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Modern Trends in User Centric Design (UCD) of Library Services and Applications

Special Issue

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Dr V.J. Suseela and Dr. V. Uma

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About Special Issue

"Modern Trends in User Centric Design (UCD) of Library Services and Applications"

Libraries as repositories of knowledge, information and resources need to be associated with structuring of information systems, services, spaces and objects for their users to retrieve his information. The library is the channel for connecting 'the user' to information sources. Based on the concept, several user services have been created by the libraries over the period such as books lending, cataloguing, document delivery, interlibrary loan, photocopy of articles, referral, and reference etc. in addition to creation of documentation services or procuring secondary services like - Abstracts & Indexes of Journal articles, bibliographic, current awareness as well SDI bulletins etc. from external scientific agencies. The ultimate objective of the libraries and information centres is always to design and redesign the library services considering user needs from time to time. The international standards developed by ISO for Human-centred design for interactive systems also formed the basis for many User Centric Design methodologies for libraries and information centers.

The 'user' is the dynamic component that enforces the design of library services, organization and collection of information as well as learning resources. Several managerial strategies, operations, applications and the best practices are being evolved in view of the ever changing user requirements and also efforts are put to explore new methodologies to know the user needs. The emphasis on User Centric Library (UCD) models and services is becoming more in the digital era with the increase of information, resources and transformation of physical format of information, mode of dissemination through speedy telecommunication channels and especially due to advanced ICT applications in libraries and information centres irrespective of their type.

The prime theme of special issue - 'User-centric design (UCD) of library services, practices, models and applications" to elicit some best practices, experiences, explorations and thoughts to add to the knowledge in this direction to enhance the quality of library resources and services and also to evaluate them in terms of user needs. Thus the user studies, user information or user research and methodologies play vital role in the cyclic process of UCD.

This issue is special as the topic is hot with real issues that librarians need to be aware and tackle the information issues of users for which the librarian himself need to be information literate with latest updates. The present issue is thus focusing on the user needs and also means/ways of applying 'user centric design' concepts to the development of library systems as well as the services. The application of strategic management principles for moulding library environments more user friendly was dealt supplemented by some case studies based on results of surveys in different organizations. The studies attempted to explore the level of users' awareness of ICT advancements and availability of e-resources (including even Urdu language studies); those have been spreading in almost all campuses in the country since more than two decades. There were attempts to assess the use of Internet, e-resources and to elicit information about the user's expressions/preferences on resources, physical library buildings, requirements and impediments in accessing resources in the transformation of libraries in electronic/digital era.

The primary emphasis was however laid on the academic institutions, but it has not exempted corporate environment. The libraries and information centres have been depending on tools to locate, access and share information. In this context, studies on search engines as the most important means of retrieving information through web sources and their latest developments as per user's requirements; the web 2.0 tools to facilitate user interaction as well as feedback and the document

delivery tools for sharing information was analyzed. Since libraries are service organizations, they should be made customer driven (user) by adapting ICT environment in campuses and libraries by implementing library automation, acquisition of e-resources and employing web based tools etc. emphasizing the need to update/evaluate the tools, services in the light of changing users requirements from time to time.

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About Papers

The papers of the special issue has covered topics on UCD along with case studies pertaining to user services

1. **User Centric Design of Library Systems and Services in the Changing IT Era: An Overview -**Defines the User Centric Library System (UCLS) and explains the need for user centric library systems and services (UCLSSs). The paper explains that the Internet and web technologies have come handy in design and delivery of the user centric library systems and services in the changing technological era. It emphasizes that all the library operations and services are largely user centric professional commitments and responsibility of librarians, whereas, some of them pertain to the professionally warranted functions for accountability of the jobs held by the librarians. The core of the library operations and services, either explicitly or implicitly are user centric and their foundations are built on Dr S R Ranganathan's Five Laws of Library Science. Information Technology is aiding the libraries in maintaining contact with the users in diverse ways and to maintain collaborative sharing of knowledge or information. The paper concludes that, there is a need for the LIS professionals to shift their philosophy from the 'Library Centered' approach to the 'Learner or User Centered' approach, to make the libraries relevant with the changing times.

2. **Strategic Management in Academic Libraries: With Reference to Users perspective -** The arrival of internet technology and the explosive growth of electronic content available on the web made the services of the academic libraries uncertain and creating challenges in rendering users services as per their requirements. This article attempts to provide a strategy for academic libraries applying principles and practices of strategic management highlighting the Ansoff matrix (model) in order to face the impediments coming in the way of providing better services to their users.

3. **Search Engines for Information Retrieval and Scholarly Communication -** The Interconnection of world through the use of Internet and Search Engines has changed the profession of Librarianship. The paper describes the Search Engine Architecture, Working Process, Information Retrieval Features, Scholarly Communication and different types of search engines and its usefulness in the field of Science, Arts, Social Sciences, Engineering, Medical, Legal, and general aspects. Search engines such as, Scirus, Infomine, Refseek, TechXtra, PubMed, Catalaw, Google, Bing, Yahoo, are presented in a tabular form. Search Engines are very important for retrieving information and scholarly communication in achieving the academic excellence as per the changing needs of users in Higher Education. Search engines create an environment whereby scholars and researchers can easily share, publish their research findings and be able to locate and also retrieve the required information. Thus, SEs are useful to the wider academic community that prepares academicians to face challenges in Higher Education.

4. **Paradigm Shift in Library Usage: Evidence Based on Corporate Library Users Survey -** The paradigm shift in the information seeking behavior of the corporate library users has created new value added market service to the library. Since majority of the software professionals are under work pressure they are not able to be present in the library so the library services should go to

his/her place on time. This paper discusses on the user expectations of future corporate libraries, preferred place to access on-line resources, hindrance to access library resources, sharing of information and librarian's focus areas, in the future.

5. **Collection Centric to User Centric Academic Library Spaces: Building Requirements of Net Generation Users -** This paper intends to examine the needs of the net generation users regarding library spaces. In the light of the data collected from 81 users from University of Hyderabad and Maulana Azad National Urdu University. There is a tendency of the users to spend more time on the web. Libraries are looked up on as learning spaces for collaborative and networked learning. The future of libraries lies in providing a platform to the users where they can converse, collaborate and share the information. Hence, library buildings in the 21st century are moving away from traditional collection-centric to user-centric service rich libraries.

6. ***Use of Library and Internet resources by Urdu Faculty, Research Scholars and P.G. Students in University Libraries of Andhra Pradesh State –*** the paper assess the availability and use of library and web resources by Urdu faculty, research scholars and P.G. students in select university libraries of erstwhile Andhra Pradesh. The findings of the study revealed that there are scanty Urdu resources available online and also there is lack of knowledge among scholars about the use of web resources. To utilize the Urdu web resources to its maximum, it is necessary to build awareness among the research scholars and train them in browsing internet as well as searching information on the internet and using resources. This can be done by conducting user orientation/awareness program.

7. **Web 2.0 Tools in Enhancing the Best Practices of Users Services in Academic Libraries: A Comparative Study in Central University Libraries in Assam State -** The web 2.0 tools are becoming more popular among avid users of this modern era as they are fast and effective tools for disseminating information. Use of these tools in a library will fascinate the users and disseminate information in a more attractive and agreeable medium. This paper is aimed at presenting the awareness and rate of knowledge in the central universities in Assam State on Web 2.0 applications among LIS professionals.

8. **Use of Document Deliver Services through J-Gate@UGC-INFONET: A Case Study of IGM Library, University of Hyderabad:** The University Library & Information Centers are playing a prominent role in procurement, organization, preservation of resources and providing access to the research scholars. These centers are the basic source of information for present and future generations. This paper explains the importance of Inter Librarian Loan facility in University Libraries and also discusses about J-Gate@UGC-INFONET (http://jgateplus.com). Finally it analysis the document supply service of IGM Library, University of Hyderabad.

9. **UCD Approach for the Management of User Services in University Libraries** This paper discusses User Centric Design (UCD) standards, processes in the light of user oriented services in academic Institutions. It discusses traditional methods of user services in libraries and shift to modern user centric services by which users are able access all types of resources online and can even interact with the librarian with regard to any services. The changes of automation, e-publishing and publishers way of delivering online resources with added value services like e-mail alerts, RSS feeds etc. have forced librarians to concentrate on library users while planning services and to transform the libraries in academic institutions from document centric to User Centric.

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User Centric Design of Library Systems and Services in the Changing IT Era: An Overview

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This article belongs to the ***Special Issue "Modern Trends in User Centric Design (UCD) of Library Services and Applications"***

Abstract Defines the User Centric Library System (UCLS) and explains the need for user centric library systems and services (UCLSSs). Argues that the design of user centric library systems are basically meant for providing quality services to the users and for their empowerment, and also for sustenance of libraries. States that the embedded librarianship and user centric libraries have some similarities in terms of librarians and users working in teams to design and develop various services and products that will better suit the users requirements. The paper explains that the Internet and Web technologies have come handy in design and delivery of the user centric library systems and services in the changing technological era. It emphasizes that all the library operations and services are largely user centric professional commitments and responsibility of librarians, whereas, some of them pertain to the professionally warranted functions for accountability of the jobs held by the librarians. The core of the library operations and services, either explicitly or implicitly are user centric and their foundations are built on Dr S.R. Ranganathan's Five Laws of Library Science. Information Technology is aiding the libraries in maintaining contact with the users in diverse ways and to maintain collaborative sharing of knowledge or information. The paper concludes that, there is a need for the LIS professionals to shift their philosophy from the 'Library Centered' approach to the 'Learner or User Centered' approach, to make the libraries relevant with the changing times.

Keywords *Library Services-Five Laws of Library Science; IT Enabled Library Services; User Centric Library Systems; Web Based Library Services*

1. Introduction

Library is the trinity of users, collections and staff, and users constitute the most important component of all the three. The primary objective of a library is to provide either documents or information needed by its users. That is, to provide right information to the right reader at the right time in a right usable form.

This explicitly or implicitly indicates that 'User' is the crucial most constituent of all types of libraries, and without users the existence of libraries cannot be thought of. Further, all the library operations and services are designed and executed, aiming at the users and in fulfilling their information needs. That is, 'putting the knowledge for use'. Therefore, naturally, the user centric design of libraries and library systems becomes imperative and essential for all kinds of libraries, whether academic, public or special. The quality of libraries or the quality of library systems and services are dependent on how well they are centered on users.

Librarians have two basic obligations to fulfill. They are: 1. Professional and Social responsibility, and 2) Professional accountability. All the library processes, activities, files, records, services and products, naturally fall in to one of the above two categories, i.e., professional responsibility or professional accountability. While, the first one is aimed at fulfilling the library users' needs and requirements, the second one is aimed at maintaining and managing the records and files as a means of accountability to the authorities and funding agencies, who provide finances or budget for running the libraries. However, the library services of all types of libraries are planned and designed focusing around the library users. Of course, some services are in direct contact with the users and felt easily by the users, whereas, some others performed behind the screen in libraries are not perceived directly by the users.

Libraries have been providing user oriented or user centric services right from their beginnings, as their very purpose is to meet the information needs of users in their respective fields of activities. Further, the user centric libraries require undertaking of two important activities which are a priori to user centric libraries. They are: 1. Identification of user needs, their information seeking behavior, and 2.User orientation, and offering Information Literacy (IL) to optimally make use of the resources, services and products of the libraries.

2. Objectives & Methods

The purpose of the present paper is to sensitize and create understanding on the librarians and information professionals who have been participating in the design and development of library systems that are aimed at users and performing all the library activities and services around the users keeping them in the central place as the essential component, to achieve the objectives of the library. It is further aimed at bringing to the knowledge of the library and information professionals that the acquisition policies, collection/resource building, library services & products are to be designed and developed keeping in view of the users of library, their information seeking behavior and information needs. Analytical and Descriptive methods are followed for this study in presenting an overview of the User Centric library design and development.

3. User Centric Libraries- Meaning/Definition

The phrase "user-centric," is synonymous for "User-centered" or "user-focused". The libraries planned/ designed around meeting the users' information needs/requirements at their best are generally considered as the 'User centric libraries'. Libraries being the social institutions and the society or people around the library (public library) constitute its users. Hence, the library has the responsibility to meet the users' information requirements. It is equally also in case of academic and special libraries, whose users are the members of the organization/institution in which the library is located. Although, user-centered design is widely supported in theory, but in practice, its conceptualization and implementation differ widely. Human Computer Interaction (HCI) specialist John Karath remarked that the phrase "user-centered design" has no agreed-up on definition. The meaning of user-centered design is extraordinarily diverse, and depends greatly on the discipline, back-ground, and research interests of its proponents.

Wikipedia defines user Centered design as “a process in which the needs, wants, and limitations of end users of a product are given extensive attention at each stage of the design process”. Further, the user centered design process includes the phases or components such as, user requirement analysis; conceptual design; design and implementation; usability evaluation, launch and maintenance. The user centered design is presented below in a graphical way.

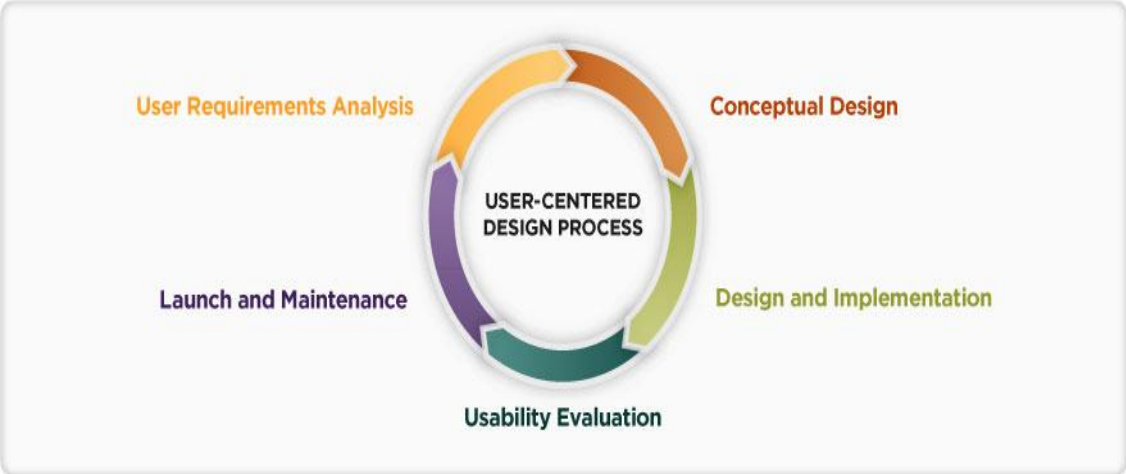

Figure 1: *User-centred Design Process*
(Source: http://usability.msu.edu/)

Therefore, for a user centric design of library systems, it is a priori and essential to find out the users requirements, their use attitude, behavior, use pattern and their satisfaction with the information products and services of the libraries. And once a design is made, it needs to be tested or evaluated to find out whether it is meeting the expected objectives and satisfaction of the users, and based on the feedback, redesign of the library system can be planned to make it effective.

A similar definition for User centric design is offered by a software company, Apple Inc., as ‘When you stay focused on your users throughout the design process, you have the best chance of delivering a product that meets their needs. After you determine who your target audience is and what, precisely, your app helps them do, it works well to use that knowledge as a tool to shape every design decision”. The Guidelines offered by the Apple Inc., for a user centric design are precisely:

1. Know your audience / user;
2. Analyze user tasks;
3. Build Prototypes;
4. Do Testing, and Focus on Solutions, not Features.

This definition equally suits to libraries also.

The embedded librarianship and user centric libraries have some similarities in terms of librarians working in teams with users and collaborating with each other for better and effective design and provision of information services and products. As partners with the library users, such as, faculty, researchers and students in academic libraries, or scientists or researchers in scientific and technical libraries, library services and instructional programmes that are needed can be designed and offered to the user community.

A. Advantages of User Centric Libraries

Since libraries are established with the basic purpose of serving the information needs of the users, they have to naturally function keeping the users as the central or focal point and to perform all their activities and services around them. The quality libraries and library services are none other than those that meet the information requirements of their users with highest level of satisfaction. Thus, delivering better and quality services is possible only when they are user centric. The justification for the budgets spent, the resources and infrastructure procured by the libraries is possible only when they meet the user' requirements. The user' interests and the interests of libraries have to go together in planning and designing of all the library policies, practices as well as services.

Dr. Ranganathan (2006) states that user is the 'king and queen of the library'. Similarly, various service oriented organizations, such as banks, consider customer as their God, and hence treat the customer is utmost important. Therefore, services of organizations are primarily aimed at satisfying the customer. The library collaborative (re)design approach focus beyond "library centric" thinking that only advances librarians' points of view on "what is the best for users". Whereas, Learner-centered and highly interactive, collaborative design is both a philosophy and a process in which the needs, wants and limitations of end users play a central role at each stage of the design process. (Somerville and Collins, 2008).

4. Review of Literature

A brief review of the literature on user centric libraries is presented below. Morris (1994), states that the concept of user-centered library services is considered as an antidote to a systems-centered approach. The author emphasizes that there is a need for a theoretical and conceptual underpinning to guide the development of a user-centered service. Morris also states that Dervin and others have provided some insights into the nature of information and information seeking that can serve as a conceptual base for understanding how our thinking has to change in order to develop user-centered services. This study suggests how an altered understanding of information can provide the basis for rethinking and potentially redesigning the library's mission, the provision of traditional services, the design of systems, and the measurement of services. Concepts from psychology are suggested as a tool for increasing the understanding of how to design user-centered services.

According to Schulze (2001), the information professionals largely agree that user-centered design contributes to high quality information systems. However, there is no general agreement about how to define the term "user-centered design," or how best to implement user-centered design strategies in the development of systems and services. Schulze proposes that a general definition of user centered design drawn from the literature of Human-Computer Interaction (HCI) could serve as a basic framework for information system design and support interdisciplinary work and also describes some useful methods of implementing this framework in the development of user-centered information systems.

Williams (2002), states that "our (library) product is the user". We did not start our planning with how service will be delivered. We started with how service will be experienced by the user. That drives everything library's user centric service links library effectiveness to how patrons rate their visit; brings backroom staff on to the floor to maximize the personal touch, promotes the multisensory learning environment'.

Arora (2008) explains that Library 2.0 encompasses a range of new and contemporary technological tools and techniques that are used for evolving collaborative environment required for Library 2.0 and in keeping the users well connected with the libraries as well as designing user centric information

systems. These tools and techniques are broadly grouped into five categories, i.e. i) Synchronous Communication: Instant messaging; ii) Content Delivery: RSS Feed, HTML Feed, Streaming Media, Podcasting, Vodcasting and SMS Enquiry Services; iii) Collaborative Publishing Tools: Blogs and Wikis; iv) Collaborative Service Platforms: Social Networks, Tagging, Social Bookmarking Services; and v) Hybrid Applications, Programs and Programming Tools: Mashups, AJAX, API and Toolbar. These tools and techniques are useful for libraries in providing new services and making existing services available in new and interesting ways. Implementation of some of these tools and techniques are likely to improve reputation and standing of libraries in the community. Some of them may successfully attract new patrons to the library, others may help to retain existing members or make libraries even more important as centres of the culture and history of their cities and academic institutions.

Somerville and Collins (2008) state that 'Information commons' were introduced into libraries in the early 1990s. Now universities are building 'library learning commons' and 'campus learning spaces'. The authors present a participatory library (re)design approach for collaborative planning "for and with" faculty teachers, student learners, and campus stakeholders. Collaborative design (co-design) employs user-centric investigations to produce products, applications, and environments aimed at advancing learning, sustaining communication, and building relationships. Examples from California Polytechnic State University and San Jose´ State University in California, USA, suggest the efficacy of this inclusive, learner-centered (re)design approach for library facilities, services, and systems. Inviting and enabling user input from the beginning, offers a fruitful planning approach in which campus librarians, stakeholders, and beneficiaries "learn their way" to appropriate library (re)design decisions. Also, user involvement in information gathering and interpretation activities initiates the interactive relationships necessary for continuous improvement. Collaborative design (co-design) yields sustained interaction with user beneficiaries and campus stakeholders. It changes how library staff members think and what they think about, concurrent with enhancing libraries' appeal and value.

Dahibhate, Patil, Dhawle and Mugde (2009) states that the primary role of the library and library professionals is to acquire the needed quality information resources that suits to the needs of the users. There is a need to provide user based or user centric services to satisfy the user requirements. The authors discuss about the user-based services and also the skills required for managing such libraries. They conclude that the technology can be used to provide more effective user centric services including induction to users, training with multimedia applications and also provide teaching and learning support to users, self-ordering documents, electronic publication, remote log in, FAQ services, etc.

Pianos (2010), states that virtual libraries try to combine traditional library services with new document types and services. The first generation of virtual libraries mostly tried to offer services based on a library-centric view of information retrieval systems. New virtual libraries try to concentrate on user's needs, but this is often easier said than done. Restrictions like copyright laws, technical limitations and the like often make it difficult to meet user requirements. A number of studies documented these needs: easy-to-use, comprehensive yet focused search, and easy access to print and online documents, subject specific, yet not too restricted to specific areas.

Bowler, et al. (2011) surveyed the landscape of user-centered design in LIS. They explored the history of the "user-centered paradigm," looking first at the historical schism between behavioral science and computer science, and then surveying some of the methods of user-centered design. Present examples of technological artifacts that reflect the basic functions of information systems—artifacts designed to collect, organize, and retrieve information—as a way to present some of the difficulties and opportunities that surround the creations of user-centered design. Specifically, it deals with how user-centered design relates to personal collections, social bookmarking, finding aids, Web interface design, information architecture, visualization systems, and personalization and adaptive search. The article then steps back

and looks at design through the wider lens of values, asking the question, how are users represented (or misrepresented) through cultural, ethical, and political forces that influence information system design? Concludes with a summary of the major issues of current state of user-centered design and from this extracts some key lessons vis-à-vis research and teaching in LIS.

Swain and Swain (2012) State that with the proliferation of ICTs, the traditional library services have been considerably renovated, redesigned and refurnished in a way that the users no longer have to rely on consultation of physical documents at a certain place and time. Presently, the library services and services are extensively made user-centric using the technologies such as, Web 2.0, Lib 2.0, etc.

Bhatti and Hanif (2013) in their study on the faculty members of social science observed that the successful library services depend mainly on satisfaction level of its users with the relevant library collection, user-centric library services and library staffs' supportive attitude. Their study was based on survey method using questionnaire. It aimed at studying the types of material used for meeting academic and research needs, purposes of seeking information, respondent's satisfaction with library services, satisfaction with library collection, journals subscription, preferred format of information, problems faced during information search, satisfaction with the attitude of the library and opening hours of library. They made some recommendations to improve library usage frequency and satisfaction by the users.

Mazzocchi (2014) states that Blogs are among the first Web 2.0 tools that libraries have used to communicate with their users. In recent years, however, they seem to have lost their role in favour of other tools such as social networks, especially Facebook. This article analyses the downward trend that library blogs (especially academic library blogs) are experiencing in relation to the explosion of social networks. The relationship between blogs and social networks as library's communication tools is also analysed.

Eke, Omekwu and Odoh (2014) observe that Social networking sites are fast becoming very popular means of both interpersonal and public communication in Nigeria. Social networking sites are modern interactive communication channels through which people connect to one another, share ideas, experiences, pictures, messages and information of interest.

5. Five Laws of Library Science and User Centricity

Dr S R Ranganathan's '*Five Laws of Library Science'* -- the Bible and guiding spirit of libraries, emphasizes on user and the need for user centric design and development of libraries. All the Five Laws of Library Science, either explicitly or implicitly reveal the importance of users and user centric services. Let us re-look into the Five Laws as to how they focus on users and user centric libraries. The First Law 'Books are for use' (**by the readers/users of the library**). That is, all library resources and document collections are acquired keeping in view that they are required by the readers and hence can be put for use, but not for mere preservation or showcasing. Ranganathan states that "existence of books is justified only by the extent to which the library books are used by readers. Library is a collection of books kept for use". The Second Law 'Every Reader his/her book' in other words "Books for all". The approach and emphasis is from the side of the users of libraries. It is stated in other words as, 'Education for all', irrespective of men or women, urban or rural people, children or adults, normal or abnormal people. That is, every user visiting the library or every member of the library should find his or her required book(s) in the library. This requires that the libraries conduct user surveys/user studies regularly to find their information requirements and to acquire the collections or information resources according to the user requirements to fulfill the second law of library science, 'every reader his or her book'. The Third Law 'Every book it's Reader' emphasizes that every document contained in the library is just not for the purpose of preservation but it is aimed at its reader. Therefore, the document selection, and all the

methods and techniques of organization of document collections should support the user in finding the documents of their concern with ease and comfort. The Fourth Law 'Save the time of the User' necessitates the libraries have to organize all the collections/resources, services and products in such a way that the users find their information without any time delays and orienting them to find their information as quickly and as conveniently by saving their time, as users time saving is of crucial importance to organization and management of library operations and services. The Fourth Law is completely oriented around the users and in economizing the users' time. The Fifth Law 'Library is a growing organism' has bigger and comprehensive approach to library organization. Ranganathan states that growing organism shall only survive. The Fifth Law visualizes library as a living creature with growing users, library resources, infrastructures and library staff, etc. As time goes on, unlike other organizations libraries maintain direct interaction and collaboration with the users/customers of the organization. It can clearly be understood from the above that out of all the Five Laws, the first four Laws are directly emphasizing on the users/readers of libraries, whereas the Fifth Law inherently or implicitly speaks on users and various others such as library staff, resources, infrastructure and services so on.

6. Library Collection Building and User Centricity

The mission of libraries is to deliver effective and timely information to the users. This is also stated as 'right information to the right reader at the right time in a right usable form'. Libraries function with the graphic material and of course, in the present times with the digital/e-resources and databases. The acquisition policies and collection/resource building of the libraries are essentially to meet the present and the future needs of the users. Here, the First Law of Library Science 'Books are for Use' stands as guiding principle in collection building in libraries. Any document collection that is procured by libraries has to be in the user interest only and needs to be put to use. Therefore, the library acquisition policies are formulated and the collections are acquired and organized accordingly, keeping in view of the users' information needs. And for identifying the information needs of the users and information seeking behavior, libraries conduct user surveys regularly and obtain the feedback on the library services and products for their improvement.

7. IT Enabled Library Services and User Centricity

All the library services and methods of organizing resources are ultimately for aiding the users of the libraries. With the changing times and changing user needs, libraries have been inventing new services to meet the information requirements of the users. The traditional and predominant services of libraries were the lending service and reference service. These two services were the most sought after services even today. Of course, with the advent of digital resources, they are termed with different nomenclature, such as, Document Delivery Service and Virtual Reference Service. These library services are directly in contact with the users to share their ideas and information. Further, all the Library services are designed either on demand or in anticipation of the users' needs. In the present times, the ICT applications have come up as boon to the libraries in outreaching, interconnecting, and collaborating with the users in planning and design of library services and products.

The libraries with physical collections and spaces have been now under transformation into virtual libraries and one of the most important library services that maintain contact with the users, the Reference Service is being transformed into Virtual Reference Service. The users now can connect with the libraries, share their opinions, put their requests for information and receive the library services and information without physically visiting the libraries. The Internet and WWW have opened up new avenues of information sharing, communication and collaboration. The Web technologies have transformed the users as authors & publishers and offered new means of sharing of information and obtaining the responses and feedback from the users. Web 2.0 and Lib 2.0 technology have been

helping the libraries in the collaborative design of library systems. The Lib 2.0 is the new generation library or the modernized library capable of delivering the instant and effective information services and enables the users to interact and share the information or knowledge. (Arora, 2009).

Some of the IT enabled services that are helping the libraries in the present times, in developing contacts with the users and delivering instant information services to the users -- synchronously or asynchronously-- to share and collaborate with the libraries and to make libraries as more dynamic partners in information and knowledge sharing.

They are:

- Document Delivery Services (Digital / e-Resources)
- Sharing of Consortia based resources
- Online Database Search & Retrieval service
- E-Mail
- Blogs & Wikis
- Social Networks
- Teleconferences / Videoconferences/ Webinars
- BBS (Bulletin Board service) / Current Awareness Services
- OPACs
- Library Websites
- Discussion Forums (listserv)
- Virtual Reference Service, etc.

8. Conclusion

The library systems and services from the beginning have been designed around the users, with the basic objective of providing either documents or information needed by the users. The Bible of Library Science, the *Five Laws of Library Science* of Dr S R Ranganathan lays the utmost emphasis on users of libraries. ICTs, especially the web technologies have been playing a key role in libraries in reaching to the users where ever they are, and enabling collaboration between the libraries and their users. Library websites, e-mails and social media such as blogs, Face book, etc are the fastest growing tools in integrating the users and libraries, enabling collaboration between them. In the present times, the libraries have been radically impacted by the ICTs and resulting in the growth and development of digital/e-resources, digital libraries, Institutional repositories, automation & networking of libraries, distributed networks, consortia resources, open Access resources, databases, etc. All these changes/ developments in information resources, their organization, search and retrieval methods necessitates organizing Information Literacy and orientation programmes to users by the libraries so that the expanding e-resources and databases can better be explored and utilized by the users.

Library collection building and acquisition policies are generally formulated keeping in view of the users' information needs and information seeking behavior. For identifying the information needs of the users and their information seeking behavior, libraries have to conduct user surveys regularly and obtain the feedback on the existing library services and products for further enhancing their quality.

The ICTs have opened up new avenues of not only reaching the users and maintaining contact with them wherever they are located, but also helped in integrating the users with the libraries and allowing them to share and collaborate with the libraries to gain benefits from them. The library resources and services if found unutilized to the expected levels can be understood as the services and resources are

not planned in a user centric manner, which is detrimental to the very existence of the libraries, and would result in wastage of resources, finances and staff efforts made in organizing the libraries.

It is high time for the LIS professionals to shift their philosophy and approach from the 'Library Centered' to the 'Learner or User Centered' approach to make the libraries relevant with the current time, more visible, accessible and usable by applying Internet and Web Technologies. User centric design of libraries can only remain relevant with the changing times and the changing user needs.

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Strategic Management in Academic Libraries with Reference to Users Perspective

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This article belongs to the ***Special Issue "Modern Trends in User Centric Design (UCD) of Library Services and Applications"***

Abstract The rapid growth of digital technologies and electronic communications in academic libraries has dislocated the model of traditional library service, which was a long hold from the past century. The arrival of internet technology and the explosive growth of electronic content available on the web made the services of the academic libraries uncertain and creating challenges in rendering users services as per their requirements. This article attempts to provide a strategy for academic libraries applying principles and practices of strategic management highlighting the Ansoff matrix (model) in order to face the impediments coming in the way of providing better services to their users.

Keywords *Strategic Management; Strategic Library Planning; Environmental Scanning; Ansoff Model of Library Service*

1. Introduction

The strategic library management is one of the most important alternatives to make the future design and development of the library. The systematic planning of academic library is highly essential due to rapid advances of information technology in the current era. Most of the University and college libraries are sustaining both teaching and research in their academic periphery. Strategic planning is a cooperative endeavor with the active participation of administration, faculties, students and library staff. During strategic planning, the role of the librarian is very significant as he is an educator and leader in the process. The strategic plan developed should offer a pattern that incorporates major goals, policies and actions of the institution that constitutes the whole. It helps in the allocation of resources; capitalize on relative strengths and weakness with the environment, and allocation of resources to make a stronger support in the hub of teaching and research. This article describes brief marketing concepts and their applications that are helpful to make academic libraries more users prone.

