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Web-based library services in university libraries in India: An analysis of librarians' perspective

Introduction
Technology-led developments have created new opportunities and challenges for libraries in creation, promotion, dissemination and storage of information. The library is one of the many institutions undergoing change in the face of technological advances. This, in turn, has led to the generation of new services, hitherto non-existent, as well as modification of existing library services and their deliverables, as well as the move towards new communication paradigms and the shift from face to face human contact to human machine interaction, from paper to electronic delivery, from text centered mode to multimedia and from physical presence to virtual presence.

The Web has become common place throughout the world, a natural complement to traditional library services and develops innovative ways to meet the information needs of users. Traditional online services have transformed themselves into web-based services using web technologies. The web also offers libraries the potential for more revolutionary change as well. Library websites have become the main point of access and catalyst for new web-based library services. A library website is a virtual public face, the quasi equivalent of the front door, signage, pathfinders, surrogates to the collections, services and it is used as a window to the World Wide Web (WWW) (Diaz,1998). It also serves as an integrated interface to a wide variety of digital resources and web-based library services for users over a network (Letha,2006).

As more libraries move towards providing services in a web environment, the improved access to remote library collections is making the use of electronic information resources more realistic and more attractive. Indian university libraries also have realized the paradigm shift in library services and they are providing better web-based library services to their current techno savvy users.

Web-based Library Services
In terms of library perspective, web-based library services provided via the Web are considered invaluable. The Web allows library staff to extend their services beyond posted library hours. It improves library visibility within the library system, users become aware of what the library has to offer. The library's use of the Web to deliver highly visible databases and full-text services promotes the image of the librarians as the 'Internet expert'. Most importantly, providing "web-based library services promotes the image of the library as an innovative, progressive, and integral to the commitment to excellent in education and research" (Halub, 1999). It can also lead to additional funding for web-based resources at a time when budgets are restricted. On the user perspective, web-based library services offer services such as more online textbooks, databases, tutorials and a virtual library of links to other useful resources. They provide the unique service of linking to full-text articles, integrating library house-keeping operations, library policies, staff listings, etc. for timely help. According to White (2001), they can

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be defined broadly as 'an information access service in which users ask questions via electronic means e.g., email or web forms'.

Therefore, for this study, *Web-based Library Services* means, "library services provided using Internet as a medium and library website as a gateway with the help of web-based library automation software". Such web-based library services include the reference service in a library - often defined as direct personal assistance given to its reader for finding information. Web-based reference services owe their increasing popularity amongst users to extend the reference desk beyond the library's walls. The goal is to meet the demand for easy 24 hours access to electronic reference sources from their desktops. The web-based reference services provided to their clientele such as electronic document delivery services, electronic current awareness services, electronic SDI services, web-based reference tools, electronic research guides, virtual reference desk/ ask-a- librarian.

The web-based acquisition library services provided by the university libraries include: online list of new arrivals, provision of alert services for new additions, electronic reserves (digital documents), on-line acquisition staff list, on line acquisition policies, online status of items.

Circulation is an area that impacts most library users and involves personalized user information; so it makes sense that libraries would be interested in making comprehensive and personalized services available to users via the web. Web-based access to patron accounts means that users can access their personal information about items checked out, over due dates, at their convenience. The more advanced services, like renewals and holds, mean that users can manipulate and interact with the circulation system without having to come to the library, wait on line, or talk to a staff member. This is a valuable time saving suggestion for most users.

The different web-based services offered in the circulation with the help of web-based library automation software via library website are: online circulation (issue/return), online availability of a particular document online reservation of document, online status of reserved documents, online cancellation of reservation of document, online renewal of loan document, online posting of overdue details of user, online user account status, patron accounts (view information only), online circulation policies are online interactive patron accounts.

Catalogues are the windows to the collection of the library and a perennial tool. They have had to exist all through the life of the library and now Web technologies made it possible to connect computers spread far and wide. This helps the librarians to get access to catalogues of different libraries all over the world. Web-based services in this area and the options provided in the questionnaire are Web PAC, catalogue of e- journals (subscribed), catalogue of e- journals (UGC-Infonet digital library consortium), catalogue of online databases, electronic indexes, catalogue of digital collections, search multiple catalogues (federated search), and downloading MARC records.

Once identified, borrowing documents from other libraries can be affected by interlibrary loan (ILL) and document delivery services. Some of the important web-based services include: electronic document delivery, ILL request web-form and ILL-based services. Coupled with this is an electronic article delivery service that provides the requested articles to the user either scanned or downloaded from the e-journal website or by sending the same as an email attachment to requested bonafide users of the library.

Serials control is a very complex process involving large number of publications and expenditure to be handled. Further, the problem of keeping track of receipts, reminders and non-receipt claims, periodicity change, merger of titles etc., is quite a task to be manually managed. Web technologies make most of these tasks very easy and efficient. The various web-based library services are: Pro-active web-based table of contents, article alert service, electronic article delivery, open J-gate and index to journal articles.

