraries are found to be satisfactory to a little extent based on the scale techniques. The Study suggests several areas for future research and for collaboration among library users towards improving the performance of library and information system to meet the high standards service quality in libraries to serve the users with utmost care and diligence. Takur and jana (2012)

carried out survey in 116 special libraries of Kolkata to examine the present status of quality management system, how they are managing quality of services, achving customers satisfaction and measuring the effectiveness of services provided by them. The study followed the ISO 9001 standard quality management systems requirements and also identified parameters applicable for libraries. Based on the findings of the study useful recommendations were made which will help the libraries in developing them as per ISO 9001 quality management system standard.

PURPOSE

This study seeks to explore the utilization of Academic Library services in the educational environment, explore the nature Academic Library use among university students, and investigate the perception of university students on Academic Library uses in library and information services.

OBJECTIVE OF THE STUDY THIS STUDY AIMS TO

To analyse the differences of TQM practices between accredited and ISO certified Academic Library.

To suggest measures to improve the implementation of TQM in accredited and ISO certified Academic Library.

How much money can one save if one improve the design of Academic Library
How to allocate quality assurance resources bases on objective data.
How can one substitute a less expensive part to the same performance.
To find out user facilities and service about Academic Library.
How uncontrollable factors affect the performance academic libraries.
Developing plans of daily routine works.
Review the Quality Assurance System in Distance Education;
To make recommendations on how to improve the level of services quality.

SCOPE AND LIMITATION

The study will be directed towards the understatement of the current situation of the higher education in Haryana universities specialized regarding applying the TQM concepts and tools that effect of performance processes regarding.

However the study has following limitation.

This study is limited to Sonipat and Gurgaon Academic Libraries and other stat academic library.

HYPOTHESES

- TQM practices are not different irrespective of the College Academic libraries whether accredited or ISO certified.
- TQM practices are not different in different College Academic libraries accredited by different agencies.

METHODOLOGY

The research is carried out among the students and faculty members of the Haryana. A structured questionnaire survey is used as the data gathering instrument. The instruments for data collection consisted of structured questions. All the closed ended questions were designed to elicit responses on a five point Likert scale to measure both respondent satisfaction and perception of service quality. Analysis of the collected data made use of the all 20 Colleges academic library of Faridabad and Palwal region.

CONCLUSION

The results would appear to indicate that the Haryana and Delhi library is not lacking in quality of service. However, we need to note that quality information service is about helping users to define and satisfy their information needs, building their confidence in

using information retrieval systems, and making the whole activity of working with library staff a pleasurable experience. To achieve total quality in information service the Haryana library should provide a comprehensive information programme that is predicated on the needs and activities of the users.

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A Perspective and Advantages of Open-Sources

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ABSTRACT

"Open source is an opportunity for the library to become more responsive, and adopt a more 'start-up' like culture to the development and deployment of services"

Open-source software and its supporting code are generally free-of-cost to download use, and modify. It is not easy to define the term 'open source software' with few words, due to the many categories and variants that exist. But it is not too complicated, either, since the idea in itself is simple. Free and open source software gives the user the right to use, copy, distribute, examine, change and improve the software. These rights are stipulated in the licenses, which apply to free and open source software. Free and open source software is not any makeshift phenomenon, but instead a fully adequate and dependable competitor to existing proprietary products and solutions in order to be able to increased competitive and improved interoperability.

Open source software entails a new kind of competition, separated from that of traditional business in that the product generally is not owned by any single company and therefore cannot be purchased of the market. Furthermore, the software itself is not constricted by any cost or fee. It can be obtained free of charge on the Internet. Free and open source software means that source code is freely accessible, that the software can be freely used, changed, improved, copied and distributed by all who wish to do so. Open-source allows users access to its source code. It allows users to modify the program according to need and to develop new code that improves the application. A common misconception about open source is that it is free-of-cost. While this is sometimes the case, the cost of open source is often found in support services rather than in product acquisition

MAJOR BENEFITS THAT OPEN SOURCE COULD BRING TO LIBRARIES, THESE INCLUDE

Lower costs: Open source offers a lower total cost of ownership than traditional library systems. There are none of the traditional license costs associated with open source. Libraries are able take advantage of the reduced costs the cloud offers by reducing local support and hosting costs (if it is supported and hosted by a third party).

No lock-in: Libraries are, in a sense, removed from the traditional lock-in associated with library systems. There is a greater opportunity to pick and choose components, and take advantage of what is, generally, better interoperability with open source solutions. Related to this is also the idea that open source is more sustainable: If a vendor goes out of business the software may disappear or be sold-on. With open it is always available, and there is usually a community involved in it to continue its development.

Adaptation and Innovation: Connected to the above is the greater capacity that libraries have to innovate with open systems and software. There is no need to await the next update or release, instead in either isolation or collaboratively, can develop the functionality required.

A richer library systems ecosystem: A less direct impact of open source is a richer library systems ecosystem. This is both in terms of the library solutions available (a healthier marketplace with both proprietary and open solutions) and in terms of collaboration and engagement between libraries themselves. Libraries are able to collaborate and share code on the functionality and fixes they require. Indeed, there are

open source systems such as Evergreen, which were developed as an open source library system for a consortia approach.

While these benefits are the headline grabbing ones, it might be argued there are more subtle, but none the less powerful benefits in the adoption of open source in libraries, especially within higher and further education. There are broader trends and themes emerging within the new information environment that make open source particularly timely for libraries. Open source solutions for the library fit very well into this broader open momentum affecting the academic world at present. Away from the academic world it is difficult not to notice the close correlation between the open, learning, sharing and peer-production culture libraries embody and that of the open source culture.

There are very few barriers to any library adopting an open source library system. The business models that surround open source library systems are currently based on third parties offering support and hosting services for libraries looking to implement a solution. Effectively, this means any library could take advantage of an open system.

There can sometimes be very pragmatic limitations to the systems themselves – the open source managements. Open source offers libraries an exciting opportunity: better understand the skills, roles and processes that are critical to the library's community of users (whether academic, public or other). Open source can be about simply outsourcing your system and support to a third party; but it can also be about re-evaluating services, systems and understanding where the real value of the library lies.

CONCLUSION

With documents getting published electronically and the Internet resources growing at the rate of 20 per cent of a month, the selection of documents is going to be a difficult job. The 21st Century librarian will basically become a resource sharing librarian, whose resources will have no boundaries, local, national or international. In this changing scenario, the librarian is going to be a highly skilled professional whose total commitment would be as navigators to global intellectual resources as facilitators, instructors, gatekeepers of knowledge interpreters, evaluators, consultants, researchers, information managers, promoters and has improved the image of the librarians by playing all the roles successfully.

The consortium, with its collective strength of participating institutions, has attracted highly discounted rates of subscription with most favourable terms of agreement. Consortia are tools, which will aid in exploiting the features of the e-journals as well as in effecting savings. So, with the help of the all above discussion we can say that the technology based instruction in the field of education gives rise to playing a special role by the libraries.

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Role of Social Networking in Digital Era: An Overview

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ABSTRACT

Value judgments a side, librarians should be aware of this phenomenon and should consider the educational role on social networking sites can play. Libraries should also find ways to use these sites to provide services to their users. The marketing potential is tremendous, as evidenced by the level of business activity within MySpace, LinkedIn and Facebook. Some potential library users may never visit their library's Web site, but libraries can build presence and services within the online spaces their users do use. Creating an online space designed specifically for young people and within their online world can help us build relationships with this demographic. Role-based or aspect-based of social networking graphs demand better ways of sharing information among the networks. The need to standardize social networks to make it easier for an individual to intact with the several aspects and roles that they may be involved in-is fast becoming a priority.
Keywords: *Social Network; Knowledge Sharing; MySpace, Facebook LinkedIn and Twitter.*

INTRODUCTION

Participation in web based social networking in Indian is steadily increasing. It is largely a youth phenomenon, with literally every college going student in the urban area becoming a member of at least one social networking site. The most popular is orkut, claiming to have more that 15 million users and second one is Facebook, which is growing faster. Twitter is gaining popularity, which celebrities and politicians having large number of followers but now-a-days Facebook is much popular between students and organizations. Social networks are explicit representations of the relationships between individuals and groups in a community. Social network analysis has been used, for example, to represent and analyze the organization structure of library users, identify key individuals, and suggest structural changes to improve unit performance. Virtual or online communities are groups of people connected through the internet and other information technologies. These have become an important part of modern society and contribute to life in many contexts social, educational, political and business. The communication technologies and infrastructures used to support virtual communities have evolved with the internet and include electronic mailing lists, bulletin boards, usenet, IRC, Wikis, and blogs. Virtual communities built on social network structures began appearing in 2002 and have become among most popular web-based applications. Such sites allow individuals to publish personal information in a semi-structured form and to define links to other members with whom they have relationships of various kinds. Current examples include Friendster, LinkedIn, Tribe.net, and Orkut. Other web-based virtual communities have successfully combined social networking with various interests, such as photography (www.Flickr.com), film (www.Netflix.com), personal blogging (www.Myspace.com) and dating (www.Thefacebook.com). Since the emergence of the web, library and information science scholarship has been remodeling the future for libraries. Scholars are recognizing that future libraries may not own their collection of resources. Instead, the library in serving future users may offer referrals to potentially appropriate points in a vast network of resources accessible through the internet or its successors. Tomorrow's library services will focus on creating guides, indexes, annotations and other tools tailored to the needs and interests of the library's own community of users. In addition, these tools and the library itself will need to be designed to improve the intellectual accessibility of those network resources likely to have greatest relevance and value to this community. Future libraries will function by organizing the universe of resources so that those resources most likely to be valuable and relevant to

the user community are made most accessible to the community, physically and intellectually.

WHAT IS A SOCIAL NETWORK?

Social Network, a term coined by anthropologist J.A. Barnes in 1954, became the buzz word through the popular websites like MySpace, Facebook, Orkut and Likedln. Online social networks became a fad in 2003 with the popularity of such kind of websites. A social network is a graph of relationships and interactions within a group of individuals, which plays a fundamental role as a medium for the spread of information, ideas and influence among its members. The individuals or organizations are related to each other by various interdependencies. This can also be visualized as a practice of expanding social contacts by making connections through individuals.

Simply, we can say that a social network is a set of people (or organizations or other social entities) connected by a set of social relationships, such as friendship, co-working, or information exchange.