2. Strategic Management

Strategic management is the process through which organizations analyse and learn from their internal and external environments, establish direction, create strategies that are intended to achieve established goals, and execute those strategies, all in an effort to satisfy key organizational constituencies, which are called stakeholders. The model is not rigid, but simply represents a useful sequence to discuss the concept of strategic management. For example, while the activities may occur in the order specified in the model, especially if a firm is engaging in strategic planning program, it may also be carried out in some other order of simultaneously as per the need.

Steiner (1979) defines the strategic management as “designing a desired future and identifying ways to bring it about involves ideas and actions that are directed to the long-term future of the organization". According to Chandler, the strategy is “the determination of the basic long-term goals and objectives of an enterprise and the adoption of courses of action and the allocation of resources necessary for carrying out those goals”.

A. Why Strategic Management in Libraries?

Strategic management empowers positive change by bringing together the diverse individuals, communities and information to advance research, education, and innovation in the academic library. It also advances the university’s attainment of academic excellence by bringing the world’s knowledge to faculty, students and research scholar at the professional, graduate, and undergraduate levels. Further, it strengthens all the academic community of a university or college’s in positive engagement and its transformation of local, national, and international arenas.

In the academic institutions, librarians are the inventive associates of the research and advanced studies. They collect, categorize, and archive information resources of relevant research for the purpose. They are managing these resources and provide quality services in order to meet the present and future needs of academic groups. They help to bridge the link among these groups and educate the whole community in the successful utilization of information. The academic community depends on the libraries when they need information.

B. Principles of Strategic Planning

The important principles of strategic planning are as follows while developing an academic library. It is very important to inquire exact query to originate exact alternative. The distinctive questions are as follows:

- How the library need to support the students in excellency
- How the library sustain different research needs including support in collaborative research of user in on or off campus.
- How the library can keep on encouraging and archiveing information over the campus to the extent of research needs and available grants.
- How to involve effectively in information technology applications of the parent organization in order to provide campus wide teaching and research support.
- How the library can support and strengthen the academic and research activity to campus users in an organization.

Today's complex and challenging environment requires the libraries to focus on mission and objectives of the organization and its willingness to experiment. Small changes may meet the university's short-term needs but they will be inadequate to sustain excellence on the long term needs.

3. Strategic Management for Academic Libraries

The role of the libraries as an essential partner of research, teaching and scholarly communication is significant in academic institutions. They provide access to world-wide resources within and beyond their collections, in all formats, as and when the user need. The physical spaces of the libraries will promote reflection, scholarly communication and intellectual exploration. The libraries will be an inventive pioneer for the whole academic group, especially when the corresponding frameworks are changed. An expert and flexible librarian as professional will interact with faculty, staff and students will be responsive to their needs of learning, research and teaching. As the academics progress toward its key objectives, it will take note that the libraries have assumed a major role in encouraging quality in teaching and scholarship interdisciplinary and information in the service society.

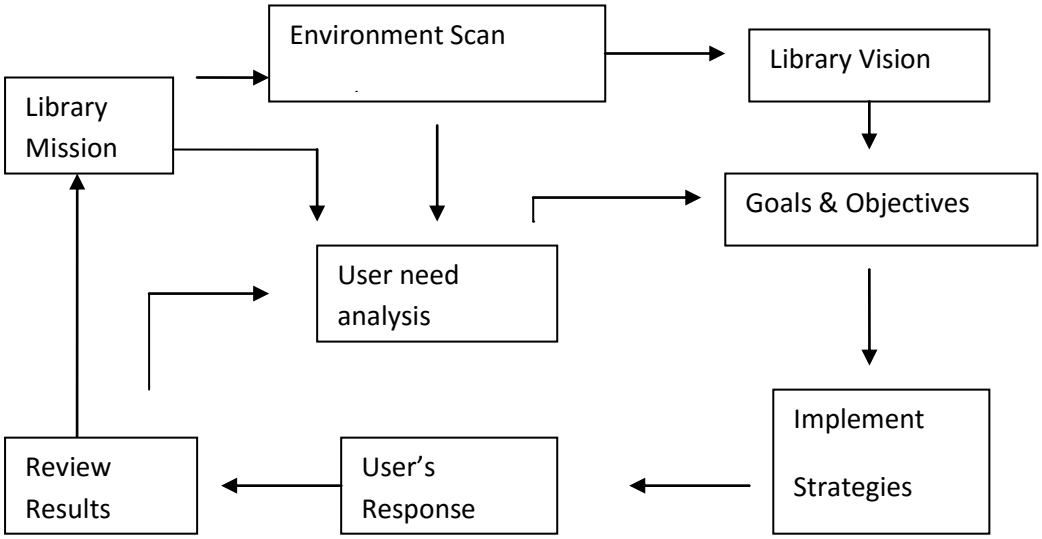

Figure 1: *Cycle of Strategic Library Planning*

A. Mission and Vision of Academic Library in Digital Era

The mission and vision of libraries in any academic system goes in line with the objectives of the concerned academic institutions. Academic libraries are the central point of dissemination of information services to the diverse groups of user, i.e. students, faculty and researchers to enhance their teaching, learning and research needs. Singh and Kaur (2009) stated that "preservation and access to knowledge and information is the main consent of academic libraries in addition to sustaining the mission of their parent. The academic libraries are playing supportive role to the university education give essential resources and services in the digital era". These facilitate the libraries to meet up the needs of their teaming users. Such resources range from print to non -print and electronic materials in line with what Yusuf and Iwu (2010), who emphasized that - "different patrons of academic libraries used different materials given by these libraries, i.e. reference materials, textbooks, journals, newspapers, past projects, electronic journals etc."

B. Environmental Scanning

Environmental scanning is the monitoring, evaluating and disseminating of information from the external and internal environment to key people within the corporation or organization (Kazmi, 2008). It is a process of gathering, analyzing all the information related with the opportunities and threats of the academic library. Further this process involves acquiring both accurate and subjective information on the business environments in which a library is working or considering to enter. Following are three modes by which an organization scans their environments.

- **Ad-hoc scanning:** - It is a short term scanning, where rare assessment usually initiated when a crisis happens in an organization. It scan the environment as a result of its affect, the company is able to recognize the problem which exists internal or external.

- **Regular scanning:** - In this mode, assessments are being carried once in a year with regular schedule. Most of the cognizant organizations believe that regular scanning should be done in regular basis and they used to perform such scanning every year.

- **Continuous scanning: -** It is a continuous scanning process, where an organization can perform assessment continuously.

C. SWOT Analysis

Strengths Weaknesses Opportunity and Threats (SWOT) are also known as SWOT analysis, is a tool for planning the academic library helps to find the key issues and problems that arise in the library environment. SWOT analysis a problem through internal and external analysis. In internal analysis, strengths and weaknesses are considered, whereas in external analysis, opportunity and threats are considered. The factors considered during internal analysis are –

- Library culture and image
- Organization structure of the library
- Organizational operational efficiency and capacity of library
- Brand awareness of library
- Financial resources of library
- Analysis of resource activities of the library

Each of these internal factors is considered as strengths and weakness of a library. Similar to internal analysis, various factors that need to be considered in external analysis are:

- Patrons of the library
- Competitors
- Recent trends of the library
- Vendors
- Members of the consortia
- Latest technology for library & information service
- Economic situation
- Political and legal restrictions

D. PEST Analysis

PEST stands for Political, economical, social and technological analysis helps the academic library to analyze the strategies to identify the environmental factors that highly affect the organization strategy. When analyzing the various factors effecting the strategy of any organization, it is also important to consider the changes occurring in these forces at work in the wider environment and identifying the environmental factors that are effecting an organization. However, this generates a large amount of information but of limited value, if it only lists the environmental influences. It is necessary to use quantitative approach also to identify the environmental factors. Consider as example of the library and information services in technical university. At the time of long term pressures the ability of the library to provide information service largely depends on the three crucial factors, they are –

- Increasing demand of information services for the users of certain categories
- Rapid development of information communication technology in library and information service
- Restriction imposed by the management and government on funding that leads to uncertain economic conditions under which academic libraries need to operate.

These are the key factors that influence the strategy for the library and information services of a university. Sometimes, librarians are pressed with day to day problems, library services and fail to address them, wherein the strategy facilitates short-term response rather than long-term development

E. Strategic Goals

Strategic management demonstrates its commitment to academic excellence through a strong service orientation and user focus. It serves the diversity of the community by providing access to a wide range of materials, by recruiting a skilled / well informed staff, by employing collaborative, strategic but risk-taking techniques and the environment that supports experimentation to meet strategic goals of the academic library. The following are some of the important goals of strategic management of academic libraries.

- It provides research and curates of whole library's artifact.
- Create active learning spaces that boost the academic research and learning objectives of any academic institutions.
- Dexterously and effectively connect with the academic community
- Implementation of latest methodologies and pedagogies in a variety of information services
- Expand revenue sources of the library through development and grant support

F. User Need Analysis

Understanding user needs is a vital part of information services and plays a critical role in the service industries. It is widely accepted that success of any service industries depends of the satisfaction of the user's needs and requirement. As service institutions like academic library, the term user need analysis can be defined as a formal procedure emphasizing on how a library attends to the needs of its users. This tool is not just developed for business process, but is considered most important analytical technique to provide better information service to the library user. This technique is widely used in many industries i.e., automobiles, consumer products, banking and software development. It highlights new opportunities in the current environment, find out user needs, identifies problems with existing services,

and encourages new technology. The bit of knowledge from user assessment leads to apply full thought for innovation.

Principles of Need Analysis

The user need analysis begins with a systematic understanding of the needs and requirement of the users, which benefits the organization to enhanced quality of work, increasing productivity, reducing supporting as well as training costs and improve the end user satisfaction. There are few principles mentioned hereunder –

- The Idea of end users is important to bring together a different, determined design group, and their assessment should rise above the wishes of your design group.
- Assessment of user needs is very important to bind together the end users thought, and to utilize quantitative research to locate the best way for service design.
- Appeal to the most minimized shared factor in end user needs. Promoting to the least ability levels results in the biggest potential innovation service.
- Do thorough beta tests of service over a long time to permit sufficient alterations before introducing item in the last assembling stage.
- Monitoring continuously user's feedback after the introduction of new service and report defects immediately and keep an exact record to apply to future releases.
- When the service designs are finished as a result of effective needs analysis, they should be put to the verification of service heads and peers.

G. Implementation of Strategy in Academic Library

Implementation of strategy in academic library is the analysis of selected strategy into organizational actions in order to accomplish strategic goals and objectives. Additionally, strategy implementation is characterized as the way in which an academic library should expand, use, and integrate the organizational structure, control systems, and culture to pursue strategies to lead competitive advantage and a better execution. Organizational structure allots exceptional creating tasks and roles to the employees and states how these can be connected so as to maximize the productivity, quality, and end user satisfaction and also to attain the competitive advantage.

The organizational structure alone is not adequate in itself to motivate the employees, but a control system is highly necessary for any sort of organization. This control system furnishes the managers the motivational impetuses of employees as well as feedback on employees in a hierarchical execution. Organizational culture refers to the particular accumulation of qualities, states of mind, standards and beliefs shared by individuals and groups hierarchy. The followings are some important process to implement strategy in academic libraries.

- **Strategy articulation** - consensus agreement of the strategic objectives to be achieved
- **Strategy communication** - engaging employees considering human behaviour or their psychology.
- **Strategy translation** - translating strategic goals into clear short-term operating goals
- **Strategy monitoring & controlling** - monitoring the progress and control the strategic goals till accomplished
- **Strategy engagement** - Keeping librarians engaged till achieving the goals

Well-structured strategies will be disrupted, if they are not properly executed. It is an important aspect to take a note that implementation of strategy in academic library will not be possible unless there is steadiness between strategy and all elements in whole organization i.e. allocation process, structure of reward, organizational structure etc.

4. Ansoff Model for Academic Library Services

Most of the library users expect variety, quality, and reliability in their services. The outcome of the market research leads to determine the needs and design services that fulfill the need of the users. Library services should be designed to meet general as well as the specific needs of the end users. To cite an illustration, many reference questions are posed each day in academic libraries, instead of answering the same questions again and again FAQ (frequently asked questions) can be included on the library website or a user guide can be issued to new users or user orientation can be conducted to groups of users according to their academic specifications. Such user friendly activities can be designed inside or outside of the library to make the academic library services more users centric.

As the marketing principles are applied to academic library services, it is very important to determine what services need to be best for end user of a library. The famous author BS Mathews (2009) defines the experience of the library as “a series of interactions with a range of end user. Our goals is to recognize and separate favorable times to engage end user by presenting various feature of the library”

The Ansoff (Matrix) model is a strategic planning tool that provides a framework to help business executives to devise strategies for future development of the organization. The tool and concept was developed by Igor Ansoff. He devised 4 alternative growth strategies in a table or matrix.

Table 1: *Ansoff Model*

	Current Service	New Service
Current Market	• Market Penetration • Advertising existing product • Service to existing user	• Service Development • Offer new service to existing user
New Market	• Market Development • Advertising existing product • Service to existing user	• Diversification • Offer new service to existing user

- **Market Penetration:** Development can be accomplished by persuading the present users to make more utilization of existing services. This is the easiest methodology because the users are library’s end users.
- M**arket Development**: Development can be possible with new market segments by matching existing services including libraries, e.g. enabling online renewals, mobile applications, receiving online recommendation for books, journals and other material and obtaining feedback of newly launched or on trial information products or tools. Further the development of library websites not only displays the information about the collection, services and also flash messages.
- **Service Development:** New innovation can be adopted and targeted to existing market segments. Market research can be utilized to establish what services will help a particular market segment. For example in academic libraries applying providing remote login facility for faculty and researchers, enabling users access to resources, various applications and databases through online public access catalogues.
- **Diversification:** New innovation can be made for new markets. This will be enhanced by reaching the library to new groups as well as put in innovative services. For academic library

users the current innovative practices like providing tools to discover or explore all the available resources in single search for quick and easy retrieval of information. Incorporation of web 2.0 applications in library websites facilitates the close interaction and feedback regarding the library services.

8. Conclusion

Strategic management in academic library is a very complex task. Due to the rapid growth of scholarly publications in electronic format and increasing complexities in the scholarly communications have tremendously transformed the role of the academic libraries in the present digital environment. Most of the libraries are facing great deal of uncertainty over this complexity. In the board outline, it is not difficult to envision. The challenge most of the libraries face today is complexity of scholar communication and the long term preservation of digital information. Furthermore, the main aim of the library is to provide right information to right user. To fulfill the objective in the complex environment, it is very necessary to deploy new techniques and technology. Strategic management is the accumulation of continuous activities and procedures that a library can use to systematically arrange and adjust resources and activities to mission, vision and technique throughout an organization. This helps an academic library to transform the static arrangement into a framework that gives key strategic performance advice to decision making and empowers the arrangement to advance and develop which prerequisites different circumstances to change.

In order to develop an effective initiation of strategic planning in the academic library, the above study suggests the need of library leadership to change and rejuvenate its management model, structure and systems. Further this paper describes the main responsibility of the library is to initiative various developments in the academic culture. An academic library should develop and distribute the strategic plan, resulting in user satisfaction and accomplishment of organizational objectives.

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Search Engines for User Centric Information Retrieval and Scholarly Communication

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This article belongs to the ***Special Issue "Modern Trends in User Centric Design (UCD) of Library Services and Applications"***

Abstract Search Engine (SE) is a software system that is designed to search for information on the World Wide Web. Search Engine helps users to find rapidly relevant information. Search Engines were established based on the traditional database and information retrieval methods and also many other algorithms have been added them to improve their search. The Interconnection of world through the use of Internet and Search Engines has changed the profession of Librarianship. The paper describes the Search Engine Architecture, Working Process, Information Retrieval Features, Scholarly Communication and different types of search engines and their usefulness in the field of Science, Arts, Social Sciences, Engineering, Medical, Legal other aspects. Search engines such as, Scirus, Infomine, Refseek, TechXtra, PubMed, Catalaw, Google, Bing, and Yahoo, are presented with their usefulness and the disciplines in which they are used. Search Engines are very important for retrieving information and scholarly communication in achieving academic excellence as per the changing needs of users in Higher Education. Search engines create an environment whereby scholars and researchers can easily share, publish their research findings and be able to locate and also retrieve the required information. Thus, the paper explains the usefulness of SEs to the wider academic community that prepares academicians to face challenges in Higher Education.

Keywords *Search Engines; Internet; Information Retrieval; World Wide Web*

1. Introduction

Searching for information on the World Wide Web (WWW) is much the same way that we look for information in a library, using an on-line catalog system. The difference and the advantage of WWW is that one can get information from all over the world, instead of from a single library collection. WWW allows people to share the information (data) from the largest database, globally. WWW plays a vital role

in the day to day lives as it contains and constantly adds information in huge quantities through various sources that lay tremendous impact on the dissemination and retrieval of information by scholars, information scientists and even by non-professionals in the society. Internet has become the largest and important network which connects billions of people all around the world. World Wide Web has been growing rapidly and attracting the librarians to access the web. The term ‘scholarly’ is referred in academic domain, especially in higher education, in the context of 'scholarly communication' to describe how research is communicated among peers and evaluated.

Search Engines are used as a quick and direct reference to get any type of information all over the world from World Wide Web. Librarian’s catalogue was the ultimate approach of users in searching information for their research before the web search engines took over. Search Engines have changed the way to find information as per the patron's needs, research requirements and connecting the library and resources with users and also beyond. Behind almost all online destinations whether it is a social network, or mobile phone or an online newspaper, individual blogs, or a database containing peer reviewed articles/chapters/data or bibliographic database, there is a search engine. There are many Search Engines available today, but retrieving relevant and meaningful information is very difficult. Perfect Search Engine is something that ‘understands exactly what you mean and gives you back exactly what you want’. Ever since the web based information and internet came into existence, the web search engines also have been getting prominence and evolving from time to time adding more and more search options, facilities, connections as well as results display features as per the advancements taking place in processing the information and dissemination to users. Initial search engines are primitive and they had rudimentary general search options. According to the search / research requirements of users and their search behaviour, the trend of developing the search engines from general search options to advanced search features came into existence. In this process various types of search engines are emerged to provide approach to reach different types, forms of information /sources covering almost all disciplines.

A. Statement of the Problem

The present study on ‘Search engines for information retrieval and scholarly communication’ has been undertaken to answer what is search engine, how search engine works, different types of search engines and their usefulness. Since any individual or researcher simply cannot exactly retrieve the required information or document among billions of pages/documents available on the web, they need the help of search engines to zoom in to a small number of pages worth looking it.

B. Objectives of the Study

The main objective of this study is to explore the working process of Search Engines in Scholarly Communication. The other objectives of the study are –

- To explore the genesis of search engines technology
- To find out the architecture and working process of search engines
- To find out the search features of select search engines
- To find out the usefulness of various types of search engines

C. Significance of the Study

There are many search engines (SEs) available today, but retrieving relevant and meaningful information is yet difficult. SEs, are the most important tools in locating the information, so it is essential to know how to use them effectively. There is no ‘perfect place’ or ‘all in one’ search engine to search

entire internet, because different search engines, will give different results. In this context, it is felt essential to study the useful features of search engines and their impact on libraries and library users.

D. Methodology

The study is based on an extensive review of literature available in documents, print journals, and online journals on internet, to investigate about the search engines technology its working process to retrieve information from the databases.

E. Limitations of the Study

Search Engines are available globally but the present study is confined to the search engines trends and technologies, working process of search-engines, search features of the search engines, usage of the select fifty (50) Search Engines. The definitions of significant terms are given below.

- **Search Engines:** A Search Engine is a program that searches documents on the Internet with specified keywords or characters and returns with a list of the websites, web documents, wherever the keywords are matched.
- **User Centered Design:** User Centered Design is a frame work of Processes in which the needs, wants and limitations of end users of a product, service or process are given extensive attention at each stage of the design process.
- **Internet:** It is a global network connecting millions of computers, networks.
- **Information Retrieval**: It is an activity of obtaining information against an information need from a source or multiple sources. It is a process of searching, and retrieving information from large amount of stored data.
- **World Wide Web**: It is a system of interlinked hypertext documents on the Internet, which can be accessed through a browser.
- **Scholarly Communication:** It is the process of publishing and sharing the research information, it involves creation, exchange and dissemination of information through search engines.

2. Review of Related Literature

Web search is now a major interdisciplinary area of study; studies on Web Search Engine crawling and retrieving have evolved as an important area of Web research since the mid-1990s. Researchers from different fields have proposed frame works for Search Engines research, taking different perspectives into account.

Bar-Ilan (2004) reveals that Information Science is divided into the two main sections. They are (1) Understanding the Web's structure and processes, and (2) understanding users' needs and behavior. Sufyan (2005) study dealt with web search quality and reveals that the quality of search depends on the search algorithm, indexing techniques used by the different Search Engines. It also revealed that the algorithm differs from Search Engine to Search Engine considerably. Hargittai (2007) stresses that research dealing with Search Engines' impact on society is largely missing, despite their central role in how people access information. However, little social science work has focused on the non-technical dimensions of Search Engine tools, the practices of the users who rely on them. Machill, Beiler and Zenker (2008) find "five topic fields considered to be central to future Search Engine research from an interdisciplinary perspective". These are 1) Search Engine policy and regulation, (2) Search Engine economics, (3) Search Engines and journalism, (4) Search Engine technology and quality, and (5) user behavior and competence. Ginsberg et al. (2009) research on Search Engines from technical developments to studies on Search Engine quality, from investigations on the social impact of Search

Engines approaches to using data from Search Engines to analytic approaches. Zimmer (2010) states that the areas deserve particular attention are: Search Engine bias, Search Engines as gatekeepers of information, values and ethics of Search Engines, framing the legal constrains and obligations. Purcell and others (2012) state that on the usage of web Search Engines from 2002 to 2012 by Americans shows a dramatic increase in the usage from 52% to 73%, the rate of increase is 21% and 91% of Americans find information when they use Search Engines. 73% of users find that Search Engines are accurate and trustworthy; overall view of Search Engine performance is very positive. Ding and Marchionini, (2013) finds that majority of students are unable to search web with efficiency, authors concluded that information literacy education is vital to teach students comprehensive web searching competency, which includes knowledge and techniques for both academic and daily-life search tasks. Egri and Bayrak (2014) states that 93% of internet traffic is managed by Search Engines, hence, exploring the potential of Search Engines is crucial, it shows the critical role of Search Engines on routing users to the right websites. The main focus was to measure the significance of time, speed, reduced bounce rate, page views, and page layout in keeping the user on the site.

3. Search Engine Architecture

Search engine gathers the contents of all web pages (using a program called crawler or spider); organize the contents of the pages in a way that allows efficient retrieval (indexing). It takes the query and determines which page matches the query and shows the results finally (ranking and displaying of results). The development of search engines enabling their complex operations according to the basic as well as the specific requirements of users is possible with a strategic application of user centered design process.

A. User Centered Design Process

User-Centered Design (UCD) is a process to design search engines software, web sites and products around the people who will use them. User-centered search engine design ensures that search engines are useful and usable.

Figure 1: *User Centered Design Process*
(Source: http://www.danygraig.com)

User centered design processes focus on typical users through the planning, analysis, design, implementation, deployment and development of a product. User centered design (UCD) process steps mainly are - know the users; analyze user tasks and goals, establish usability requirements; prototype on design ideas; usability test the concepts and repeat the process for user needs. User-centered search engine design brings the users need into consideration from the beginning of the search engine development. Efficient information retrieval, navigability and good typography, scholarly communication all contribute towards user-centered design. The search engine architecture model is presented below

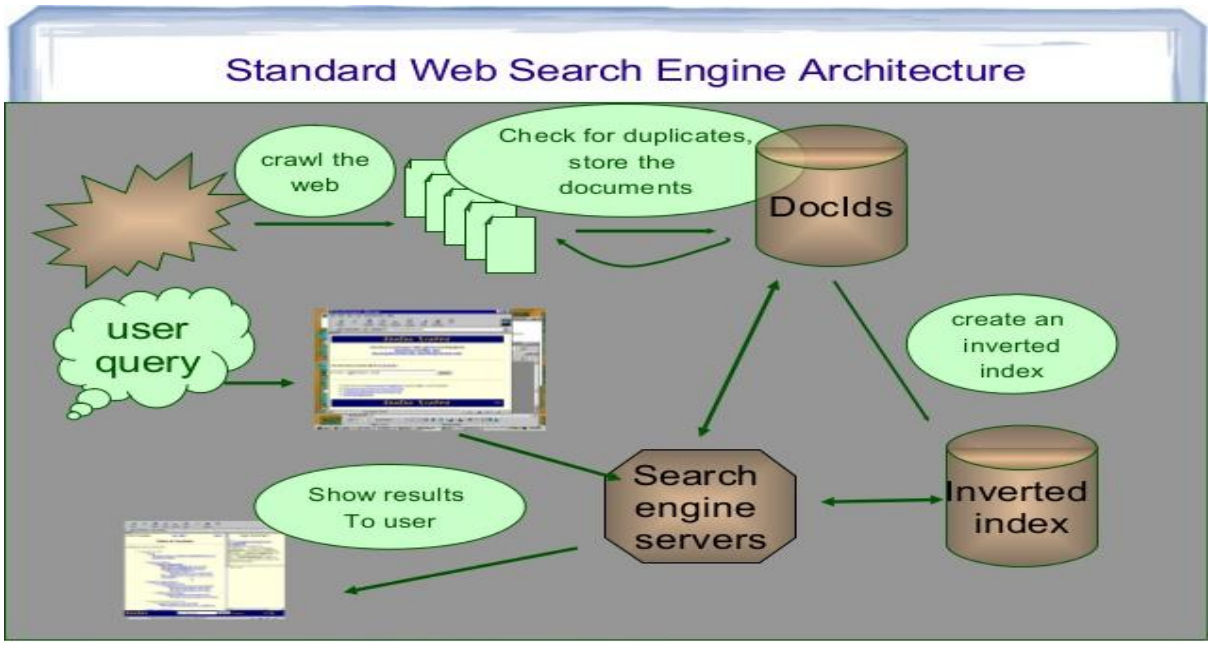

Figure 2: *Standard web Search Engine Architecture*
(Source: www.google.co.in/search?q=web+search+engine+architecture)

4. Working Process of Search Engines

Search Engines allow the user to enter keywords that are run against a database. Based on combination of criteria, Search Engine retrieves WWW documents from the database that match the keywords entered by the searcher. Search Engine works on the four main principles:

- Web crawling,
- Indexing web pages,
- Ranking the results, and
- Search and display the results.

For searching process, Search Engines, simultaneously adopts “Best match searching” as the default mode of operation with “Boolean Searching” as an alternative and advanced retrieval options. A single Search Engine cannot cover every available web resource, but may contain references to millions of resources and thus results may vary from one Search Engine to another.

5. Search Engines - Search Features

The important search features of search engines and the usefulness in search process is mentioned in the following table with examples.

Table 1: *Search Features of Search Engines*

Sl. No.	Search Feature	Description of Search Features	Example
e1	AND (+ plus sign)	Inclusion of Search Term.	Library AND Digital Library
2	OR	Result that contain at least one of the keyword.	Library OR Digital Library
3	NOT (- sign)	Result that contain one keyword but exclude the other keyword.	Library NOT Digital Library
4	Nesting ( ) Parentheses	Nesting utilizes parentheses to clarify relationships between search terms.	Using (India OR United States) AND Digital libraries
5	Proximity Searching	Proximity search is to search for two or more words that occur within a specified number of words (or fewer) of each other in the database.	Big Data Application retrieves records containing the three words immediately adjacent to one another and in the same order.
6	Phrase Search	Phrase Searching ensures that will retrieve search terms next to each other in the order user typed.	library science, “library science”
7	* Truncation.	Truncation expands a search term to include all forms of a root word,	patent* retrieves patent, patents, patented, etc.
9	File Format Search	Users can limit their search to any specific file format.	MicrosoftWord (.doc), (.pdf), (.xls), (.ppt), (.txt)
10	Site/Domain	Limit to domain search	.com / .gov / .edu / .org
11	Spelling Check	Mistake in spelling then system asks ‘did you mean this’.	LibrayScince Did you mean Library Science
12	Similar terms.	Use the "~" symbol to return similar terms.	~plane, also searches for aircraft, flight, jet, etc.

6. Search Engines/Databases – Usefulness

The search engines, their usefulness and the discipline in which they are employed are given in the following table.