In the case of Pro-active web-based table of contents, the library prepares the table of contents of all the e-journals and posts it on their library websites for individual subscription by the users and also sending automatically the same to subscribed members as an e-mail attachment, as an when it receives from the e-journal publisher.

An article alert service is to keep users abreast of current trends and developments in respective area/subject and to save the user's time in searching the current articles as well as develop 'current' approach in users' minds and to promote quality research and also avoiding duplication of efforts and to generate new ideas. Example includes, Table of Contents of each journal either prepared by the library or downloads from the e-journal publisher's site and sending the same to users of the concerned subject

An index to journal articles is excerpted from a number of scholarly (and not-so scholarly) journals. Examples include *Library, Information Science & Technology Abstracts* (LISTA), where it indexes more than 600 periodicals, plus books, research reports and proceedings. *Library and Information Science Abstracts (LISA)* is an international abstracting and indexing tool designed for library professionals and a valuable reference tool for current awareness in information sciences. 620+ titles are currently monitored for inclusion in LISA. *Scopus* is the largest abstract and citation database of research literature and quality web sources. *Current Abstracts* offers complete bibliographic citation information for nearly 9,800+ scholarly academic journals. This database provides up-to-date table of contents, abstracting and indexing for all included journals.

Other web-based library services, includes online staff lists, online suggestion forms, online library news, online library holidays lists, online in-house library bulletins, web-based user education/virtual library tours, online integrated push-based services (e-mail based), online helpdesk services/Ask-a-librarian, e-mail-based services, online library chat, library forums (e-mail based), web-based FAQ, library blogs, library wiki, online contact address, online subject gateways, online mailboxes for user comments or suggestions, change password online, online general library policies, information about special exhibits, web-based library tutorials, and online map of the library.

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Review of related studies
Libraries provide their collections and services to a large variety of users, some of whom will continue using the library interface regardless of the way in which it addresses their expectations. However the majority of today's library users are those who were born into the internet age and whose scholarly research habits are tightly bound with their overall internet experience (Sadeh, 2007).

Web-based library services are modified versions of existing services and technology-driven library services (Arora,2001) or transformed from traditional library services incorporating new services that are peculiar to web environment (Moyo, 2004) and underlines its significance for changes in the library information systems paradigms (Cordeiro and Carvalho, 2002). The library users value the services that they access from their desktops because the web-based library services save lot of time and traveling cost (Ahmed, 2007; Pathak, Mishra, & Sahoo, 2008) and accustomed to the dynamic and interactive nature of the Web, as well as social networking tools (Wang, 2009) and also overwhelming attention is being given to the web-based information services in libraries (Krishnamurthy & Chan, 2005).

Libraries have always changed; the pace of that change somehow is felt to be faster now than ever before (Casey and Savastinuk, 2007). Library portal reflects the strengths and weaknesses of the libraries very effectively. Libraries should make consistent efforts to provide web-based services to their users (Kanamadi & Kumbar, 2006). Web 2.0 facilitates communication, conversation, information sharing, and collaboration within the online community (Stephens & Collins, 2007). Academic libraries are quickly becoming the major players in adopting and incorporating Web 2.0 applications into their services compared with other types of libraries (Xu, Ouyang and Chu, 2009). For example, RSS feeds can inform library users about new library activities, while blogs enable the library to aggregate knowledge from users (Kim and Abbas, 2010; Schrecker, 2008) and setting up a subject-based blog provides constructive resources to assist readers with researching and utilizing this technology (Blair and Level, 2008). Academic librarians are trying to find out what the students and faculty believe the library is doing well and also what could be improved in providing materials and services. Apart from comment cards and regular library surveys, a new media format called weblog or blog is being used to allow librarians and library users – students and faculty, to express their concerns, air their opinions, and exchange their ideas (Zhuo, 2006).

Few research studies of types of web-based library services exist, but one exception is a study by Schubert and Ee-Peng (1998) of an integrated web-based inter-library loan (ILL) system to replace and enhance the existing manual-based ILL system. Others include the trend towards electronic delivery of articles in ILL (Walton, 2008); web-based document delivery service as a value added service available to the users (Chandra, 2002); innovative reference services and other cutting edge digital products such as podcasting and wikis (Lukasiewicz, 2007); and chat reference as a synchronous way of communication which has special advantages compared with e-mail (Nielsen and Hummelshøj, 2008). Hanson and Cervone (2007) "identified Wiki, blog, Really Simple Syndication (RSS), Instant Messaging (IM) and podcast as the prominent Web 2.0 tools

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for academic Libraries". The introduction of an instant messaging (IM) reference service fitting into the existing range of help services was discussed by Hvass and Myer (2008); while Web forms are becoming increasingly widespread because they facilitate interactivity and can be presented in a more warm, personal way than a simple e-mail link (Dewald, 1999). Feldman and Strobel (2002) recommend that for advancing web-based services it is essential to initiate self-service circulation or librarian-mediated online reference. These innovative services are made possible because of the Web (Tobin and Kesselman, 2002). Web-based library tutorials are the hallmark of good web-based instruction (Dewald,1999) and provides realistic learning arenas (Su and Kuo, 2010). Virtual library tours are also using new technologies and replace image maps on main campus websites (Bhatnagar, 2005).