ROLE OF SOCIAL NETWORKING IN LIBRARIES

Presently social software in libraries are engage in viral marketing, integrating themselves into their users' social networks and using that in to promote library services. Libraries can also play a valuable role as educators, teaching parents, teens, and young adults how to be safe online. Librarians can sift through the hype and paranoia to give parents solid information about ways to keep their kids safe. While social networking sites have received negative attention over the past few years, libraries can use them in positive ways to provide better services to their users. A school, public, or academic librarian, it should be easy to find out whether the students or younger users primarily use MySpace, Facebook, or one of the other popular social networking sites. Becoming a member of that site will let gain valuable insights into the interests, needs, and wants of users. From this research, it might be able to determine what other technologies of users are using to inform for library's future services. At public and special libraries where populations may be more diverse, users may belong to a wide range of online communities geared toward different interests. More than likely, though, some of users will belong to Facebook, MySpace, or Friendster, as well as Flickr and other popular online communities. Many of these communities let to search for members by geographic area or by institution, making it easy to find local people. Observing the users'interactions in these spaces will offer insights about the community that it may never get from a survey or other formal research tool. As information professionals are the responsibility to educate our users about online safety. Young people may be more technologically ability but they may not be as aware of privacy issues online. Students using Facebook may think that only other students can read their profiles, but faculties with a valid .edu address can register and see what their students have been writing. Young people creating profiles online also need to be aware of the potential dangers of meeting people they communicate with online. Search engines can sometimes pick up even information that people think is private. Users may not realize how easy it is for a potential employer to do an online search and find things that they've written. It's important to distinguish between what is truly private and protected and what content is freely accessible to anyone with Web access. Some services republish content from other Web sites, and users may be shocked to find things they've written published in other places on the Web. Libraries have an important role in educating users about the dangers of putting personal information online and the ways they can participate in online communities while protecting themselves.

APPLICATION OF ONLINE SOCIAL NETWORKS

The following list presents representative online social networks and their application. It can be anticipated that the next generation social network will be a semantic social network, as proposed by the PUII SSNP, which interconnects people and resources with the help of meta-data and ontology reasoning capability.
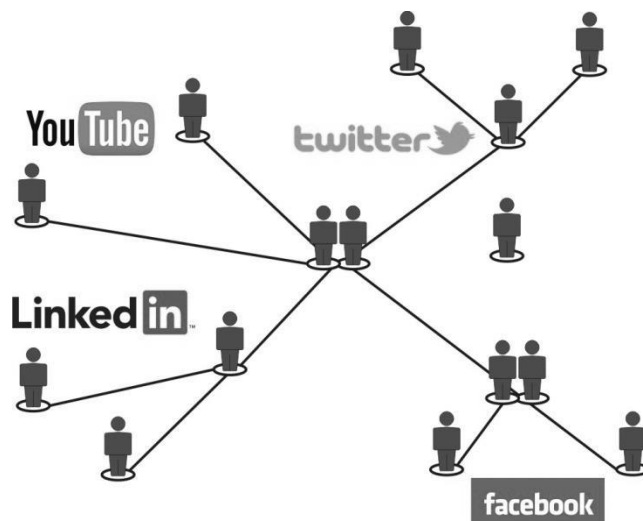
FACEBOOK

Facebook applications are developed using the Facebook Platform (http://apps.facebook.com/login.php), which was launched on 25 May 2007. Utilizing the Facebook Developer Application, third-party programmers can create applications to suit their purposes. Applications can be created to provide a variety of services, such as displaying an RSS feed, searching an outside resource, or cataloging a person's recently seen, to name a few. In order to use a Facebook application, an individual must first add that application to his or her profile. We can create group also in Facebook. I have created "Library Dot Com" group which have LIS professionals and they share views, events regarding library field.

The most interesting social network in cyberspace today is at Facebook. It is one of the first social networks to have been built in exclusivity. The community is closed to anyone who doesn't have belong to an academic community. (For the college community this means having a .edu email address.) To students who flock to register at the site the school community' message provides a sense of belonging and safety. Not only can _like' people find each other on Facebook, but only _like' people can join in the first place. The .edu requirement gives Facebook its unique ambience. In LIS world it has become the electronic replacement for those ageing printed facebooks or view books that many schools dispense (at great expense) as student directories. Facebook may provide a false sense of security. Many users believe they can mingle with their peers free from intruders. However, after a few public incidents and copious attention from the press, they are quickly learning that Facebook not only makes no guarantees that people who don't belong stay out, but that because of it's popularity it's become something of a target for a bevy of surprise visitors. Stories abound about how everyone from marketers, to job recruiters, to college admissions counselors, to teachers and even law enforcement are using Facebook to see what students are doing.

LINKEDIN

It is founded in May 2003; it focuses on professional users creating networks of co-workers and other business associates. It allows members to look for jobs, seeking out experts in a particular area, or to make contact with other professionals through trusted connections. LinkedIn is probably the site with the least potential for social purposes. We can create group in LinkedIn. I have created **Library Dot Com** group in this social site and mostly library professionals are members of it.

FRIENDSTER

It is established in 2003, this is primarily a site for social connections for making friends. A member's photo and profile are only revealed to people in personal networks; messages can only be sent and received from those with a mutual network of friends. Friendster is currently in its development phase, during which membership is free.

MYSPACE

MySpace encourages sociability by visibility, or representing a user's identity in a public web environment. The emphasis in MySpace is providing a public virtual space for your public identity, accessible to anyone. Sociability on MySpace is mediated through both real world''connections and virtual connections. MySpace encourages user interaction through their open, publicly accessible user profile pages. MySpace also allows users outside of their network to view user's profile pages, although with limited access.

TWITTER

Twitter encourages sociability through simplicity. According to Twitter's home page Twitter is a service for friends, family and co-workers to communicate and stay connected through the exchange of quick, frequent answers to one simple question:
What are you doing? ''This highly streamlined social website focuses almost exclusively on quick 140 characters or less''updates. These updates have been dubbed as tweets.'' Twitter is decidedly simple, which makes interacting with the interface tremendously easy and intuitive for users familiar with social networking websites.
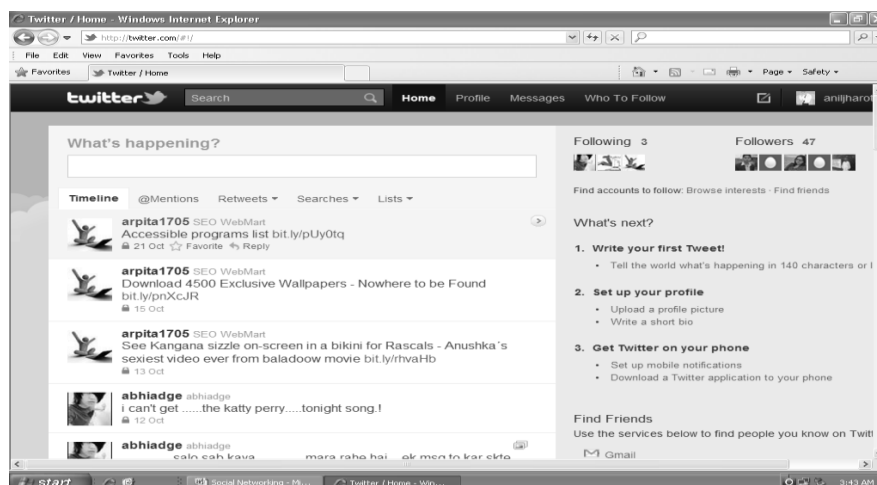
FEATURES OF SOCIAL NETWORKING

To create groups that share common interests or affiliations, upload or stream live videos and hold discussions in forums. To allows professionals to exchange information, opportunities and ideas. Professionals are able to stay informed with new knowledge about their field. Teachers, lecturers and students are also using social networks as a communication tool. The use of online social networks by libraries and information

organizations is also increasingly prevalent and a growing tool that is being used to communicate with more potential library users, as well as extending the services provided to individual libraries.

OBJECTIVES OF SOCIAL NETWORKING

- Provide links to recommended Internet Resources
- Book reviews, information about new books
- Book discussions
- Provide research tips
- Communication among librarians (in a library system)
- Provide entertainment or amusement for users
- Online survey and interviews on social sites for research.

ROLE OF SOCIAL NETWORKING IN LIBRARIES

Several other universities have created applications for searching their library's catalog directly from social sites like Facebook. And LinkedIn search modules for commercial databases such as JSTOR and World cat can also be added to profiles. Other applications, not directly associated with library research, may also serve a useful purpose. For example, Visual Bookshelf is an application that Facebook and LinkedIn users can install to help them keep track of books that they have read, are reading, or hope to read. Books can also be recommended to friends. This application could serve as a good reader's advisory tool for public services and school media librarians in the virtual environment. The library's visibility across campus increased after librarian profiles were created. The news feed feature of Facebook helps to keep friends and colleagues updated on activities. For example, attendance and participation in professional events can be announced using the event feature. Also, updates can be made to the personal status feature reflecting professional development activities. Another most important feature of Facebook, that the group administrators post the jobs and important announcements on community walls.

OPPORTUNITIES FOR LIBRARY MEMBERS TO PARTICIPATE

- Contribute to, or review conceptual models,
- Help identify dependent and independent variables to be measured,
- Provide a sounding board for methods development,
- Review and aid in the development of survey instruments,
- Provide feedback on findings to help Librarians build a stronger network.

CONCLUSION

The modern generation of computer users will certainly be immersed in social networking as the dominant way to conduct cultural and social live life. It is to be expected that a major of several dissimilar networks in will accompany the explosion of social network to a more seamless experience for the users with various roles in real life. However, since social network engage only 5% of user's time functionality based approaches may drive the user experience in the future, which social networking playing an important, but a less significant or notable role. Social networking may be today's buzzword, but when examined from the librarian and information scientist perspective, this approach to information retrieval is grossly amateur. This article briefly reviewed some recent work in social network, made some recommendation for using social networks in libraries.

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Necessity of Multilingual Supportive Functional Model to Effective Online Information Seeking for Academicians

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ABSTRACT

There is a hug necessity of the developing a Functional Model of online information seeking behaviour of academicians to effective seeking on online platform and hopes to unveil a standard, uniform, widely acceptable, easily usable amongst academicians when seeking and gathering information. Earlier several models have come up with a variety of issues, trying to explain the stages of information searching process and the behaviours associated with each stage.

INTRODUCTION

In the information communication technology enable scenario online information seeking behaviour is a relatively new phenomenon. However, it is the active process of obtaining data from the Web. Now a day's information seeking behaviour is an area of online active interest among the academicians especially in research scholars. In Indian scenario the academicians (especially in Humanities and Social science) are facing huge problem to access and utilize the maximum resources including Govt. resources availed on the internet due to unavailability of standard and uniform model. In these days libraries and universities are continuously adapting and seeking latest and effective ways along with high technique to respond to the fundamental and interconnected missions of research, teaching and community service, and that is why some have embraced the use of the Internet in service delivery. On the other hand, this study is more concerned with maximizing usage of this resource by Academicians in fulfilling their primary aim of research and reaching out to these resources on the Internet using the requisite navigational skills. Online is the condition of being connected to a network of computers or other devices. The term is frequently used to describe someone who is currently connected to the Internet. Information refers to the ideas or thoughts that individual seek, contribute, or obtain from various formal and informal channels, study and research. Information seeking is a conscious effort to acquire information in response to a need or gap in your knowledge, (Case, 2002).

PERCEPTION OF VARIOUS MODELS OF INFORMATION SEEKING BEHAVIOUR

A number of surveys and studies on the information seeking behavior have been carried out during the last decades. Although all theses model based study and surveys included information seeking, information seeking behavior, information seeking of professional's, information behavior, in many cases, these models, surveys examined the information seeking behavior, information behavior and so forth, but online information seeking behavior is not targeted towards academicians in Indian scenario by earlier models and study.