Table 2: *Search Engines Usefulness*

Sl. No.	Search Engines (SEs)	Usefulness/Description
1	AOL Search	It is useful in Communication Mass Media, and digital distribution of content.
2	Academia.edu	It is a platform for academics to share research papers.
3	Awesome Library	It is an online library Search Engine to find full-text of books, journals, kid-safe sites, business information.
4	Bing	It is now known as “Bing” Search Engine of Microsoft.
5	BPubs	It is a Business Publications Search Engine, useful to access business and trade publications.
6	Bielefeld Academic Search Engine- (BASE)	It is one of the world’s most voluminous search engines, especially academic open access web resources.
7	CataLaw	It is Law Search Engine that organizes “all indexes of law and government into a uniform, universal and unique meta index.”
8	CiteSeer	It is useful to access Scientific Research Digital Library by using the

		CiteSeerX website.
9	Clusty	Clusty Search Engine organizes numerous search results into several meaningful categories called clusters.
10	Congoo	Congoo Search Engine is for current events and news searches; Congoo connects to the latest in technology, industry, business, world news, finance, politics, Internet trends and more.
11	Deeper Web	It allows navigating through search results. The technique involved is tag cloud technique.
12	Dogpile	Dogpile find is the best of all the major Search Engines like Google, Yahoo!, and Bing, with categories including Web, Images, Video, and even White Pages. It filters for duplicates and then presents the results to the user.
13	DuckDuckGo	DuckDuckGo has some slick features, like 'zero click' information.
14	Ethnologue	Ethnologue searches the world's known living languages. It can find more than 28,000 citations in the Ethnologue's language.
15	Excite	Excite is a collection of Internet sites and services and offers online service for a variety of content.
16	Google	Google's mission statement is 'to organize the world's information. Google is fast, relevant and the largest single catalogue of web pages available today. Google uses the page rank algorithm for displaying the pages. The main features of Google are images, maps news, geographic directions, photos etc. Google Indexes 8 Billion pages.
17	Google Books	Google Books can search through online in the field like literature, science, fiction, biology etc.
18	Google Scholar	Google Scholar searches wide array of scholarly literature, including journals, books, theses, universities, and academic publishers, etc.
19	HotBot	HotBot searches the Internet for user documents stored on a hard drive.
20	Harvester42	Harvester42 distributes queries over 30 major Search Engines in parallel and presents a large result page with the individual Search Engine results.
21	Internet Public Library	It searches the collections by subject, checks out the reading room when user visits this online public library.
22	INFOMINE	INFOMINE is a virtual library of Internet resources relevant to faculty, students and research staff at the university level.
23	Intute	Intute is a British Search Engine, specialized to search in science and technology, arts, humanities, social sciences, health and life sciences etc.
24	ISEEk Education	iSEEK is an excellent targeted search engine, designed especially for students and teachers.
25	Inspec	Inspec was made for scientists and engineers by the Institution of Engineering and Technology. Users will find nearly 13 million abstracts and research literature, primarily in the fields of physics and engineering.
26	JustCite	JustCite is an online legal research platform that helps users to find leading cases and establish the current status of the law.
27	Libdex	Libdex is a directory of library across the world as well as an extensive collection of books. Libdex searches the indexes about 18,000 different libraries.
28	Librarians' Internet Index	Librarians' Internet Index is a 17,000 plus websites evaluated and chosen by librarians in many subject categories. Search with keyword like business, government, media, health, computers, or the arts and humanities.
29	Library of Congress	Library of Congress new Search Engine Congress.gov is in beta form and will eventually replace the THOMAS legislative search system. It narrows search results by year, by subject, by House or Senate or other factors.
30	Lycos	Lycos is more of a content hub than a Search Engine destination Lycos Slogan is 'Simplify your Digital Life'. Lycos Entertainment is '*Gamesville',*

		'Lycos Television' and 'Lycos Video'.
31	Mamma	Mamma is "the mother of all Search Engines," Meta search tool for web, news, image, video etc.
32	MetaCrawler	Meta Crawler was a Meta Search Engine that blended the top web search results from Google, Yahoo!, Bing Ask.com, About.com, and other popular Search Engines. Meta Crawler also provided users the option to search for images, video, news, yellow pages and white pages.
33	MsFreckles	MsFreckles.com provides an easy way to make professional searches for the ordinary internet user. It also offers translation of a text, calculator, super filter, blog search and more.
34	One Page Multi Search	It searches the Meta Search Engines & Search Engines at once. Alta Vista, AOL, Entire Web, Gigablast, Hot Bot, Lycos, Scrub, Yahoo!, Google, Dogpile, Ask Jeeves, and a many more.
35	OmniMedicalSearch.com	OmniMedicalSearch.com collects information from many of the top medical professional sites such as PubMed, NIH, and Merck; this Search Engine provides information from peer level sources. Partnered with Healthline.com and Google Custom Search, the results offered are from a full Search Engine. They also offer a "reference desk of hard-to-find medical resources."
36	OAIster	OAIster finds millions of digital resources from thousands of contributors, especially open access resources.
37	Picsearch	It is a photo Search Engine and has more than 2 billion images in its directory.
38	PubMed	It is a Health Sciences Search Engine. PubMed is for medical students and researchers. It can find journal articles, citations, clinical information etc.
39	RefDesk	RefDesk is known as the "fact checker for the Internet." It can search MSN, Google, Yahoo! Wikipedia, as well as various dictionaries and periodicals.
40	RefSeek	RefSeek is an ad-free Search Engine delivers academic results from more than 1 billion indexed documents, web pages, books, journals, newspapers, and more.
41	Songza	Songza is a music Search Engine, "lets you listen to any song or band." User can also search the featured list or top played list.
42	Scirus	Scirus is a free science-specific Search Engine from Elsevier, covering science-related journal articles, preprints, patents and websites in all areas of science. Scirus searches over 450 million science-specific web pages.
43	SweetSearch	SweetSearch helps students find outstanding information faster. It indexes 35,000 of the most relevant websites.
44	Savvy Search	Savvy Search accesses around a dozen different Search Engines return the results. It offers search forms in over 25 languages.
45	TechXtra	TechXtra is for mainly engineering students. Resource Discovery Tool for Engineering, Mathematics, and Computing.
46	The Open Library	The Open Library is a World's classic literature at user fingertips. Over 1,000,000 free ebook titles available. Here, librarians discover "one web page for every book."
47	WorldCat	WorldCat find items from 10,000 libraries worldwide. WorldCat helps patrons and librarians "find items in libraries near you." Search for books, DVDs, CDs and articles.
48	Yahoo	Yahoo finds information on Mail Search, Cricket, Finance, News, Astrology, Games, Lifestyle, Movies, Celebrity, Answers, Screen, Shopping, Flicker, Mobile, Movies, Messenger, My Yahoo, Transliteration, Travel, Weather etc.
49	Yovisto	Yovisto is a video search engine specialized on educational video content.
50	Yippy	Yippy (formerly 'Clusty') is a Deep Web Search Engine that searches other Search Engines. Deep web pages are usually harder to locate by conventional search.

7. Librarian and User Centric Design

Traditional librarians manage their holdings using catalogs that contain information about every collection library owns. The role of a librarian is continually evolving to meet the information needs of academicians, technical experts, researchers and needs of the society. A paradigm shift in librarianship is taking place since the 20th century with the advent of new information technologies and their applications to make the library services more and more user centric. A modern librarian deals with the information in different forms like physical books, electronic resources, magazines, newspapers, audio, video recordings, maps, manuscripts, archives, photographs, bibliographic databases, web-based and digital resources. World Wide Web has created a revolution in the accessibility of information to the user. Internet and the web search engines are the principal building blocks that are used in the development of several sources of information/documents/data i.e., databases, institutional repositories and digital or virtual libraries.

Resource discovery system helps the librarians in locating, retrieving and presenting information of relevance to their patrons. The new role of librarian in designing libraries to suit the user requirements is becoming a challenging task. Librarians began serving the library patrons as consortia manager, consultant, content manager, facilitator, guide, teacher, information intermediary, knowledge manager, researcher, web designer, etc. to transform libraries more user centric and to satisfy their information /research needs and demands. The Resource discovery tools and technologies - like search engines, meta search engines, web directories, subject gateways, search and retrieval protocols, metadata harvesters, federated search, Internet, metadata schemes like, Dublin Core, Text Encoding Initiative (TEI), Metadata Encoding and Transmission Standard (METS), Metadata Object Description Schema (MODS), Encoded Archival and Description (EAD), etc. play significant role in discovery and transfer of information to the library patrons.

Trained librarian is a powerful search engine. Google search engine brings back lakhs of answers to a single query, but a librarian can get the right one, in a strategic manner. The 21st century librarian when acquires and adopts the latest technologies, and current research trends will become not only well versed with information search and retrieval but will educate library users by conducting information literacy. With the ever increase flood of information, the librarian is transforming as a navigator of information. For this, librarian needs excellent planning, designing techniques, managerial strategies, and analytical skills, to design and deliver the information to suit the user needs.

8. Conclusion

The Human society has experienced unprecedented explosion of information with the advent of digital technologies. The millions of users search World Wide Web for information every day. The web Search Engines are developed with wonderful search features. Though the web search engines are developed with various search features currently there is no search engine that will be able to cover the entire World Wide Web or Internet. Searching across several search engines is more advantageous than searching through a single one. With the exponential growth of information, everyday millions of pages are being added, updated, and deleted to www. The modern day librarian is expected to develop adequate knowledge, competency and skills and be well versed on information search and retrieval tools. User centered search engine works effectively when user query better understands by the system, retrieves exact results as per users request, increases users satisfaction, loyalty, adoption and it also reduces development cost, support services cost and maintenance costs of search engines.

The future trend in Search Engines technology is very dynamic one, Google Glass and Flying Drones are the emerging players in search engines technology. The dynamics of a web search engines will be a

great challenge to any designer of search engine. The spoken queries need to be translated into text queries using a speech recognition system, natural language processing and automatic translation of the queries before matching them to documents for retrieval. The developers of search engines and designers look for the latest technological advancements, innovative ideas and also taking the new demands from users into consideration for redesigning search engines accordingly to meet the information needs ever arising and to face challenges in higher education.

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Paradigm Shift in Library Usage: Evidence Based on Corporate Library Users Survey

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This article belongs to the ***Special Issue "Modern Trends in User Centric Design (UCD) of Library Services and Applications"***

Abstract This paper focuses on new ways to access and use information for corporate library users. There is an unbelievable growth in information technology sector, due to this, the information seeking pattern of the corporate library users have been changing quite often. As a result, the role of librarians is more focused on exploring awareness to gather the required information. The paradigm shift in the information seeking behavior of the corporate library users has created new value added market service to the library. Since majority of the software professionals are under work pressure they are not able to be present in the library so the library services should go to his/her place on time. This paper discusses on the user expectations of future corporate libraries, preferred place to access on-line resources, hindrance to access library resources, sharing of information and librarian's focus areas, in the future.
Keywords *Paradigm Shift in Corporate Libraries; Future Corporate Libraries; Information Sharing; Rating of Corporate Library Service*

1. Introduction

Information is powerful, valuable and therefore should be available everywhere. People are very fast in acquiring information and they rely on and live with technology. Technology changes are happening in every field and everyone needs information to be on their hands and thus expecting a new paradigm shift at every instance. In this context, the information seeking behavior of the library users is also changing towards new technologies. They are not willing to wait to get the information of their interest as they are pressurized to complete their task on time. It should be noted that the information seeking behavior or pattern of IT professionals distinctly differ from the other library users. This is because they are exposed to technology to a greater extent. They are well-versed in handling software devices and tools and so prefer information through online resources, looking for a new paradigm shift in the libraries.

This results in their fewer visits to the library. Some studies also show that they prefer to obtain information through social networking service (SNS) and various internet sources as of time and they feel that they could save the time in going to the library and searching for their needed information. In this context, due to the tremendous growth of availability of information and technology in this century, the corporate librarian's need a new paradigm to cater to the needs of the corporate library users and modify the library services by effectively planning for the future fate of corporate libraries.

2. Software Industry at a Glance

Information technology development has changed India's image from a bureaucratic economy to a land of innovative entrepreneurs. In India, the IT sector has generated 2.5 million direct employment making India to be one of the biggest hub of IT capital of this modern world, where all the major companies in the world IT sector are located. The IT companies are distributed in the major cities of India including Bangalore, Chennai, Kolkata, Hyderabad, Trivandrum, Noida, Mumbai and Pune. As Bangalore is the leading IT exporter, it is considered to be the silicon valley of India. The IT market in India is focusing on providing low cost solution in service business of the Global IT. There are only a few Indian companies involved in product development business of global IT, but now in the recent years a slow increase in the number of such companies has been stated. Certain high level software jobs like software development life cycle (SDLC), processes involving analysis, high level design and architectural design are not allocated to Indian IT players by the US giants, even though they have enough competencies to take up and complete these jobs successfully. Another visible change in the IT industry is the slow geographical diffusion of IT jobs that were confirmed to Bangalore which are now slowly moving into other cities like Chennai, Hyderabad and Pune.

3. Cognizant Technology Solutions: A Profile

Cognizant is a leading provider of information technology, consulting, Infrastructure Services and business process outsourcing (BPO) to successful leading IT companies in the world. Cognizant is organized into vertical and horizontal units where the vertical units focus on specific industries and the horizontals focus on specific technologies or process areas. Both the horizontal and vertical units have business consultants, together forming the Cognizant Business Consulting (CBC) team. Being the chief recruiter of MBAs Cognizant is involved in business development and business analysis for IT services projects. It has its headquarters in Teaneck, New Jersey with more than 100 development and delivery centers across the world and 217,700 employees as of March 31, 2015. Being a member of the NASDAQ-100, the Forbes Fast Tech 25, Information Weeks Top Innovators, the company is ranked #308 among the "Fortune 500" (up 44 places from 2013) and appeared on Fortunes "World Most Admired" list for seven consecutive years and is one of the fastest growing companies of the world. CTS is one among the top 10 companies receiving H1-B visa to send more employees to work in US offices and its locations. In 2015, Cognizant has first quarter revenue of $2.91 billion and is expecting second quarter revenue of at least $ 3.01 billion. Presently, Cognizant is headed by Francis D'Souza, its Chief Executive Officer under whose leadership CTS has a strong leadership team comprising of Gordon Coburn as its president and John E. Klein as its Chairman and Karen McLoughlin as its Chief Financial Officer.

4. Need for the Study

There are few studies have been conducted in corporate library users perception on library services. There is no even single study has been made to identify the factors lead to paradigm shift in library usage in corporate world. Corporate libraries are expected to grow day by day to meet the technology challenges and expectations from the users. Corporate library users are all very well talented and know

how to get their information of interest when required. Certain external factors are also forcing the corporate libraries to seriously evaluate and redefine their purpose that they have established within the IT industry. It is the duty of corporate librarian to identify and implement new paradigm services to meet the challenges posed by google, wiki and other Internet search tools that have changed the information seeking behavior of software professionals. In this crucial context, it is needed to carry out a study on corporate library users in the context of paradigm shift so as to focus on their search and accessing patterns of information to serve better.

5. Review of Literature

It has been observed that number of studies have been conducted on the Information Seeking Behaviour of which only a few studies are pertaining to software professionals. Most of the studies have shown that corporate libraries are providing wide range of services to the corporate users due to the unbelievable growth in the IT sector; the corporate library user's information seeking behaviour has been changed quite a lot and is expecting library services to be available at their desk or through mobile devices wherever they are. Leckie et al., (1996) presented that engineers work with a specific objective in mind – a particular product or device to be delivered to the client. This implies that accuracy, reliability of information is paramount. Information needs of engineers also vary by age, primary role and career stage. Oral communication is predominantly used to gather knowledge. Communication via telephone and face-to-face are considered important. It was also seen that experience affects the strategy chosen to seek information. Chun Wei Choo, Brian Detlor and Don Turnbull (2000) studied the usage of the Web to seek external information of IT specialists, managers, and research/marketing/consulting staff through questionnaire and interview method and suggested that a behavioral framework that relates motivations (Aguilar) and moves (Ellis) may be helpful in analyzing patterns of Web-based information seeking. Hertzum and Petersen (2000) proposed that engineers get most of the information from colleagues and internal reports. They spend 40-66% of their time communicating in order to get the necessary information. Yitzhaki and Hammershlag (2004) identified the information seeking behavior of software engineers and computer scientists and concluded that most of the software engineers and scientists preferred verbal discourse with colleagues, professional journals and printed text books as most accessible and often used them as information sources. Ko, A.J.; DeLine, R.; Venolia, G (2007) analyzed the software developers' day-to-day information needs and observed that their most frequently sought information included awareness about artifacts and coworkers whereas searches relating to knowledge about design and program behavior were deferred.

6. Objectives

The objectives of the research paper are:

- To identify the demographic and work profiles of the corporate library users of CTS library
- To identify the role of the library in their carrier growth and their preferred places to access the needed information
- To focus on their expectations for the future corporate libraries and the barriers to use their libraries
- To examine their information sharing modalities

7. Methodology

The study is based on the primary data collected from the library users in CTS Library. Since all the software professionals are busy with their work they are unable to spare time for an interview, so the

questionnaires were posted to their respective official email ids with a request to fill the same. A number of 100 questionnaires were posted, of which, 95 filled questionnaires have received in return.

The study has adopted a simple random sampling technique to select the respondents belonging to CTS and is assumed that all the respondents are users of the library and therefore no clustering strategy is adopted. But the respondents are categorized according to their designation to make contrast in seeking pattern of information.

8. Results and Discussions

This section provides results of the survey in tabular form. Further, the results are interpreted and correlated with findings of the other studies. Among the 95 respondents 73 (76.84%) are male and 22 (23.16%) are female. The result shows large number of male respondents has actively participated in the survey.

Table 1: *Gender-wise Distribution*
(Source: Sample Survey, 2015)

Sl. No.	Gender	No. of Respondents	Percentage
1	Male	73	76.84
2	Female	22	23.16

A. Age Wise Distribution of the Respondents

Age is an important biological factor which is considered one of the prerequisite in job market especially in IT industry. Majority of the new entrants in the IT field will be less than 25 years and are fresh candidates. In the study, the same view is proved. Table 2 shows age wise distribution of the respondents

Table 2: *Age-wise Distribution*
(Source: Sample Survey, 2015)

Sl. No.	Age (in years)	No. of Respondents	Percentage
1	Below 25	40	42.11
2	26 - 30	42	44.21
3	31 - 35	5	5.26
4	36 - 40	6	6.31
5	41 - 45	2	2.11
6	46 - 50	0	0.00
7	Above 51	0	0.00

It is found from the table that majority of the respondents belong to the age group of below 30 years that accounts for 86.32 percent. Only few respondents are found in the rest of the age category i.e. above 30 years. An interesting findings is observed from the study is that there are no respondents from the age group of above 45 years. This is because the younger age group is more dynamic, suitable to diversity and adoptability. They would have an idea of improving their talents and skills. Therefore, they will refer more to update information and to standardize their carrier growth.

B. Educational Qualifications

Educational qualification is a main factor to set a job/employment in any field and is especially more important in software industry. In response to the booming of the industry, many fields have emerged, new courses and degrees are being offered by the educational institutions. Table 3 shows educational-wise classification of the respondents.

Table 3: *Educational Qualifications-wise Distribution*
(Source: Sample Survey, 2015)

Sl. No.	Educational Qualifications	No. of Respondents	Percentage
1	BE	48	50.53
2	B.Tech	17	17.89
3	M.E	9	9.47
4	M.Tech	7	7.37
5	BCA	8	8.42
6	MCA	3	3.16
7	Others	3	3.16

It is observed from the table that Graduates with B.E degrees (50.53%) are more in sample composition followed by B.Tech graduates (17.89%).The higher degree graduates and other technical holders are also low. It is clear from the table that fresh graduates are interested to participate in the survey and are happy to utilize the library resources efficiently.

C. Role of the Respondents in the CTS

Table 4 shows the various roles played by the respondents in the organization. It is evident that 32.63% of the respondents have Associates, 27.38% were program Analysts and 21.05% were Senior Associates revealing that software professionals in these roles have responded more. In addition 5.26% each of Programmer Analyst Trainee and Manager, 3.16% of Associate Director and 2.11% of Associate Vice President have participated in the survey. It is found that more than 81% of the respondents in the intermediate level have participated in this survey.

Table 4: *Roles of the Respondents*
(Source: Sample Survey, 2015)

Sl. No	Designation	No. of Respondents	Percentage
1	Programmer Analyst Trainee	5	5.26
2	Programmer Analyst	26	27.38
3	Associates	31	32.63
4	Senior Associate	20	21.05
5	Manager	5	5.26
6	Senior Manager	1	1.05
7	Associate Director	3	3.16
8	Director	1	1.05
9	Senior Director	1	1.05
10	Associate Vice President	2	2.11
11	Senior Vice President	0	0.00

D. Total Experience of the Respondents in the Industry

Table 5 shows the classification of the respondents according to their years of experience. It is found that professionals with <3 years of experience have responded more whose percentage share is 48.42%, followed by the respondents with 4-6 years of experience that accounts for 24.21% and respondents with 10-12 years of experience comprise 11.58%. An interesting finding is to be noted from the study is that the majority of the respondents are from the fresher's level who are having experience of less than three years as compared with experienced professionals.

Table 5: *Total Experience of the Respondents in the Industry*
(Source: Sample Survey, 2015)

Sl. No.	Years of Experience	No. of Respondents	Percentage
1	<3	46	48.42
2	4 to 6	23	24.21
3	7 to 9	8	8.42
4	10 to 12	11	11.58
5	13 to 15	5	5.26
6	>16	2	2.11

E. Respondent's Portfolio

Table 6 shows the distribution of the respondents based on the portfolio for which they are working. It is clear from the table that 16.84% of the respondents are in the Banking and Financial Services Industry, 13.68%each of the respondents are in the Insurance/Transportation & Logistics Industry and 12.63% of the respondents are in the Energy & Utilities Industry. It is found that majority of the respondents are working in Banking, Insurance and Transportation verticals.

Table 6: *Respondent's Portfolio*
(Source: Sample Survey, 2015)

Sl. No.	Respondent's Portfolio	No. of Respondents	Percentage
1	Banking & Financial Services	16	16.84
2	Communications	4	4.21
3	Consumer Goods	3	3.16
4	Education	0	0.00
5	Energy & Utilities	12	12.63
6	Healthcare	6	6.32
7	Information Services	6	6.32
8	Insurance	13	13.68
9	Life Sciences	1	1.05
10	Manufacturing	9	9.47
11	Media & Entertainment	2	2.11
12	Retail	6	6.32
13	Technology	4	4.21
14	Transportation & Logistics	13	13.68
15	Travel & Hospitality	0	0.00

F. Respondent's Services

Table 7 shows the distribution of the respondents based on the Services or capability through which they are linked to the verticals. It is seen from the task that 48.42% of the respondents are in the Application Services, 23.16% of them are in the Infrastructure Services, 7.37% of the respondents are in the Business Process Services etc. It is clear from the table that more respondents are from the application development side followed by infrastructure and BPO.

Table 7: *Respondent's Services*
(Source: Sample Survey, 2015)

Sl. No.	Services	No. of Respondents	Percentage
1	Analytics	3	3.16
2	Application Services	46	48.42
3	Business Process Services	7	7.37
4	Cloud	3	3.16
5	Digital Works	2	2.11
6	Infrastructure Services	22	23.16
8	Consulting	0	0.00
9	Customer Relationship Management	0	0.00
10	Engineering & Manufacturing Solutions	4	4.21
11	Enterprise Risk & Security Solutions	0	0.00
12	Experience Design	0	0.00
13	Human Capital Management	0	0.00
15	Mobility	5	5.26
16	Portals & Content Management	0	0.00
17	Quality Engineering & Assurance	2	2.11
18	Social	0	0.00
19	Supply Chain Management	1	1.05

G. Respondent's Competency

Table 8 shows the distribution of the respondents based on the competencies they possess. It is evident that 13.68% have Testing Competency, 10.53% have Web Development Competency, 7.37% have Network Administration, Security and Business Intelligence/Data Warehousing Tools Competencies each etc., It is evident from the table that professionals working in Testing projects have participated in this survey mostly followed by those working in Web Development projects.

Table 8: *Respondent's Competency*
(Source: Sample Survey, 2015)

Sl. No.	Competency	No. of Respondents	Percentage
1	DBA / Data Modeling / Data Engineering	4	4.21
2	Testing	13	13.68
3	Business Intelligence / Data warehousing Tools	7	7.37
4	Client Server	6	6.32
5	Usability Engineering	2	2.11
6	Mainframe Technologies	8	8.42
7	Content Management Solutions / Portals	7	7.37
8	Business Analysis	2	2.11
9	ERP Technology	2	2.11
10	Project/Program Management	4	4.21

11	Business Process Management	4	4.21
12	Web Development	10	10.53
13	Microsoft Technologies	6	6.32
14	Mobile applications and device management	5	5.26
15	Big Data	3	3.16
16	Middleware	2	2.11
17	Network Administration, Security	7	7.37
18	Training	0	0.00
19	Travel	0	0.00
20	HR, Recruitment, Administration	2	2.11
21	Accounts and Finance	1	1.05

H. Enhance and Apply the Techniques Acquired from the Library

Figure 1 demonstrates the knowledge and benefits acquired by the respondents through the library. 40% of the respondents have agreed and 17.89% have strongly agreed to the fact that they were able to enhance and apply the techniques acquired from the library. From this result, we can conclude that the library is still serving and helpful in the career growth of these professionals, even though modern technological means of obtaining information are available in their desk itself.

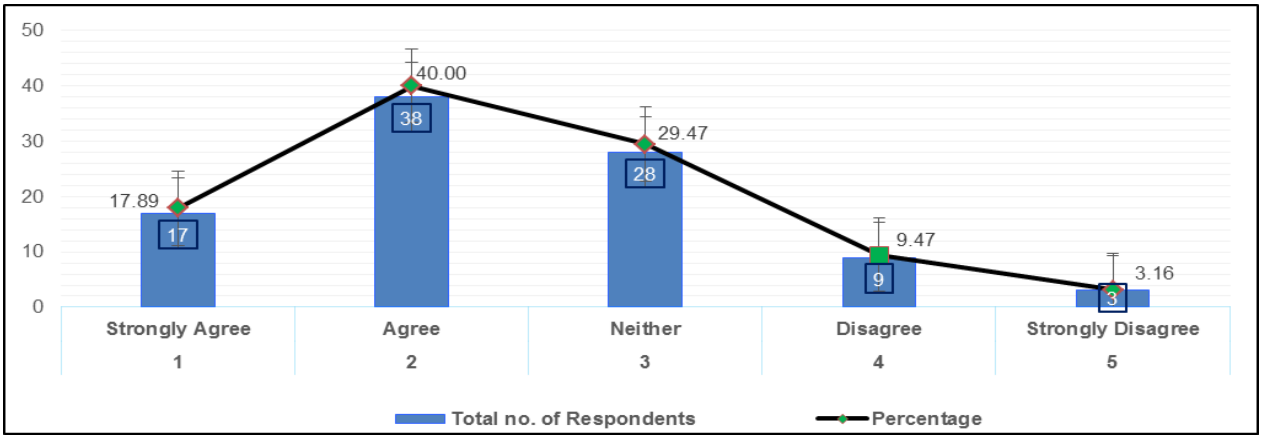

Figure 1: *Apply the Techniques Acquired from the Library*

I. Preferred Place to Access Online Resources

Figure 2 shows the place from which the respondents prefer to access online-resources. 62.11% prefer workstation, 24.21% prefer library, 11.57% prefer home and 2.10 % prefer internet centers to access online-resources. This finding clearly points out that majority of the respondents prefer to use online resources from their desk itself rather than coming to the library. It is also encouraging to find that 24.21% of the respondents are happy to choose library as their preferred place to access on-line resources. This confirms the success of the library in catering to the needs of these professionals.

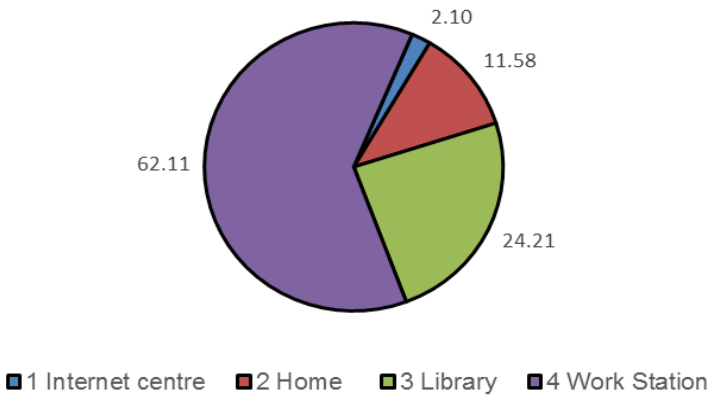

Figure 2: *Preference Place to Access Online Resources*

It is also pertinent to mention that libraries provide their resources on the desktops of the users with the ICT applications. The CTS library may subscribe to databases, which can be accessed on their desktops.

J. Expectation of Future Corporate Library

Figure 3 shows the future expectations of the respondents regarding the corporate library and its services. It is clear from the table that 48.42% of the respondents are expecting library services through handheld devices, 30.53% of the respondents prefer digitized resources for their information needs and 17.89% of the respondents are expecting to have a bigger and better library. An interesting finding from this table is that there is a moderate level of interest among IT professionals towards libraries amidst the tremendous technological developments.

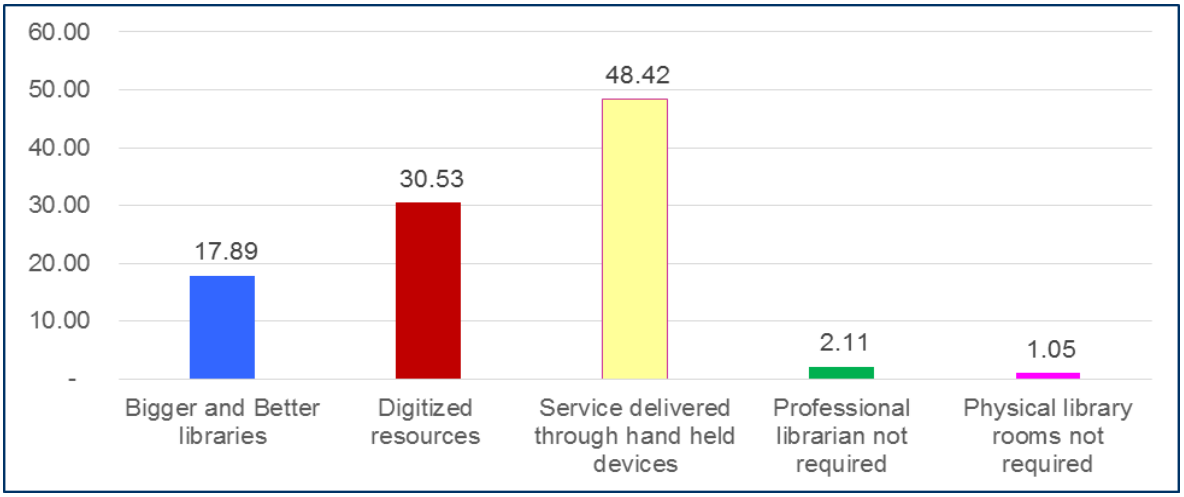

Figure 3: *Future Corporate Library*

K. Factors Affecting in Accessing the Library

Table 9 shows the various hindrances in accessing the library. It is clear from the table that 28.42% of the respondents are underwork pressure, 18.95% respondents are facing uncertainty of job, 15.79% of the respondents are having tight work schedules & are compelled to work long hours, 12.63% of the

respondents are experiencing lack of role clarity & sense of dissatisfaction, 11.58% of the respondents are having lack of time to access the library, 8.41% of the respondents are working on shifts, 2.11 % each of the respondents are facing harassment from the reporting managers and are being distracted with social media and other activities. From the table a wide range of barriers faced by the software professionals in accessing the library are identified.

Table 9: *Factors Affecting the Access to Library*
(Source: Sample Survey, 2015)

Sl. No.	Barriers	No. of Respondents	Percentage
1	Work pressure	27	28.42
2	Lack of time	11	11.58
3	Uncertainty of job	18	18.95
4	Working on shifts	8	8.41
5	Lack of role clarity & Sense of dissatisfaction	12	12.63
6	Tight work schedules, Compelled to work long hours	15	15.79
7	Frequent work-related travel	0	0.00
8	Reporting managers harassment	2	2.11
9	Health problems	0	0.00
10	Emotional disorders	0	0.00
11	Distracted with social media, other activities	2	2.11

L. Sharing of Information

Table 10 exposes that many of the respondents of the study preferred to share either personal or career related information through either facebook or whatsApp. This is because the use of mobile devices has increased and people are becoming more dependent on them. It is clear that 1st and 2nd rankings were predominantly given to Facebook, WhatsApp, Twitter, YouTube and LinkedIn showing their popularity in sharing information. Google+ and Skype are shown to be used to a certain extent, whereas, Hike, and MySpace seemed to be of less popularity. Many organizations are themselves playing a major role in sharing information(s) to its employees by fixing mandatory learning hours as part of their goals. Social networking media is also playing a leading role in sharing information and libraries are also employing these tools to serve the user community.

The software professionals are asked to complete mandatory training courses through online resources like e-resources (books 24x7) which allows company employees to access learning assets around the globe in several modalities including video, audio and interactive formats at work place, home or on the road. Many IT companies have realized the importance of such media and have tied up with service providers like Skillport. Also the organizations have setup a credit system for using these resources that are directly linked to individual and group performance systems where defaulters will be rated accordingly.

Table 10: *Sharing of Information through SNS*
(Source: Sample Survey, 2015)

Sl. No.	Sharing of Information through SNS	Rank									No. of Respondents
		1	2	3	4	5	6	7	8	9	
1	Facebook	81	11	3	0	0	0	0	0	0	95
2	WhatsApp	79	10	2	1	1	1	1	0	0	95
3	Twitter	65	23	6	0	1	0	0	0	0	95

4	YouTube	53	7	9	11	3	12	0	0	0	95
5	LinkedIn	41	23	17	0	0	5	3	4	2	95
6	Google+	39	7	9	7	1	3	6	14	9	95
7	Skype	23	11	6	8	1	2	0	0	44	95
8	Hike	0	0	0	1	1	2	3	5	83	95
9	MySpace	0	0	0	0	1	0	2	3	89	95

M. Rating of Corporate Library Services

Table 11 shows the performance rating given to the various services provided by the library. The findings of this study express the satisfaction of the respondents towards the services rendered by the library. It is clear from the table that 44.02% of the responses were very good and 41.98% of responses were good making an average of 86%, which shows the success of the library in providing the required services to the users. It is also evident from the table that 13% of the responses were average and only 0.99% of the responses were poor. This shows that majority of the respondents have given positive responses towards availing the library services. It is also evident that the innovative services through electronic devices (Mobile phone, Tabs etc.,) are more preferable to the respondents as they can be benefitted through the services provided by library wherever they are.