Furthermore, web services offer many advantages to the library community, but the majority of these advantages can only be realized if web services are standardized (Wusteman, 2006); but, the key issues involved are with opportunities, challenges, and future developing trends of delivering dynamic and distributed web-based library information resources, services, and instructions for library users in the digital age (LiLi, 2006). It is clear that libraries continue to offer unique and valuable web-based library services to their clientele. However, mere provision of such web-based services is not an end in itself and "identify the relevant information and web services based on the user feedback and improve the existing services" (Ganesan & Pandian,2004). There is an imperative need for libraries to exercise proper awareness, "necessary orientation and training of such newly introduced services in order to create a positive environment for change (Syed, 2002) and using web technology as the delivery mode (Bhatnagar & Deshmukh, 2006) and in a developing country like India where resources are limited, funds are invariably scarce for the library (Parida, 2004). It is very important for university libraries and librarians to design, develop, enhance, implement, and deliver world class web-based library services, resources, and instructions at the fingertips of library users and devoting resources to strengthen support in the core areas of teaching and research (Reddy, 2004).

The present study takes a broad view of web-based library services, focusing on different web-based library services as well as the whole spectrum of library services in study university libraries. Finally, the paper will focus on the imperative need for enhancing the quality of web-based library services in Web 2.0 environment and training programs for creating a positive environment for effective use of web-based library services.

Research objectives and methodology
In the light of the aim of the study and review of literature, the following research objectives were set:

- to identify university library websites in India which have web-based library services;
- to discuss web-based house keeping services offered through university library websites;
- to assess the institutional resources and processes in order to support web-

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based library services;

- to analyse the existing web-based library services in university libraries under study; and

- to suggest the new approaches for effective use of web-based library services.

Regarding scope, in the changed scenario, more and more university libraries in India are exploring and offering new web-based library services to satisfy their clientele. The web-based library services offered in university libraries in India include: reference, acquisition, circulation, cataloguing, periodicals, inter library loan/document delivery, and other web-based library services.

Twenty (20) university library websites in India (Appendix I) were surveyed. The selection of sample was based on functional web-based library services, providing via library website with the help of web-based library automation software during the month of September 2009. The survey was conducted by means of a structured questionnaire circulated personally among 20 university librarians and the response rate was 100%. The responses received from the university librarians to 22 questions are presented below in the form of tables and figures and analyzed by using a simple method of calculation.

Analysis and results
Web-based library services
Table I shows that 90% of the respondents said that electronic document delivery services are being provided; 75% have web-based reference tools; 65% of the libraries provide electronic current awareness services; 45% each have virtual reference desk/ask-a-librarian and online current awareness bulletins; whereas 40% each offer electronic SDI services and electronic research guides.

Take in Table I

90% of the respondents mentioned online lists of new arrivals, followed by online status of new items (60%), 55% mentioned provision of alert services for new additions, 30% indicated the availability of electronic reserves (digital documents), 25% mentioned online acquisition staff lists. Nearly all university libraries are providing an online list of the new arrivals. Among other services, online status of terms and provision of alert service for new additions are too provided by a majority of them.

The basic objective of any library is to assist the clientele in the use of resources of library in an effective manner leading to their optimum utilization. They are: electronic indexes, bibliographic databases, union catalogue, consortia based, and any other aids. The responses show that 50% possess electronic indexes, 80% have bibliographic databases, followed by 65% having union catalogue, and 75% are providing consortium based services under other online finding aids (other than OPAC). Interestingly, OCLC, JCCC@UGC Infonet, and e- journals are some of the other online finding aids in practice.

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90% study libraries have online availability of a particular document, 85% each have online reservation of document and online circulation (issue/return), 80% have online status of reserved document, 75% have online cancellation of document, 70% each have online user account status and patron account(view information only), 65% each have online renewal loan document and online posting of overdue details of the user, and 55% have online circulation policies. Only 35% study libraries provide online interactive Patron accounts services.

It should be noted that for most of the surveyed libraries, circulation services are a component of their Web PAC software that is purchased/open source from an outside vendor. Also, in two cases the access to patron accounts is via telnet which is not exactly a web-based service (like the web, telnet is a system for accessing information on the Internet). However, those two cases were included in the numbers above. The same finding was also attested by Mirza and Mahmood (2009) "the web OPAC is a significant service offered by libraries through their websites"; 95% subscribe to e-journals and have e-journals (UGC-Infonet digital library consortium) and also provide online databases, 60% each have electronic indexes and search multiple catalogues (federated search), and 55% each have digital collection and MARC format in cataloguing.