VARIOUS MODELS OF INFORMATION SEEKING BEHAVIOUR

This is the simplified model of Wilson that is commonly described as the Macro-model. In his model, Wilson shows how the information need arises, the actual searching process for information and the testable information behavior; for example, the information needs differ depending on the work roles or personal characteristics. Therefore, this model can be viewed a well established theory (Wilson 1999). The limitation of the model is that

'all of the hypotheses are only implicit and are not made explicit. Nor is there any indication of the processes whereby context has its effect upon the person, nor of the factors that result in the perception of barriers, nor of whether the various assumed barriers have similar or different effects upon the motivation of individuals to seek information' (Wilson 1999). However, the very fact that the model is lacking in certain elements stimulates thinking about the kinds of elements that a more complete model ought to include (Wilson 1999). This model reflects the survey questions asked about how the tertiary students' information need arises once an assessment task is given and how their searching method and behavior differ depending on their personal characteristics.

Dervin's model is not only seen as an Information Seeking Behavior model, but 'a set of assumptions, a theoretic perspective, a methodological approach, a set of research methods, and a practice' (Wilson 1999). The model consists of four different aspects. The first aspect is Situation, when the information problem arises. The second aspect is gap, which describes the individual's awareness of the current situation, and the preferred situation. The third aspect is Outcome, which reflects the results of the sense-making process, and finally, Bridge, which is a closing-gap element (Wilson 1999). Dervin's model is highly relevant to the research conducted as it shows the steps of the process that students go through when searching for information, the situation: reflecting the task given to the student, gap: reflecting the gap in which information searching process starts by thinking of what could be relevant to the task given, searching general information, evaluating and filtering the information found by measuring its relevance and lastly, the outcome: reflecting the results of the information searching process (*i.e.* the filtered information that the student uses to answer a specific task question).
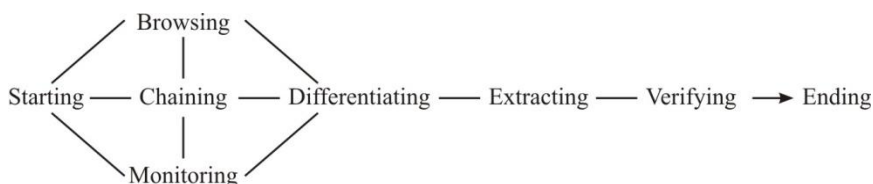

Fig. 1

ELLIS'S CHARACTERISTICS

Ellis's explanations of the different behaviors involved in Information Seeking Process is not put as a pictorial model like the previous theories discussed. He explains the stages using the term "features" as he claims that the effect of the different behaviors form a set of stages. Below are the steps of "features" of his theory (Wilson 1999):

Starting: a person seeking information, *for example*, asking some knowledgeable colleague

- **Chaining:** following footnotes and citations in known material
- **Browsing:** 'semi-directed or semi-structured searching'
- **Differentiating:** identify the differences in information sources as a way to filter the information obtained
- **Monitoring:** keeping up-to-date or current awareness searching
- **Extracting:** selecting the relevant information to the person's information needs
- **Verifying:** checking the accuracy of information
- **Ending:** ending the information seeking process, which may be defined as 'tying up loose ends' through a final search

According to Ellis, the interaction between any two features of his model depends greatly on the circumstances a person with the information needs has. But no matter what the circumstances are, the process must start with the Starting feature, and end with the Ending. This model suggests that each feature is a different behavior of the process and

may vary in sequence depending on the individual's unique circumstances. Ellis's model appears to be between the micro-analysis of information seeking behavior and the macro-analysis of information behavior in general; therefore, it is worthwhile mentioning, that both models of Wilson and Ellis work at different levels of the overall process of information seeking (Wilson 1999). Ellis's characteristics help in this research to specifically identify each step the student takes to gather useful information, by first searching for general information and asking knowledgeable people such as academics in the university, secondly, following the notes and the helpful materials given by academics, gathering information independently and evaluating and keeping up-to-date and checking its accuracy (*e.g.* checking information citation and date) and finally filtering the information according to what's most relevant and ending the process by responding to the academic task given.

The model of ISP describes the various experiences that the information seeker goes through from the early stages of the information search process, until the end. Kuhlthau describes the experiences as "a series of thoughts, actions and feelings accompanying the information seeker" (Kuhlthau 2010). The process of information search usually starts with the feelings of uncertainty, vague, ambiguity, doubt and general thoughts of the problem area. Therefore, the information seeker takes action to collect relevant information to the general topic of the problem, then as the process progresses, the information seeker starts to collect more specific information that answers his/her specific questions in the problem area. As the process proceeds successfully, the feeling of uncertainty and doubt changes to confidence and the thoughts of vague clears out gradually.
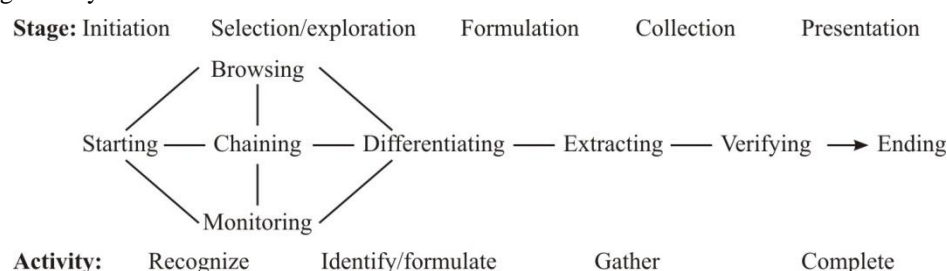

Fig. 2: Combined Model

Wilson (1999) suggests that the two models represent major differences and similarities. For example, Ellis presents his model as elements of the information seeking behavior, and suggests that the behavioral characteristics may vary with different persons or with the same person at different times. Whereas Kuhlthau posits stages on the basis of her analysis of behavior. Therefore, the two models oppose. The strength of Ellis's model as compared with Kuhlthau's, is that it is based on experimental research and has been tested in successive studies, most recently in the context of an engineering company. The difference of Kuhlthau's theory as compared with Ellis's model is that she brought the feelings and thoughts of the person with the information needs into recognition, and how these thoughts and feelings gradually change as the process progresses. Ellis's model however, focuses on the logical steps that the information seeker takes to obtain useful information. Although Ellis suggests circumstances change from one person to another, but there may be common patterns amongst information seekers that could be observed through more in depth studies. Thus, it can be concluded that the two theories oppose in a way, and complement each other in another, with each theory looking at information seeking process from a different angle. Kuhlthau's model helps focusing on the emotional and cognitive side of the searching process, where the student feels uncertain and unsure on what information he/she might need to help answering the question, and

how this feeling might develop into stress and anxiety in the early stages. Then, when the topic is pinpointed, the student is a little relieved knowing what information is needed, which then the process of exploring the topic, formulating and collecting information follows. During the process, the feeling of uncertainty and ambiguity gradually develops into confidence and relief, that's when the student is optimistic and sure that he/she is capable of responding to the task given.

NECESSITY OF THE MODEL IN INDIAN SCENARIO

In Indian scenario, the research scholars belonging rural areas (especially in the discipline of Humanities and Social science) are commonly facing major problem to access and utilize the maximum resources and services (Govt. resources, database and services) availed on the internet due to unavailability of standard and uniform model. This is the major reason resources (developed by Govt. fund) are not fully utilized. Because of lack of good web structure there is a huge gap among various internet resources and their seekers, that's why, academicians belonging rural areas institutions are not fully satisfied with resources and services accessed from online. Behind this phenomenon there is a big cause that there is no mechanism developed to online information seeking in Indian scenario. To short out this problem first of all we must be understand the shifting trend of seeking behaviour from traditional to online especially among academicians and then to full fill their specific needs there is a judicious need for the development of standard and uniform model on view of language diversity in India. That model or mechanism should be multilingual supportive.

ADVANTAGE OF THE ONLINE ISB MODEL

- The maximum utilization of good resources is generating good and qualitative research output.
- This model will assist to the users who have effected with language barriers.
- The user will be able to use all type of resources and services, developed by govt. or other agencies.
- Model will be widely usable and easy accessible.
- This model will providing effective and efficient online seeking to the academicians in Indian scenario.

CONCLUSION

In the digital edge we can say that probably Indian academicians are one of the most potential users of the web resources, database and services. However due to lack of technical and advance mechanism, our academicians (especially in Humanities and social science) are facing rigorous problem while seeking web resources. On the basis of study it can be say that this problem is almost related with diversity of language. Our academic system and research output is diversely effected may because of such limitation. That's why there is a need to develop a universal model or mechanism to minimizing the gap between the quality web resources with users for quality research. If this model or mechanism is developed, it will explore the online information seeking behavior of academicians for sustainable education among academicians of higher learning institutions. This mechanism or model will assist Academicians in their search for information on the Internet and provide effective and efficient seeking especially for those seekers who are not much comfortable in various languages.

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Security and Privacy Challenges in Cloud Computing

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ABSTRACT

Cloud computing is getting Information technology services over the web by a third party supplier on "Pay as you go basis". Cloud computing has many advantages such as efficiency, cost effectiveness, scalability, mobile computing, reduction in capital cost and unlimited storage space. All these benefits make cloud computing very enticing yet the organizations feel reluctant in using cloud services due to the issue of privacy and security. Cloud computing demands the storage of personal data of its users on remote computers unknown to the users. Though service providers strive to reduce the risks over the clouds and increase their reliability in order to build mutual trust between them and the cloud customers yet cloud has not gained complete acceptance by users. This paper discusses the threats and vulnerabilities associated with the cloud computing and measures that could be taken while moving to the cloud.

Keywords: *Cloud computing, Security, Privacy, Reliability, Risk*

INTRODUCTION

Cloud computing is a technology that demands the data outside the boundaries of the premises of the users. Cloud computing is one of the fastest growing technology. Cloud is offering range of different types of services, which includes storage, readymade and customizable software, IT platform for software development and use, processing power, applications, database or even virtual private computer according to needs. The consumers have hugely accepted SaaS, IaaS and PaaS in past years. Key advantages of using cloud are on-demand service, reduced upfront cost and maintenance cost, less maintenance responsibility, reduced risk, easier disaster recovery business continuity, efficient backup system etc. According to Forbes the worldwide cloud computing market will grow at a 36% compound annual growth rate (CAGR) through 2016, reaching a market size of $19.5B by 2016. Enterprises have started setting cloud-related spending as part of their enterprise-wide IT budgets .Another research by the IDC cloud research, shows that spending on public IT cloud services is expected to be more than $107 billion in 2017. By 2017, IDC expects public IT cloud services will drive 17% of the IT product spending and nearly half of all growth across five technology categories: applications, system infrastructure software, platform as a service (PaaS), servers, and basic services. However, the results of research of a U.K. based communications services provider company, BT shows a contradiction. 79 percent of participating respondents said they're adopting cloud storage and web applications in their businesses, but they also report their confidence in the security of the cloud is at an all-time low. It also revealed that more than three quarters of IT decision makers say security is their main concern about using cloud-based services. Approximately half of respondents admit that they are 'very or extremely anxious' about the security implications of these services. This is a substantial increase of 10 percent globally from previous research in 2012.It shows that companies are moving to the cloud to avail its numerous benefits but they are not sure about the security. Here is the list of some high profile breaches that shook the trust in cloud in recent times:

ADOBE'S SECURITY BREACH

Adobe suffered a major security breach in October 2013 when the attackers gained access to Adobe IDs, encrypted customer credit card records, and login data as the full range of

Adobe's software was compromised. Approximately 38 million accounts were compromised in this attack while company claimed only 3 million users were affected.