Table 11: *Rating of Corporate Library Services*
(Source: Sample Survey, 2015)

Sl. No.	Rate the Below Services offered by Your Library	Poor	Average	Good	Very Good	No. of Respondents
1	Circulation	0	11	40	44	95
2	eBooks (Books 24x7)	0	12	47	36	95
3	eBooks on Mobile Device	0	14	33	48	95
4	eJournals	0	16	39	40	95
5	Reference Service	0	18	45	32	95
6	Digital Learning Centre	0	6	28	61	95
7	Transfer Library Resources	1	11	41	42	95
8	Library Connect Programmes	0	12	40	43	95
9	Content Page Service	0	3	51	41	95
10	Reprographic Services	0	14	41	40	95
11	Reservation	0	10	44	41	95
12	Inter-Library Loan	6	15	47	27	95
13	Document Scanning	5	4	18	68	95
14	Newspaper Clipping Services	1	18	40	36	95
15	Audio-Video Viewing	1	7	44	43	95
16	New Arrivals Display	1	31	36	27	95
17	Computer based Learning Courses	1	8	44	42	95
	Total No of Participants	16	210	678	711	1615
	Percentage	0.99	13.00	41.98	44.02	100

9. Summary and Conclusion

Information and communication technologies dominate the world. Everyone ultimately has to depend on the ICTs tools for their ordinary life. The positive growth of the sector leads to huge investment in the sector and paves way for opening up of millions job opportunities. Many MNCs have started their software companies in India and CTS is one of the popular companies. It offers employment opportunities for young and dynamic graduates with computer knowledge. The software professionals are generally viewed to be under work stress. They are not able to cope with stress due to many

reasons. Psychologists suggest visiting the library and reading books would relieve them from stress. In this context the software companies are establishing separate libraries. Further, library offer more information to the corporate professionals to equip or enhance or update their knowledge. In the study, irrespective of designation, software professionals used to visit libraries for updating their knowledge and information. A majority of the respondents prefer to use online resources from their desk itself rather than coming to the library. A significant finding is observed from the survey that software professionals used to read/ access information through on-line. It is also found that respondents are expecting library services through handheld devices. Work pressure and uncertainty of their jobs are the major barriers for them to use the library. Many of the respondents of the study preferred to share either personal or career related information through either Facebook or WhatsApp. Thus, the librarian's role is much needed to upgrade and implement library services that can be delivered to their desk or through hand held devices.

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Collection Centric to User Centric Academic Library Spaces: Building Requirements of Net Generation Users

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This article belongs to the ***Special Issue "Modern Trends in User Centric Design (UCD) of Library Services and Applications"***

Abstract This paper intends to examine the needs of the net generation users regarding library spaces. In the light of the data collected from 81 users from University of Hyderabad and Maulana Azad National Urdu University, the study looks into the preferences of users and whether the increasing use of Internet requires changes in the library spaces for the future generation. The modern academic community including teachers, students and researchers are more oriented towards using information available on the internet. There is a tendency of the users to spend more time on the web. Libraries are looked up on as learning spaces for collaborative and networked learning. The future of libraries lies in providing a platform to the users where they can converse, collaborate and share the information. Hence, library buildings in the 21st century are moving away from traditional collection-centric to user-centric service rich libraries

Keywords *Modern Library Buildings; Academic Library Spaces; Net Generation Library Spaces; User Centric Academic Library Buildings; University of Hyderabad Library Building; Maulana Azad National Urdu University Library Building*

1. Introduction

A well-established library is essential for an academic institution. Library houses the books and other material to support the research and other educational activities of the academic institution and provides variety of services to promote the use of books and satisfy the needs of users. Library provides the space required for learning and expanding the knowledge of the students.

Traditionally, libraries were collection centric, primarily focused on acquiring, organizing, storing and preserving the required information for easy retrieval and use. Literature reveals that in the pre Gutenberg era, the monastic libraries, church libraries etc. housed great collections of manuscripts and contained huge reading rooms. The paintings of great artists decorated the walls of these libraries. The libraries served only a selected few and are not open for the public. In the 18th and early 19th centuries with the expansion of education and growth of educational institutions, Libraries also envisaged a change in terms of their growth and services. There is a growth in terms of the collection of books and also readers. The libraries were no longer limited to the selected few. The libraries had different areas-stack area, reading rooms etc. but still closed access was practiced in most of the libraries.

In the late 19th century, several universities have established their libraries. Libraries usually are located in the centre of the campus. The libraries had spacious rooms adjoining the stacks and open access was encouraged. The entrance of the library is usually occupied by circulation desks, cataloguing cabinets. The book stacks occupied more room. The buildings had good ventilation allowing natural light and air. Growth of the collection demanded more physical space. Preservation, maintenance and security of the books were the major concern of library staff which is continuing even today. The important criteria for planning collection centric library buildings were –

- Growth in the physical collection
- More space to accommodate the growing book stacks and collection
- Providing spaces for readers to access the collections
- Service spaces
- Maintenance, preservation and conservation of library collections
- Safety and Security of the library holdings
- Extension or expansion of the buildings

21st century witnessed number of changes brought about by the technology, explosion of information sources, growth in the number of open access and open educational resources and thereby changes in the needs of the users. The modern academic community including teachers, students and researchers are more oriented towards using information available on the internet. There is a tendency of the users to spend more time on the web. Libraries are looked up on as learning spaces for collaborative and networked learning. The future of libraries lies in providing a platform to the users where they can converse, collaborate and share the information. Hence, library buildings in the 21st century are moving away from traditional collection-centric to user-centric, service rich libraries. This paper intends to examine the needs of the net generation users regarding library spaces.

2. Research Questions

The Study intends to address two important questions –

- In the light of increasing use of internet by the students, do they still prefer physical library space?
- What changes, the net generation users are looking for in terms of library spaces?

3. Review of Literature

There is difference of opinion regarding the requirement of physical library buildings in the internet era. Many people believe that there will be no need for a physical library, because information will be accessible from the computers on their desktops with the press of a button. Others believe that Technology itself is causing increased demand for space in many areas of the library. There are growing

numbers of computer workstations for patrons and staff alike and other equipment such as network files, server's needs are specialized and additional space often not found in existing facilities (Lucker, 1992). A growing role of the library is helping students and others learn to use the new technology to access information. This is requiring libraries to supply more space for face-to-face consultation with information professionals (Clemmer & Smith, 1992) and most often necessitating the provision of a large, well-equipped user instruction room (Bazillion, 1994).

The digital age, contrary to predictions, has had a largely positive impact on library design. The increase in the use of IT and e-resources allow libraries to be more flexible and the spaces within them are more fluid. Library spaces are no longer defined by the collections as in the past but need to encourage interaction between, and among, library users and library staff. The technological advancements referred above are releasing library staff from routine tasks and driving the move toward a user-focused rather than a collection-based approach to both services and the layout of spaces. Library premises are no longer largely governed by the storage and display of resources or by the need for space-consuming issues and service desks but rather by the needs of users. The creation of exciting and attractive library space has been shown to bring people into the physical library to use the virtual resources. The library as meeting place is another well-recognized trend in library design. The concept of the library as a "third place"—a place away from both the workplace and the home to study in peace, work collaboratively, or socialize—has been much documented (Banning et al., 2006; Oldenburg, 2001).

Freeman (2005), has noted that "rather than threatening the traditional concept of the library, the integration of new information technology has actually become the catalyst that transforms the library into a more vital and critical intellectual centre of life at colleges and universities today" (Latimer, 2010) has identified the following drivers leading to a changing approach to the design of academic libraries: the increasing availability of e-resources and the concomitant shift in the balance between printed and virtual collections; technological advances such as self-issue/return, the automation of manual handling, the use of sorting robots, compact shelving, and RFID technology; social networking—the library as a meeting place; and the need to market libraries in the face of increasing competition from other information providers.

The need for libraries to market themselves has become increasingly important, and this in turn has had an impact on library design. There is a strong need to create an identity for the library; as Arets (2005) has pointed out, a building that looks exciting on the outside will entice people in to find out what is going on inside. The library building itself becomes a marketing tool. The library at Cottbus has been visited by approximately 20,000 tourists since it opened in 2005 (Degwitz, 2010).

In India there are very few studies focused on library buildings. Some researchers attempted to study the standards and norms for library layout in India. Kumud Prabha (2005) studied the norms and standards used for library layout in India. Bureau of Indian Standards provides that a library should have a stack room, a Librarian's room and a reading room having seating capacity of 40 to 120 chairs. The Stack room should be big enough to accommodate 6,000 to 10,000 books at least. The paper concludes that there are no authentic standards for libraries in India.

Rathinasabhapathy, G. (2014) examined the various standards prescribed by various regulatory bodies of professional education such as AICTE, MCI, DCI, PCI, NCTE etc. And found that none of the professional bodies have suggested clear cut norms for library buildings and furniture.

Review of literature reveals that –

- There are no significant studies on the impact of technology on library design in India

- In countries like UK and USA, approach to library buildings is moving from collection centric to user centric and providing space for collaboration, networking and sharing information for the net-generation users.

4. Methodology

In order to know the needs and preferences of users regarding the library space, a small survey is conducted where structured questionnaire is distributed to 100 students studying at the two central universities namely – University of Hyderabad (UOH) and Maulana Azad National Urdu University (MANUU), Hyderabad. Convenience sampling is used. Eighty two responses are received. Data regarding - requirement of physical library building, frequency of library visits, user preferences regarding spaces for quiet study, discussions, presentations, training rooms etc. were collected.

5. Library Building Specifications of Selected Universities

A. University of Hyderabad

(http://igmlnet.uohyd.ac.in:8000)

University of Hyderabad is one of the reputed institutes of higher education, known for its excellence in research and distinguished faculty. IGM Library caters to the information needs of faculty, research scholars and students in Arts, Humanities, Social Sciences, Management, Sciences and Engineering. The main objective is to make the Library the most effective Learning Resource centre to contribute to the quality of higher education. The library has latest ICT infrastructure. Library Building provides congenial learning environment to the users through its various sections including Online Public Access Catalog (OPAC) Searching Area, Internet browsing area for accessing e-resources, Laptop zone with Wi-Fi facility, specialized workstations & software for visually-challenged students.

The University Library is situated at a central place and constitutes 57000 S. ft. Area The building has a reading space with seating capacity to accommodate 400 users. Apart from the reading space, there are 30 individual reading carrels, a lounge of 2000 S. ft. for browsing and relaxed reading. The Building also has an IT Zone for accessing e-resources. Library has a separate Air-conditioned Annex Building with 2 reading halls with 200 seating capacity and Wi-Fi, which is kept open on all the days round the clock (365 days 24 hrs.)

At present the library has a total collection of about 4.00 lakhs volumes including monographs, text books, back volumes of journals, theses/dissertations, CDs/DVDs. The library is subscribing around 300 print journals in various disciplines of the university and providing access to more than 35000 e-resources including e-books and UGC Infonet e-resources.

B. Maulana Azad National Urdu University (MANUU), Hyderabad

(http://www.manuu.ac.in/central_library.php)

The MANUU Library was established in the year 1998 along with the University. The Library has shifted to its newly constructed independent building in Dec. 2008. The New Library Building has G+1 with 3300 sq.mts of built up area and Seating capacity of 200. The Central Library is the most modular, functional and uses modern technology for its operations. The library is fully computerized and using NewGenLib LIS Software for day to day operations. The library is equipped with state of the art ICT infrastructure including CD/DVD mirror server, Bar code technology, 3M Security System, Biometric device and paging system for public announcements.

The library has more than 58,000 books, subscribes to 179 journals and 389 Audio and Video CDs. The University is a member of the countrywide Infonet e-journal consortium. The Library has a Reading Room with seating capacity of 200. Library Building includes separate section for OPAC, cubicles for research scholars, audio visual section comprising T.V., MP3 System, Walkman with Headphones for listening to Audio cassettes. Library provides online access to Springer link, JCCC-UGC infonet, JSTOR, etc. through INFLIBNET E-journal consortium. Library also provides links to several freely available online databases such as Wikipedia, answers.com, DOAJ, DOAB, Indiastat etc. The library provides Internet Access service to all library members free of charge for browsing e-resources.

6. Analysis & Findings

A. Background

The background information of the respondents under study is presented in Table 1.

***Table 1**: Background Information of the Respondents*

S. No.	Description	MANUU No. (%age)	UOH No. (%age)	Total
1	No. of Respondents	41 (50%)	41 (50%)	82 (100)
2	Category of the Respondents			
	Undergraduate	15 (36.6%)	4 (9.8%)	19 (23.3%)
	Postgraduate	21 (51.2%)	22 (54.7%)	43 (52.4%)
3	Gender of the Respondents			
	Male	37 (90.2%)	33 (80.5%)	70 (85.4%)
	Female	4 (9.8%)	8 (19.5%)	12 (14.6%)

The Table 1 gives the background information of the respondents from the two Universities under study. Out of total 82 respondents, 41 are from UOH and 41 are from MANUU. Out of the total respondents, 23.3% are under graduate students & 52.4% are post graduate students. Gender-wise analysis of the respondents reveals that majority (85.4%) are male students and only 14.6% of them are female.

B. Library Building

The respondents are asked whether they require a physical library building in the context of changing information & communication scenario.

***Table 2:** Respondent's Opinion Regarding Requirement of a Physical Library Building*

S. No.	Requirement of Physical Library Building	Name of the University		Total No. (%)
		MANUU No. (%)	UOH No. (%)	
1	Yes	39 (95.1)	40 (97.6)	79 (96.3)
2	No	2 (4.9)	1 (2.4)	3 (3.7)
	Total	41 (50)	41(50)	82 (100)

It is evident from Table 2 that 96.3% responded in favour of the physical library building and only 3 (3.7%) users in both the universities felt that physical library building requirement is not necessary.

C. Library Visits

Table 3: *Frequency of Library Visits by the Respondents*

S. No.	Frequency of Library Visits	Name of the University		Total No. (%)
		MANUU No. (%)	UOH No. (%)	
1	Daily	35 (85.4%)	30 (73.2%)	65 (79.3%)
2	Weekly	6 (14.6%)	10 (24.4%)	16 (19.5%)
3	Monthly	0 (0%)	1 (2.4%)	1 (1.2%)
4	Total	41 (50%)	41 (50%)	82 (100%)

Data from Table 3 reveals that 79.3% users visit the library every day, 19.5% visit the library once in a week and only 1.2% respondents visit the library once in a month.

Table 4: *Response with Regard to the Quick Visits to the Library*

S. No.	Quick visits	Name of the University		Total No. (%)
		MANUU No. (%)	UOH No. (%)	
1	Yes	33 (80.5)	37 (90.2)	70 (85.4)
2	No	8 (19.5)	4 (9.8)	12 (14.6)
	Total	41 (50)	41 (50)	82 (100)

The respondents are asked whether they make quick visit to the library or spend considerable time in the library. The analysis is presented in Table 4. Majority of users i.e. 85.4% responded that they made quick visits to the library, whereas only 14.6% of them spend considerable time in the library.

D. Library Assistance

From the table no.5, it can be seen that majority of the users (81.7%) preferred to search for books and information on their own and only 19.5% seek assistance of the library staff in locating the books.

Table 5: *Responses with regard to Searching/Locating books in the Library*

S. No.	Search/Locate books in the Library	Name of the University		Total No. (%)
		MANUU No. (%)	UOH No. (%)	
1	Self-search	31 (75.6)	36 (87.8)	67 (81.7)
2	Take assistance of library staff	10 (24.4)	5 (12.2)	15 (19.5)
	Total	41 (50)	41 (50)	82 (100)

E. Location of Library Building

Table 6: *Respondents' Preference for Library Building in the Vicinity of the Department*

S. No.	Location of the Library	Name of the University		Total No. (%)
		MANUU No. (%)	UOH No. (%)	
1	Strongly agree	40 (97.56)	41 (50)	81 (98.8)
2	Agree	1(2.44)	0 (0)	1 (1.2)
3	Disagree	0 (0)	0 (0)	0 (0)
	Total	41 (50)	41 (50)	82 (100)

The Table 6 shows that majority of respondents (98.8%) strongly felt that library should be located at a central place and should be within the vicinity of their departments.

F. Preferred Areas in the Library

Table 7: *User Preferences for Different Areas in the Library*

S. No.	Preferred Areas	Name of the University					
		MANUU			UOH		
		Yes	No	Total	Yes	No	Total
1.	Rooms for Library orientation / training programs for using e-resources	33	8	41	28	13	41
2	Rooms for Quiet Study	37	4	41	34	7	41
3	Discussion Rooms	28	13	41	23	18	41
4	Presentation Rooms	29	12	41	23	18	41
5	Food Counters	30	11	41	23	18	41
6	Separate reading rooms for men & women	26	15	41	9	32	41

From the Table 7, it is evident that majority users favour having separate rooms for library orientation/training programmes in using e-resources; rooms for quiet study, separate discussion rooms, presentation rooms, food counters. Due to religious customs, users of MANUU favoured separate reading rooms for men and women.

Figure 1 presents analysis of preferences for different areas by 3 categories of students under study. UG students showed preference for separate rooms for training and orientation in the use of e-resources in the library, while all types of users agreed that there should be rooms for quiet study especially the researchers. Majority of Researchers and PG students require spaces for discussion and presentations also. Most of the Researchers and PG students expressed that separate food counters are required within the library so that they can spend longer hours in the library.

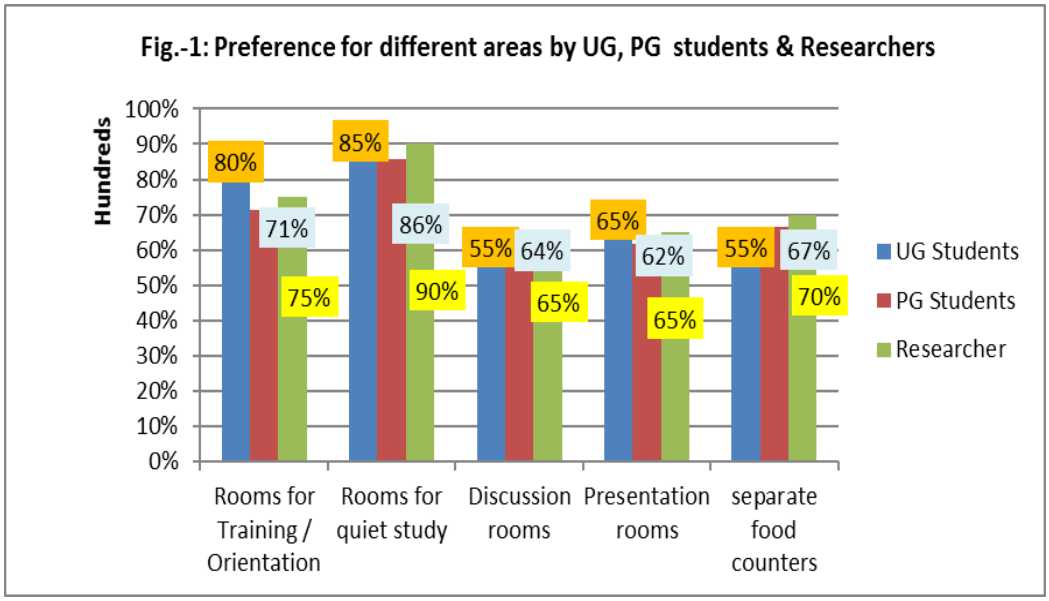

Figure 1: *Preference for Different Areas by UG, PG Students and Researchers*

G. Facilities in the Library

Table 8 shows the preferences of the users for different facilities to be provided in the library. From the table, it is evident that users of both the universities preferred to have the facilities like – Internet Lab, Access to Institutional Repository, Digital Library, and Research Cubicle, computer workstations, laptop connections and Wi-Fi facilities in the library. The users preferred to have internet facility (98%), Generator (100%), Digital library and Laptop connection (96%), safety and security (83%), computer and other electronic equipment (74%). which are very much essential in present day library building planning.

Table 8: *Respondent's Preferences for Different Facilities in the Library*

S. No.	Facility	Name of the University							
		MANUU				UOH			
		Very much required	Required	Not required	Total	Very much required	Required	Not required	Total
1	**Internet Lab**	32 (78%)	8 (19.8%)	1 (2.4%)	41 (100%)	28 (68.3%)	13 (31.7%)	0	41 (100%)
2	**Institutional Repository**	20 (48.8%)	16 (39%)	5 (12.2%)	41 (100%)	21 (51.2%)	19 (46.3%)	1 (2.4%)	41 (100%)
3	**Digital Library**	30 (73.2%)	9 (21.9%)	2 (4.9%)	41 (100%)	30 (73.2%)	11 (26.8%)	0	41 (100%)
4	**Generator**	33 (80.5%)	8 (19.5%)	0	41 (100%)	31 (75.6%)	10 (24.4%)	0	41 (100%)
5	**Seminar Hall**	15 (36.6%)	13 (31.7%)	13 (31.7%)	41 (100%)	13 (31.7%)	18 (43.9%)	10 (24.4%)	41 (100%)
6	**Research cubicles**	30 (73.2%)	8 (19.5%)	3 (7.3%)	41 (100%)	27 (65.9%)	10 (24.4%)	4 (9.7%)	41 (100%)
7	**Computer workstations**	28 (68.3%)	11 (26.8%)	2 (4.9%)	41 (100%)	25 (61%)	16 (39%)	0	41 (100%)

8	**Laptop connections**	30 (73.2%)	8 (19.5%)	3 (7.3%)	41 (100%)	27 (65.9%)	10 (24.4%)	4 (9.7%)	41 (100%)
9	**LAN/WAN**	30 (73.2%)	8 (19.5%)	3 (7.3%)	41 (100%)	29 (70.7%)	11 (26.8%)	1 (2.4%)	41 (100%)
10	**Wi-Fi**	27 (65.9%)	9 (21.9%)	5 (12.2%)	41 (100%)	30 (73.2%)	11 (26.8%)	0	41 (100%)
11	**Classrooms**	15 (36.6%)	13 (31.7%)	13 (31.7%)	41 (100%)	13 (31.7%)	20 (48.8%)	8 (19.5%)	41 (100%)

H. Significant Factors of Library Buildings

The Table 9 gives the Users preference from both the universities for different factors important for Library building. The users opined that library should have more facilities for safety and security (83%); computer and other electronic equipment (74%), Plants (70%) and Open spaces (66%) are very important aspects in the library.

Table 9: *Respondent's Opinion on Factors Important for Library Building*

S. No.	Facility	Name of the University							
		MANUU				UOH			
		Very Important	Important	Not Important	Total	Very Important	Important	Not Important	Total
1	Open spaces	33 (80.4%)	7 (17%)	1 (2.4%)	41 (100%)	21 (51.2%)	17 (41.5%)	3 (7.3%)	41 (100%)
2	Colour	22 (53.7%)	15 (36.6%)	4 (9.7%)	41 (100%)	19 (46.3%)	18 (43.9%)	4 (9.7%)	41 (100%)
3	Natural lighting	29 (70.7%)	8 (19.5%)	4 (9.7%)	41 (100%)	26 (63.4%)	14 (34.1%)	1 (2.4%)	41 (100%)
4	Plants	35 (85.4%	5 (12.2%)	1 (2.4%)	41 (100%)	22 (53.7%)	16 (39%)	3 (7.3%)	41 (100%)
5	Tempting furniture	21 (51.2%)	14 (34.2%)	6 (14.6%)	41 (100%)	25 (61%)	12 (29.3%)	4 (9.7%)	41 (100%)
6	Computer & Other electronic devices	31 (75.6%)	8 (19.5%)	2 (4.9%)	41 (100%)	30 (73.2%)	10 (24.4%)	1 (2.4%)	41 (100%)
7	Mobility &Wireless communication	29 (70.7%)	10 (24.4%)	2 (4.9%)	41 (100%)	32 (78%)	8 (19.5%)	1 (2.4%)	41 (100%)
8	Safety & Security Measures	38 (92.7%)	2 (4.9%)	1 (2.4%)	41 (100%)	30 (73.2%)	10 (24.4%)	1 (2.4%)	41 (100%)

7. Findings

1. The students are asked if they need a physical library building in the present day context, 96.3% responded in favour of the physical library building.

2. Data revealed that 79.3% users visit the library every day, 19.5% visit the library once in a week and only 1.2% respondents visit the library one in a month.

3. While 85.4% of users responded they make quick visits to the library, only 12% of them spend considerable time in the library.

4. Just above half of the respondents (56.1%) preferred to sit at the same place in the library every day while the remaining 43.9% change their place for reading.

5. Majority of the users (80.5%) preferred to search for books and information on their own and only 19.5% seek assistance of the library staff in locating the books.

6. Almost all users (99.8%) felt that library should be located at a central place and should be within the vicinity of their departments.

7. Majority users favour having separate rooms for library orientation/training programmes in using e-resources; rooms for quiet study, separate discussion rooms, presentation rooms, food counters.

8. The users preferred to have internet facility (98%), Generator (100%), Digital library and Laptop connection (96%), safety and security (83%), computer and other electronic equipment (74%), Plants (70%) and Open spaces (66%) which are very much essential in present day library building planning.

9. Generator facility has been recorded highest percentage from both the Universities i.e., 41 (100%) in MANUU and 41 (100%) in UOH, followed by Internet facility with 32 (78%) in MANUU and 28 (68.3%) in UOH.

10. The facility of Digital library has also recorded similar preference from both MANUU and UOH with 30 (73.2%) response. The LAN/WAN facility have been given 30 (73.2%) preference while 29 (70.7%) preference have been given in UOH.

11. The facility for laptop connections in MANUU has recorded 30 (73.2%) while UOH has recorded 27 (65.9%). Importance have been given to Wi-Fi facility with 27 (65.9%) in MANUU and 30 (73.2%) in UOH.

12. University-wise breakup of the responses for factors important for library building like Plants is 35 (85.4%) in MANUU while in UOH it is 22 (53.7%).

13. For Open spaces, the respondents have given their preference as 33 (80.4%) in MANUU while in UOH the preference is 21 (51.2%).

14. Another factor important for library building is availability of Computer and other electronic device for which the preference is 31 (75.6%) by respondents from MANUU and 30 (73.2%) from UOH.

15. Safety and security measures have been given more importance 38 (92.7%) by the respondents from MANUU and 30 (73.2%) from UOH

8. Conclusion

It is clearly seen from the findings that in-spite of the increase in use of Internet and electronic resources, learners and scholars prefer to have a physical library building with good collection of print and electronic resources. Study also shows that in the net-generation, people want to get connected to one another, learn collaboratively and share their research. Due to the same reason the users preferred to have discussion rooms and separate rooms for making and sharing presentations, apart from spaces usually allotted for quiet study by the libraries. Natural lighting, open spaces for circulation of air and plants will make learning environment more conducive to serious kind of studies and research.

It is interesting to note that even though technology enables 24/7, anytime, anywhere access to learning as well scholarly resources and users can access the library through their desktops without coming to the library, most of the users still prefer to spend more time in the library. Therefore, we can say that ICT is not posing a threat to the library buildings but can be seen as an opportunity for users to use the library space in more innovative ways. Academic Libraries should plan the spaces also keeping in view the current needs of the learners, in order to make them more and more user-centric learning spaces. Literature reveals that very few systematic studies are made on the different aspects of academic library buildings in India. Hence more research needs to be done on user-centric library spaces.

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Use of Library and Internet Resources by Urdu Faculty, Research Scholars and P.G. Students in University Libraries of Andhra Pradesh State

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This article belongs to the ***Special Issue "Modern Trends in User Centric Design (UCD) of Library Services and Applications"***

Abstract The Information and communication technology has transformed the old concept of libraries from traditional to digital form. In today's world the most popular source of information is the Internet and electronic resources. The present study has been undertaken to assess the availability and use of library and web resources by Urdu faculty, research scholars and P.G. students in select university libraries of erstwhile Andhra Pradesh. The particular study was under taken to assess the awareness, availability and use of library and Urdu web resources by the users. Their extent of satisfaction, impediment and impact of Internet and Urdu web resources were analyzed. The findings of the study revealed that there are scanty Urdu resources available online and also there is lack of knowledge among scholars about the use of web resources. To utilize the Urdu web resources to its maximum, it is necessary to build awareness among the research scholars and train them in browsing internet as well as searching information on the internet and using resources. This can be done by conducting user orientation/awareness program.

Keywords *Urdu Resources; Urdu Web Resources; Osmania University Library-Urdu Resources; University of Hyderabad Library-Urdu Resources; Use of Urdu Resources; Urdu Resources-User Orientation*

1. Introduction

Urdu has always been predominantly the language of the Muslims, though millions of non-Muslims are able to read and write, millions more are able to understand and speak, whereas a few of them could make major contribution to Urdu literature.

Urdu is one of the chief languages of the South Asian subcontinent. It is cultivated and spoken from Kashmir to Kanyakumari and from Gujarat to West Bengal. Pakistan has adopted it as National Language and across the borders of India established the active nuclei in the countries like Great Britain, the United States, and also some of the Scandinavian, West Asian and African countries.

In India, status of Urdu language underwent a drastic change after Independence in 1947 when the monopolistic position of English as the exclusive official language and the main medium of instruction ended. Immediately after, there came the linguistic reorganization of states in 1956.

Urdu is the official language of Jammu and Kashmir and has acquired the status of a second language in Andhra Pradesh and Bihar. Since, the basic structure of Urdu as well the vocabulary is very much similar to Hindi language, it claims the same family history with Hindi. It has assimilated Persian, Arabic, English vocabulary and literary styles during the process of its long historical development.

2. Web Resources in Urdu Language

Since the past couple of decades, more and more people are browsing the Internet to gather the data and retrieve information. The shift to digital libraries has greatly influenced the common man's use of physical libraries. These factors resulted in the increased availability of Internet and web-resources. Research scholars have become more used to retrieve information from the Internet than a traditional library.

The Internet growth and the development of web technologies have given way to gather large-scale language data. The reduction in the cost of computers and increase of storage space has enabled the web researcher to easily collect enormous online text of various types and sources, such as news articles, novels, blogs etc. However, large volume of information on the Internet is in English Language. Although information exists in other languages, the growth of information on the Internet in other languages, especially in Indian languages is observed to be very slow. Some of the popular web resources available in Urdu language are listed below:

A. **Annual of Urdu studies:** The Annual of Urdu Studies is a free, web-based journal which provides full text of scholarly articles, translations, short stories, poetry and views of scholars working on Urdu literature. It also publishes reviews of books, reports, research-in-progress, notices and information on forthcoming events of interest to its readers (conferences, workshops, competitions, awards, etc.) and serves as an annual inventory of significant Western publications in the field. The website includes even full-text archives.

B. **Urdu poetry resources:** Urdu poetry resources' is a website that provides links to wide range of resources about Urdu poetry including English translations, technical, critical articles, reviews and online dictionaries. There are also web pages that give links to biographical and publication details of poets as well as ghazal singer's and also links to respective bookstores and audio websites.