Federated search computer programs allow users to search multiple information sources with a single query from a single user interface. The user enters a search query in the portal interface's search box and the query is sent to every individual database in the portal or federated search list. Access details for the individual databases must be preset in the portal by its owner. Interestingly, many study libraries are using *JCCC@UGC-Infonet* search facility to search the e-journals and databases of UGC-Infonet digital library consortium and *Open J-gate*, is an electronic gateway to global journal literature in *open* access domain, launched in 2006, they provide access to all the open access journals and databases.

85% of the libraries have open J-gate web-based library services, followed by 70% where each provides electronic article delivery and an index to journal articles. 40% have article alert services, and 20% have pro-active Web-based table of contents. An open ended question regarding any other web based periodical services reveals one service i.e. JCCC@UGC Infonet being provided by 85% of the libraries.

85% of the studied libraries are having e-mail based services; 80% maintain online staff lists and contact addresses; 70% have online library news; 65% have online feedback form; 55% possess online library holidays list and subject gateways; 45% use online helpdesk/Ask-a-librarian, library forums (e-mail based), and general library policies; 40% provide an online map of the library and web-based FAQ; 35% offer web-based user education/virtual library tours, change password online, information about special exhibits, and web-based library tutorials; web-based tutorials provides realistic learning arenas. 30% of the respondents own online mailboxes for user comments or suggestions, library blog, and online in-house library bulletins. Only 5% of the libraries provide a library wiki. Applying wikis in libraries enables information to be read and edited by

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people simultaneously, facilitating the libraries' operations and enhancing collaboration within the profession while increasing the involvement of the community (Chu, 2009).

Web form for reference queries
Interactivity is a key feature of successful web-based services and web forms are good examples of interactivity. Most of the library websites in this study have web forms for inviting feedback from the users and a few of them are facilitating a separate web form for reference queries. A question was asked to know the status of web form for reference queries in the study libraries and the responses reveal that 40% libraries are using the web form for their reference queries, while the remaining 60% libraries are unable to facilitate the web form for reference queries.

An open ended question that was asked to know the status of interactive online reference services available in the reference service reveals that they are not providing any such kind of reference services. A few study libraries are providing online reference services through CREDO reference service (University of Delhi) which is a collection of 239 best references from the world's 55 leading reference publishers. It includes encyclopedias, dictionaries, thesauri and books of quotations, not to mention a range of subject-specific titles covering everything from art to accountancy and literature to law.

To reinforce the above, a value added open question was asked to find out about various latest and innovative/interactive web-based reference services such as: Web resources, e-books, digitized books, reference links through library portal, links for e-resources including these which are subscribed, abstracting/indexing databases, annual reviews, and other library reference tools.

Most of the academic libraries currently involved in real-time reference service are part of a collaborative network so that they can share staffing and work around the clock to truly provide reference service at any time. Examples include: Instant Messaging reference service is one of the real-time electronic consulting and reference services offered by academic libraries via specific software running on the internet platform. Digital reference service, also called "Ask-an-expert" or "Ask-a-librarian" services are Internet-based question and answer service that connect users with individuals who possess specialized subject knowledge and skill in conducting precision searches (Davis, 2001).

Web form for suggesting a document to library
Web forms are becoming increasingly widespread in academic libraries in digital age because they facilitate interactivity and can be presented in a warmer, personal way than a simple e-mail link. A question was asked to know the status of suggested document to a library by users, using a web form. The responses indicate that 30% gave the answer 'yes', for providing a web form and 70% have said 'no' they are not providing a web form to suggest a document to library by user.

An open ended question was put to the librarians to know how the web interaction mechanism is working with regard to the need for a document to the library. The

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references show that the libraries are using SQL server, NewGenLib automation software, e-mail, and web.

Web form for circulation queries
Information is an important factor for any library and making this information available to the users is more important and this responsibility lies on the information professionals. Internet and web technologies are being explored and searched for the required information instantly by the users from remote computers. It was discovered that using a web form for circulation queries - 30% of respondents said 'Yes' for web form facilitating the user queries regarding circulation but 70% said 'No' that is they are not web form for circulation queries.

An open ended question was put to the librarians to elucidate the value of the interactive and alternative facilities for circulation service mechanism. It was revealed that different services, such as: Online delivering of answers to the users, feedback form are being provided through web-based integrated library automation software (NewGenLib automation software), and through an e-mail.

Downloading MARC 21 records
Provision for downloading MARC 21 records from different libraries is possible. For example, Library of Congress is providing this facility to any library using Z35.50 tools. Z39.50 provides choices to the user to request for selective data elements from the database record. It also gives choices about the format for transferring the record (i.e. record syntax) from the server to the client. The status of the downloading MARC21 records by the study libraries reveals that it is evident that 40% are saying 'yes' that is downloading (online) MARC 21 records from another library is available and 60% said 'no' indicating that such a facility is not available.