- **Knight Capital:** Knight Capital was cloud-based automatic stock-trading company the software of which was based on an incorrect algorithm .It cost the firm a staggering $440 million in just forty five minutes. The incorrectly programmed software bought stocks at the market price resulting in several billion dollars of unwanted positions, before selling at the bid price for less money. The error eventually forced the company to sell their business to another company.
- **Microsoft's Windows Azure:** In February 2013, an expired SSL certificate caused Windows Azure to suffer an outage for twelve hours, with all attempts at secure access timing out as unavailable. At the same time other Microsoft services such as Xbox Live, Xbox Music, and Xbox Video all suffered with issues, as users were unable to access cloud-connected data or utilize any multimedia content tied to the products.
- **Amazon:** In January 2013, the main homepage of the web-shopping giant, Amazon went offline for an hour which cost the company $5 million revenues.

CONCERNS WITH CLOUD COMPUTING

Cloud users have a lot of issues with the security and privacy of the services provided by the cloud service providers. Cloud Security Alliance (CSA), reported top nine cloud security threats in a report published in 2013 and dubbed them as "Notorious nine". The company emphasized those risks at a three-day conference hosted jointly by the CSA and the International Association of Privacy Professionals (IAPP).These threats in the order of their severity are:

- **Data Breaches:** Theft of confidential corporate information is always a risk to any IT infrastructure, but CSA indicates the cloud model offers new, major highways attacks. If the base of the cloud data from multiple leases is not thought out properly, a flaw in the application of one client can open attackers' access to data not only of the client, but all other cloud users.
- **Data Loss:** The second-greatest threat in a cloud computing environment, according to CSA, is data loss. Data could be lost if stolen by a hacker. It can also suffer a fire or natural disaster or accidentally deleted if a provider of cloud services does not introduce proper backup measures. On the other hand, the data could be lost if the customer loses the encryption key he used to encrypt the data before uploading it to the cloud. Loss of data not only affects relationship with the customers but can also put the provider in legal hassles.
- **Account Hijacking:** A hijacked account can be used by an attacker to eavesdrop the activities of the legitimate user, manipulate data, redirect users of the service to fraudulent sites and also use the reputation of the user to have gains. The key to defending against this threat is to protect credentials from being stolen. Phishing, exploitation of software vulnerabilities such as buffer overflow attacks, and loss of passwords and credentials can all lead to the loss of control over a user account.
- **Insecure interfaces or APIs:** APIs are used by IT admins of user's organization to manage and interact with the cloud services. They allow provisioning, management, orchestration, and monitoring of the cloud. APIs are integral to security and availability of general cloud services. Weak interfaces and APIs can expose an organization to security issues pertaining to confidentiality, integrity, availability, and accountability. Hence these interfaces must be well designed and secured to include authentication, access control and encryption.
- **Denial of Service:** A denial of service (DoS) attack is a malicious attempt to make a server or a network resource unavailable to users, usually by temporarily interrupting or suspending the services of a host connected to the Internet. In this type of attack, attacker sends large amount of data packets which affect the availability of service for legitimate users by overloading server's capacity and bandwidth. Furthermore, there is

distributed denial of service (DDoS) attack which is more dangerous for cloud computing, because of its distinctive nature of source of the attack. In a distributed denial-of-service (DDoS) attack, an attacker may use a computer to attack another computer. By taking advantage of security vulnerabilities or weaknesses, an attacker could take control of the computer of a user and then use it to send huge amounts of data to a website or send spam to particular email addresses. The attack is "distributed" because the attacker uses multiple computers of different users to launch the denial-of-service attack. DoS or DDoSattack can take place against any SaaS, PaaS, IaaS, private cloud or public cloud environment

- **Malicious Insiders:** CSA warns that without proper level of security on IaaS, PaaS or SaaS, an insider who has improper intentions (*e.g.,* system administrator) may gain access to confidential information that is not intended for him. Malicious insiders are certified to do greater and bigger damage than any other attacks. . One tactic cloud customers should use to protect themselves is to keep their encryption keys on their own premises, not in the cloud.

- **Abuse of Cloud Services:** Cloud computing brings large-scale, elastic services to enterprise users and hackers alike. Massive power of cloud servers can make the task of hackers easy for cracking encryption keys, serving malware or for launching DDoS attacks. Cloud service providers need to consider how to keep track of people who use the power of the cloud infrastructure and prevent such abuses.

- **Insufficient Due Diligence:** Cloud provides enticing benefits but ignorance on the part of organizations can lead to disasters when they embrace the cloud without fully understanding the cloud environment and associated risks. Organizations should conduct a comprehensive, thorough review of its internal systems and potential cloud providers to fully understand all the risks to which they may expose in future before moving to a new model. They must ensure that the development team is familiar with the cloud and its associated technology. They also need to train the group in an appropriate manner.

- **Shared Technology Issues:** In a multi-tenant environment, the compromise of a single component may expose the entire environment to a potential of compromise and breach. Hence in a shared infrastructure an in-depth defensive strategy is recommended to the use of compute, storage, networking, applications, and user access. Monitoring should watch for destructive moves and behaviours.

STEPS TO CLOUD SECURITY

According to Edwards (2009), Enterprises that want to proceed with cloud computing should use the following steps to verify and understand cloud security provided by a cloud provider:

- Understanding the cloud by having an in-depth understanding of how cloud computing transmit and handles data.

- Demanding Transparency by having detailed information on the security architecture of the cloud service provider.

- Internal Security should be reinforced by checking the robustness of the cloud provider's internal security technologies and practices including firewalls and user access controls.

- Considering the Legal Implications by knowing how the laws and regulations affect what is sent into the cloud.

- Monitoring any development or changes in the cloud technologies and practices that may impact data's security.

SOLUTION OF SECURITY ISSUES

Here are some measures/solutions that users of cloud computing should adopt before moving to the cloud to minimize the security threats:

- **Finding right Cloud Provider:** Cloud users should find a cloud vendor who is well established; have experience, standards and regulation. So there may not be any chance of cloud vendor closing.
- **Clear Service Level Agreement:** Service Level Agreement with cloud vendor should be clear without any ambiguity. So if cloud vendor closes before contract, enterprise can claim.
- **Recovery Facilities:** Cloud vendors should provide good recovery facilities in the case of lose of data due to certain issues. Data recovery facilities should be provided and continuity of data should be facilitated.
- **Better Enterprise Infrastructure:** Enterprise must have infrastructure which facilitates installation and configuration of hardware components such as firewalls, routers, servers, thin clients etc.
- **Data Encryption techniques for security purpose:** Developers should develop the application which provides encrypted data for the security. So additional security from enterprise is not required and all security burdens are placed on cloud vendor.
- **Knowledge of data flow:** There should be clear knowledge of the flow of data. So the IT managers can have idea where the data is for all the times, where it is being stored and where it is being shared. There should be total analysis of data.
- **Browser Security:** As a client sends the request to the server by web browser, the web browser have to make use of SSL to encrypt the credentials to authenticate the user. SSL support point to point communication means if there is third party, intermediary host can decrypt the data. If hacker installs sniffing packages on intermediary host, the attacker may get the credentials of the user and use in these credentials in the cloud system as a valid user.

CONCLUSION

The technology of cloud computing is growing rapidly. Organizations are finding the benefits of the cloud immense and are moving towards it. But without proper understanding of the cloud, entering into it could lead to more damage than the good. Organizations need to identify proper counter measures and risk management techniques through which security issues and threats could be tackled. That is possible only by identifying and measuring all the factors related to cloud.

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Role of Information Technology in Libraries

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ABSTRACT

Information is very important for human being development. Information Technology provides information to the right person, at the right time and at the right place. This paper focus on the study of Information technology tools and applications in Libraries, to find out the Information technology skills in Library Information System Professionals and to modernize the Libraries.

Keywords: *Information technology, Information technology Tools.*

INTRODUCTION

Information is the key aspect in any type of R&D (Research and development). According to information, it is considered as a fifth need of human after ranking air, water, food and shelter. Information technology entered into Libraries, especially Academic Libraries and research libraries during 1960s. Quick and easy access to every required information is a supreme importance especially in Academic Libraries. Information processing, storage, communication, dissemination of information automation etc, further origin of Internet and development of World Wide Web, revolutionized the information communication technology.

INFORMATION TECHNOLOGY

According to **ALA Glossary** "Information Technology as the application of computers and technologies to the acquisition, organization, storage, retrieval and dissemination of information".

According to the **Webster's New encyclopedia**, "Information Technology is the Collective term for various technologies involved in the processing and transmission of Information they include computing telecommunications and microelectronics".

According to **the British Department of Industry**, it defines Information Technology as "The acquisition, processing, storage and dissemination of vocal, pictorial, textual and numerical information by microelectronics based combination of computing and telecommunication.

MECHANISM OF INFORMATION TECHNOLOGY

Technological change is becoming a driving force in our society. Information technology is a generic term used for a group of technologies. Following are the major components of information technologies as most relevant in modern library and information system.

INFORMATION TECHNOLOGY: INFRASTRUCTURE

The adaptation of any new technology requires the presence of an infrastructure with which it acquires, learn and successfully apply the technology. This includes sufficiently available human resources, well developed telecommunication networks, research and development capabilities and capital for investments as shown in Fig. 1.
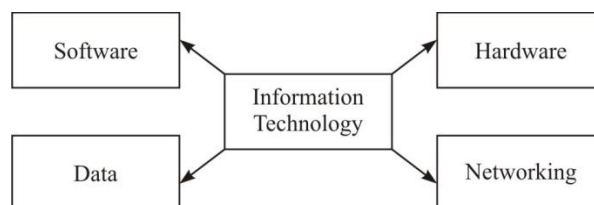

Fig. 1

RELEVANCE OF INFORMATION TECHNOLOGY IN LIBRARY

The library is the main information centre which can make use of the fat development IT for the benefits of mankind as a whole. The librarian's preference of IT should include all those technologies which are expected to be used in the library activities/operations and other library services for collection, processing, storage, retrieval and dissemination of recorded information, the fast developing information technologies have showered almost every areas of application including libraries. In case of libraries, these are good use in the following environments.