C. **ImaginAsian:** ImagineAsian is a reader development project started in 2002, Leicester City, Brent Harrow and Hillingdon Libraries which aims to raise the profile and increase the recognition of Indic writing in Urdu, Gujarati, Punjabi and English. This online resource provides a selection of book titles written in these four languages, including full bibliographic details and synopses. ImaginAsian brings together the authors who may only be approached individually in other online resources.

D. **U4U.Com:** U4U.Com is an online library with over 500,000 pages of world class Urdu literature with complete text of notable writers - from classic to contemporary. It is the only legal site featuring

hundreds of authors and poets. U4U.COM is fully indexed, searchable, and highly interactive website, with custom skins (graphics designs) to suit the aesthetics of all users. Urdu literature is treasured with some finest world-recognized poets and writers, such as Ghalib, Mir, Faiz, Qasmi and has a large corpus, ranging from poetry to fiction to epics (dastaan). U4U.COM presents a tribute to Urdu writers.

E. **Urdu E-newspapers in India:** India has an effervescent Urdu press, though the circulation of newspapers is much higher in Pakistan. However, in India, the Urdu papers are published from far and widely distributed across the country. Some of the important newspapers available online are listed below:

Table 1: *List of Some of the Important Newspapers Available Online*

S. No.	Name of the Newspaper	Place of Publication	URL
1.	Inquilab	Mumbai	*www.inquilab.com*
2.	Siasat	Hyderabad	*www.siasat.com*
3.	Sahafat	Lucknow	*www.sahafat.in*
4.	Munsif	Hyderabad	www.munsif.com
5.	Roznama Rashtriya Sahara	Delhi	*www.roznamasahara.com*
6.	Urdu Times	Mumbai	*www.urdutimes.net*
7.	Hindustan Express	Delhi	*www.hindustanurdudaily.com*
8.	Etemaad	Hyderabad	www.*etemaaddaily.com*
9.	Milap	Delhi	*www.milap.com*
10.	Mashriq	Kashmir	*www.akhbaremashriq.com*
11.	Aftab	Kashmir	*www.dailyaftab.com*
12.	Chattan weekly	Kashmir	*www.chattanonline.com*

F. Apart from the above mentioned resources, there are several websites in Urdu poetry and Literature like – Urdu Point (http://www.urdupoint.com/); Urdu Life (http://www.urdulife.com/poetry/), etc.

G. Software: ‘Mutakallim’ is Urdu Text to Speech Software that speaks and recognizes Urdu language. It is also known as Urdu Genie/Urdu Jini. Mutakallim was an attempt to develop Urdu Software that can recognize spoken Urdu words and Speak Urdu statements written/typed by the user.

3. Statement of the Problem

Users differ from one Library to another. Public library is comprised of general public. In a special library users are researchers and specialists. In an academic library the students, teachers and research scholars are the users. Whatever may be the type, the role of the libraries is to provide information and satisfy the information needs of the users from time to time.

User study helps in knowing the difficulties faced by the user in using their services and in obtaining the requisite information for his work. User study and feedback from the user helps the librarians to plan the services, taking the necessary steps matching their user needs, by which the smooth flow of information from the information system to user is enabled.

Present study is a part of the Information use studies aimed at exploring the information seeking behavior; extent of use; satisfaction about library and web resources by Urdu faculty, research scholars and students in the following six selected university libraries in the erstwhile state of Andhra Pradesh –

- Maulana Azad National Urdu University, (MANUU) Hyderabad
- Osmania University, (OU) Hyderabad
- Satavahana University, (SU) Karimnagar
- Sri Venkateswara University, (SVU) Tirupati
- Telangana University, (TU) Nizambad and
- University of Hyderabad, (UOH) Hyderabad

The above mentioned six universities are offering M.Phil. and Ph.D. programmes in addition to Master's degree in Urdu language, having separate departments for Urdu. Hence these six universities are selected for the study.

As the total strength of the faculty, research scholars and students in the selected university libraries is only 500 in number, the researcher resorted to census method. Structured questionnaires were distributed to all the 500 members. However, 380 responses were received in time. The details of Total strength and the response obtained in the selected university libraries are shown in Table 2.

Table 2: *Total Strength of Students, Research Scholars and Faculty and the Response Obtained (As per University)*

S. No.	Name of the University	PG	M.Phil. /Ph.D.	Faculty	Total	Response Obtained (Percentage)
1.	Maulana Azad National Urdu University	60	57	26	143	109 (76.22%)
2.	Osmania University	25	36	10	71	44 (61.97%)
3.	Satavahana University	45	0	03	48	35 (72.91%)
4.	Sri Venkateswara University	50	14	04	68	53 (77.94%)
5.	Telangana University	54	08	04	66	48 (72.72%)
6.	University of Hyderabad	57	37	10	104	91 (87.5%)
	Total	291	152	57	500	380 (76%)

4. Objectives of the Study

The specific objectives of the study are to –

1. Examine the frequency of library use
2. Analyze the pattern of internet use including – frequency and place of internet use
3. Analyze the use of Urdu e-resources
4. Analyze the preference for print and electronic resources
5. Study the impact of library and internet on academic performance of the respondents.

A. Need and Significance of the Study

A review of the existing literature reveals that intermittent efforts are made to study the problems encountered in the acquisition and development of Urdu library collections, evolving classification

systems suitable for Urdu language books. The present study therefore, aims to fill these gaps in the literature.

Studies focusing on the Information needs of Urdu scholars are not carried out in India, especially in Andhra Pradesh where several libraries like Osmania University Library, MAANU and other libraries with rich collections of Urdu resources are existing and Urdu scholars as well as learners are extensively using these collections. Hence this study would be of immense value to these libraries and learners.

5. Review of Literature

Several studies are conducted on the use of the library, Information needs and information seeking behavior and the use of electronic sources by academicians belonging to different faculties like sciences, social sciences and the humanities in general. However, the use of library and information sources by Urdu faculty, students and researchers are very scarcely found in the literature.

Das, A. and Basu, D. (2009) conducted study at Bidhan Chandra KrishiViswavidyalaya, West Bengal, which aimed to understand the differential purposes of “Internet use by the students and researchers”. The study also examined the students’ learning mode of Internet use, perception regarding its benefits, impact and influence in performance, user satisfaction and first hand problems faced by the students and researchers in use of internet.

Madhusudhan, M. (2007) made a study on “Internet use by research scholars in University of Delhi, India”. It was found that the Internet browsing facility has enabled the research scholars to enhance their academic excellence by providing them the latest information and access to worldwide information. A high proportion of respondents are using e-journals and databases.

Purnima Devi and Herojit Sing (2009) in their article “Internet users: a study of Manipur University Library” assessed the attitude of Internet users, especially the research scholars. The major objectives were to identify Internet is not a substitute for the library and to find the use of Internet resources by research scholars for their research work.

Vasappa Gowda and D. Shivalingaiah (2009) conducted a study on “Attitude of research scholars towards usage of electronic information resources: a survey of University Libraries in Karnataka.” Questionnaire was distributed to gather data from researchers of humanities, social science disciplines in six universities in Karnataka and responses were received from 845 research scholars. In general the research scholars preferred print resources and there exists significant differences in the preferences of print and electronic resources among various disciplines. Further the study identified the gaps in the need and availability of electronic resources like online journals and databases in the university libraries and also revealed that the electronic resources have created a positive hope among the research community in searching the information.

Mahajan (2006) on analyzed the Internet use by researchers in Punjab University, Chandigarh, and also how the convergence of information and communication technologies, as embodied by the Internet, has transformed the present day society into a knowledge society.

Mulimani, Mallikarjun N. and Gudiman, Suresh B. conducted a survey on “Usage of Internet by Students and Research Scholars of Karnataka University Library”. The main aim of this survey was to understand student’s usage of Internet and computer technology, their experience with technology and their aptitudes and expectation about technology resources and identify areas for improvement of services. The paper discusses the impact of Internet in Karnataka University Library.

6. Data Analysis and Findings

The findings drawn from 380 responses of 6 selected universities, as per the following objectives are analyzed below.

1. The frequency of library use
2. The pattern of internet use including – frequency and place of internet use
3. The use of Urdu e-resources
4. Preference of Print / Electronic
5. The impact of library and internet on academic performance of the respondents.

A. **Frequency of Library Visit**

Table 3: *Distribution of Respondents according to Frequency of Library Visit*

S. No.	Frequency of Library Visit	Faculty	Research Scholars	Students	Total
1	Everyday	6 (11.5%)	44 (32.6%)	51 (26.4%)	101 (26.6%)
2	Weekly	27 (51.9%)	54 (40%)	73 (37.8%)	154 (40.5%)
3	Fortnightly	8 (15.4%)	29 (21.5%)	48 (24.9%)	85 (22.4%)
4	Monthly	4 (7.7%)	2 (1.5%)	9 (4.7%)	15 (3.9%)
5	Rarely	7 (13.5%)	6 (4.4%)	12 (6.2%)	25 (6.6%)
	Total	52	135	193	380

The Table 3 shows the frequency of library use by Urdu faculty, research scholars and students of Andhra Pradesh. From the table, it is clear that less than half of the respondents (40.5%) visit the library once in a week and just above one fourths of the respondents (26.6%) visit the library every day.

Analysis of the frequency of library visit by different groups of users reveals interesting findings. Just above half of the faculty (51.9%) visit the library once in a week. Out of the remaining, 15.4% visit the library fortnightly. It is also noticed that 13.5% of the faculty rarely visit the library. Among the research scholars, less than half (40%) of them visit the library once in a week and 32.6% visit the library every day. Majority of the students (37.8%) visit the library once in a week, followed by 26.4% of them -visiting the library every day.

B. **Frequency of Internet Use**

The Table 4 shows Internet use in terms of hours per day by Urdu faculty, research scholars and students of Andhra Pradesh. Majority of the faculty (88.5%), research scholars (94.1%) and students (91.2%) are using internet at a minimum of one hour per day. For the hours of use per day for two and three hours, the response is very less from all three categories of users.

Table 4: *Frequency of Internet Use (In Terms of Hours per Day)*

S. No.	Internet Use (In hours)	Faculty	Research Scholars	Students	Total
1	One Hour	46 (88.5%)	127 (94.1%)	176 (91.2%)	349 (91.8%)
2	Two Hours	4 (7.7%)	5 (3.7%)	12 (6.2%)	21 (5.5%)
3	Three Hours	2 (3.8%)	3 (2.2%)	5 (2.6%)	10 (2.6%)
	Total	52 (13.7%)	135 (35.6%)	193 (50.7%)	380 (100%)

C. **Place of Internet Access**

The Table 5 shows the ranking of criteria for access of Internet facility by Urdu faculty, research scholars and students in Universities of Andhra Pradesh. A majority of the respondents (60.3%) percent accessed Internet from the Library, while 46.6% accessed from the Cyber Café. Another 51.6% accessed from home and 38.2% accessed Internet from the University Department/Computer center.

Table 5: *Ranking Criteria as per the Place Preference for Accessing Internet*

Ranking	Faculty	Research Scholars	Students	Total
(a) From the Place of Residence				
First Rank	14 (7.1%)	69 (35.2%)	113 (57.7%)	196 (51.6%)
Second Rank	14 (24.1%)	24 (41.4%)	20 (34.5%)	58 (15.3%)
Third Rank	21 (21.2%)	27 (27.3%)	51 (51.5%)	99 (26.1%)
Fourth Rank	3 (11.1%)	15 (55.6%)	9 (33.3%)	27 (7.1%)
Total	52 (13.7%)	135 (35.6%)	193 (50.7%)	380 (100%)
(b) Cyber Café				
First Rank	11 (20.4%)	22 (40.7%)	21 (38.9%)	54 (14.2%)
Second Rank	26 (14.7%)	62 (35.0%)	89 (50.3%)	177 (46.6%)
Third Rank	5 (7.0%)	40 (56.3%)	26 (36.6%)	71 (18.7%)
Fourth Rank	10 (%)	11 (14.5%)	57 (75.0%)	78 (20.0%)
Total	52 (13.7%)	135 (35.6%)	193 (50.7%)	380 (100%)
(c) Library				
First Rank	42 (18.3%)	74 (32.3%)	113 (49.3%)	229 (60.3%)
Second Rank	1 (1.4%)	30 (41.7%)	41 (56.9%)	72 (18.9%)
Third Rank	8 (11.1%)	26 (36.1%)	38 (52.8%)	72 (18.9%)
Fourth Rank	1 (14.3%)	5 (71.4%)	1 (14.3%)	7 (1.8%)
Total	52 (13.7%)	135 (35.6%)	193 (50.7%)	380 (100%)
(d) University Department / Computer Centre etc.				
First Rank	13 (8.9%)	72 (49.7%)	60 (41.4%)	145 (38.2%)
Second Rank	25 (23.1%)	33 (30.6%)	50 (46.3%)	108 (28.4%)
Third Rank	4 (9.3%)	10 (23.3%)	29 (67.4%)	43 (11.3%)

Fourth Rank	10 (11.9%)	20 (23.8%)	54 (64.3%)	84 (22.1%)
Total	52 (13.7%	135 (35.6%)	193 (50.7%)	380 00%)

D. **Use of Urdu E-journals and Magazines**

The Table 6 gives the data about the use of Urdu e-journals like (a) Annual of Urdu studies, (b) Urdu language jihadi journal, (c) Maarif-e-Raza journal (d) Yojana and (e) Bazm-e-sahara by faculty, research scholars and students of Andhra Pradesh. Out of 380 respondents, 193 (50.8%) respondents belongs students, 135 (35.5%) are research scholars, 52 (13.7%) are faculty. A major number of respondents either faculty or research scholars or students has shown average use towards Yojana 165 (43.4%) and Bazm-e-sahara 183 (48.2%). The least use has been shown towards the Annual of Urdu Studies 262 (68.9%), Urdu language jihadi journal 368 (96.8%) and Maarif-e-Raza journal 355 (93.4%).

Table 6: *Use of Urdu E-journals and Magazines*

Use	Faculty	Research Scholars	Students	Total
(a) The Annual of Urdu Studies, USA				
Most	2 (7.4%)	4 (14.8%)	21 (77.8%)	27 (7.1%)
Average	17 (18.7%)	40 (44.0%)	34 (37.4%)	91 (23.9%)
Least	33 (12.6%)	91 (34.7%)	138 (52.7%)	262 (68.9%)
Total	52 (13.7%)	135 (35.5%)	193 (50.8%)	380 (100%)
(b) Urdu Language Jihadi journal, Pakistan				
Most	0 (0%)	1 (50.0%)	1 (50.0%)	2 (0.5%)
Average	0 (0%)	8 (80.0%)	2 (20.0%)	10 (2.6%)
Least	52 (14.1%)	126 (34.2%)	190 (51.6%)	368 (96.8%)
Total	52 (13.7%)	135 (35.5%)	193 (50.8%)	380 (100%)
(c) Maarif-e-Raza journal, Pakistan				
Most	4 (36.4%)	6 (54.5%)	1 (9.1%)	11 (2.9%)
Average	2 (14.3%)	7 (50.0%)	5 (35.7%)	14 (3.7%)
Least	46 (13.0%)	122 (34.4%)	187 (52.7%)	355 (93.4%)
Total	52 (13.7%)	135 (35.5%)	193 (50.8%)	380 (100%)
(d) Yojana, India				
Most	16 (15.7%)	47 (46.1%)	39 (38.2%)	102 (26.8%)
Average	14 (8.5%)	60 (36.4%)	91 (55.2%)	165 (43.4%)
Least	22 (19.5%)	28 (24.8%)	63 (55.8%)	113 (29.7%)
Total	52 (13.7%)	135 (35.5%)	193 (50.8%)	380 (100%)
(e) Bazm-e-Sahara, India				
Most	14 (15.2%)	33 (35.9%)	45 (48.9%)	92 (24.2%)
Average	12 (6.6%)	67 (36.6%)	104 (56.8%)	183 (48.2%)
Least	26 (24.8%)	35 (33.3%)	44 (41.9%)	105 (27.6%)
Total	52 (13.7%)	135 (35.5%)	193 (50.8%)	380 (100%)

E. **Use of Urdu E-books**

The Table 7 gives the use of Urdu e-books resources like (a) Urdudost.com, (b) Urduweb.in, (c) Urdupoint.com and (d) u4u, by faculty, research scholars and students of Andhra Pradesh. Out of 380 respondents, 193 (50.8%) respondents belong students, 135 (35.5%) are research scholars, 52 (13.7%) are faculty. A majority of respondents in all categories either from faculty or research scholars or students have shown average use towards Urdudost.com 177 (46.6%), Urduweb.in 196 (51.6%) and Urdupoint.com 180 (47.4%).

Table 7: *Use of Urdu e-books*

Use	Faculty	Research Scholars	Students	Total
(a) www.urdudost.com				
Most	16 (16.2%)	45 (45.5%)	38 (38.4%)	99 (26.1%)
Average	18 (10.2%)	68 (38.4%)	91 (51.4%)	177 (46.6%)
Least	18 (17.3%)	22 (21.2%)	64 (61.5%)	104 (27.4%)
Total	52 (13.7%)	135 (35.5%)	193 (50.8%)	380 (100%)
(b) www.urduweb.in				
Most	16 (22.9%)	40 (57.1%)	14 (20.0%)	70 (18.4%)
Average	18(9.2%)	67 (34.2%)	111 (56.6%)	196 (51.6%)
Least	18(15.8%)	28 (24.6%)	68 (59.6%)	114 (30.0%)
Total	52 (13.7%)	135 (35.5%)	193 (50.8%)	380 (100%)
(c) www.urdupoint.com				
Most	12 (18.8%)	34 (53.1%)	18 (28.1%)	64 (16.8%)
Average	22 (12.2%)	68 (37.8%)	90 (50.0%)	180 (47.4%)
Least	18 (13.2%)	33 (24.3%)	85 (62.5%)	136 (35.8%)
Total	52 (13.7%)	135 (35.5%)	193 (50.8%)	380 (100%)
(d) www.u4u.com				
Most	4 (13.3%)	21 (70.0%)	5 (16.7%)	30 (7.9%)
Average	18 (10.3%)	66 (37.9%)	90 (51.7%)	174 (45.8%)
Least	30 (17.0%)	48 (27.3%)	98 (55.7%)	176 (46.3%)
Total	52 (13.7%)	135 (35.5%)	193 (50.8%)	380 (100%)

The Table 8 reflects the data on the Use of online Urdu resources by faculty, research scholars and students of Andhra Pradesh. A major number of respondents either faculty or research scholars or students marked average use towards Urdu e-journals 50%, Urdu databases 47.6% Urdu e-books 42.6%. The use of Online Newspapers in Urdu Language has been rated as “Most” by faculty with 82.3%.

F. **Use of Online Urdu Resources**

Table 8: *Use Regarding Different Types of Online Urdu Resources by the Respondents*

S. No.	Online Urdu Resources	Use as per the No. of respondents (%)		
		Most	Average	Least
1	Urdu e-books	115 (30.3%)	162 (42.6%)	103 (27.1%)
2	Urdu e-journals	61 (16.1%)	190 (50.0%)	129 (33.9%)
3	Urdu Databases	37 (9.8%)	181 (47.6%)	162 (42.6%)
4	Online Newspapers in Urdu Language	313 (82.3%)	50 (13.2%)	17 (4.5%)

G. **Preference for Print and Electronic Information**

S. No.	Type of Source	Satisfaction As per No. of respondents (%)
1	Print Information	238 (62.6%)
2	Electronic Information	142 (37.36%)

The respondents were asked to mark their preference of use of print and electronic sources of information to satisfy their information needs. It can be seen from the Table 9, that 62.6% of the respondent's preferred print information and only 37.36% of respondents stated that they use electronic sources to satisfy their information needs.

H. **The Impact of Internet Use on Library**

The Table 10 shows the impact of Internet use on library. Out of 332 (87.4%) respondents who said "NO", 45 (13.6%) are faculty members, 121 (36.4%) are research scholars and 166 (50.0%) of them are students. The respondents prefer library resources more than the Internet resources. Since there are very few resources available on the internet, very few electronic journals being published in Urdu language and very few electronic books resources available, there is very less use of Internet and more use of printed Urdu material. Hence there is more usage of library resources than the internet resources. Therefore it can be observed that the respondents are more used towards printed material and their usage of library resources is also more. It is also apparent from the data that Internet cannot decrease the importance of Library resources. Since, the electronic resources in Urdu language are scanty, the use is more focused towards print resources and the respondents ultimately depend on print form. The situation implies that there is a need to improve digital resources in Urdu language.

Table 10: *Respondent's Opinion on Whether Internet Decrease the Importance of Library Resources*

S. No.	Type of Users	No. of Respondents (%)		Total
		Yes	No	
1	Faculty	7 (13.5%)	45 (86.5%)	52 (13.7%)
2	Research Scholars	14 (10.3%)	121 (89.6%)	135 (35.6%)
3	Students	27 (14%)	166 (86%)	193 (50.7%)
		48	332	380

Total	(12.6%)	(87.4%)	(100%)

7. Summary of Findings

- Majority of respondents (40.5%) reported that they visit the library once in a week and only 26.6% visit the library every day. Considerable respondents (6.6%) reported the rare use of the library. From the data, it can be stated that Library is not used to the optimum level by the respondents. The reasons for the less frequent visits could be because of lack of up-to-date collection of Urdu books or lack of proper arrangement and maintenance in the library. The study finds that respondents make more use of textbooks, Internet and newspapers in the library compared to other resources.
- Frequency of Internet use by the respondents shows that majority of the faculty (88.5%), research scholars (94.1%) and students (91.2%) are using internet for one hour per day.
- Respondents were asked about the place of Internet access. The responses were ranked based on the average score received for each option. Respondents ranked internet accessed from the library as first rank (3.37) followed by accessing internet from the place of residence (3.11) and from the University department/ Computer center (2.82).
- The Urdu magazines published in electronic form in India - Yojana (26.8%) and Bazm-e-sahara (24.2%) is used to a greater extent by the respondents. The least use has been shown towards the Annual of Urdu Studies 262 (69%), Urdu language jihadi journal 368 (97%) and Maarif-e-Raza journal 355 (93.4%). The reason for less usage towards e-journals and magazines may be either the library is not subscribing the e-journals or the respondents are not aware of using the e-journals and magazines. Since there are very less online e-journals and magazines published in Urdu language and literature, the usage is also very less.
- Although use of e-books is observed to be less by the respondents, they rated Urdu dost.com (26%) as most used website for e-books. Other websites including Urduweb.in (18.4%) and Urdupoint.com are used by 16.8% respondents only.
- Average satisfaction is received from the respondents towards Urdu e-journals 50%, Urdu databases 47.6% and Urdu e-books 42.6%. The satisfaction regarding the Online Newspapers in Urdu Language has been rated as “Good” by respondents with 82.3%.
- It is found that Print is the most preferred medium for satisfying the information needs compared to the electronic medium.
- Very high percentage (87.4%) of respondents opined that use of Internet do not reduce the use of Library. All the respondents agreed that library has positive impact on the academic performance.

8. Recommendation & Conclusion

Since, the electronic resources in Urdu language are scanty; there is a need to improve digital resources in Urdu language. The above data also indicate that still there is a gap in publishing e-resources in Urdu language as well using those are available by all the categories of users. Though good number of students, research scholars and faculty members are using and preferring Urdu e-resources, the findings reveal that –

- There is need to increase awareness about the availability of information resources such as full text digital resources more and more information gateways, groups, discussion forums, etc. coming up in this era and also about searching OPACs.
- There is a need to develop knowledge about use of electronic resources of all types available online including books, journals, theses and dissertations, technical reports, patents, databases, etc.

The Internet has become a major source of communication and dissemination of information in the twenty-first century. Libraries in India are rapidly transforming into digital libraries and virtual learning resource centers. A large portion of user populations in the university are aware about the Internet, but they do not know all its techniques and applications. Further, a few users of the universities in the country still do not have sufficient knowledge about the Internet and related applications. For this purpose, there is need for effective user education, to develop awareness and knowledge among users for the effective use of ever populating learning resources in electronic form. More efforts by library professionals are needed to educate users to effectively use the Internet and its techniques and applications.

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Web 2.0 Tools in Enhancing the Best Practices of User Services in Academic Libraries: A Comparative Study of Central University Libraries in Assam State

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This article belongs to the ***Special Issue "Modern Trends in User Centric Design (UCD) of Library Services and Applications"***

Abstract Applications of Web 2.0 tools are playing a significant role to enhance the best practices of library activities as well as on-line digital reference services. The tools are becoming more popular among avid users of this modern era as they are fast and effective tools for disseminating information. Use of these tools in a library will fascinate the users and disseminate information in a more attractive and agreeable medium. This paper is aimed at presenting the results of a study conducted in the central universities in Assam State on Web 2.0 applications among LIS professionals. During the survey, structured questionnaires were distributed randomly among LIS professionals and the responses were received with a rate of eighty eight percent. The comparative study revealed the respondents' awareness and rate of knowledge about the Web 2.0 tools in the central university libraries.
Keywords *Web 2.0; LIS Professionals; Best Practices; Central University Libraries; Assam*

1. Introduction

Web 2.0 tools are dominating the personal and professional lives of millions of users. The popularity of the tools draws the attention of all the people and it has changed the ways that libraries, museums, archives and other cultural heritage organizations work. As librarianship changes and adapts to the needs of the internet generation, use of these tools has become an essential feature in the work areas of the professionals [4].

Web 2.0 tools and plans have provided innovative practices to the normal way of working in the library profession. Web 2.0 facilities presently offered by libraries include Blogs, Wikis, RSS, Podcasts, Video Casts, Instant Messaging, SNS and Twitter, etc [4]. The use of Web 2.0 tools and applications brought

substantive change in library collection and services. The library collection is changed, becoming more interactive and fully accessible. The library's services are changed, focusing more on facilitating information dissemination and the information retrieval rather than providing controlled access to it [2].

Some important web 2.0 applications useful for libraries are mentioned below.

- Blogs are websites. They can be used to promote library services providing links to recommended sources, listing book reviews, promoting entertainment, providing news for LIS professionals, initiating book discussions, facilitating communication amongst library users and encouraging the development of a community.
- SNSs (social networking services) can encourage a variety of library services such as library announcements, posting news, updating resources, communicating with patrons, providing reference service, collaborating on projects, for customer service, sending alerts about requested materials, as a marketing tool, as a way to share information about professional development opportunities, for cataloging, for internal updates, and for networking with other staff, libraries, and library-relevant organizations.
- RSS feed through library can offer a variety of services such as workshops/classes, to market ideas, activities, event announcement, new acquisitions, exhibitions, to share library news and content, as well as to gather and distribute related information from other web sources. LIS professionals can use RSS feeds for Current Awareness Service and SDI (Selective Dissemination of Information) services. This resembles the traditional library services namely CAS and SDI.
- Wikis can be used for internal communications among staff, to create a knowledge base, to facilitate committee work, for instructional purposes in the classroom, to teach information literacy to students, in project management and strategic planning also.
- Instant messaging (IM) is similar to e-mail that can exchange text messages and it is a more immediate and informal way of communication system. One of the best examples of instant messaging service is used in 'chat reference' services, where users can interact with librarians.
- Podcasts can be facilitated through a variety of library services like provision of weekly updates new arrival book, lectures, tutorials, events, conferences, in information literacy instruction, library marketing, library instruction, keeping patrons up to date with library information, library guides and tours. Libraries can distribute iPods to their users to intensify their podcasting services and resources.
- In library environment, Vodcast's are playing an important role in information dissemination. It displays some of its lectures (through You Tube) using Web 2.0 technologies. Several libraries around the world are using You Tube for information dissemination.

Libraries are increasingly enhancing their websites by introducing Web 2.0 features in providing the users' services. The amalgamation of Web 2.0 features has endorsed the website to be more flexible and adaptable. With the adoption of Web 2.0 tools, LIS professionals effectively work on outreach activities and promotion. LIS professionals can get first-hand information about the users through interacting with them. They can then understand the behaviour of the users and design services to meet their needs [12].

There are only two central universities in Assam. They are, Tezpur University and Assam University situated at Brahmaputra Valley and Barak Valley regions of Assam respectively to cater the academic needs of the people. The Central Library of Assam University known as Rabindra library was established in the year 1994 as a central facility for meeting the information requirements of the academic community of the university. It possesses more than one lakh books and it is the largest library in the Barak Valley region of Assam along with other valuable resources [3].

The Central Library of Tezpur University was established in 1994 along with the establishment of the University. The library holds more than sixty five thousand volumes of print documents and subscribed to more than six hundred and thirty current journals.

Both the libraries are member of the UGC-Infonet Consortia of INFLIBNET and getting access facility to around 9081 (including 525 on perpetual basis) e-journals and seven databases. Both the libraries get online access of 926 e-journals through DelCon Consortium. Library users can access books database, these database, journal database, e-journals and other e-resources from any terminal within the university campus [9].

2. Statement of the Problem

Web 2.0 tools are not a new concept for libraries, and now-a-days, these tools have come up with innovative features and flexibilities. Many studies carried out on Web 2.0 tools in library services and activities in order to get benefits of these miraculous tools and explore the library services on virtual environment on web. No study was undertaken to understand the awareness and use of Web 2.0 technologies as the best practices among LIS Professionals in the central university libraries of Assam. Keeping the emerging use of Web 2.0 applications all over the world in view, this study was aimed at finding the use of Web 2.0 applications for enhancing the best practice in the central libraries of Assam.

3. Objectives of the Study

The main objective of the study is to determine LIS professional's awareness on Web 2.0 tools and its usage in the two central university libraries of Assam. The other objectives of the study are:

1) To assess the use of Web 2.0 tools by LIS professionals
2) To determine the sources of learning the Web 2.0 tools
3) To understand the impediments to use Web 2.0 tools
4) To determine the purposes and different challenges faced in using Web 2.0 tools
5) To find out training needs on Web 2.0 tools
6) To assess the type of training and tools of Web 2.0

4. Research Methodology

The present study has been undertaken in two central universities in Assam such as Assam University, Silchar and Tezpur University, Tezpur. Survey method was adopted to conduct the study and a structured questionnaire was designed to collect information from the LIS professionals. The structured questionnaire was set and distributed among LIS professionals of both the university libraries. Fifteen questionnaires were distributed to Assam University LIS Professionals. Out of fifteen questionnaires, fourteen professionals were responded that means response rate was ninety three percent of LIS Professionals in Assam University, Silchar. Ten questionnaires were circulated to Tezpur University LIS Professionals. Out of ten, eight questionnaires were received from respondents i.e.; eighty percent. On the whole twenty two responses were received from total twenty five questionnaires circulated and the response rate of both the universities was eighty eight percent. Functioning of the university libraries were personally observed and interviews with the respondents were also taken as and when became necessary.

5. Literature Review

Numerous studies on awareness and usage of Web 2.0 tools among various professionals have been conducted and literatures on the area are available in print and non-print form. A few of the earlier studies found on Web 2.0 applications among LIS professionals are summarized below.