Online facility to suggest a journal
The internet has left a great impact on almost all aspects of a university library. It has its positive effect on the work processes, services, collection development processes, types of collection, users' instructions, readers' services and preservation of the intellectual record, online facility to suggest a journal to library is not an exception. Regarding the status of such a facility provided by the surveyed libraries revealed that 65% said 'no', indicating that such a facility is not available. Those who said 'yes' (35%) further informed that there are three ways to know the status of suggested journal by the user online: (i) through library website, (ii) through publishers' website, and (iii) through e-mail.

Web form for articles by e-mail
Most of university library websites in India have web forms for diverse purposes. A question was asked to know the status of web form for getting articles by e-mail in the libraries, i.e the provision of a web-form for users for facilitating requested articles as an e-mail attachment by the libraries under study. It is apparent that 60% replied 'yes', that they are facilitating a web-form for requesting articles by users and sending the same through e-mail and 40% said 'no' indicating that such a facility is not available.

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Electronic document delivery service is a method employing electronic technologies for receipt and supply of documents which are known as EDDS. It is very fast or almost instantaneous document delivery and simultaneous delivery of the same document to several requestors and ability to maintain the efficiency even with increased demands. Figure 1 indicates that 70% (14 libraries) each facilitates ILL-based services and electronic document delivery services, followed by 45% (9 libraries) possessing ILL request web-form. Only 40% (8 libraries) are having request form for new items.

Problems faced while providing web-based library services
Motivations for web-based library services include the need to attain high-quality services over and above what the traditional library can offer. Traditional services will often be integrated with web-based services. However, whether services are web-based or a hybrid of web and traditional services, it is important that patrons receive an acceptable quality of service. The implementation of web-based services requires skilled staff with sufficient space, furnishings, hardware, software and good library websites, high bandwidth (internet speed) to accomplish their work. Moreover, it is important for equipment facilities such as computers, servers, scanners and network hardware to be made available to maintain efficacy. Web-based library services should be based on merit, considering ability, interest and availability. In addition, staff should be given the time and resources for training and continuing orientation to ensure effective service. Planning for the provision of web-based library services should include a promotion strategy. As with traditional services, web-based library services cannot be provided in a vacuum. The target users should be established and should be involved in the planning and evaluation of the service.

To accomplish the above, a question was put to the respondents to state as to what problems or limitations they experienced while implementing the web-based library services. The responses received from them (Figure 2) demonstrate that 65% (13 respondents) are having lack of skilled professionals, followed by 55% (11 respondents) possessing inadequate terminals access, 50% (10 respondents) each have slow internet connectivity (bandwidth) and insufficient time & training. Only 40% (8 respondents) experience lack of systems.

One of the motivations for implementing web-based library services is to circumvent the budgetary constraints that face most university libraries in India. However, this should not be construed to mean budgets curtailments or slash. In fact, initial capital outlay of putting in place technology-based libraries often tends to be high. This implies that any plan for the provision of web-based library services should include specific allocation of funds to cover the personnel, hardware, software, connectivity, furnishings, training, publicity and space to support these services. Moreover, provision should be made for ongoing budgetary requirements and staff recruitment for offering web-based library services should be based on merit.

Opinion and rating of the web-based library services
Connectivity is the critical technical factor for browsing web-based library services. The problem of slow access to the Internet also affects users' access and use of web-based library services of the library. "The major contributory factor is very low bandwidths" (Madhusudhan, 2007). It is a problem that affects web-based library services access in many universities in India. To highlight this major problem, respondents were asked to rate the web-based library services in the university library. The responses of the respondents on the usefulness and satisfaction are stated in Figure 3, where it is clearly shown from the analysis that 40% each have responded by saying 'very good' and 'good' respectively, Excellent is the response given by 10%, while 'satisfactory' is another response given by 10% of librarians. However, none of them expressed dissatisfaction with web-based library services in the university libraries and made some suggestions to improve the way of increasing speed of the web-based library services.

Developing new web-based library services
Increasingly, with the support of technology, information specialists are transforming university libraries into complex cyber communities where users are able to share the same information to fulfill their needs. Many university libraries in India are digitizing materials and making them available on the Web or using Web PACs as gateway to point to resources on the internet.

As more study libraries move towards providing library services in a web environment, access to remote library collections is making the use of e-information resources more feasible and more attractive. Online catalogues are evolving into a gateway to web resources everywhere, not only to books, and serial titles held locally, but also to other collections elsewhere and, through indexing and abstracting services, to articles in periodicals. Libraries have a lot at stake if they cannot evolve fast to take advantage of the enormous volumes of information on the Web, some of which are free. Although the modes of operations of web-based library services are likely to vary from conventional service, the status of both services should be considered as equal, especially with respect to quality goals. It is also important that staff working in web-based library service areas in university libraries have knowledge of web-based library service operations so that they can effectively determine when to refer virtual questions to another reference or web services point, and the goal should be to provide a quality and diverse web-based library service to a broad range of users anytime, anywhere.