- **Interconnection of Libraries:** Library networking means a group of Libraries and information Centers are interconnected for some common pattern or design for information exchange and communication with a view to improve efficiency.
- **Library Management System:** Library management System includes the following activities which will certainly be geared up by the use of these fast IT developments: Classification, Cataloguing, Indexing, Database creation, Database Indexing.
- **Audio-Video Tools:** It includes photography, microfilms, microfiches, audio and tapes, printing, optical disk etc.
- **Automation of Library:** Library automation is the concept of reducing the human intervention in all the library services so that any user can receive the desired information with the maximum comfort and at the lowest cost. Major areas of the automation can be classified into two –organization of all library databases and all housekeeping operations of library.
- **Technological Communication:** Technological Communication consisting of technical Writing, editing, publishing, DTP systems *etc.*

ADVANTAGES AND DISADVANTAGES OF INFORMATION TECHNOLOGY

All computer based systems should be user friendly and should satisfy as many of the following factors as possible:

Advantages of information technology

- Increases efficiency
- Enhance the knowledge and experience
- Improve the communication facilities
- Speedy and easy access of information
- Collaboration and creation of library networks
- More stable
- Avoid repetition of efforts within a library
- Increase the range of services offered
- Reduce the workload of the library staff
- Save the time of the users
- Improves the quality of library services
- Integration within the organizations.
- Improve the status of the library
- Helps to attract the users.
- Reforming and combining of data from different sources
- Information flexibility to the users
- Remote access to users
- Round the clock access to users
- Access to unlimited information from different sources
- More up to date information.

DISADVANTAGES OF INFORMATION TECHNOLOGY

- Inadequate trained staff
- Operational costs are exceeding year by year

- Insufficient funds
- Unemployment.

CONCLUSION AND RECOMMENDATION

The application of Information technology tools are increasing in Academic Libraries especially in Engineering College and Arts & Science colleges due to the development of technologies. Utilization of Information Technology in present libraries is optimistic to gain right information at the right time in the right place and at the right cost. Information Technology helps to progress the rank of the library and it condense the work stack of the library professions. Information Technology has broken the worldwide boundaries, new apparatus and methods help to provide better services to our clients. It has been observed that very few libraries are offering Video conferences it is due to fewer consortiums. If consortium with other libraries will increase the usage of Video conferencing will also increase.

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Challenges and Issues:
Migration to Open Source Software

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ABSTRACT

The increasing popularity of OSS has changed the software industry landscape in a dramatic way in latest years. Open Source Software (OSS) communities have successfully developed a lot of software and suggested OSS as a solution to a lot of computing problems, although most of the software users only use proprietary applications. OSS is freedom to run or execute; copy or redistribute; change or modify; study or improve; freedom to do anything. It provides freedom to study or analyse how the program works, and adapt it according to the needs. Apart from the benefits OSS invites a lot of software problems such as, producing complex software and generating software code that could be prone to hackers and errors. This paper presents an overview of the issues and challenges to migrate to open source software from proprietary software.

Keywords: *Open Source Software, Proprietary Software, Migration, OSS Communities.*

INTRODUCTION

Today is the world of Information and Communication Technology and its tools. ICT has become an integral part of our daily life. ICT may include a wide range of hardware such as PC/laptop, digital or web cameras, printers, scanners and other multimedia devices; software such as word processing, spreadsheet, accounting, inventory management, image processing and much more; technologies such as web based technologies, database technologies and some others. ICT can add value to teaching, learning and evaluation. It enhances the quality and efficiency of teaching and learning against the traditional chalk-board model. It motivates and encourages both students and educators and develops their interest in new concepts.

Now-a-days, Google is a famous search engine and one can search millions of software for teaching and learning in each and every field, subject or topic. But like other services software too has its cost which is known license cost. A software license allows an end-user permission to use one or more copies of software in ways where such a use would otherwise potentially constitute copyright infringement of the software owner's exclusive rights under copyright law. Also, software licenses typically contain terms which assigns liability and responsibility between the parties entering into the license agreement. In enterprises and commercial software transactions these terms often include limitations of warranties, liability and warranty disclaimers, and indemnity if the software infringes intellectual property rights of others. Apart from high fees of license, licensee is not able to update or modify any as software code is not provided with the license. The license is only for using the software as a service not to modify or redistributing it. Again for modification or updates, licensee has to pay additional cost for it. These software are also known as closed source software or proprietary software which are owned by an individual or company.

The primary business model for closed source software includes the use of constraints on what can be done with the software and the restriction of access to the original source code. The motive is to form of imposed artificial scarcity on a product that is otherwise very easy to copy and redistribute. Purchasing license means that an end-user is not actually purchasing software, but only purchasing the right to use the software. The source code to closed-source software is considered a trade secret by its manufacturers.

Now the new term "open source" derived which refers to something that can be modified because its design is publicly accessible by anyone. While it originated in the context of computer software development, today the term "open source" designates a set of values—what we call the open source way. Open source products, projects, or initiatives are those that accept and respect open exchanges of information, collaborative participation, transparency, meritocracy, rapid prototyping and community development. The source code of free and open source software (OSS) is available for modification or enhancement by anyone which means that they are free of cost and free to do with the software as you wish.

Research Methodology Used

This paper discusses the major issues and challenges in migrating to OSS from proprietary software. The paper reviewed both the technical and non-technical issues and challenges of the migration process to the OSS. The paper is based on theoretical and argumentative approach. There is no formal research methods used in this type of research; however, personal knowledge and literature review is presented. The technical challenges includes.

Technical Support

OSS provides freedom to copy and redistribute. The developer of OSS is user itself. In past few years, we have seen large growth of OSS but many IT experts are still hesitant to use these software due to fear of lack of technical support. There are OSS communities which provide on-call support but there SLA guarantees may not be there as required for such applications. Positive aspect is that an enterprise grade support is available on chargeable basis from third party providers for some of the OSS. Other factor of the technical infrastructure is the lack of application or software manuals and local languages up to date documentations. Learning and supporting OSS may require a greater training input than equivalent proprietary software[1]. Another factor is generating a reservoir of sufficiently and properly educated persons. People should be able to learn about IT and programming concepts. Specifically, people should be provided with the seed of knowledge and abilities required to extend and continue studies on their own. In fact, people are learning software development via pirated software. These software development environments demonstrate the effectiveness of every-day practical use by the free software community. The education system should include the teaching of the use of these software development environments instead of requiring or using commercial ones.

Usability and Compatibility

The usability of OSS is considered as one reason for this limited distribution. Usability is typically described in terms of five characteristics: learn ability, efficiency of use, memorability, error frequency and severity, and subjective satisfaction[2]. To understand the usability of current OSS the current software development process is needed to be examined. Usability is separate from the software utility and characteristics such as cost and reliability. In fact, many development tools and software applications such as editors and compilers do not appear to represent a major OSS usability problem. Sometimes the incompatibility and updates are painful in OSS and hence many times they are not preferred due to technical reason. In order to make adoption quick, the hardware/software compatibility check and POC should be performed before using the OSS[3].

Security

The introduction of the low cost communication technologies and the high speed Internet provides an incredible new opportunity of creating a true information society. However, this introduction raises several disbeliefs about the security of information systems. Developers of OSS are always concerned about security as the developers of proprietary

software projects. However, the development processes might be very different and cannot consider which is inherently more secure[4]. One of the threats of OSS adoption is perceived security risks. Experts believe risks and vulnerability of open and closed source are same. The benefit of open source software is that there are so many people working on it, the cycle time for closure of open source vulnerability is smaller. As the platform gains maturity, it also gains strength in terms of security and stability. Buying the enterprise support will help the closure of open source vulnerability by quicker turnaround of patches as well as information & awareness.

Integrity

Integrity and availability are the important and major aspects of information security. The integrity is more than just that information held in databases is correct. *e.g.* how can be known that the OSS not only does what it is supposed to do but also doesn't do what it is not supposed to do? An integrity of open source software can be defined as the ability of a software system to withstand attacks to its security. The open source software integrity is an element of software assurance. Whereas, software assurance means that the software functions as intended. The software assurance is regularly discussed in the context of guaranteeing and ensuring that the open source code itself is more secure via the repeatable application of secure development practices of open source software. However, although there has been appropriate focus and increased interesting on reducing open source software vulnerabilities via secure development practices, which represents only one aspect of open source software assurance. A process security is another key of consideration for software suppliers and customers. The process security is reference to the used processes to handle open source software components during their source obtaining, development and delivery, meanwhile a variety of possible attack vectors exist during the open source software lifecycle. A key problem in open source software systems is that although a software application at the beginning of execution may be verified or validate as authentic, during running, the flow of the execution can be redirected to externally injected malicious code using, *i.e.* buffer overflow exploit.

Migration

Migration is a key consideration for any system implementation, upgrade, or consolidation. It can be data migration or application migration. Automatic migration is preferred in case of data migration freeing up human resources from tedious tasks. Migration occurs for a variety of reasons, including server or storage equipment replacements, maintenance or upgrades, application migration, website consolidation and data centre relocation.

Migrating is a big challenge in case of OSS as there is lack of technical support and knowhow. Almost all public administrations have huge databases. Often this data is of critical importance and huge (financial) resources have been and are allocated to collect, organize, and maintain the data. Sometimes there is absence of data governance policies and organizational structure and neglecting to validate and redefine business rules. But migrating applications and data carries a great deal of risk. Thirty-eight percent of these projects exceed schedule and budget, and nearly half go over significantly. The problem: data migration is more complex than most people realize. Data migration teams often find that required data is unavailable and undocumented, has unknown formats and data quality issues, and resides in many more legacy systems than originally believed. Further, the data must often be transformed and normalized to meet requirements of the target system. These issues frequently lead to bad data in the target application and overall project slips

Management and Maintenance

As OSS is becoming ever more important and widespread, thus its management and maintenance are becoming important issues as well. Generally, the software management

and maintenance are resource and time consuming and ongoing processes. Error and bugs detection and correction are the main duties in the software management and maintenance. The best way is to perform and finish these duties while the software development process and before the software release. Hence, finding software parts where testing efforts must be concentrated can help project managers and software engineers, in restructuring, inspecting and testing efforts towards these critical software parts. As a result, the software resources can be used more efficiently by the developers to deliver higher quality software products in a timely manner, due to the fact that applying equal verification and testing effort to all software system parts has become cost-prohibitive.

Legal Issues

There are different kinds of licenses for OSS to meet the requirements of different customers ranging from private users to commercial software providers. Reading the OSS license agreements and understanding its various norms are important in order to have a clear policy articulated for an organization. Recognized open source licenses have well defined conditions for the code contribution to any other development of the software or for code incorporation into other packages.

CONCLUSION

The philosophy of OSS is to be an alternatives approach for proprietary software and traditional software engineering processes. The research in OSS area is growing and governments over the world are trying to free their software products from the dominance of large software companies and external governments' policies. However, more investigations are needed to study the quality of each approach end product, and overcome the issues and challenges of OSS. The paper has presented an overview of the issues and challenges to migrate to free and open source software (OSS) and suggested some important criteria for assessing migration challenges. Despite these technical challenges to migrate to OSS, the impact of free open source is expected to be quite noticeable in the software technology and community as a whole. OSS supports novel development models, which have already been demonstrated to be especially well suited to efficiently take advantage of the work of developers spread across world. In generally, it has a very positive impact as an enabler for the creation of new markets and business opportunities.