- Abidinet et al. [1] in their studies indicated that most of the respondents were using Web 2.0 services in their daily lives. However, users did not use this service provided by the public libraries, although all 14 public libraries had adopted at least two or more Web 2.0 services, especially SNSs. In fact, the adoption of Web 2.0 services was at an initial stage of its development and thus, most of the Malaysian libraries were in the process of enhancing its progress for the betterment of the services. Conversely, the study also found that there were no definite policies on the adoption of these services.
- Baroet, al. [4] conducted a survey on awareness and use of web 2.0 tools by librarians in University Libraries in Nigeria. The survey report showed that the librarians were more familiar with SNSs, IMs, and media sharing sites, blogs and wikis. Web 2.0 tools like Flickr, RSS feeds, podcast and social bookmarking were among the least used. The study revealed that librarians used Web 2.0 tools mostly for reference services online, library news/events, training resources, and image and video sharing. Lack of facilities such as computers with internet access, lack of skills, and lack of time were indicated as some of the barriers in the use of Web 2.0 tools by librarians in university libraries in Nigeria.
- Mansor and Idris [7] conducted a survey on perceptions, awareness and acceptance of Library 2.0 applications among librarians at the international Islamic University Malaysia. The findings showed that there was high awareness among the librarians with Library 2.0 applications. The findings also indicated that there was high level of computer expertise among the respondents in terms of web browsers and search engines, in addition to high level of utilization in some of the Web 2.0 applications. In addition, the study observed high rates of using blogs and Wikipedia among the librarians.
- Tyagi [10] expressed that Web 2.0 was especially useful and creative when knowledge was digitized, modular and allowed to be used and distributed in a flexible way. The application of the Web 2.0 tools in Indian higher education was still marginal and it would have to overcome a lot of obstacles in order to hold its ground as in higher education of developed countries. The adoption of Web 2.0 tools at universities was associated with important challenges (potential risks, institutional fears) and an effective strategy to deal with implementation problems.
- Tyagi [11] observed that significant portion of the respondents had good knowledge about the Web 2.0 tools. Web 2.0 provided innovative and interesting resources for librarians to serve their users as quickly and effectively as possible with new ways. The respondents having excellent skills of internet usage were more inclined towards adoption of Web 2.0 technologies in their personal life.
- Thanuskodi [12] carried out a survey on awareness of library 2.0 applications among library and information science professionals at Annamalai University, India, which indicated that majority 37 (61.66%) of the respondents needed training on Web 2.0 technologies and tools. The study found that 20 (33.33%) of the respondents considered workshops as important for using blogs. When asked about workshop on using wikis, only a very few respondents (15.55%) agreed to it.

The reviews of literature indicate that there was no such literature to understand the level of awareness and use of Web 2.0 tools by the LIS professionals in the university libraries of Assam state.

6. Analysis and Interpretations

The analysis and interpretations are discussed below:

A. Level of Awareness of Web 2.0 Applications

LIS Professionals were asked to specify whether they were familiar about Web 2.0 tools such as blogs, Wikipedia, RSS feed, social networks, podcasting, and others. It was observed that all of the respondents have sufficient knowledge about the Web 2.0 tools (Table 1). 86% of respondents in Assam University were aware of Web 2.0 tools. While, only 75% of respondents in Tezpur University were aware of the same.

Table 1: *Level of Awareness of Web 2.0 Tools*

Aspects	Assam University		Tezpur University	
	Responses (N = 14)	%	Responses (N = 8)	%
Yes	12	86	6	75
No	2	14	2	25
Total	14	100	8	100

A question was posed to identify which particular Web 2.0 tools were used and the respondents were aware of. The results are depicted in percentages and illustrated vide Figure 1.

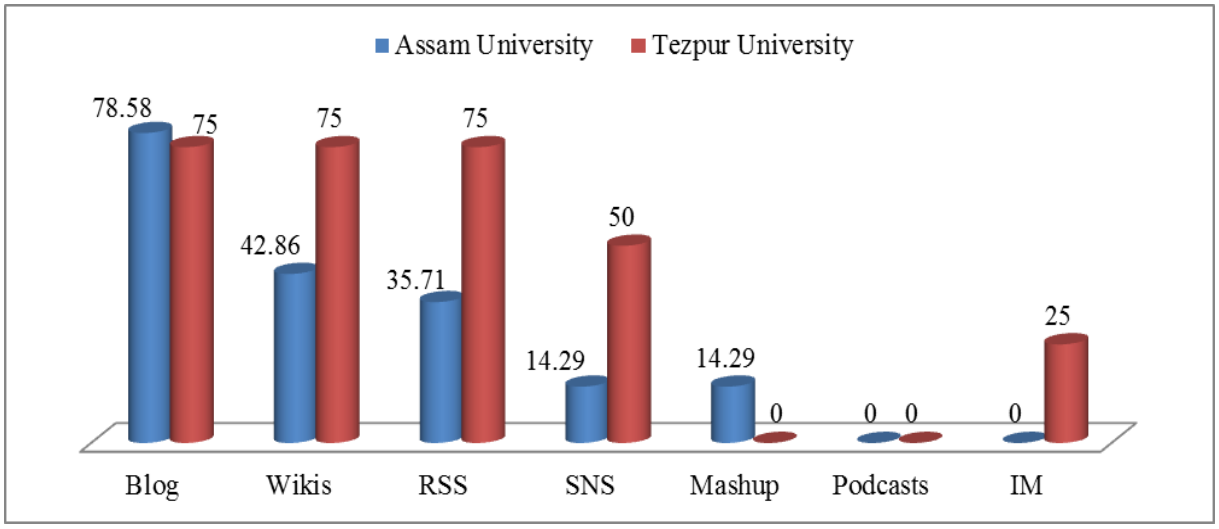

Figure 1: *Familiarity of Web 2.0 Tools (in percentages)*

It was revealed from the study that the respondents in both the universities are highly aware blogs as Web 2.0 tool**.** The percentage of response is 78.58% in Assam University and 75% in Tezpur University.

B. Use of Web 2.0 Tools

One of the main objectives was to study the opinion of usage of Web 2.0 tools among LIS Professionals. Results showed that 86% of the participants of Assam University used Web 2.0 tools while 75% of the respondents of Tezpur University used Web 2.0 tools as shown in Figure 2**.**

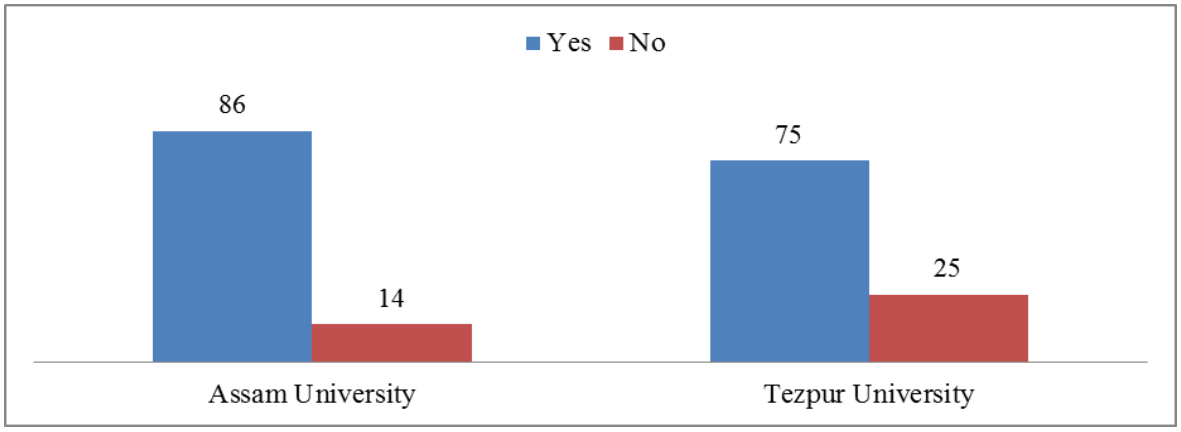

Figure 2: *Use of Web 2.0 Tools (in percentages)*

C. Sources of Learning the Web 2.0 Tools Use

Respondents were asked to classify the method used for acquiring the necessary skills to use Web 2.0 applications. The results are shown in Figure 3. It was revealed from the data that 64.29% of Assam University LIS professionals learnt through self-practice, while 75% respondents of Tezpur University acquired skills through self-practice; 42.86% of respondents learnt Web 2.0 tools through workshop and 12.5% of participants acquired knowledge through workshop respectively.

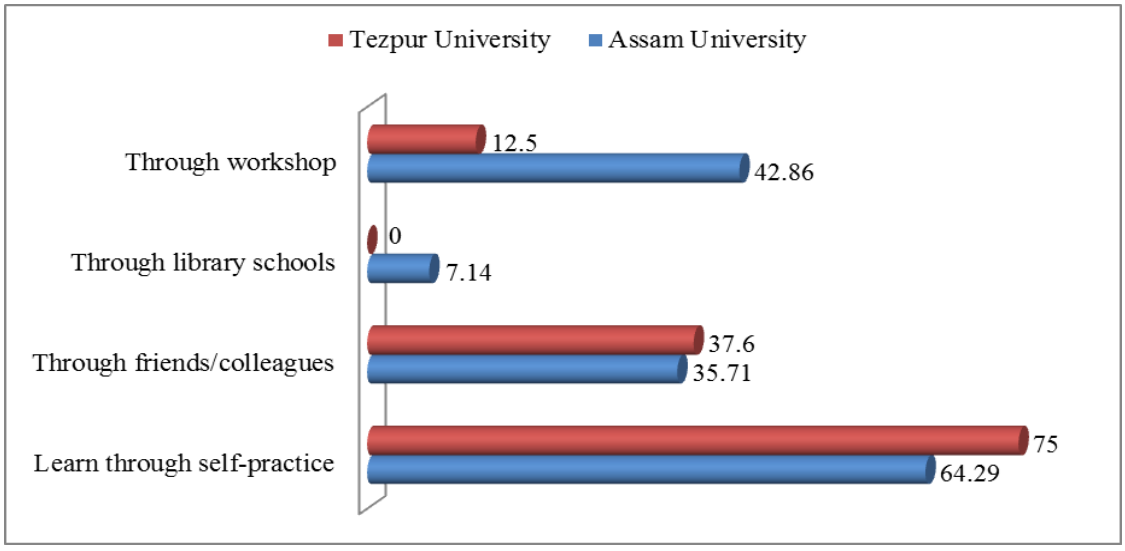

Figure 3: *Means of Acquiring Skills to Use of Web 2.0 tools (in percentages)*

D. Impediment to the Use of Web 2.0 Tools

Only a few LIS professionals responded to the question where they were asked to mention the reasons why they were not using Web 2.0 Applications. Table 2 discloses various reasons for not using Web 2.0 tools among LIS professionals. 21.42% of respondents in Assam University expressed that they have IPR/copyright issues and institutional fears in using Web 2.0 applications. While, only 12.5% of participants in Tezpur University responded that inability to prove "authenticity of the content" and IPR/copyright issues in using Web 2.0 applications. Only 14.29% of participants in Assam University realized unreliable power supply in using Web 2.0 applications in library.

Table 2: *Reasons for Not Using Web 2.0 tools*

Reasons for Not Using Web 2.0 Tools	Assam University		Tezpur University	
	Responses (N = 14)	%	Responses (N = 8)	%
Inability to prove "authenticity of the content"	0	0	1	12.5
IPR and copyright issues	3	21.42	1	12.5
Institutional fears	3	21.42	0	0
Unreliable power supply	2	14.29	0	0

E. Purposes of Web 2.0 Tools Use

Differences regarding the purposes for which LIS professionals use Web 2.0 tools also exist among LIS professionals in Assam University and Tezpur It was observed that 62.6% of LIS professionals in Tezpur University use the Web 2.0 tools for keeping users aware with knowledge of current subjects. While, only 35.71% of LIS professionals in Assam University use the Web 2.0 tools for keeping users aware with knowledge of current subjects. 50% of LIS professionals in Tezpur University engaged in sharing information about new arrival of books and participate in discussions/interactions. While, only 21.42% of LIS professionals in Assam University engaged themselves in sharing information about new arrival of books and participate in discussions/interaction (Figure 4).

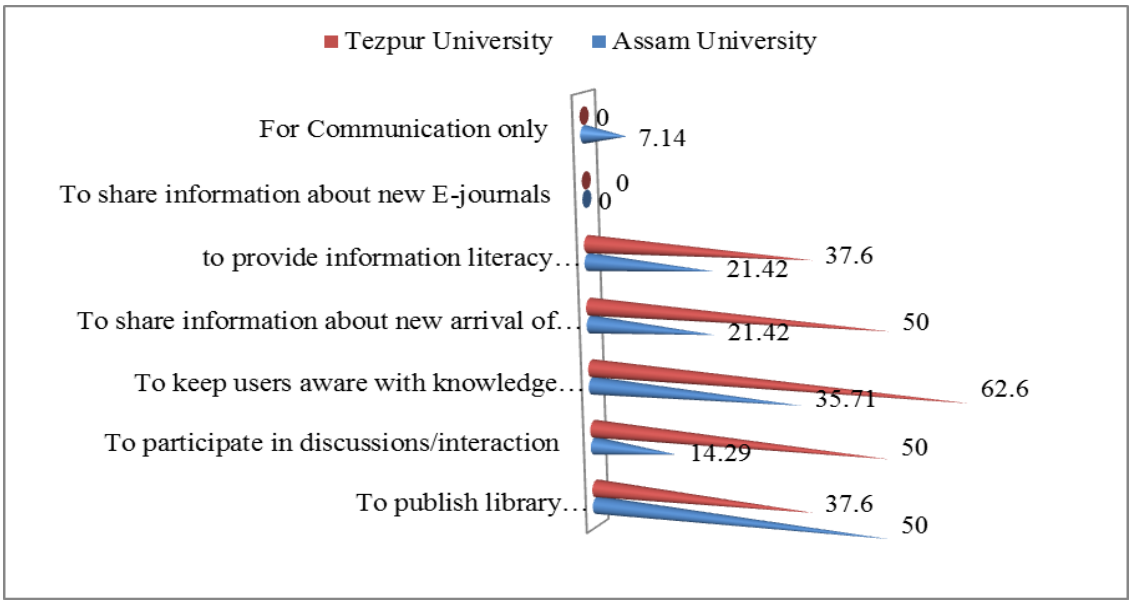

Figure 4*: Purposes of Web 2.0 tools use among LIS Professionals (in percentages)*

F. Challenges Faced in Using Web 2.0 Tools

LIS professionals were asked to indicate challenges faced in using Web 2.0 tools (Figure 5). Various problems have been mentioned by the respondents. 87.6% of LIS professionals in Tezpur University indicated lack of skills as one of the major encounters to effectively use Web 2.0 tools. While, only 50% of LIS professionals from Assam University realized lack of skills as a barrier. 62.5% of LIS professionals in Tezpur University opined lack of facility and lack of infrastructure as a challenge to use Web 2.0 tools.

While 50% of LIS professionals in Assam University indicated that lack of facility and lack of infrastructure as challenges in using Web 2.0 tools.

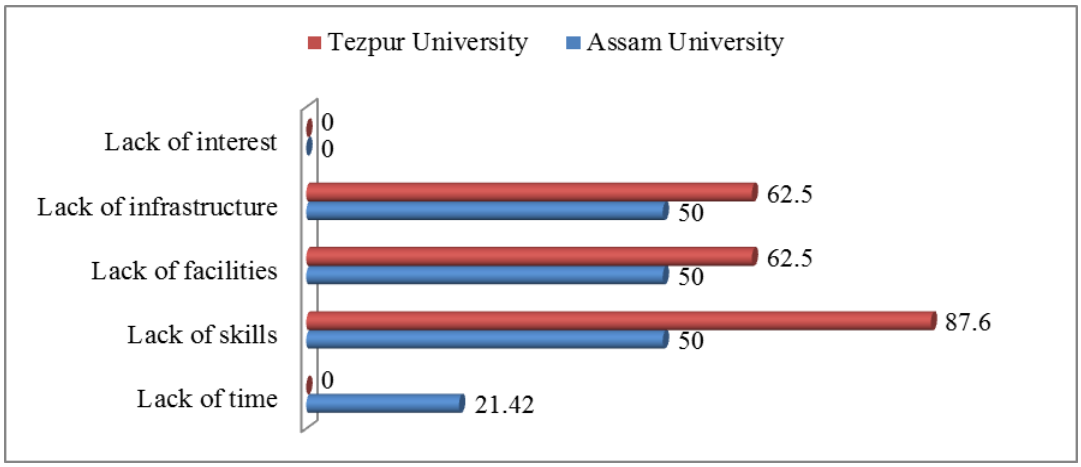

Figure 5: *Barrier in Using Web 2.0 tools among LIS Professionals (in percentages)*

G. Type of Training and Tools of Web 2.0

The study showed that 71.42% of LIS professionals of Assam University needed training on application of Web 2.0 technologies and tools. While only 75% of Tezpur University participants opined that they required training on application of Web 2.0 technologies and tools in libraries. 57.14% of the Assam University respondents felt the importance of workshop for using blogs, wikis, SNSs, and podcasting. While only 62.5% of Tezpur University respondents were of the view that they needed workshop to learn about blogs, wikis, SNSs and podcasting. When asked about workshops on application of mashups, only 35.71% of respondents of Assam University and 37.6% of Tezpur University agreed the same (Figure 6).

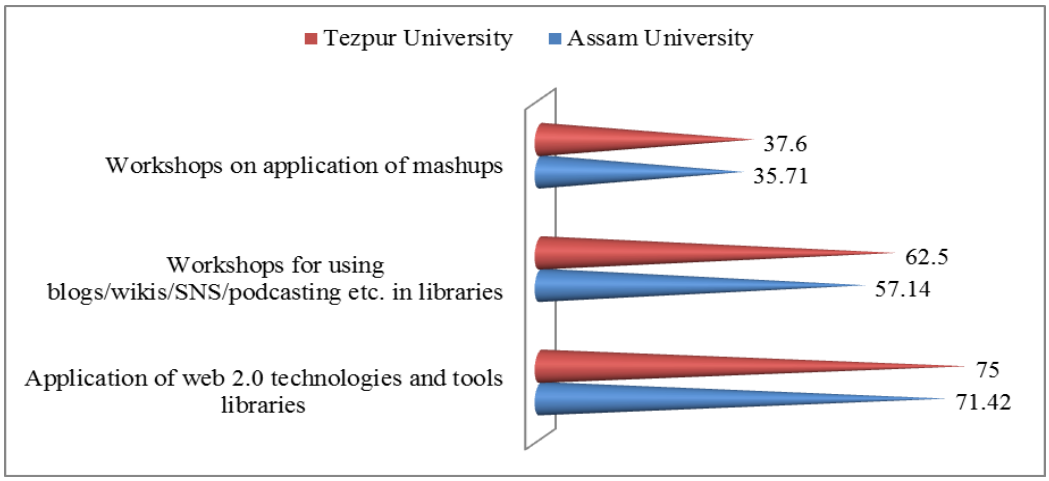

Figure 6: *Training Needs on Web 2.0 tools*

H. Training Needs on Web 2.0 Tools

Respondents were asked to indicate their outlook regarding the training wishes on Web 2.0 tools in libraries. Table 3 shows that LIS professionals of both the universities supported the needs for the training on Web 2.0 tools.

Table 3: *Training Needs on web 2.0 tools*

Training on Web 2.0 Tools	Assam University		Tezpur University	
	Responses (N = 14)	%	Responses (N = 8)	%
Yes	14	100	8	100
No	0	0	0	0
Total	14	100	8	100

7. Discussion

Web 2.0 tools facilitate different library services, geared towards the needs and expectation of today's library users. It makes information accessible whenever or wherever the users require it. Web 2.0 based library services are new trends for library and information centres. Library and information professionals should pay attention that Library 2.0 could revitalize the way they serve and interact with the customers [6]. The present study was conducted with a main objective to determine LIS professionals' awareness on Web 2.0 tools as a best practice and its usage in the two central university libraries of Assam. The usage of Web 2.0 tools among LIS Professionals derived from the study showed higher in Assam University than the Tezpur University. Respondents of both the universities felt the needs for the training on the use of Web 2.0 tools so that they can make optimum use of these tools for providing services to their users.

8. Recommendations

From the results discussed above following recommendations have been drawn:

- Seminars or workshops should be regularly organized from time to time for LIS professionals and users to support themselves to become familiar with different Web 2.0 tools. This would help to improve their level of competencies in delivery and use of library services.
- Many Web 2.0 tools are freely available in the web and students are already taking advantage of them. They can participate, contribute and collaborate in the creation of a new content over the web. Moreover, there is no financial constraint in using these tools. Thus, University Authority should support the use of these existing technologies rather than developing new technologies from scratch.
- The Web 2.0 tools support in enhancing the excellent as well as innovative and more efficient library services to the present users and will also help in reaching out to new potential users. Librarians and LIS professionals should be ready to adopt Web 2.0 tools based services to the users. It opens a way to interact/share their information to users.
- A separate course on Web 2.0 tools should be included in course curriculum in library science departments in universities. Teaching about Web 2.0 tools in library science department will enable to prepare the next generation library staff for the new challenges ahead.
- LIS professionals should acquire required knowledge and training to use Library 2.0 tools in their libraries effectively.
- Library 2.0 services are constantly updated and reevaluated to best serve the library users. LIS professionals should attempt to harness the Web 2.0 tools in the design and implementation of library services and by encouraging users' feedback and participation [8].

9. Conclusion

Many Web 2.0 tools are extensively available which can be of great help for the libraries. The LIS professionals in the central university libraries of Assam should take advantage out of them. They can participate, contribute, and collaborate in the creation of a new content over the web. These tools are simple to use and easy to customize as per needs. Web 2.0 tools support in enhancing the innovative and more efficient services to the library users. Some of them may successfully attract new patrons to the library, others may help to retain existing members or make libraries even more important as centres of the culture and history of their cities and academic institutions. These new services and on-going changes are likely to make libraries more interesting, more relevant, and better acceptable place [2]. Applications of Web 2.0 technologies in libraries will result in a meaningful and substantive change in libraries, its collection, services and methods of delivery of services. Central university libraries in Assam must thrive to embrace Web 2.0 tools for effective service delivery in this digital era. Although LIS professionals are aware of these tools still they must be proactive in their attempts to adopt and use different Web 2.0 tools fully in enhancing best practices. They should continue to play the role they have always played as facilitators between information and the end users. It is now mandatory for academic librarians to be aware of web 2.0 tools as most of the publishers who provide e-resources /databases are enabling these features for easy and prompt access to the user community.

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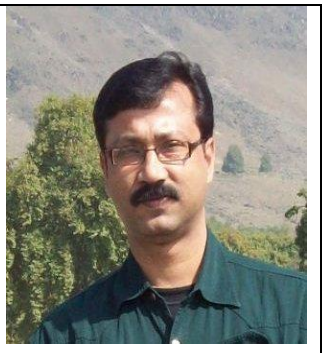

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Use of Document Delivery Services through J-Gate@UGC-INFONET - A Case Study of IGM Library, University of Hyderabad

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This article belongs to the ***Special Issue "Modern Trends in User Centric Design (UCD) of Library Services and Applications"***

Abstract The University Library & Information Centers are playing a prominent role in procurement, organization, preservation of resources and providing access to the research scholars. These centers are the basic source of information for present and future generations. This paper explains the importance of Inter Librarian Loan facility in University Libraries and also discusses about J-Gate@UGC-Infonet (http://jgateplus.com). Finally it analysis the document supply service of IGM Library, University of Hyderabad.

Keywords *Document Delivery Services; University Libraries-Resource Sharing; J-gate; JCCC for University Libraries*

1. Introduction

Libraries and information centres are the primary source of information or documents to students, research scholars and faculty in universities. Libraries are the basic support for teaching, research and advanced studies in universities. Though, libraries strive to provide all the required resources to their clientele, but unable to meet their complete requirements in-spite of spending maximum of their budgets. Moreover, cost escalations of resources and shrinking library budgets and ever increasing users demands for resources have posing constant challenges to librarians. Further no library is self sufficient to meet the entire research requirements, but relies on sharing the resources among themselves. Resource sharing also helps libraries to meet the gaps in individual library collection and when they cannot afford to purchase resources for their users. In addition to libraries mutually sharing resources, many library resource sharing networks and consortia are formed in this electronic and digital era and helping the member libraries to share their resources and increase the research output of the organization.

The term interlibrary loan service referred as a library to library transaction. It is considered essential service of the library because the other libraries do not give books directly to patrons of other different libraries. In olden days Inter Library Loan (ILL) service has been provided by libraries to obtain materials such as books, photocopies of journal articles and other materials from other libraries. The books will be returned to the lending library after taking photocopies of the required chapters. Libraries were not usually collecting any charges from their users or libraries for these services.

Library and Information services are being transformed by technology and they have to adapt to these changes to meet their users' changing needs and growing expectations. The implementations of ICT in the libraries have demanded new forms of library services to get more user satisfaction. Digital library service has evolved after the implementation of ICT in the library and information centers. Technological advancements in information industry and libraries also transformed the scenario of even document delivery services as the libraries are unable to meet the requirement of their library users with their limited resources.

All web-enabled libraries are in an ideal position to provide ILL services to their clientele through modern information communication technology (ICT). ILL services can be rendered more effectively in these days. Scanned articles now can be sent through electronic mail over the Internet. Patrons can also initiate a request that will go immediately to the library that owns the item, effectively bypassing the interlibrary loan unit of the home library. These changes have increased the speed of process of making request/delivery of article and its receipt by the user; thereby productivity for library staff is increased and ultimately speedy service to the patron.

2. Review of Literature

Brown (1997) described how maximum resources can be successfully accessed during budget constraints. Moreover, he addressed future concerns of university libraries in the electronic environment and recommended the adoption of resource-sharing, efficient delivery methods and clarification of legal issue. Conrolly (1999) was of the opinion that web based ILL Systems are replacing paper based manual systems.

Srivastva, Mehandra and Kanauja, Laleta (2004) conducted a survey for investigating the present situation of library automation, CD-ROM database services, internet and on-line facilities, reprographic services in Agricultural University libraries in India. This study also emphasized the traditional documentation and information services namely bibliographic service, current awareness service, abstracting and indexing and newspaper clipping services in agricultural Universities in India. Findings indicated that, 100% libraries are providing Current Awareness Service and bibliographic services.40% libraries providing indexing and abstracting services. Almost all the libraries providing reprographic services and 73.33% providing microfilm reading facility and they suggested that all the libraries should provide better information services electronically for meeting the requirement of the users.

Desale, Sanjay, Londhe, N.L. and Patil S.K. (2009), conducted a study on JCCC@UGCINFONET and the document supply service at the University of Pune. They faced problems while using the JCCC@UGCINFONET interface and the administrative interface in providing ILL service. They suggested the JCCC software should be evaluated from both the users and administrative point-of-view.

Sangeeta Kaul (2010), while conducted a survey of DELNET libraries for assessing the usage of DELNET services found that Photocopying of journal articles and supply is the most popular service of DELNET. The study has found that 86% member libraries are benefited from the union catalogue and above 90% libraries are satisfied about the ILL/DD service of the DELNET.

In view of the importance of document delivery services to university users i.e. faculty, research scholars and students, it is aimed to overview the document delivery services organized by INFLIBNET Centre through their UGC Infonet Digital Library consortium, especially with special reference to the currently operated online service J-Gate@UGC-INFONET for university libraries and analyze its usage in University of Hyderabad by the Library quantitatively. The required data was collected from the library records, literature published in journals and usage statistics supplied by the UGC Infonet Digital Library Consortium

3. INFLIBNET Centre - Document Delivery Services

The Information and Library Network (INFLIBNET) Centre is an autonomous Inter-University Centre (IUC) of the University Grants Commission (UGC). It has involved in creating the infrastructure for the sharing of library and information resources and services among academic and research institutions in India. INFLIBNET works collaboratively with Indian university libraries to shape the future of academic libraries in the evolving information environment (INFLIBNET, 2008).

INFLIBNET has started a document supply service based upon the collection of subscribed journals within the UGC INFONET digital library consortium. Initially the document delivery service commenced with a group of 6 university libraries to host their resources to supply to all university users through their respective libraries. The service was upgraded to JCCC@UGC-Infonet increasing the resources from 16 host libraries, which is currently operating with 22 university libraries. These 22 libraries are designated as document supply centres to provide resources or services to users affiliated to 149 universities covered by the UGC through JCCC@UGC-Infonet. These document supply libraries provide their subscribed journals consisting of more than 2,000 titles, which are not available through the consortium. These journal articles are made available through the document delivery portal which can be accessed by the users of all the member universities of consortium. The Inflibnet DDS centres (university libraries) are listed as under.

1. Annamalai University
2. Assam University
3. Banaras Hindu University
4. Banasthali Vidyapith
5. Bangalore University
6. University of Calcutta
7. University of Delhi
8. University of Hyderabad
9. Jadavpur University
10. Jawaharlal Nehru University, New Delhi
11. Kurukshetra University
12. University of Madras
13. MS University, Baroda
14. Nagpur University
15. North Eastern Hill University
16. Panjab University
17. Pondicherry University

18. University of Pune
19. Punjabi University
20. 20 University of Rajasthan
21. Pandit Ravishankar Shukla University
22. Tata Institute of Social Sciences

J-Gate Custom Content for Consortium (JCCC) is a virtual library of journal literature created as a customized e-journals access gateway and database solution. It acts as a one point access to 7900+ journals subscribed currently under UGC INFONET Digital library consortium as well as university libraries designated as Inter Library Loan (ILL) Centers besides open access journals. INFLIBNET has identified 22 potential universities as ILL Centers in the country to fulfill ILL request from the users affiliated to universities covered under UGC- INFONET Digital Library Consortium. JCCC has facility to trigger e-mail request for article to Inter Library Loan Centers as well as to INFLIBNET Centre.

The INFLIBNET Centre has further upgraded the document delivery service portal from JCCC to J-gate with additional features which are useful to researchers. The universities are provided with a link to the Document Delivery Service Portal, J-Gate@UGC INFONET (http://igateplus.com) and also the search interface for directly using from library website to request research articles from other universities. Users from these universities can send requests that are not available in their own library, directly via the internet for articles found in J-gate portal.

4. J-Gate@UGC INFONET: The Journals Gateway

J-Gate is an electronic gateway to global e-journal literature, including good number of open access journals. It was launched in 2001 by Informatics India Limited, Bangalore, India. J-Gate also supports the online subscription of journals, electronic document delivery, archiving and other related services. J-Gate@UGC-INFONET (http://jgateplus.com) provides articles from the journals not subscribed to by the UGC-INFONET Digital Library Consortium by including the exclusive journals subscribed by 22 (university libraries) designated as document supply centres by INFLIBNET. These identified document supply centres by INFLIBNET are responsible for supplying journal articles to all other universities.

The J-gate functions as a common interface for all the publishers' content subscribed or even not subscribed by the UGC-INFONET Digital Library Consortium and the journals (print and e-journals) subscribed by 22 document supply centres. Thus provides a list of hyper linked articles on users search so that a user can select the article and access/ download those articles which were already licensed (through subscription/consortium) to the home university. The journal articles that are not accessible to a searcher from home university, the interface facilitates semi-automatic generation of a document supply request directing users to the INFLIBNET Centre or to one of the document supply centres as the case may be. J-gate collects the journal subscription information from all the document delivery centres and also the articles published in open access journals to list them in their portal, so that they will be visible to all university users when they search for journal articles.

The general features and search functionalities as given by J-gate plus (source: http://jgateplus.com.) are detailed below.

A. General Features

- J-Gate is an e-journal portal presently hosts content from 44,579 e-journals of 12,191 publishers, providing access to 6,250 online-only journals, which are not available in print.
- Captures and indexes articles from more than 22,847 open-access e-journals and maintaining links over 6,625,640 open-access articles.
- Browse TOC (table of contents) uniformly to all the journal titles browsable alphabetically by Journal title; publisher-wise and subject-wise.
- Basic bibliographic data is provided with abstracts (wherever available).
- Author address and e-mail is provided wherever available.
- Provides links to full-text articles (open-access, subscription and also unsubscribed).
- Link to Union List for finding availability.
- Daily updating.
- 24/7 availability of access.
- High-speed in-house Internet infrastructure.
- Content capturing and conversion system with high automation ensures high quality content aggregation.
- In-house software development team.
- Safe and reliable high-capacity storage system for content storage.