In this context, a question was put to the respondents to know the process used at their library to develop new web-based library services. 25% libraries responded by saying 'through library website committee' and 'through committee' respectively, 'with external subject experts' and 'staff interaction/meetings' is the response given by 30% respondents, while 'librarian initiation only' and 'through library advisory sub-committee' are other response**s** given by 20% each of librarians (Figure 4).

Human resources for implementing web-based library services
Humans are the most important and valuable resource for every organization, in the form of employees (Rao, 1990), library is not an exception and effectiveness of the

organization and motivated people can make things happen and enable organization to achieve its goals. For the last two decades, academic libraries of the world have been going through a sea of change and India is not an exception. The most revolutionary change libraries face is the speedily growing web-based library services. Application of Web 2.0 in libraries has taken the libraries into next generation. This particular application of Web 2.0 is known as Library 2.0 and it is completely user centric which provokes libraries to share the resources collectively. It is important for the librarians to experience Web 2.0 tools from a user's perspective and use these tools in modernizing library services. Therefore, librarians have to be techno-savvy in today's world of information and communication technology.

"The expectations of the libraries and librarians are constantly on the increase and as a result librarians are forced to wear many more hats, to name few: data miner, researcher, Internet and computer expert, multimedia specialist and webmaster. Librarians undergo constant training as new tools emerge and they are struggling to provide the services that patron, employers and the academic community has not only to expect, but to demand all of this in an environment of ever-diminishing budgetary resources and library staff"(Madhusudhan, 2007).

An environment in flux, the librarian imagines, designs, and implements solutions which ensure that library values are sustained in the digital age. The librarian thus becomes less visible but more important in the higher education landscape. Implicitly and explicitly, s/he acts as a broker across boundaries of intellectual communities. S/he cultivates a close relationship with users, helping them understand his/her role.

Strengthening web-based library services
The Web 2.0 generation which stimulated expectations and demanding more computing for next generation. Therefore, in broader sense we can say that Web 2.0 is bringing individual together and information scattered all over the Web, whereas it is being expected that Web 3.0 will bring information together. Application of mashup technologies will give us the virtual world of information in which Web will be strengthened with more computing and analyzing powers through artificial intelligence. Now, Web 3.0 will prominently be based up on the librarians, for organizing this scattered or unorganized information. The application of semantic technologies and ontologies will be the key aspects in the web generation.

Consequently, Library 3.0 envelops a lot of challenges to the librarians as well as new dimensions to the profession, although, Web 3.0, which may not be accepted by many of the professionals. Librarians need to be more inclined towards the use of latest tools and technology to create virtual library system. But basic aim remains the same i.e. 'right information to the right user at the right time'.

In view of the above changes in web technologies, an open ended question was posed in the form of suggestions from university librarians of the surveyed libraries to strengthen web-based library services and to cope up with Web 2.0 and Web 3.0. The more important suggestions and future plans of the respondents are as given here under:

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       (i)   to increase professional and technically qualified staff for developing web-based library services;

       (ii)   digital library portal will be created with Library 2.0 or Library 3.0;

       (iii)   Outsourcing the present library services to develop as web-based library services;

       (iv)   to provide proper training for staff in web technology and digital literacy to develop new web-based library services;

       (v)   providing table of content**s** of each book with its web catalogue; and

       (vi)   user awareness programmes are needed for web-based library services.

Suggestions emanating from the study

The survey and the subsequent analysis of the data and the findings of the study have enabled the researchers to provide some practical suggestions for improving the web-based library services expected from study university libraries as given hereunder:

- Most of the study libraries are lagging behind in effective use of web forms, which are effective tools for library-user interaction and communication. It is recommended that the studied libraries will attend to this shortcoming by developing web forms for reference queries, to suggest a document and journal to library, circulation queries, and request of article (s) by e-mail.

- The University Grants Commission (UGC) of India with the help of Information and Library Network (INFLIBNET) should formulate the national web standards for university library websites to meet the new challenges of next-generation web-based library and information architecture and set up web content steering committees to strengthen access of web-based information.

- University libraries today are faced with various challenges of offering quality web-based library services to both generation X students and faculty. There is an urgent need for Web-based library committee in university libraries in India to strengthen web-based library services.

- University libraries in India must continually develop effective web-based information literacy programmes to provide a high degree of interactivity and flexibility to enhance the quality of web-based library services they offer.

- There is an urgent need to develop dynamic library websites, apply semantic technologies and ontologies. Ontologies try to resolve the problem of ambiguity in natural language and the problems that arise due to the use of transmission meanings, analogy, comparison or metaphor (Toleva, 2010).

- Users today are accustomed to the dynamic and interactive nature of the Web, as well as social networking tools. Many of them use Web tools to find the information they need (Wang, 2009). So, more RSS feeds, library wikis, instant messaging reference services, virtual library tours, online library and floor maps,

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discussion forums and listservs, multi-language support content to regional and international users, and increase more terminals for access the new power for web-based library services.