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Marketing Strategies for Virtual Resources in Electronic Commerce

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ABSTRACT

In virtual business world, real world constraints of operating within a single integrated, strategic orientation and the complexity and challenges associated with realising and alternative strategic orientation can be addressed. A virtual business model can provide customers and market relevant strategic interaction as the firm moves through transition to build a new, cohesive culture to support collaboration between organizations and its customers. The marketing phenomenon's that facilitate and encourage people pass along a marketing message voluntarily a promotional method that is of customers, by customers, and for customers. It is virtually impossible to create a web network marketing program that is guaranteed to go viral.

This paper deals with the use of strategic marketing planning for developing and sustaining competitive advantages in virtual retailing. The notion of value creation in electronic marketing, the strategies for competitive advantages and positioning and retailing mix is then developed. The implementation of the marketing planning process and the development and execution of marketing plans can help virtual retailers to sustain their competitive advantages.

Virtual community is a tool that can increase that chance of success in the marketing and distribution of products. This work thoroughly examines one of the phenomena that is reaping the most success on the internet. Marketing programs are developed for the selected strategy. Program objectives refer to specific objectives will be accomplished through tactical action programs. Program objectives and programs can be discussed together.

Virtual retailers, competitive advantages, web marketing program, virtual business model, and virtual community.

INTRODUCTION

Strategic orientation of the firm have been described as competing cultural alignments based around production, technology, entrepreneurship, and customers. Each orientation delivers competitive advantages grounded. A customer orientation places strategic emphasis on creating superior customer value through meeting the needs of purposively defined customer segments.

The ultimate goal of marketers interested in creating successful viral marketing programs is to create message that appeals to individuals with high social networking potential that have a high probability of being presented and spread by these individuals and their competitors in their communication with others in short period of time. Viral marketing describes any strategy that encourages individuals to pass on a marketing message to others creating the potential for exponential growth in the message exposure and influence. Viral advertising refers to marketing strategies that use pre-existing social networks to produce increase in brand awareness through self replicating viral processes analogous to the spread of pathological and computer viruses. Viral marketing as a technique that uses pre-existing social networks to produce exponential increase in awareness. Basically, it is marketing that appears to work much the same as cold virus spreading from person to person explosively.

It has been argued that in a business world the shortcomings of aligning an organization around one strategic orientation and the timeframe complexity and

challenges associated with achieving a desired orientation can be addressed. Information technology developments enable retailers in particular to focus their marketing efforts on managing their customers are more effectively argue that appropriate marketing objective to integrate "destination" and web traffic control sites into a coordination plan designed to achieve generation of initial visits and secure repeat visits. The paper examines the role of strategies along with an electronic commerce context playing particular attention to the discussion of strategies for competitive advantages and positioning in retailing as well as the concept of the virtual retailing mix. It presents step by step process for the development of virtual retailers marketing plan.

In the modern corporate environment, dramatic changes occur in information technology and its business applications. The socio demographic composition of markets has significantly changed and consumers' behaviour is not same. All these changes along with increased uncertainty lead inevitably to price, redefinition of market boundaries and compressed product life cycles for competing companies. The general consequences of all these trends is that strategic planning helps modern companies to successfully confront the business and compete in the market. The essence of strategic planning lies with considerations of current alternative strategic decisions, given possible threats and communities.

STRATEGIC MARKETING PLANNING

In the modern corporate environment, dramatic changes occur in information technology and its business applications. Consumers' behavior is not the same as before. In addition, new forms of competition emerge. All these changes, along with increased uncertainty, lead in the modern corporate environment, dramatic changes occur in information technology and its business applications. The socio-demographic composition of markets has significantly changed, and inevitably to price/cost reductions, redefinition of market boundaries and compressed product life cycles for competing companies. The general consequence of all these trends is that strategic planning helps modern companies to successfully confront the business environment's dramatic changes and compete in the market. Strategic planning is a systematic process which includes: the evaluation of the company's nature, the definition of its basic long-term objectives, the identification of quantified objectives, the development of appropriate strategies for the satisfaction of the objectives, and the necessary resource allocation in order to implement the strategies. The essence of strategic planning lies with the consideration of current alternative strategic decisions, given possible threats and opportunities.

VALUE CREATION IN ELECTRONIC MARKETING

Value is the basic motive for the generation of exchange processes. However, sellers compete for buyers, especially in cases in which a buyer has multiple choices of similar products from different sellers. In such instances, the buyer selects the product which offers the greatest value. In the opposite case of various products offering the same value, the buyer and the seller can implicate themselves in some form of negotiation process, or the exchange will materialize between the buyer and that seller who offers the product at the lowest price than those of the competitors.

- **The Marketing Plan for Virtual Business:** A typical marketing plan for a virtual retailer includes the ten sections outlined. Of course, different retailers can adapt differentiated versions of this outline according to the nature of their business and their overall strategic orientation.
- **Creating a virtual business world:** In a virtual business world, multiple agents can act as individual orientations and be assigned the ability to understand the competencies of other agents in order to efficiently manage knowledge and task distribution internal and external to the organization. The model to be developed here

is defined as virtual as it contains agents that represent, and behave as, orientations that do not exist in the real world of the case institution.

- **Strategic orientations of customer, segments and markets:** Several different conceptualizations of customer orientation as a strategic orientation is evident in the management and marketing literatures (i.e. market orientation, customer orientation and customer focus) which exhibit specific differences in resource investment and in the generation and delivery of client organization value. Consistent with both customer orientation (CO) and a customer focus (CF), market orientation (MO) places high priority on the delivery of customer value. But, the extent and nature of delivered value emerging from each of these orientations will be very different as a consequence of differences in the innovation and relationship management systems, decision making criteria, market engagement activities and locations for information collection, dissemination and action under each orientation. For example, the locus of innovation for an organization operating under a customer focus strategy will reside in each specific customer relationship. In contrast, from a customer orientation perspective the locus of innovation will be the customer groups strategically targeted by an organization.

- **Meeting the challenges in information systems management:** Many of today's information technology systems are unable to successfully or efficiently integrate data from a number of heterogeneous sources. The amount of stored information is continually growing, often becoming invisible through nonintegrated databases or file sources exhibiting different formats and interfaces. Initial attempts to integrate data sources required all data be controlled by a single administrative domain and to conform to a single schema. Recently proposed solutions include Data spaces, ontology-based integration and distributed sensor networks.

PROPOSED HYPOTHESIS

In a new approach marketing planning process will be at the Business and product level and these steps are outlined in the process below:

Business Level Establishing the Business Mission, Undertaking a Marketing Audit, Formulating a SWOT Analysis, Generation and evaluation of strategic alternatives, Setting Marketing objectives.

Product Level Developing core strategy, outlining marketing mix decisions.

MARKETING LIMITATIONS

Evaluation of these project results provide lessons learned when considering future marketing of clinical services. In the first project where radio advertisements, newspaper print advertisement, and face to face marketing were use to target patients for clinical services, no patients enrolled in clinical services.

- **Positioning Strategy and the Virtual Retailing Mix:** Given that strategy means the sum of all company's actions through which it seeks sustainable competitive advantages, then marketing strategy of a virtual retailer incorporates the following instrumental elements
- The groups of consumers that the retailer should target
- The other virtual retailers to compete against
- The basis on which to compete against competitors for the same customer targets

CONCLUSION

The viral catch depends on a high pass rate from person to person. If a large percentage of recipients forward something to a large number of people, the overall growth balloons very quickly but if the pass along numbers gets too low, the overall growth quickly fizzles. Its vital component is encouraging individuals to pass on marketing message to others, creating the potential for exponential growth in the messages exposure and influence. Like viruses it takes advantages of rapid multiplication to explode the message

to thousands and even millions. International marketing will increase the portfolio for expansion of business. Future trends on marketing strategy influenced by the total range of the product, pricing level, production facility, technological change and competitor behavior. Finally, strategy will be customized based on the customer situation of that particular business scenario. Need of a good marketing strategy for the success of a product is based on uninterrupted review & augmentation of business & marketing strategies. Moreover, the identification of best customers, capability to overcome on strong competitors, potential of elimination of commoditization, importance of product range are important parameters to drive towards a vision of organization.

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Role of Library Professionals in Today's Globalized Era

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ABSTRACT

The transition of traditional library collections to digital or virtual collections presented the librarian with new opportunities. The Internet, Web environment and associated sophisticated tools have given the librarian a new dynamic role to play and serve the new information based society in better ways than hitherto. Because of the powerful features of Web i.e. distributed, heterogeneous, collaborative, multimedia, multi-protocol, hypermedia-oriented architecture, World Wide Web has revolutionized the way people access information, and has opened up new possibilities in areas such as digital libraries, virtual libraries, scientific information retrieval and dissemination. Not only the world is becoming interconnected, but also the use of Internet and Web has changed the fundamental roles, paradigms, and organizational culture of libraries and librarians as well. The role of librarian in Internet and Web environment especially as intermediary, facilitator, end-user trainer, Web site builder, researcher, interface designer, knowledge manager and sifter of information.

Keywords: *Role of Library Professional, Internet, E-learning, ICT, Hybrid library, Virtual library, Digital library.*

INTRODUCTION

Information technology has transformed the whole world into a global community, which is increasingly depending on the creative management and distribution of information. Over the past decades the world has been experiencing significant changes in which the need to acquire, utilize and share knowledge has become increasingly essential. Now, in the 21st century, the age of knowledge and information is in its higher gear. This is an age when invisible knowledge and information take the role of prime movers leading all sector. Creative brains become leaders of economy and knowledge workers are in great demand.

PROBLEMS AND OPPORTUNITIES FOR LIBRARIAN IN INDIA

Library and information services are fundamental to the goals of creating, disseminating, optimally utilizing and preserving knowledge. They are instrumental in transforming an unequal society into an egalitarian, progressive knowledge-based society. It is well known that in India most of the libraries function in the government sector. These are in academic and research institutions and under the public library system, which is again under the state and central governments. At present, education being a state subject and coming under the purview of different apex agencies, there is no common direction or coordination among them. It is imperative that all libraries (public, academic, research and special) change gear and develop at an accelerated pace. Developments in information communication technology (ICT) have enabled libraries to provide access to all, and also bridge the gap between the local, the national and the global. Yet the Library and Information Services sector in India has not kept pace with the paradigmatic changes taking place in society. There are a few libraries which are using state of art technologies to disseminate knowledge to their respective user community. There is lack of cooperation among the libraries of different organizations and which cause the lack of union catalogues at national level. The national library failed even to do this immense task. One of the major problems faced by Library and Information Services sector in India is lack of bibliographic control at national level which causes duplication in research. A considerable number of libraries had not been developed bibliographic databases of their documents for putting them on network.