B. Search Functionalities

The J-gate home page gives various search options such as quick search, advanced search and browse journals for the user's convenience. The subscriber can choose to search by author, title, authors' address/institution, keywords, etc. Each of these options provides distinct features. Quick search allows users to search for articles using Boolean operators such as AND, OR and NOT. (Sanjay K. Desale, Londhe, N.L. and Suresh Patil).

C. DDS Process

Through J-gate portal photocopies of journal articles can be requested by the faculty and research scholars from any member university directly without depending on library at free of cost. The DDS process is illustrated vide the following screenshots.

However, the respective university libraries will be coordinating these operations, users' requests or complaints and usage within the organization and also with consortium regarding the development activities of DDS. Consortium conducts orientation or awareness programs for the benefit of university users with the help of providers, while conducting meetings with library administrators of DDS.

Authorized users (within recognized IP range/environment/campus) will be able to put their query through quick, advanced search interface or by browsing through journals list, selecting volume/number, table of content and finally the article by its location or locations. Further, users will be able register for their favourite journals and get their alerts notified through registered email.

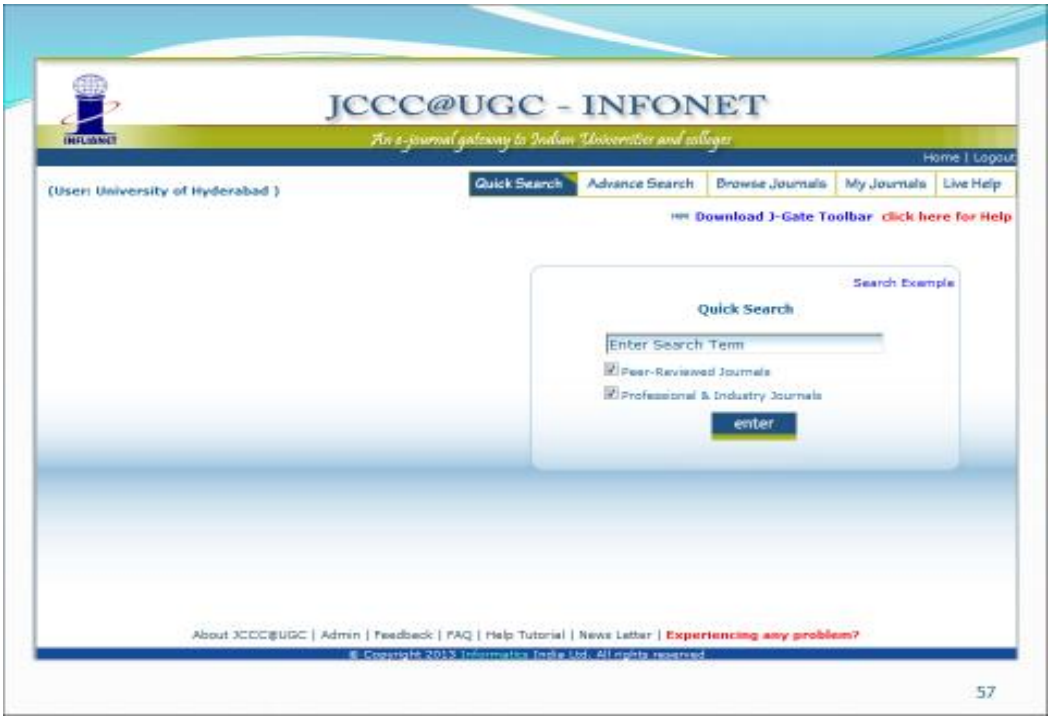


Figure 1: *Screenshot 1: JCCC@UGC- INFONET Search Interface*

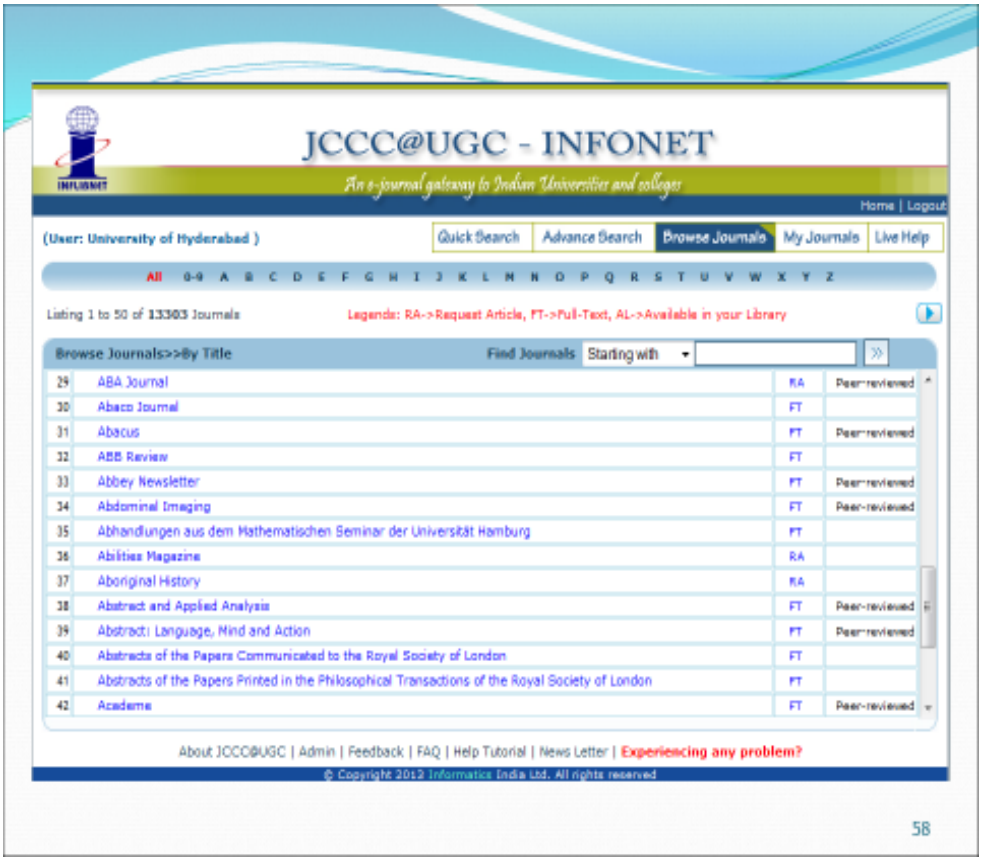


Figure 2: *Screenshot 2: Screenshot of Browse Journals Option (http://jgateplus.com)*

Figure 3: *Screenshot of Articles listed for Users Selection*
(Source: http://jgateplus.com)

The document supply requests will be generated to designated centres and INFLIBNET centre for the journal articles which are not accessible to their users in their own university and also they will be able to track request history and the fulfilment status of requests.

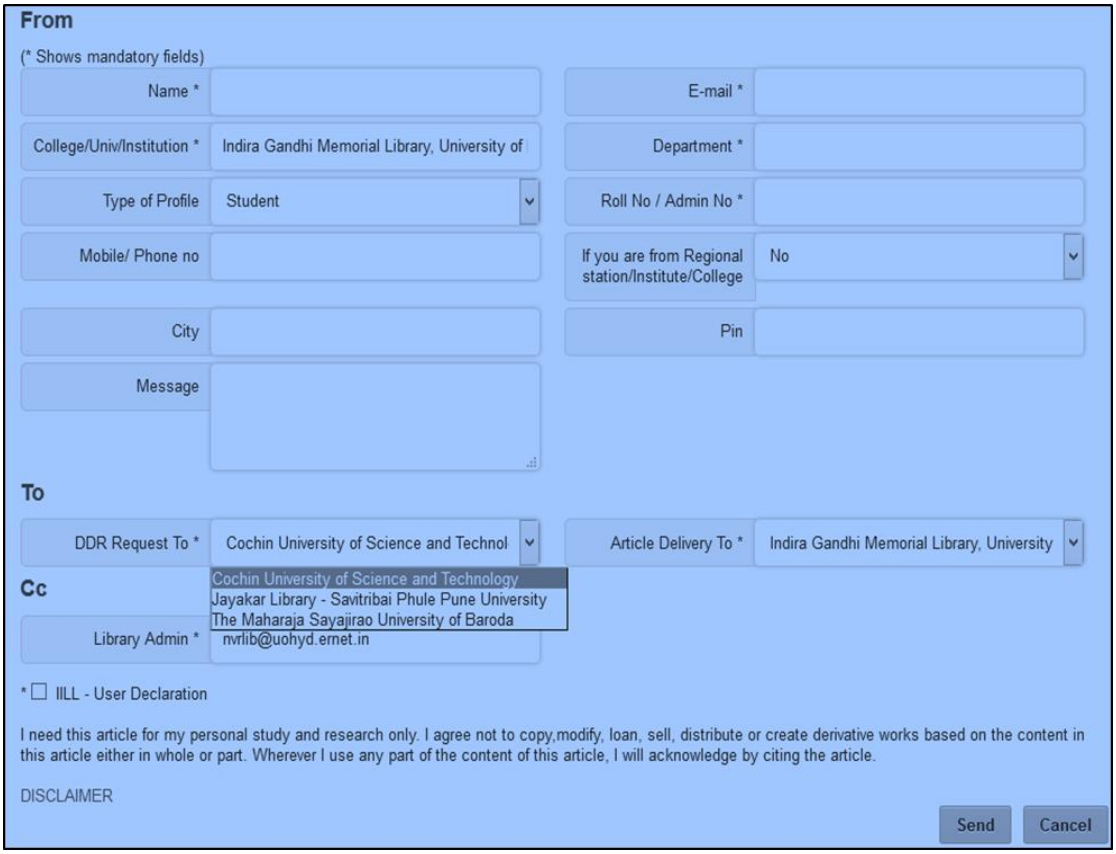


Figure 4: *Screenshot of Locations Listed Against the Selected Article for Users Selection of Location*
(Source: http://jgateplus.com)

5. IGM Library - Usage of Document Delivery Services

The University of Hyderabad Library is one of the leading university libraries in India established in the inception in 1975 and named as Indira Gandhi Memorial Library in 1988. The university library has been actively involving in interlibrary loan activities since the inception and later continued this service as despatch of photocopy of articles to other university libraries against their requests.The Indira Gandhi Memorial Library was the first university library in India to take advantage of ICT developments to provide information and online services to their users at right time. The online services being provided by the Library such as- Online Public Access Catalogue, memberships in resource sharing networks/consortia, subscription to e-journal databases, hosting collection in document delivery services and maintaining own library websites etc.

The library has been maintaining large collection of print, digital and electronic documents. The library has been subscribing to electronic resources since the year 1998 apart from licensing to online journals / web editions to print journals and full text journals databases since the year 2001. The library is additionally getting access to full text, abstracting databases and also the other portal services from UGC Infonet Digital Library Consortium. Further the library is providing access to back volumes of journals from 15 scholarly publishers from the first volume on perpetual access. At present, the library is subscribing to 47 journal databases covering almost 30,000 e'journals. The library is also providing access to around 5000 e'books/serial publications.

UGC INFLIBNET Centre has selected IGM Library as one of the 6 host libraries to provide Document Delivery services since the inception of the consortium. Ever since the consortium migrated to JCCC online platform for facilitating DDS with 16 host universities, the IGM library continued to be in important position in delivering these services.

Currently the number of hosting universities is increased to 22 under J-Gate@UGC-INFONET programme. Under this program photocopies of journal articles will be sent to the faculty and research scholars of other universities and also to the home university users at free of cost on their request.

As per the usage statistics provided by the UGC Infonet Digital Library Consortium, the document delivery service / activity pertaining to the university with JCCC @ UGC Infonet has been increasing from 9144 (2008) to 18914 (2010) as shown in the Figure 4 and then gradually decreased up to 11249 by 2012 (Suseela, 2013).

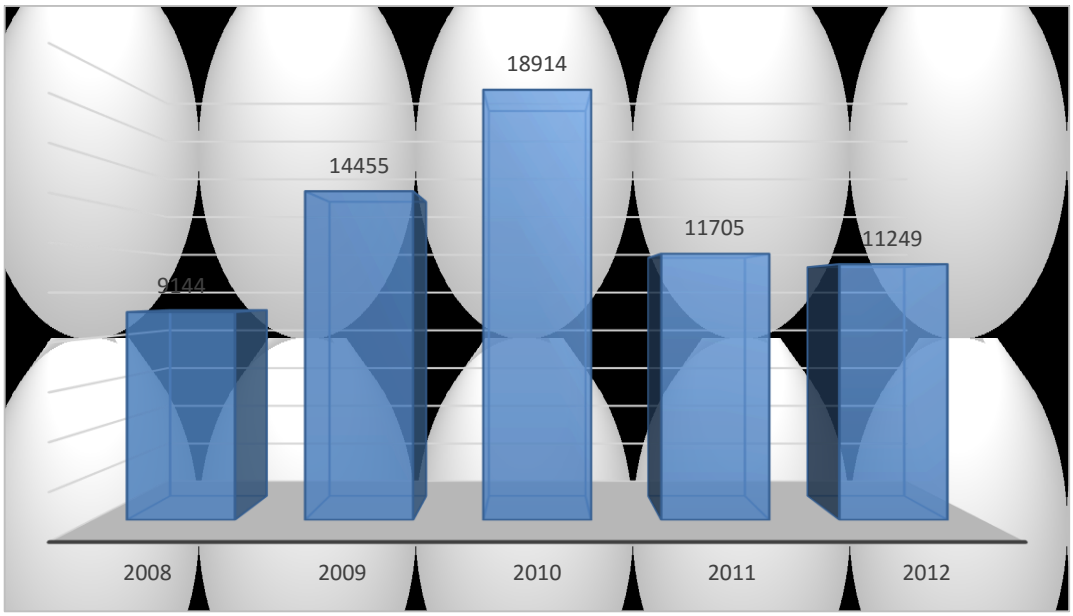


Figure 4: *UOH - JCCC@UGC Infonet Activity 2008 – 2012*
(Source: Suseela, 2013)

The latest statistics indicates further decrease of the activity by 2119 in the year 2014. The decrease in document delivery activity can be attributed to the decrease of print/online journal subscriptions by individual libraries, non-availability of required journals/articles to users through J-gate portal and the frequent changes in service portal and also the interface. The budget is decreasing with the increase in cost of the resources.

DDS-Article-wise

The article delivery service rendered by the IGM Library, University of Hyderabad for the current year is presented in Table 1. The data shows that, the university library has supplied 386 articles to the different Research Scholars requesting from all over Indian Universities, under INFLIBNET, J-Gateplus@UGC-Infonet Document Delivery Service portal for a period of 10 months i.e. from January, 2015 to October, 2015.

Table 1: *Number of Documents Supplied to Different Universities in India Under J-Gate@UGC-INFONET Portal (January to October, 2015)*

No. of Articles Supplied (Range)	Number of Universities Requested Articles
01 to 10	64
11 to 20	4
21 to 30	2
31 to 40	1
41 to 50	1
51 to 60	1
	73

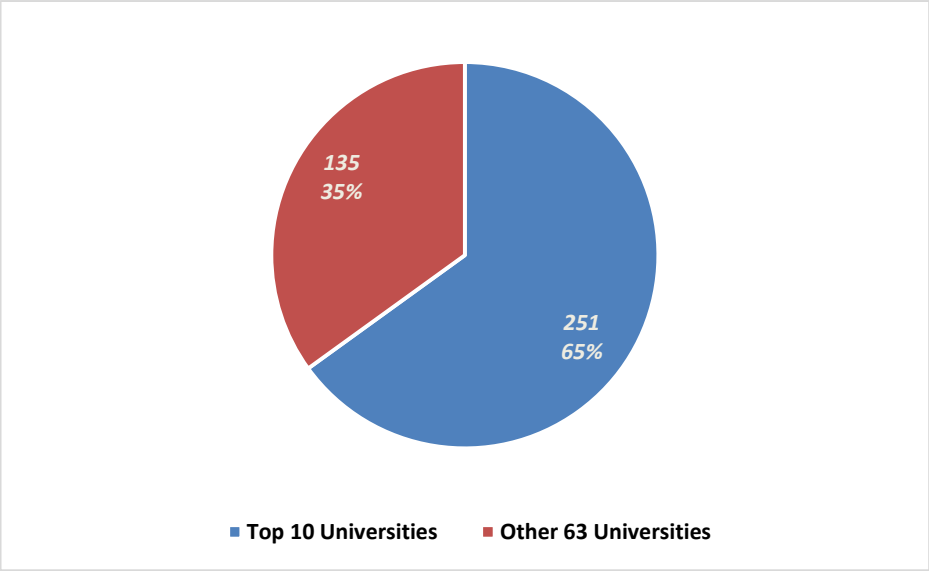
From the above Table it is observed that, during 10 months period, the IGM Library supplied 1 to 10 copies of articles to 64 Universities, 11 to 20 articles were supplied to 4 Universities, 21 to 30 articles to 2 Universities, 31 to 40 articles were supplied to 1 University, 41 to 50 articles were supplied to 1 University and 51 to 60 articles were supplied to a single university under INFLIBNET, J-gate@UGC-INFONET Document Delivery Service.

DDS - University-wise

Table 2: *Number of Articles Supplied to top 10 Universities by the IGM Library Under J-gate@UGC-INFONET*

Sl. No.	Name of the University	Number of Article Supplied
1	Guru Jambheshwar University, Hisar	52
2	Punjab University, Chandigarh	46
3	Bharathiar University, Tamil Nadu	31
4	Tata Institute of Social Sciences, Mumbai	26
5	Kuvempu University, Karnataka	23
6	University of Kerala, Thiruvananthapuram	19
7	Annamalai University, Tamil Nadu	19
8	Acharya Nagarjuna University, Guntur, Andhra Pradesh	14
9	Central University of Kerala	11
10	University of Calicut	10
11	Other Universities (63)	135 articles (less than 10 to each university)

The data about counts of articles sent to top 10 universities indicate that approximately 65% articles are sent to them, whereas 135 (around 35%) articles were sent to 63 universities.



During the 10 months period 73 University Research Scholars were requested through INFLIBNET, J-Gate@UGC-INFONET (http://jgateplus.com), Document Delivery Service. Out of 73 Universities, the highest numbers of articles i.e. 52 articles, were supplied to Guru Jambheshwar University, Hisar followed by 46 articles were supplied to Punjab University, Chandigarh, 31 articles were supplied to Bharathiar University, Tamil Nadu, 26 articles were supplied to Tata Institute of Social Sciences, Mumbai, 23 articles were supplied to Kuvempu University, Karnataka, 19 articles were supplied to the two universities i.e. University of Kerala, Thiruvananthapuram and Annamalai University, Tamil Nadu, 14 articles were supplied to Acharya Nagarjuna University, Guntur, Andhra Pradesh, 11 articles were supplied to Central University of Kerala and 10 articles were sent to the University of Calicut, Kerala State, whereas remaining 63 other universities received less than 10 articles as per their request through J-gate portal.

6. Discussion

Generally the Universities are not in a position to subscribe all the required resource to their research scholars, hence this DDS is very useful to get their required article from the other university Libraries. Though the service is prevalent since print resources only period, it gained momentum with the online supply of articles, which ultimately results in the increase of research output of Research Scholars and university. University Libraries have been developing their ICT infrastructure, resources and facilities with the Special grants given by UGC Inflibnet.

The usage statistics pertaining to this online service supplied by UGC Inflibnet reflect that the use of document delivery services was increasing in the initial years, but decreasing subsequently. The dependency on document delivery service might be reducing as almost all the universities are able to access innumerable journal resources with back files even since inception volume. Further the exclusive resources subscribed by host universities are coming down year by year, due to cut in budgets and increase in cost. The frequent changes in J-gate portal service and also the interface changes cause confusion and avoidance of using such self-support services.

Further in the current environment of subscribing digital/electronic resources and document delivery restrictions in electronic form, university libraries need to send them in only print form, which is

undoubtedly an added burden especially when staff as well as financial resources are diminishing day by day to undertake additional tasks.

Reciprocate activity of other libraries is another motivating factor for the supply of articles, especially when host libraries are not getting required articles. From the users experience/complaints it is observed that majority of users requests for articles are not getting response and only around 8 articles are received from other university libraries. Moreover the process of searching article in J-gate portal and sending requests for its supply is yet not familiar to majority of users, in spite of conducting regular orientation sessions by the library.

7. Conclusion

INFLIBNET Center, Ahmedabad has recently conducted a meeting to all the 22 university document supply centres at Bangalore. In that meeting the university librarians expressed several problems, which they were facing for sending the article to other university research scholars. Most of the librarians requested to provide finance for purchase of computers, scanners, and manpower and also for the stationary. And the librarians also expressed that due to the lack of finance and manpower they are not able to send the requested article to the research scholars.

The J-Gate@UGC-INFONET document supply can increase the speed of document supply. Once the document is located in the library, the requested article can be scanned and quickly sent to the requester by e-mail.

The Gate@UGC-INFONET is very useful and increases the speed of document supply to all the universities in India. J-gate is a gateway to all the resources of the member libraries and provides easy and quick passing of resources from library to library. The IGM library has provided highest number of articles to other university research scholars through e-mail and by post. It is most important for all the universities to participate in the program and send the required articles to the research scholars to support their research. The J-gate features and search facility should be explained to the users through orientation which the University of Hyderabad regularly conducts in the beginning of the year to reach the facilities to the students. To promote research every university should come forward in DDS since it is give and take service in which all participating university users are benefited.

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UCD Approach for the Management of User Services in University Libraries

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Publication Date:

This article belongs to the ***Special Issue*** ***"Modern Trends in User Centric Design (UCD) of Library Services and Applications"***

Abstract This paper discusses User Centric Design (UCD) standards, processes in the light of user oriented services in academic Institutions. It discusses traditional methods of user services in libraries and shift to modern user centric services by which users are able access all types of resources online and can even interact with the librarian with regard to any services. The users are able to renew their books online and get the resources of other libraries through document delivery services without physically stepping into the library. Some of the models mentioned in this paper highlight the services which are designed as per users' needs. The changes of automation, e-publishing and publishers way of delivering online resources with added value services like e-mail alerts, RSS feeds etc. have forced librarians to concentrate on library users while planning services and to transform the libraries in academic institutions from document centric to User Centric.
Keywords *User Services; University Libraries; UCD-Standards; User Services-Management*

1. Introduction

User centred design (UCD) is an approach while designing any product, service or any related operations. Though the concept has become widely popular with the software development focussing on the end users all through the different stages of design process, it is now spread to all the domains connected with human interaction in the creation of any product or services or operations including those related to libraries and information centres. The concept UCD has been gaining prominence in the domain of the libraries and information centres, as they need to handle varied collections of information resources and services for their users, while experiencing transformation in their environment with the emergence of latest information formats and the developments for disseminating scholarly information quickly.

Thus, the paper intends to outline the different perceptions of User Centred Design and discuss the application of UCD concept in planning the collection of information resources and user services for academic libraries.

2. UCD (User Centric Design)

The term 'design' (verb) is defined as 'to plan and make decisions about something that is being built or created' (Merriam-Webster Dictionary). Thus, the user-centered design (UCD) focusses on user's involvement all-through the planning, design and development of a product. Webopedia (http://www.webopedia.com/TERM/U/user_centered_design.html) defined it as "a design philosophy and a process in which the needs and limitations of end users of a product are given extensive attention at each stage of the design process". Several authors, associations, organizations made incredible efforts to conceptualize UCD in a way that can be applied to every condition. Usability Professional Association explained User centric design (UCD) "as an approach to design that grounds the process in information about the people who will use the product". Norman (2002) described UCD as "a philosophy based on the needs and interests of the user, with an emphasis on making products usable and understandable". By this definition, it is understood that actual user involvement does not form a part of UCD alone by necessity, but for the effective development of product or service. Whatever be the several perceptions of UCD, it can basically be characterized by a focus on the user, and on that the user's perspective should be incorporated in all stages of the design process. Further, it is understood that involving users in the design process is a common way of ensuring that their needs and interests are being met.

A. User Centic Design – Standards

The international standard ISO 13407 (Human centred design processes for interactive systems) was formed as the basis for many UCD methodologies. This standard defines a general process for including human-centred activities throughout the development life-cycle, but the model does not specify exact methods. The standard was further revised by ISO 9241-210:2010 - Ergonomics of human-system interaction - Part 210: Human-centred design for interactive systems, cancelling and replacing ISO 13407:1999. The revisions would be-

- clarifying the role of iteration in the whole design process (not just evaluation);
- emphasizing that human-centred method, can be used throughout the system life cycle;
- explaining design activities;
- clarifying the principles of human-centred design

The standard emphasizes that – "human-centred design is an approach to interactive systems development that aims to make systems usable and useful by focusing on the users, their needs and requirements, and by applying human factors/ergonomics, and usability knowledge and techniques. This approach enhances the effectiveness and efficiency improves human well-being, user satisfaction, accessibility and sustainability; and counteracts possible adverse effects of use on human health, safety and performance". Various approaches to UCD are following the latest specifications of the ISO standard. The standard lists 6 important principles that will ensure a design user centred:

1. The design should be based upon an explicit understanding of users, tasks and environments.
2. Users are involved throughout design and development.
3. The design is driven and refined by user-centred evaluation.
4. The process is iterative.
5. The design addresses the whole user experience.
6. The design team includes multidisciplinary skills and perspectives.

B. User Centric Design Process

The concept of user centric design for an information product can be understood in three concentric layers as visualized in Figure 1, wherein the core area indicates the 'user' and 'user needs'; surrounding the core area lies 'the information system' that is structured according to the user needs and the outer layer refers to the information retrieval and product access.

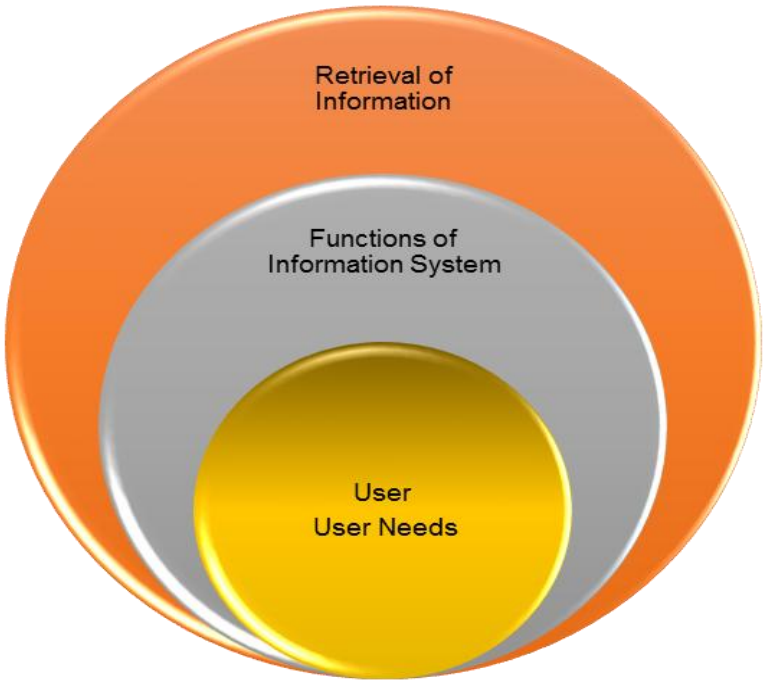

***Figure 1**: The Functional Information System UCD Model*

Thus the 'User' being the significant component in User Centric Design Process, the method of obtaining the data about users and their needs and testing the design is also important for making necessary modifications in redesign. These 'users' actually be the beneficiaries of the product/s, even though may never have truly connected with it during manufacturing stage, but have well impacted by their design. Such users were referred as - 'indirect stakeholders' by Friedman, Kahn, and Borning (2006), who have drawn distinction between the direct and Stakeholders, wherein the direct stakeholders should have priority in the conceptualization of a design, the interests of indirect stakeholders.

3. User Oriented Library Services in Academic Environment

In the context of user oriented library services, Bowler et al. (2011) were of the opinion that "User-centred design, as its name suggests, reflects the user, typically from a cognitive, affective or behavioural point of view, as well as the social, organizational, and cultural contexts in which users function. The shift from a system-centred to user-centred perspective in LIS arose from the emergence of information retrieval systems that could be operated without the intermediation of experts and a need to understand how to better serve a new clientele of end users". Thus, due to the predominance of web, web based technologies and tools and also web 2.0 applications in libraries, made the user involvement significant in the design of systems, services and spaces.

A. Library Users

The user/s can be any individual or any organization that use the product for a specified purpose. The users may vary according the type of organization/ library and the purpose. The integrated information system that is built can generate managerial information, data for clients (staff) at various operational desks and to the targeted end users of the system. The library users vary as per the type of library, public library users ranging from a common man to a business man, researcher, students, teachers, industrialists and politicians etc., while special library users needs are limited to their domain of work. The users of academic libraries refer to - undergraduate students, post graduate students and research scholars, faculty members, visiting faculty, project assistants and other Institutional members. The users can be in the normal state of using the products and also with different capabilities and competencies - physically handicapped and visually challenged users, etc.