- The major problem facing by the study libraries during study period is an acute shortage of professional and technical staff (lying vacant). So it is recommended that the study libraries must recruit professionals with practical knowledge of web technologies in libraries for developing and implementing new web-based library services in study libraries.

Conclusion

Web-based library services will become more widespread and sophisticated as the Web becomes common place throughout the entire world. Librarians should be expert in holding the hands of the users who are moving towards a new communication paradigm shift from face to face human contact to human machine interaction, from paper to electronic delivery, from text centered mode to multimedia and from physical presence to virtual presence. Library professionals must use Web 2.0 tools to offer traditional services in an innovative manner and address the information requirements of the techno-savvy users (Tripathi & Kumar, 2010). Despite these changes in communication technology, the reference interview will remain at the heart of the reference transaction. To meet these challenges the librarians may play a leadership role in providing better Web-based library services to their current techno savvy users.

The findings from this study show that many of the surveyed university libraries are yet to exploit the full potential of the web. In fact, by looking at what other libraries have done, librarians can discover new ideas and learn how to develop and implement such web-based library services, for example, instant messaging reference services, weblogs, and wikis represent the new ultimate level of power for web-based library services.

This study is significant because it represents one of the earliest works to shed light on the current level of adoption and use of web-based library services in select university libraries in India and the ways in which individual web-based applications have been used are examined. University librarians and Web designers of study libraries may benchmark their own efforts in deploying web-based library services against this study.

Lastly, it should also be noted that this research has some limitations. Since it surveyed librarians from only twenty universities, the librarians may not accurately represent the whole population. For future research, a broad study should include more university libraries that offer the full range of web-based library services and report the problems faced by users while using them, as well as expanding the study to other libraries in order to gain a broader perspective on the development of web-based library services.

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Appendix –I

List of surveyed university libraries in India with URLs   (*n=20*)

 Name of the University & URL of the Library

Acharya N G Ranga Agricultural University, Hyderabad www.angrau.net/lib.htm >
Bangalore University, Bengaluru < http://library.bub.ernet.in >
Banaras Hindu University, Varanasi < http://www.bhu.ac.in/bhulibrary/index.html>
Goa University, Goa < http://goalnet.unigoa.ac.in >
Guru Nanak Dev University, Amrithsar < http://library.gndu.ac.in>
Guru Gobin Singh Indraprastha University, Delhi < http://ggsipu.nic.in>
Jamia Millia Islamia , New Delhi < www.jmi.nic.in/zhl/zhlibrary.htm >
Jawaharlal Nehru University, New Delhi <
http://www.jnu.ac.in/main.asp?sendvol=library>
Kurukshetra University, Kurukshetra < http://kukinfo.com/library.htm>
Madurai Kamaraj University, Madurai < http://www.mkulibrary.org>
North Eastern Hill University, Shillong < www.nehu.ac.in/library.html >
Osmania University, Hyderabad <http://202.41.92.19:8080/newgenlibctxt/Opac2_0.jsp>
Panjab University, Chandigarh <http://library.puchd.ac.in>
Pondicherry University, Puducherry <http://www.pondiuni.org/facil.html>
Tezpur University, Tezpur <http://www.tezu.ernet.in/Library>
University of Delhi, Delhi <http://crl.du.ac.in>
University of Hyderabad, Hyderabad < www.uohyd.ernet.in/>
University of Madras, Chennai < www.unom.ac.in/chepauklib.html >
University of Pune, Pune < http://www.unipune.ac.in/other_ academic_ and_ service_
units/Jaykar_lib/default.htm >
University of Jammu, Jammu < www.jammuuniversity.in/campus_library.asp >

Description	Responses	Percentage
Electronic document delivery service	18	90
Web-based reference tools	15	75
Electronic current awareness service	13	65
Virtual reference desk/ Ask- a- librarian	09	45
Online current awareness bulletins	09	45
Electronic research guides	08	40
Electronic SDI services	08	40
Online list of new arrivals	18	90
Online status of items (on order, processing, etc.)	12	60
Provision of alert services for new additions	11	55
Electronic reserves (digital documents)	06	30
On-line acquisition polices	06	30
On-line acquisition staff list	05	25
Bibliographic databases	16	80
Consortium based services	15	75
Union catalogue	13	65
Electronic indexes	10	50
Online availability of a particular document	18	90
Online circulation (issue/return)	17	85
Online reservation of document	17	85
Online status of reserved documents	16	80
Online cancel of reservation of document	15	75
Online user account status	14	70
Patron accounts (view information only)	14	70
Online renewal of loan document	13	65
Online posting of overdue details of the user	13	65
Online circulation policies	11	55
Online interactive patron accounts	07	35
Web PAC	20	100
Electronic journals (subscribed)	19	95
Electronic journals (UGC- Infonet digital library consortium)	19	95
Online databases	19	95
Electronic indexes	12	60
Search multiple catalogs (federated search)	12	60
Digital collections	11	55
MARC format in cataloguing	11	55
Open J-gate	17	85
Electronic article delivery	14	70
Index to journal articles	14	70
Article alert service	08	40
Pro-active web-based table of contents	04	20
e-mail based services	17	85