THE CURRENT TRENDS

Library is a huge storehouse of information. Emergence of Internet and Communication Technology libraries has been acquiring different approaches of the same and mode of service is changed. Therefore, different types of libraries have born in society, such as:

- **Hybrid library:** The hybrid library is a term used to describe libraries containing a mix of traditional print library resources and the growing number of electronic resources. Hybrid libraries are mixes of printed books and magazines, as well as electronic materials such as downloadable audio books, electronic journals, e-books, etc. Hybrid libraries are the new norm in most public and academic liberties.
- **Automated library:** A library where access points and housekeeping operations are computerized is called an automated library. The graphic records are still print-on-paper publication.
- **Digital library:** A library in which, a significant proportion of the resources are available in machine-readable format, accessible by means of computer. The digital content may be locally held or accessed remotely via computer networks.
  According to Wiederhold "A digital library is popularly viewed as an electronic version of a library where storage is in digital form, allowing direct communication to obtain material and copying it from a master version."
- **Virtual library:** The access point as well as the graphic records are in electronic/digital form when these electronic/digital libraries are connected via various networks, particularly the INTERNET, this is called virtual library. A "library without walls" in which the collections do not exist on paper, microform, or other tangible form at a physical location but are electronically accessible in digital format via computer networks. Such libraries exist only on a very limited scale.

REQUIRED SKILL FOR LIBRARY PROFESSIONALS

The electronic environment of the 21st century will demand a range of skills from by Library professionals, including…

- Technical skills.
- Information Technology (IT) skills.
- Managerial skill.

According to National Knowledge Commission, India, skills required fulfilling the changing role of libraries are:

- Library and information handling skills.
- Service orientation.
- ICT knowledge skills.
- Communication and training skills.
- Marketing and presentation skills.
- Understanding of cultural diversity.

CHALLENGING ROLE OF LIBRARIAN IN E-LEARNING

Role of Libraries in learning itself is established and beyond question, it hence follows that the supportive role in an enhanced form is also applicable in E-learning systems. Infact in this present online and distributed versatile, student creation learning environment, librarians have greater roles to play. Librarians with their experience of handling content in diverse ways make available shareable learning resources to the faculty and even among the visit tuitions.

In response to importance of library and information professionals in E-learning we may observe the positions like, "E-librarian", "Cybrarian", "Web Librarian", "E-learning Information service officer", "learning object librarians", "E-learning content manager", "Information manager" and so on.

CHANGES FACING LIBRARY PROFESSIONALS

This is an era of change brought about by the introduction of informational technologies. "Library professionals have come a long way from the time when they were considered caretakers of the book collection. Now they are information providers, consultants, curriculum activists, instructional designers, instructional leaders, production specialists and most important, teachers". Some agents of change are closely interrelated such as economic, employment, technological, and instructional trends. Economic trends impact employment. Employment trends in turn impact technology. Employment and technology trends likewise, have a serious impact on education and instruction. The economic trends that have brought changes to the role of the library professionals include reduced budgets at a time of increased costs for both resources and personnel.

There are many technological trends that impact the job of the library professionals. The automation of the library, the use of CD-ROM's and the Internet has dramatically changed the role of the library professionals, making their job more demanding.

The use of technology has placed increased demand on library professionals' time to teach information technology, to learn new technologies, to troubleshoot, and to learn which Internet resources can assist students and teachers. Technology has brought many changes to education in the past ten years and technological literacy is listed as one of the goals of the Common Essential Leanings, which is a component of the Core Curriculum. The goals of technological literacy are the following:

- To develop a contemporary view of technology
- To develop understanding that technology both shapes and is shaped by society
- To develop students' appreciation of the value and limitations of technology within society
- To provide opportunities for students' active involvement in decision-making related to technological developments (Sask. Ed., 1992).
- To contribute to development of "strong sense" critical and creative thinkers
- To develop an understanding of how knowledge is created, evaluated, refined and changed within subject areas.
- To promote both intuitive, imaginative thought and the ability to evaluate ideas, processes, experiences and objects in meaningful contexts.
- To enable students to think for themselves, to recognize the limits of individual reflection and the need to contribute to and build upon mutual understandings (Sask. Ed., 1992).
- To support the development of a positive disposition to life long-learning
- To develop students' abilities to meet their own learning needs
- To develop students' abilities to access knowledge (Sask. Ed., 1992).

SOURCES FOR PROFESSIONAL COMPETENCIES DEVELOPMENT

Library Professionals have a wide range of channels and ways to develop their professional competencies and manage changing technologies effectively. The important methods/ways for improving professional competences are:
- Acquiring formal qualifications
- Pursuing doctoral research
- Distance and E-learning courses
- Reading professional literature
- Tours and visits to well managed libraries
- Affiliation to professional bodies
- Attending professionals meetings.

Conferences and Seminars
- Presenting papers in conferences and seminars
- Writing papers in periodicals and books

- Participation in specialist groups
- Personal interactions with expert fellow.

Professionals
- Attending workplace programs
- Attending Induction Programs
- Attending staff training and development courses
- Undertaking research and development projects.
- Web resources.

FUTURE OF LIBRARY PROFESSIONALS

Information Technology is rapidly changing the whole world, creating new challenges and opportunities. Library professionals have to face many complex challenges, make use of the technological opportunities and respond to all these changes positively. LIS professionals with latest technological competencis are in great demand. They have great opportunities and bright career prospects as long as they improve their professional and technological competencies and grab them. Otherwise, it becomes even difficult to survive in the modern libraries. Those professionals that anticipate and embrace change constructively, creatively and intelligently will be the ones, who are most likely to survive, prosper, develop and succeed rather than decline and suffer in the future. LIS professionals need vision for modern professional skills and technological competencies in order to have bright future in the 21st Century.

CONCLUSION

Library and information professionals should add new ICT skills to their current capabilities in order to help users overcoming their anxieties about the new world of networked and digitized information, and assist them to navigate through it. For which training is indispensable to bestow the professionals with the skills, knowledge and confidence to use ICT effectively in their day-today work, and to the benefit of their clientele. Above all, making library staff competent locally and globally necessitates greater 'investment in staff' for raising their level of technology skills and preventing skills obsolescence. The libraries all over the world are now responding with adaptability, creativity and flexibility. Indian librarians of today serve in a society which is actually in flux, torn by the technological revolution and rapid political changes. Librarians and information professionals in India are now experiencing both excitement and anxiety as a result of the sweeping societal changes. In preparing the future librarians of India, in making them more proactive, the library and information science departments of different universities can definitely play a significant role.

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Internationalization and Curriculum Development Programmes of Library and Information Science Education

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ABSTRACT

Library and Information Science curriculum is a major and important component of LIS education. The studies on LIS curriculum are carried out all over the world to examine the LIS curricula from different perspectives of LIS education. Many more aspects are directly effected the LIS curriculum such as technology advancement, easy technology adoption, changing market requirements, and manpower needs. There are many more studies related to various important aspects of LIS curricula such as Development of LIS Education and its Multidisciplinary Nature, Internationalization of LIS Curricula, Curriculum Development Programs and LIS Collaboration published all over the world, but some limited studies on these issues are presented in this paper.
Keywords: *LIS Education, Curricula, Curriculum Development, Digital Era and LIS Programmes.*

INTRODUCTION

Library and Information Science attained the status of a scientific field and emerged as one of the professional subject involving information service to society. It has developed theories, philosophical basis, methodologies and assumptions. LIS education underwent enormous changes due to social, economic, and technological progress in the 21st century. Information Technology has made substantial impact on Library and Information Science education. The advent of Internet and information communication technologies stepped up flows of electronic information and practice of library services in digital era. "Today it has entered into the era of 'virtual library' using digital technology. In the process, these contemporary changes were incorporated into the educational curriculum and course content. The LIS professional has a greater role to play in content management in the IT environment." (Asundi and Karisiddappa, 2004). "LIS Schools in India are seriously affected by insufficient infrastructure, inadequate faculty, lack of quality research and information support. The course contents by and large are also not reflecting anything of the emerging employment opportunities in the diversity of areas. Whereas, the core curriculum continues to stick to classification, cataloguing, indexing, and vocabulary control, the emerging themes, such as information literacy, knowledge management, e-learning, ICT applications, use of networks in teaching, and teaching about networks have not been adequately integrated in the curricula" (Singh & Wijetunge, 2006).

Training of library personnel in particular are at a turning point, library education require to be oriented towards a rapidly changing society. Today professional education of library personnel towards achievement of the highest wisdom in promoting utilization of modern techniques and knowledge to educate students becoming accomplished practitioners. "The LIS schools in India must bear a still heavier responsibility to provide high quality and relevant education. Library schools would benefit from a system of regular contacts with employers and the users of library and information services. Guidance from this quarter would help library schools to design their programmes in a more logical and pragmatic manner" (Mangla, 1998: 292). "Keeping in mind the CDC (2001) recommendations and the CILIP Accreditation Instrument, the wide range of skills and expertise needed for efficient provision of information and effective management of library and information services, requires equivalent changes in the

educational course content. LIS curricula have taken these challenges into consideration and revised their course structures thus competing with the demands for manpower from the contemporary information society. The majority of universities switched over to a two year integrated Masters degree in Library and Information Science and adopted the suggested curricular programmes in total or with little modifications to suit local needs and demands" (Varalakshmi, 2006: 338-346).

Review of literature helps to identify the recognized findings on selected research areas. Some of the deserved and relevant literature which is covering all aspects of the study has been mentioned as under:

DEVELOPMENT OF LIS EDUCATION

The rapid proliferation in LIS departments has caused reversals in the quality of education. Many believe that it is best to replace the existing one year master's courses, with a graduate course lasting two to three years designed so as to provide its graduates with better opportunities on the job market (Agrawal, 1996). Sturges (1999) believes that LIS education has been shifting from a formally collection-dominated profession to a content-based tendency with the following emphases: 1) accessing and filtering content; 2) [re]intermediation between the user and technology; 3) negotiating ethical and regulatory difficulties; 4) designing user-oriented services; 5) managing knowledge resources; and 6) creating value-added information packages. According to Stoker (2000), after revisiting issues about LIS education (*e.g.,* the core curriculum, and theory versus practice), raised two more issues. One is the relationship between librarianship, information management and knowledge management while the other is about the changing student body in the UK. In Stoker's view, LIS education can no longer be delivered in a single slice. Rather it should be a continuing process. This is a theoretical discussion without actual collection and analysis of curricular data. As per the Hallmark study of KALIPER (2000) The KALIPER Report (2000) has been identified as the second most significant study, next to the Williamson Reports, that has covered the wide landscape of LIS education in the United States. The study, conducted over a 2-year span, evaluated the markets, situation of 31 leading LIS schools of North America, change dynamics, and the curricula of these schools. The Report identified the forces that sought changes in LIS curricula (Rehman,2007). Some of the factors identified the demands of students, employers, graduates, and professional associations for graduate competencies; growth and expense of supporting emerging technology; internal campus relationships and positioning; availability and/or presence of faculty with new subject expertise; competition from other LIS programs; and availability of financial support for innovation. The KALIPER Report (2000) has identified six trends in LIS education that have been extensively cited, reviewed, and debated in the literature. These are as follows:

- Addressing broad-based information environments and information problems in curricula;
- Emerging with a distinct core that is predominantly user-centered;
- Increasing the infusion of information technology into their curricula;
- Experimenting with specialization within the curriculum;
- Offering instruction in diverse formats; and
- Expanding curricula by offering related degrees at the undergraduate,master's, and doctoral levels.