B. Conventional Library User Services

Dr. S.R. Ranganathan, the father of library and information science in India and also the architect of Indian librarianship described the Library as - trinity of books (resources various types and formats); staff; and users. The five fundamental laws specify those resources and other components of the library should be only designed keeping in view of the respective users. It implies that library should provide the basic or extensive facilities according to the requirements, convenience and use of their clientele (users)

- Resources (based on the objectives of organization)
- Tools to access resources
- Functional Building
- Comfortable furniture
- Tidy and serene ambiance
- Professional and non-professional staff to maintain library and services
- Line of authority, Administration, policies and rules

When print (Books, reference books, journals, maps, atlas, etc.) resources are predominant, the library services and tools designed as per user's requirements is illustrated vide Figure 2

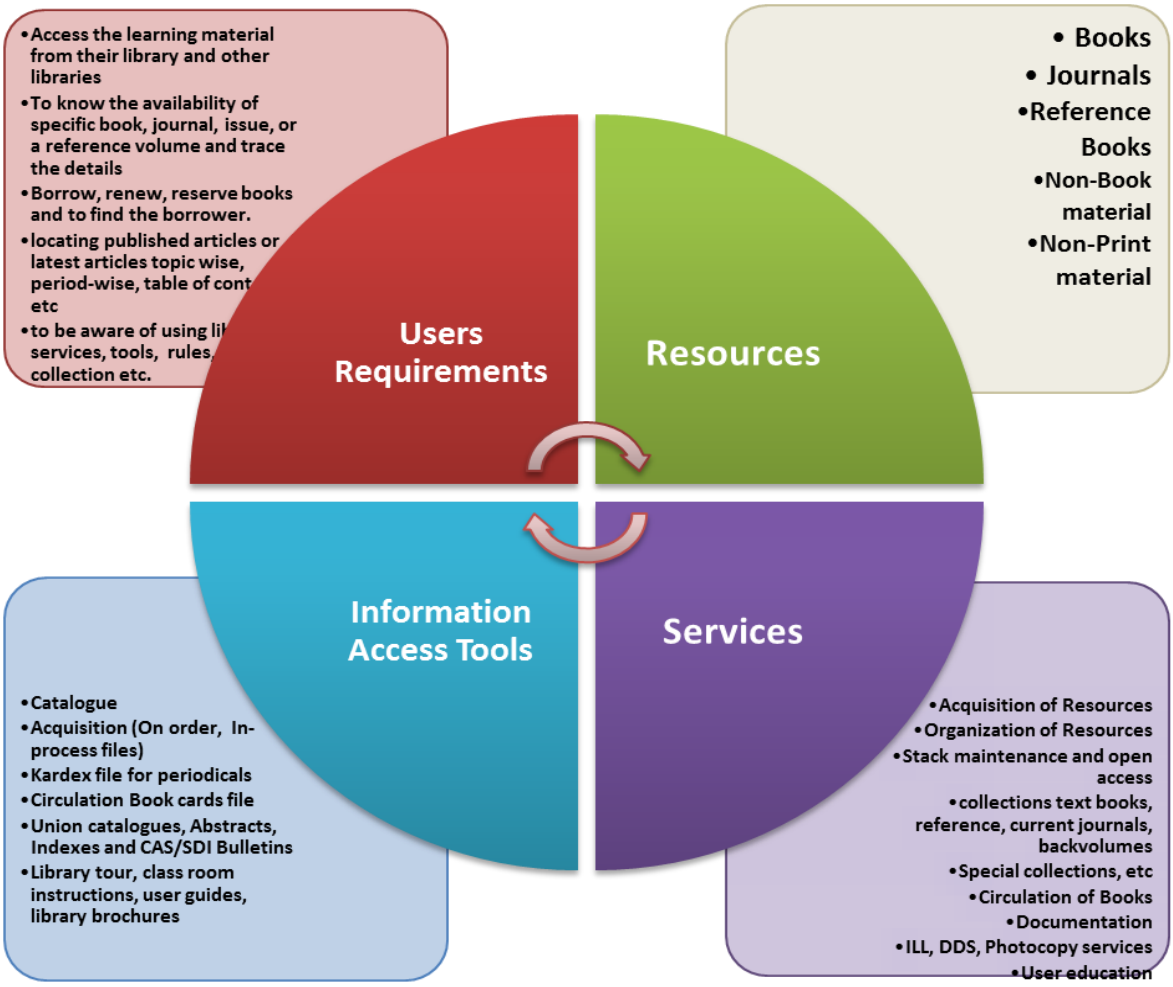

Figure 2: *User Based Services in Conventional Libraries*

C. Change of User's Requirements - Influencing Factors

There have been several factors influencing change in user's requirements in academic environment. Some of the significant factors are mentioned below.

- Interdisciplinary/multidisciplinary research
- Ever growing publications and innumerable resources
- Transformation of physical format of information due to ICT advancements in processing and information/documents.
- Use of telecommunication networks for the dissemination of scholarly information and the use of web technologies to hyperlink resources, the development of search and discovery services
- Ever upgrading ICT infrastructure with the increasing users expectations
- ICT Applications in libraries such as automation, e-publishing, e-resources, resources sharing, formation of library consortia, development of access tools for subscribed as well as free resources, arresting plagiarism, possibility of providing remote access, etc.
- Wide spread campuses in research and academic institutions
- Research collaboration among distantly working people

The ICT applications in libraries are mostly visible to users through hyperlinked online platform, especially the library's catalogue OPAC which is the gateway to library resources and also formed as user interface that will be connecting to all the integrated library automated operations. Further the information, resources and services will be passed on to the library users remotely through online library catalogues or OPACs, websites of publishers/aggregators/providers and finally the library websites.

4. Need for UCD in Academic Library Environment

The users can be expert in their field of specialization, whereas librarians are well versed with the system of organizing the information or documents for facilitating easy retrieval. User's concerns need to be included while designing the library information system. The design needs constant updating or revision by incorporating the ever-changing user's requirements. A librarian can understand the user requirements as well the organization of knowledge or concepts and therefore will be able to structure the collection, services etc. accordingly. For example, for organizing the documents in the library, their indexing, the classification scheme; the catalogue formats and the subject indexing followed by library are unknown to the user, whereas the librarian will be able design in such a way that the similar subject numbers come together so that the user will be able to get all the documents in the subject area together on shelf and also in catalogue. The tools/services so designed and developed for serious researchers or library users, when print was predominant were expensive, inadequate, and far from the reach of researchers geographically or cost-wise.

Though the traditional library catalogues of any form meet the search requirements at a minimum level, author, title, subject and keyword etc. but are not be able to inform the status of a recommended book or any other material housed in the library nor the book lent to a borrower. The advent of ICT applications in libraries and publishing not only increased the content but also laid several pressures and demands on libraries through users. Since most of the library automation software designed focusing on entry of bibliographic records in view of building information retrieval systems, are found not so compatible with regard the acquisition and other maintenance operations of books and serials and other materials, in several instances users mostly depend on manual systems to suggest or recommend for additional copies of text books, reserve, renew books etc. Users should know the list of current journal titles to be renewed by invoking a key. Similarly the different statuses of library material such as in bindery, lost, damaged, written off etc. should be displayed in the similar way. The recently added books to the collection should be programmed in a way that the books added in the current week should be automatically displayed to the user by invoking a key.

So the Library automation software should be designed in a way that meets the user's requirements by accommodating different physical formats or types of resources. The catalogue should be able to direct the user to table of contents, abstract and also to the full text of the article through OPAC. In an example of library automation, patrons need to know the books outstanding against their names which are made online.

Further, the use of e–resources is bound by the license terms and agreements of publishers and the violation of these terms knowingly or unknowingly will be treated as abuse which results in access block to the entire gateway or institution. Libraries need to commence information literacy programs to make the users aware of these fair use rules of accessing electronic resources. Presently, all most of all the institutions are able to access numerous scholarly resources through various sources (publishers or targets) and users are often constrained to get the right information among hundreds/ thousands of heterogeneous sources, though each publisher provides search interface with all the search facilities. Libraries needs to arrange or acquire meta-search, bibliographic search or discovery services that

provides query based search, in addition to the article full text databases, where users are able to search across all the sources.

Moreover, the multidisciplinary research, and ease in the creation of content lead to the generation of new concepts and terms more than ever in this electronic era. The situation has been posing challenges in the organization of concepts (by relating terms both hierarchically and horizontally) and ultimately effecting the information retrieval. Archiving and digitization activities in these current decades demand the organization of classics, rare collections and research documents etc.and also need to be displayed on HTML platform for the use of researchers.

All most all the students are currently handling internet access with small and smart devices like tablets, mobiles in addition to personal computers/laptops. Thus, information services including OPACs need to be made compatible to these small/smart devices by designing apps for them. Accordingly, most of the LIS software providers, publishers of full text/bibliographic databases are building their websites in mobile enabled form including OPACs.

The Government's perception of ‘right to education’ enabled physically and visually challenged users to visit libraries for their education and research purpose. They need to be equipped with altogether different setup which is compatible to them.

Ever changing information formats, mode of dissemination of information, hardware, software and networking infrastructure lay demand on the libraries for constantly upgrading information access environment according to the users’ requirements, which is a challenge for librarians.

5. UCD Process for Academic Libraries

To design a user centric model applying the ISO-13407 standard in an academic library environment, it is needed to use a human centred design process, constituting the following cyclic activities.

1. Identifying the organizational goals and recognizing the objectives of library
2. Identifying the users of the product, purpose of using it and where it is used or under what context it is being used.
3. Identifying requirements of the system is very crucial for successful design of product
4. Design of solutions also should be the part of design process in all the stages of products precisely from the conceptualization to completion
5. Design implementation & completion process
6. Evaluating design or testing the design is one way the quality testing of the product, which is preferably performed through usability testing with actual users.
7. Modifying the design incorporating the user’s requirements based on the feedback to achieve the target.

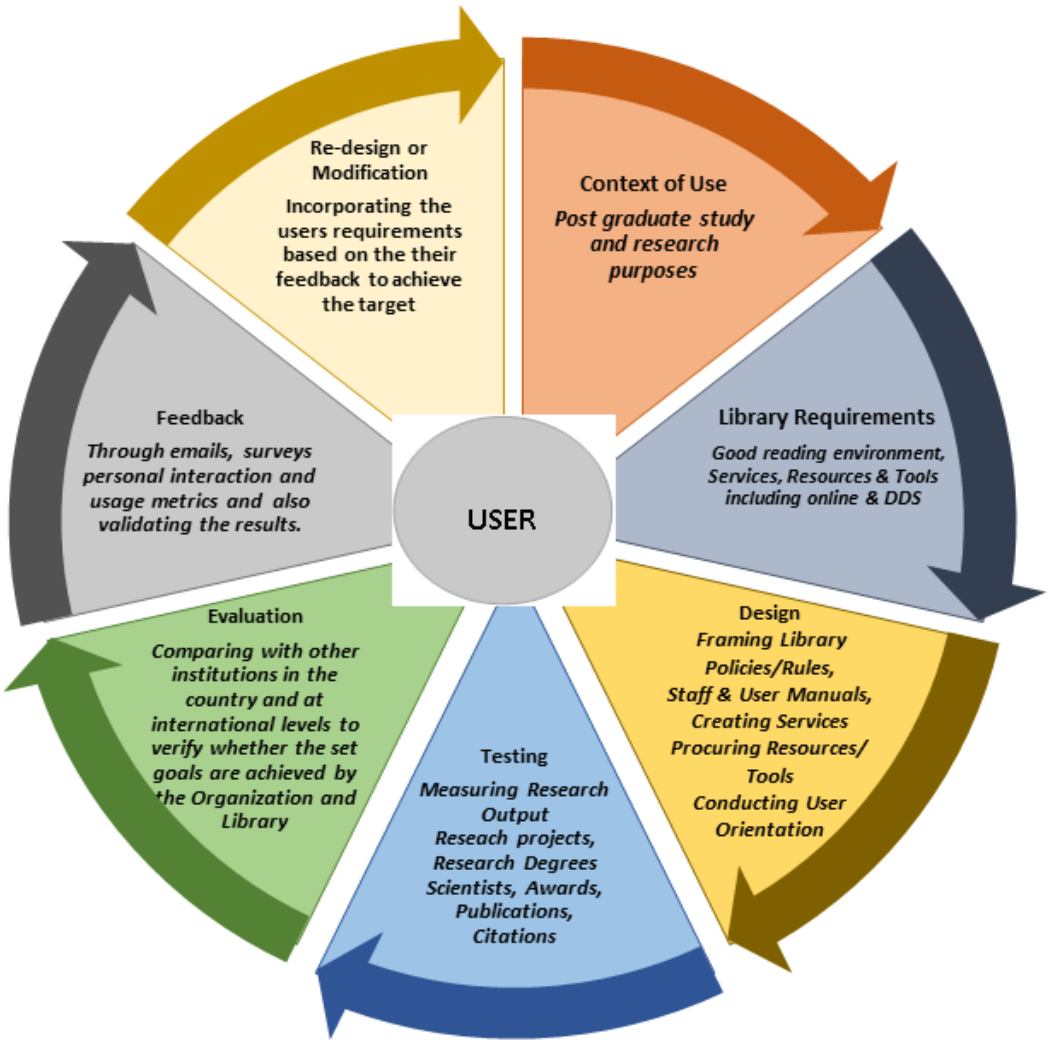

Figure 3 *- UCD Process for Academic Libraries*

The information to be disseminated to users is infinite and limitless. Thus the information architecture is highly significant for the design of website particularly while organizing the content and creating navigation for the content according to user's background and navigating style.

In LIS context, there have been several popular conventional and modern methods in practice for drawing user's feedback. Most of the libraries have been now relying on a complaint box at the library entrance; interaction with users; group mailing; surveys (both paper and online) and the usage data, etc. To cite an example – number of user's login into OPAC every day, number of searches made as against hits, number of transactions in circulation section for specified period and how many members visit the library every day on extended hours and on holidays, etc. Since the hypermedia is opted as the main platform for disseminating information, distributing resources, building digital/virtual libraries and to obtain feedback from users easily, several instances of applying UCD process for the design of websites and intuitive search interfaces are found in literature.

Manzari and Trinidad-Christensen (2006) applied user-centred design principles to the Library and Information Science (LIS) Website Library at the C. W. Post campus of Long Island University. The website was subjected to a heuristic evaluation and usability testing and the findings were applied for redesign incorporating the users' suggestions. They intended to list all resources and information related to connect to the main library's home page and library catalogue. An online survey was also posted on web site to update it based on user feedback. The usability test confirmed that the Web-site was designed well.

OCLC's WorldCat.org is a cloud-based, multi-institution, international catalogue. The 'User-centered design of a recommender system for a "Universal" Library Catalogue" was a joint research project with the Information School, University of Sheffield to develop the 'recommender systems' for retrieving journals, books, digital media, video, etc. User-centred design and empirical evaluation of a prototype system would provide invaluable data for OCLC in assessing the value of recommender services for WorldCat.org. Consequently the end users of WorldCat.org, effective recommender functionality will assist with information discovery within the library catalogue.

Kress and Del Bosque and Ipri (2010) investigated reasons for the user's failure to locate the electronic and print items from university library catalogues or websites by applying usability testing and quality control methods. The researchers have conducted the ILLiad analysis from the cancelled interlibrary loan requests of the years 2007, 2008 and 2009 identifying the categories available in e-journal collection; LASR and Lied Library. By using interlibrary loan data it was possible to analyse actual citations that the users were unable to find, despite the fact that the library owned the materials.

Tidal (2011) discussed the creation process of a user centred library homepage by conducting a survey and a usability test before shifting their Ursula C. Schwerin Library's library website to a content management system. The survey consisting of 24 respondents and the data from usability testing gave very useful feedback. So the alterations could be made based on first round usability test while transitioning the website to Drupal CMS reducing the number of links on home page and also later to make the site more users centric.

Sadeh (2007) explored the need for designing a new search interface for Ex Libris as a solution for the discovery and delivery of library collections as per users' expectations. He observed the following users' needs and expectations of the design of the interface. The information displayed on the screen should be minimal; the work flow and search options should be appropriate; Queries can be as simple or as complex as needed; should be supporting post-search tools that help users focus on relevant items within the result list; and also will be able to suggest alternative routes for finding relevant information; and also does not need training for searchers. It is found that the search interface is user friendly and all the participants in the usability test could manage with marginal help and time.

Guo and Pei (2011) applied both qualitative and quantitative methods to assess user's requirements. The results were analysed through cluster analysis, applying user testing combining with heuristic evaluation, the library website was evaluated and constructed by user-centred design methods such as - reducing the number of categories; error rate and help-frequency and thereby improving the user satisfaction significantly.

Sommerville and Brar (2009) described the application of user-centered and EBL (evidence-based librarianship) to enable the end-user's involvement in the digital library project design and development. From 2003 to 2006, user-centred design guided increasingly by the complex human-computer interaction projects at California Polytechnic State University to change the project from library centric to "user centric." Further it is found that purposeful conversations aimed at learning from user-generated

evidence enrich the planning process for digital library projects. Practical implications – Collaborative design assumes that enabling interfaces, systems, and environments are best designed and developed inclusively, with and for beneficiaries. Towards the end, practical guidelines are offered to enable replication of this approach, which depends on user produced and interpreted evidence, in other organizational settings.

6. Implications of UCD on Users Information Services

The concept of UCD has brought drastic changes in information collection, processing, packing and information retrieval in simpler and easy means. The net generation users are becoming proactive in retrieving information in different formats without physically visiting the library because of remote connectivity and also the publishers new ways of publishing and delivering the information with added updating services. The libraries also have been providing the online information to users making it more users centric. The following aspects need to be looked upon while discussing the implications of UCD.

A. Library Automation

The automation not only eased various lengthy and tedious operations of the library, but also facilitates many more approaches and information to users, by building the database of bibliographic records. Automation of each module is expected to easily meet the basic requirements of library users and also been able to fulfil various other needs not met during manual processes.

- Acquisition module
- Processing (Catalogue or Creation of bibliographic records) module
- Serials module
- Circulation module
- Documentation services

Library catalogue is the inventory of library material or resources. Its physical form has been transforming from register, card during print only period to online and also online public access catalogue (OPAC) accommodating all types of resources in all the formats.

The conventional library catalogues had limited approaches for users to reach their information such as author, title, series, subject headings, reference, cross-reference and added entries. The author & subject analytical entries prepared to meet the user's approach to individual chapters/parts of composite books, made librarians to do lot of clerical jobs and at the same time gives a very little understanding to users. The application of database management systems to library bibliographic records enable to sort and index all the keywords, which facilitates multiple search opportunities to library end users through modern OPACs. The online catalogues evolved in integrated automated library systems have been including many more services over the generations. In integrated library automation system each of the subsystem (module) is related to the other subsystems and contributes to the user information on the whole, e.g. an acquisition subsystem needs to provide interfaces to cataloguing. All the subsystems are well connected to built-in cataloguing subsystem to draw data for their sub-module activities while producing the information or data required for users.

The design decision by library automation software developers will be primarily based on the quantity as well as the type of database and information retrieval needs. The database is reflected and accessible to users through catalogue which is well optimized for efficient search and retrieval.

Online Public Access Catalogue- As mentioned above, through OPAC users will be able to search the library collection of books, journals and other material

- By author, title, subject etc. approaches or any keyword related to it.
- Find the status of searched item, whether available on shelf, or in issue or in bindery or damaged or withdrawn
- To find whether any digitized copy of a book or full text article/journal available online and get linked to the respective soft copy
- To find the searched item by location/s
- To know the availability of a specific journal by title/ISSN or a specific Issue or back volume of a journal
- Latest Issue of a specific journal
- View or download the list of books / Journals on a specific subject
- Additionally users should be able to self-register, modify the contact details, enter the topics of interest etc. and will be able to get the following advantages as authorized user.

Acquisitions Module- The Acquisitions Module as in integral part of library automation software should be able to include the following in user interfaces -

- OPAC interface should support an authorized user sending recommendations for books, journals, or any other material for purchase
- OPAC should display query acquisitions files – to track the status of recommended item, whether ORDERED, or RECEIVED or IN PROCESS
- Faculty may recommend items to be kept on reserve for a limited period /semester/for text book collection.

Automated Circulation Module- The automated circulation module in many LIS software is facilitating the following in user interface available through OPAC and enables the user to –

- Search member records by names, member IDs
- Retrieving information about borrowed items on loan, over dues if any to clear etc.
- To reserve books under loan and receive the notification regarding the check-in status of reserved book
- To renew books online
- Reporting of loss of book/s and loss of ID card
- Payment of cost of lost book or lost ID card and get the receipt
- Payment of overdue charges if any, online and get the receipt
- By adding email address to patron records, users can be notified through mail regarding their borrowed items, over dues, etc. at specified intervals
- Through adding small devices like additional monitor towards the user (opposite) side with the help of split connectors to computers at circulation counter, an added value service also can be provided to the users. Thereby the patrons would be able to view their transactions while issuing or returning the books.

Automated Serials Module- The automated is the basis for not only creating serials database with holdings but also for generating union catalogue of serials, i.e. serial holdings pertaining to many libraries and several article based services. These services can be designed by coordinating journal records, locations of institutions, and articles data with patron profiles.

- Availability of article/journal in other libraries
- Availability of articles on a various identified topic/s (CAS service)
- Articles related to the interests of identified members (SDI service)

B. Electronic Publishing, Electronic Resources and Software/Tool

- Possibility of accessing full text remotely from publishers servers
- Single/unified search across databases, publisher's resources, over a period different types i.e. journal articles, books or book chapters, a piece of information, or data table, an image or a formula
- Basic Search or keyword search
- Advanced search with multiple options,
- To enable federated search, use of Boolean operators, filters to narrow the search results without leaving the search results page
- To be able to track spelling or grammatical errors in the text
- Facility to verify the similarity in the text with already published content and be able to arrest plagiarism or copy paste culture in original writings.
- Ability to assess the usability of an article or a book or a chapter or an author by reading the abstract, table of contents, reviews and by the citations recorded
- Able to view citations and track the duplication, development and collaboration in research.
- Ability to establish the credibility of an author/institution/journal or book by way of citation based measures such as h-index, etc.
- Capacity to provide meta-search or discovery services to be able to search all subscribed as well as free resources at once with a single interface
- Ability to apply semantic technologies to connect the related concepts, methodologies, creations etc. in information retrieval.
- Some libraries provide specially designed facilities for physically disabled and visually challenged users in library buildings right from the entrance, seating arrangement and organization of collection to purchase of special software for accessing online resources and learn from them.
    - Library building is structurally designed in a way that the physically disabled users comfortably move on ramps with wheel chairs and lifts to easily climb the linear structure of building. A separate rooms/halls for such students are being provided organizing their exclusive collections (especially Braille), personal computers loaded with required software, printers within their reach.
    - Special programs for such students like competitive tests and reward can be encouraging.
    - The material kept on the top rows should be reachable by arranging small step-up stools
    - Since most of the current literature and information is available online, it will be made usable to visually challenged students by arranging the text to speech software, screen readers etc. in exclusive personal computers e.g. JAWS (Job access with speech) screen reading programs, Kurzweil TTS (Text to speech software) programs and printers etc. The different software compatible to regional languages should be explored and arranged for such deprived students.

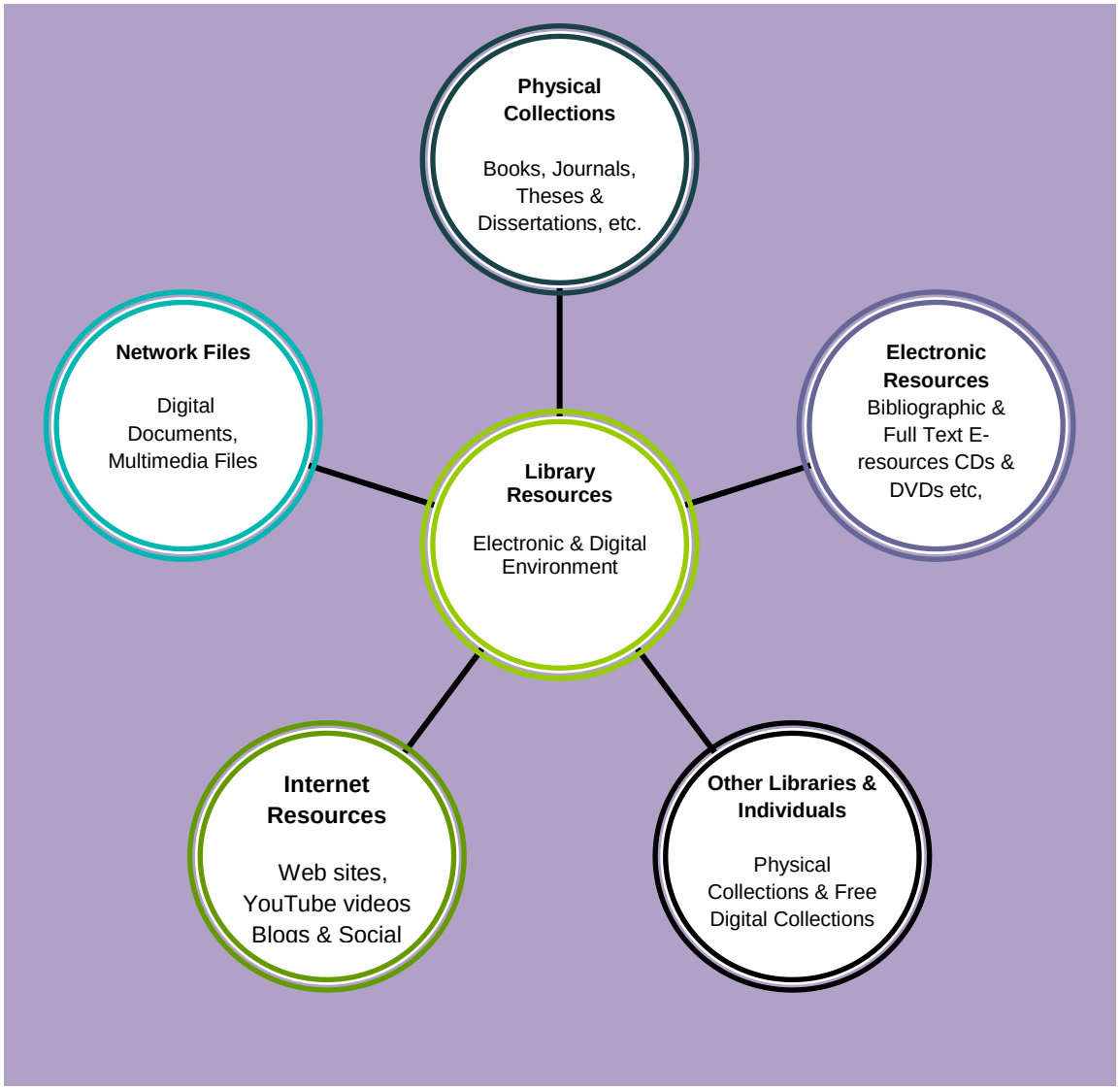

Figure 4: *Impact of Electronic and Digital Resources to Include Concepts, Data, Software/Tools*

C. Digital Libraries and Institutional Repositories

Stuart Snydman of Stanford University explained in digital libraries blog that the university library followed a user-centred approach in building portals for their digital library systems and services. Feedback obtained through interviews with scholars and faculty formed as a reference for designing and validating the website that supports both interaction and technical design. The organization of content and functions on a website were represented by block diagrams visualizing the relationship between site pages, content types and functional activities. They made a clear distinction between interaction design and visual design, in which interaction design emphasized on information architecture, layout, navigation, and content organization etc.

Further, an exclusive server can be arranged for digital library to upload all digital documents in searchable format and necessary metadata serves well for retrieving the relevant documents or information easily through separate search interface or commonly through OPAC without missing even related items. Schopfel Joachim (2013) mentioned “five specific characteristics that provide scientific

excellence to the ETD repositories – 1) quality of content; 2) metadata for the description of the content and context of the ETD (Electronic theses and dissertations) files; 3) format that is searchable and open for users and should be suitable for long-term preservation and intelligent exploitation of the content; 4) interoperability – for more visibility of the ETD, repositories should be networked at regional, state wise and international levels and also interconnected; and 5) in addition to the search and browsing services, some practises should be complimented using social media tools, federated tools and sophisticated discovery tools, collecting usage statistics and observing citations, videos and presentations on theses, printing in book format on demand, options for copyright protection & licensing, preservation in multiple copies etc. He also stated that the above best practices adopted by the librarian can add value to ETD repositories and make the services user centric with the least, flexible and innovative effort.

D. Information Literacy (User Education)

The library plays a vital role in educating the users, especially in academic institutions, where the user's population is large and be regularly floating every year. These user education programmes of earlier times have taken new shape into Information literacy with the advent of electronic resources, tools and services and also latest information retrieval systems. Usually such programmes will be conducted to newly admitted students and research scholars to explain about library rules, organization of collection, services and use of library tools and accessing the resources etc. Special orientation will be conducted by the library in the specific occasions or while introducing new information products to make the information/document centric to library centric. Though users are now familiar with different types of online resourses, they still need guidance from the library regarding the –

- I.P authenticated e-resources under copyright, fair-use terms of publishers, the way to register for databases access, wherever it is mandatory, for example Scifinder scholar, CMIE etc.; the availability of remote login, wherever publisher allows.
- Moblie applications especially for the use of webOPAC.
- Existing networking infrastructure for accessing e-resources and online based tools, like internet and OPAC terminals, Wi-Fi, importance of secured network in case of accessing valuable and highly expensive copyrighted material in electronic form etc.
- Further the users need to be explained about the benefits of registering for databases such as - receiving alerts regarding new publications in the selected area of research work i.e. article, new journal or a chapter or about launch of new product or a trial access.
- Researchers can even be trained to search and retrieve the required information or document precisely without missing relevance.
- Researchers can be taught about the value of citations, citation styles explaining about the plagiarism the research misconduct, researcher's gateways and their use of relevant tools.

With the increasing use of web based resources and tools for various purposes in academic and research environment, the networked users in the present era can be motivated to be aware of the policies/rules of the library and resources by prominently displaying on the library web page, without making much effort to contact the library personally during working hours / days and also access the resources. Thereby the library users will be able to access university's authenticated web resources on or off campus anywhere, anytime as they are connected through the campus-wide Wi-Fi, remote login facilities created for users.

These training sessions on the use of the library with audios & videos, online interactive sessions can even be posted on library websites for user's information and also to get the feedback from them. Surveys can be posted online to take users feedback on any product, resource or service.

- Are you satisfied with the Library services?
- Do you get the information easily & speedily than some years back?
- Do you feel that the library has shifted from document centric to user centric?
- Are you familiar with the web OPAC?
- Do you need training in the use of online resources?
- Are you able navigate and get the relevant information online?

Figure 5 *- E- Interaction with the User (modified from Koerber, 2015)*

Apart from library tours, user guides and instruction classes, libraries can even hyperlink the videos of instructional lectures and publishers tutorials to their websites for users to self-learn the various processes involved in information retrieval. A self-directed training can be made simple by hyperlinking the modules to library's website or Intranet, or as multi-part online courses. Moreover, such programs can be useful to train staff as well as patrons.

E. Library Websites

Since, the hypermedia has become prominent platform to display of resources as well as disseminate the information emerging in variable formats, libraries are gradually transforming into virtual libraries providing remote services and resources to widely distributed users across the campuses. There is a visible difference in the conventional static library websites, when users are not just satisfied with infrequent updated text by the site administrator, but requiring automatically updated information in dynamic mode. It is possible by embedding the respective web applications and scripts in Webpages. Further, the latest content management systems e.g. Word press support the user's interaction with websites like providing search interface, submitting feedback/contact us or ask us etc. and connecting to social networking as well as researcher's networks.

Moreover, the inclusion of web 2.0 tools such as library blogs, chat services, ask the librarian to library website or online catalogue will speed up the communication between the user and library. It will not only setup quick library contact service to the user but also get necessary feedback from users, which ultimately ignite the launch of new services or redesign of existing services.

7. Conclusion

"Google can bring you back 100,000 answers, a librarian can bring you back the right one"

- Neil Gaiman

It is pertinent to mention that most of the research scholars or faculty does not know how to fully tap the resources of the library. In this context if the role of librarian in managing the resources is considered as the most significant only when it is made user centric by flashing the new arrivals, training sessions in the use of the web OPAC & online resources and document delivery services etc. In the recent years the libraries are even involving in screening theses & dissertations before submitting with the similarity index so that the researchers, institutions know the value and originality of the theses. This service is a value added service to the research output. In the light of novelty of the services provided in the present

context in the established libraries it is never the less to mention that the libraries are becoming more and more user centric and user prone. The role of librarians and libraries in academic environment lies more in making the users to understand the resources/ services and enable them to achieve competency in tapping the resources whether print or online. Universities without research is meaningless so also libraries without users. Hence the importance of UCD.

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Experience: Over 30 years. Resource Person-PGDLAN (University of Hyderabad), Centre for Regional Studies, UOH, Academic Staff Colleges UOH; MAANU and OU. Participated in Two Turn Key Projects at CCL, Hyderabad and Dr. BRAOU, Hyderabad. Worked as Associate Coordinator (2012) and Coordinator (2014) for PGDLAN Course and Convener - NACMIER 2014

Publications: Above 60 papers in national and international journals/conference and also attended a number of conferences/workshops. Published 2 books and also jointly edited NACMIER 2014 conference volume. Articles Reviewed for PEARL and editor for International Journal of Advanced Library & Information Science * ISST Advances in Librarianship

Membership in Professional Associations: Life member of APLA, ALSD, TSLA.

Awards: Recipient of ***Mahila Siromani award*** (on 8.3.14)

Uma, V. (Dr.)

Suseela, V.J. (Dr.)

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