Online staff list	16	80
Online contact addresses	16	80
Online library news	14	70
Online Feedback form	13	65
Online library holidays list	11	55
Online subject gateways	11	55
Online integrated push-based services	09	45
Online helpdesk services/Ask-a- Librarian	09	45
Library forums (e-mail based)	09	45
Online general library policies	09	45
Online map of the library	08	40
Web-based FAQ	08	40
Web-based user education/virtual library tours	07	35
Change password online	07	35
Information about special exhibits	07	35
Web-based library tutorials	07	35
Online mailboxes for user comments	06	30
Library blog	06	30
Online in-house library bulletins	06	30
Library wiki	01	05

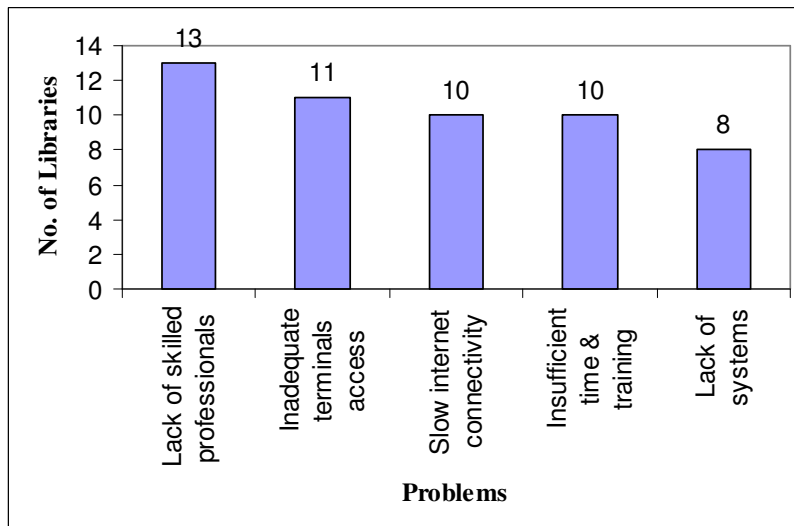*(n=20)*   **Table I:**
Web-based library services

Note: Respondents were permitted to give multiple answers.

Figure 1:
Online facility to suggest a journal

Note: Multiple answers were permitted.

Figure 2:
Problems faced while
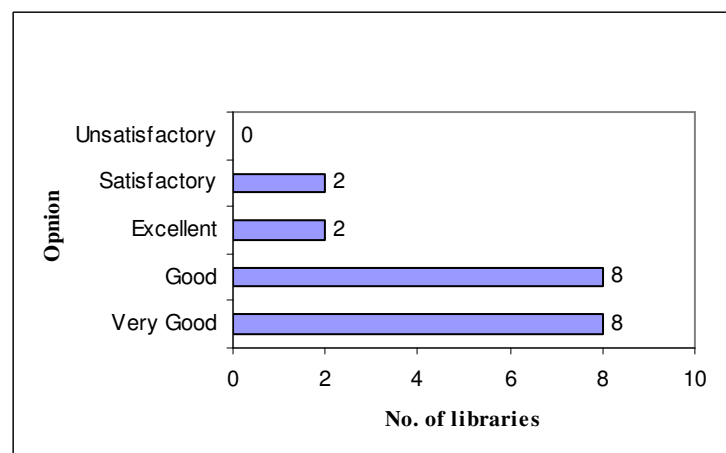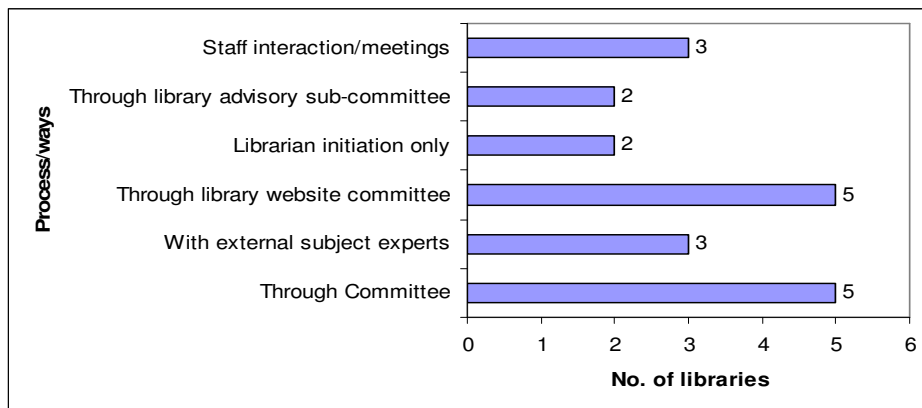providing web-based services

Figure 3:
Rating of the web-based services

Note: Multiple answers were permitted.

Note: Multiple answers were permitted.

Figure 4:
Developing new web-based library services