MULTIDISCIPLINARY NATURE OF LIS EDUCATION

The terms "interdisciplinary and multidisciplinary and notes that most interdisciplinary activities are not "interdisciplinary" but "multidisciplinary." She characterizes "multidisciplinarity" as the juxtaposition of disciplines, essentially additive, not integrative. "Interdisciplinarity" to her is the integration of material from various disciplines into a new coherent entity. Klein notes in her discussion of the

"multidisciplinary/inter- disciplinary" distinction, most people who refer to interdisciplinary activities are really speaking of multidisciplinary activities" (Klein, Julie Thompson, 1990). Smith, Linda C.(1994) used the indicators in her study are sufficiently relevant to the concept of multidisciplinarity (other disciplines being additive, not integrative), that we consider her results on interdisciplinarity to be relevant to this study of multidisciplinary in LIS education programs.

LIS as a multidisciplinary field has become pervasive and there is little discussion in the literature as to whether it is appropriate but rather on how it may be necessary to expand the multidisciplinary aspects of the field for LIS education to survive. The KALIPER Report in 2000 characterized the multidisciplinary character of LIS education as a natural result of LIS faculty conducting research with or hiring faculty from cognate fields and offering joint programs or courses with faculty from other departments. The report further states that "Faculties are growing increasingly multidisciplinary, especially through joint appointments . . ." and notes that this trend has a significant impact on curriculum development (Weech, Terry L. and Pluzhenskaia, Marina, 2005).

INTERNATIONALIZATION OF LIS CURRICULA

An international dimension was added to the curriculum that helped students develop some international competencies without leaving the country. This first stage of the internationalization was purely domestic and can be referred to as "internationalization at home" (Knight, 2003). Agada, Johan and Hough, Brenda (2005) reported that the LIS curriculum need be repositioned in the global context for the following three reasons: Information is now recognised as the driving force in contemporary society; global information policy regimes on core LIS issues are being designed largely by non LIS experts, and emerging information regimes threaten to undermine LIS core values in international information exchanges. The authors suggested that students create projects such as the Emporia-Nigeria Project as a case study of international exchange of information. According to Higgins, S. E. (2006) that international component in schools of library and information science as an indicator of such consciousness because assumptions of universality in the LIS curriculum may be inaccurate. Because there is a growing need for professionals who are knowledgeable and concerned about the social and policy issues across the globalized society, internationalization has a place on the LIS curricula. Librarians who have the appropriate commitment, values and attitude to be information intermediaries acknowledge that their role can extend to helping individuals and social groups around the world participate and flourish in the emerging digital environment. Clearly, the issues of globalization occur within the context of an information society and libraries within highly developed nations as well as libraries within underdeveloped nations reflect the political meanings of technology and culture.

"Two-year Master's program offered by Royal School of LIS is also available as an international course taught in English. The international postgraduate program was offered for the first time in 2005. The program emphasizes the theories, principles, methods and practical applications of information science and comprises three general modules and one special subject module. Each module is of one semester's duration, corresponding to 30 ECTS (European Credit Transfer System credit points). The four modules on offer are: Information Seeking and Information Retrieval Theories, Knowledge Organization, Knowledge Management and Special subject module (thesis work, individual thematic focus). Degree seeking students must complete the three subject-specific modules and prepare a thesis in the context of the special subject module. The international Master's program is also available as a study abroad opportunity for exchange students from RSLIS partner institutions. The course tends to attract a mix of Danish and foreign students with quite a few course participants being immigrants or persons with a non-Danish nationality living in Denmark. It is important that course organizers at the hosting academic institution and those teaching seminars and modules

within an international program are aware of the peculiar academic and cultural resources and potentials possessed by international students. These personal knowledge resources and insights should be fully exploited in classroom settings and allowed to enrich teaching and learning activities. Thus, teaching and seminar sessions should be organized and approached so as to encourage international students to present and reflect on upon issues and problem areas, etc., that relate to practices, developments, states of affairs, priorities and viewpoints in students' home countries. Whenever relevant, international course participants should be encouraged to provide input and contribute views on library purpose and philosophy, library systems, library and information services, information technology and challenges, LIS professional matters and historical developments in the field, etc. Critical analysis of the concept of comparative librarianship in a contemporary perspective should help clarify its practical applications to teaching and learning in the context of international degree programs" (Abdullahi, 2008).

There are "similarities, difference and common problems of LIS education in SAARC countries and European countries where Bologna Process has been accepted. If the Bologna Process is accepted for LIS education the mobility of students from one country to another country within SAARC countries would be possible. The Bologna Process of LIS education would lead to the internationalization. It compels the universities and institutions among SAARC countries to maintain quality in LIS education. The acceptance of Bologna Process for LIS education in SAARC countries would enhance its worldwide attraction and competitions. This would result in the employability of the graduates more than the present" (Baradol, 2009). Kajberg, Leif (2009) describe one possible reason for the postulated decline of interest in comparative librarianship could be the redefining of library school programs, curricular revision efforts and the shift in priorities that have taken place within library education during the last two, three decades or so. Library studies and librarianship pure have been downgraded in LIS school contexts and recent years have seen the emergence and rise of other subjects such as IT, information systems, business information resources, knowledge management, digitization, information architecture, planning, media and formats and retrieval. In other words, curricular "mainstreaming" trends within our discipline and in our academic institutions during recent years have quietly pushed comparative librarianship to the sidelines. This development is distinct not least in British LIS schools. As a result, library history, international librarianship, librarianship abroad, etc. have become declining course areas and they tend to receive less priority in curricula, lower number of lessons, etc.The new era of IT and the incredible growth in the use of social networking tools on the Internet along with the increased interest in the international dimension of higher education could bring a new perspective to comparative librarianship. In determining the relevance and suitability of comparative studies to contemporary LIS education, attention should be focused on the aspects of cross-country analysis of LIS-specific issues and phenomena and the implications and requirements of "the international LIS classroom". Hence, there is a need for examining and discussing the applicability of comparative analysis as an analytical tool and a research methodology to cross-country and cross-cultural analysis of library systems, library architecture, library and information infrastructures, information provision developments, LIS education as well as "professional ideology" and developments. Comparative studies can be undertaken at the national and regional level, across continents and even from a global perspective. These trends were identified through content analysis methodology applied to conference presentations given in Tokyo in 2003 and 2004 by pre-selected invited experts from China, Korea, Singapore, Taiwan, and Thailand, as part of the LIPER project. The project with the acronym LIPER (the Library and Information Professions and Education Renewal) addressed the history, current situation, and future prospects of LIS educational delivery systems and curricula in Japan. The invited LIS experts from

five Asian countries were requested to focus on LIS education in their respective country and explore four major issues in their presentations:

- the current state of LIS education,
- qualification systems for librarianship,
- recent changes in curricula and employment markets for certified librarians, and
- co-operation and credit exchanges with other universities, *etc.* in nearby countries. Content analysis techniques were then applied to the transcribed material.

CURRICULUM DEVELOPMENT PROGRAMS

The curriculum development approaches in terms of three dimensions: procedural - steps to follow in planning curricula; descriptive - how curricula are actually planned; and conceptual - elements of curriculum planning and interrelationship of concepts (Posner, 1988). The Curriculum Development Programmes designed only to address today's operational problems become obsolete and useless. We need to restore the theoretical base unique to library science and, combined with flexibly structured programmes and a strong framework, create courses which permit the insertion of the "made to measure" element of current social and technological demands. As society recognizes the importance of the librarian, let us design a curriculum that responds to society's requirements and attention on the curriculum and through this reflects on several aspects related to librarianship as a discipline, and the different approaches which have been part of it in the past, present and perhaps even in the future (Morals, Estela 1995).

The Association for Library and Information Science Education (ALISE) published in 2000 a report on LIS education in the information age (ALISE, 2000). It has identified six trends that were shaping curricula change in LIS programs, among them the emergence of user-centered courses and the increasing investment and infusion of information technology into Curriculum. The user-centered course objective is to enable libraries and information centres to take into account the user paradigm in their services. Information technology underlies all aspects of the Curriculum and recommended that LIS programs should bear the responsibility for keeping their students on the cutting edge of existing and new technologies as they become available. ALISE recommended the creation of laboratories in LIS programs to enable students to gain facility in learning a variety of software applications, online searching, Web design, integrated media production, creation of database applications, computer-supported collaboration, and usability testing. It appears through these recommendations that LIS programs must focus on information technology, especially computers. They have to set a working and learning environment to enable students to get basic computer and web technology skills, including web searching and design. Schools must also enable students to work with digital documents to create knowledge resource in multiple formats, describe, store, search and disseminate them. It also means that students must have knowledge in documents formats handling (image, text or video), and structuring respective to data description or creation standards as SGML, XML, DTD, MARC, Dublin Core. LIS programs must give opportunities to their students to design web sites with new technology especially with a variety of software applications available.

LIS COLLABORATION

Watkins and Biggs (1996) described the Western tradition that favors individual work over collaboration. The question again is; how can we design a curriculum that is morinclusive, that enhances collaboration and that values and accommodate diverse learnersin our schools. As indicated, LIS education, now more than ever needs culturally mediated instruction in order to educate future library and information professionals who are responsive to the needs of their diverse communities and who are able to be change agents to their institutions and professions. Lin (2004) studied that need for cooperation between LIS education programs has been highlighted by various studies. He reviewed

the opportunities and challenges of such cooperation in East Asia. She highlighted the importance of discussion groups and other channels in promoting collaboration and cooperation between educational institutions in different regions. Khoo, Singh, and Chaudhry (2006) suggested that such collaborative efforts might be more successful when focused on specific areas and on specific projects. With this background in view, this paper describes a number of projects that have been undertaken in the Southeast Asian Region to facilitate cooperation and collaboration between information studies education programs. Virkus, Sirje (2007) described the collaboration in library and information science education in Europe. International collaboration has had an important influence on these developments and started further discussions on recognition of qualifications, quality assurance and innovation of curricula. Several stages of internationalization can be identified: internationalization at home; training of trainers; mobility, networking and involvement in collaborative projects, and joint curricula development. The identification of new learning needs and client expectations has led to the development of new programs and courses as well as new concepts of curricula. The development of the new English language joint master programme has been an important recent initiative. International collaboration has helped to prepare our students for professional activities in a global environment, cope with limited resources, rapid technological developments and increased calls for quality assurance.

CONCLUSION

IFLA guidelines (2000) and ALA standards (2008) for LIS educational programs also acknowledge the employers' right to know whether a given program is of good standing. They recommend the involvement of employers in planning and evaluation of program goals/objectives and curriculum. They also recommend their participation in governance of the programs. According to Champeny, (2006) examined significant differences in concepts such as "information" and "knowledge", their conceptual relationships to each other, and their proper places in library science, as different library science curricula are products of different social, economic and political realities. Suggestions are presented for developing a curriculum that both integrates understandings from the international library community and is appropriate to local circumstances.

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