



WWJMRD2017;3(10): 236-250

www.wwjmr.com

International Journal

Peer Reviewed Journal

Refereed Journal

Indexed Journal

UGC Approved Journal

Impact Factor MJIF: 4.25

e-ISSN: 2454-6615

Umesh Prasad

Isabella Thoburn PG College,
Lucknow, U.P., India.

ICT in the Libraries: A Review

Umesh Prasad

Summary

It was traced to find out awareness of librarians towards information technologies and its uses. In relation, the valuable information from the existing literature about the use of current technologies in libraries was obtained.

It focuses the meaning, need and scope of Current Technologies, library networking and use of ICT facilities for automated networking and traces the historical growth and development, functions and services of some selected academic, special and public libraries in Lucknow city.

Through the review, it was attempted to discuss the present status of current technologies and networking of libraries, particularly academic, special and public libraries in Lucknow city. It also covers the previous situation, present condition and future prospects of current technologies in the academic, special and public libraries in Lucknow and a suitable proposal for library networking and resource sharing among the academic, special and public libraries has been made.

The findings and recommendations from the study should hopefully lead to a clarification of many problems in the formulation of planning and policy making regarding use of current technologies for housekeeping operations. It is assumed that it would help the librarians, policy makers and concerned authority to develop and implement a suitable system to accelerate library automation.

Keywords: ICT, Libraries, information technologies, current technologies

Introduction

Work Done by the Renowned Authors in the Area of ICT

The renowned authors who has already worked on similar topics, some of them are as follows:

Mathew (2011) studied the Impact of Information Communication Technology (ICT) on professional development and educational needs of library professionals in the university of Kerala. The aim of study was to assess whether the developments in information communication technologies have any influence on the library professionals, professional skill in handling developments in ICT.

Sampath Kumar and Biradar (2010) observed the use of Information Communication Technology (ICT) in 31 (thirty one) college libraries in Karnataka, India by analyzing the ICT infrastructure, status of library automation, barriers to implementation of library automation and librarians' attitudes towards the use of ICT. The survey carried out using the questionnaire, observation and informal interview with the professionals in the selected colleges and showed that lack of budget, manpower, skilled staff and training are the main constraints for not automating the library activities. Even though library professionals had shown a positive attitude towards the use of ICT applications and library automation, majority expressed the need for appropriate training to make use of ICT tools.

Rajput and Gautam (2010) investigated automation and problems in their implementation in the special libraries of Indore, India. This study was carried out to know the status of library automation and problems in their implementation in special libraries of Indore City, Madhya Pradesh. The study revealed that special libraries of Indore have embraced the new information technology more profoundly than other fields and most of them are currently using electronic products and services.

Mohamed and Abdul Shukkoor (2010) reported the Information and Communication Technology (ICT) literacy among the library professionals of Calicut University, Kerala. The study includes only the library professionals in the central library and departmental libraries

Correspondence:

Umesh Prasad

Isabella Thoburn PG College,
Lucknow, U.P., India.

of Calicut University. A structured questionnaire was used to collect data. The study reveals that the Professional Assistants are more ICT proficient in ICT skills than the Junior Librarians and Assistant Librarians. The use of ICT-based resources and services, library automation software, and general-purpose application software is high among the Junior professionals than the senior library staff. The use of digital library and institutional repository software is very low among the library professionals. Majority of the professionals had confidence in routine ICT and Internet tasks, and needed training or orientation in library automation, digital library and institutional repository software.

Walimiki and Ramakrishnegowda (2009) surveyed University libraries in Karnataka outline the status of ICT infrastructure of selected six University libraries. A structured questionnaire was used to obtain data from the University librarians. The data collected include details of hardware infrastructure like availability of servers, PC's, Laptops, printers, scanners *etc.* Software facilities for automation of house-keeping operations, digital library activities are included in the survey. Availability of campus LAN and internet facilities to provide access to information sources are detailed in the study. The survey revealed that most of the libraries lack sufficient hardware and software facilities, and internet with required bandwidth. The University libraries have to plan, implement and develop ICT infrastructure to exploit the benefits of digital information environment.

Singh, Sharma and Negi (2009) reported in a study of the current state-of-the-art use and applications of ICT in LICs in Noida. The study was based on 25 LICs of public, government, corporate, public, and private enterprises in Noida. The data was collected through a structured questionnaire through mail/e-mail among the librarians of selected institutions. The study tried to find out the opinion of the librarians about the barriers in application of ICT in LICs and their attitude towards adopting the technology. The result showed the lack of awareness, interest and initiation of library professionals towards ICT application in the LICs.

Choudhury and Sethi (2009) studied the information literacy skills of library professionals working in three major Universities of Orissa. Survey using structured questionnaire and interviews points to the fact that most of the library professionals were computer literate, having undergone computer courses like PGDCA, DCA and other short-term courses. They were also aware of the use of e-resources, evaluation of web resources, IPR, web OPAC, search engines *etc.* The authors recommended that library professionals are to be encouraged to attend various training programmes on different advanced concepts of information technology.

Ademodi and Adepoju (2009) reported in a study of academic librarians in Nigeria and aimed to determine whether academic librarians in selected Nigerian states possess computer skills and competencies in the use of computer. Thirty questionnaires were administered to respondents in the academic libraries under study. The study found that the academic libraries in these states had very few computers and these computers were used more for administrative duties and Internet browsing than library routines. Most of the librarians were computer literate, but had no computers to use. The rate of computer skill and

competence was low. The study recommended that librarians must be properly trained to acquire computer skills and more attention and funds should be committed to training and procurement of ICT infrastructure in Nigerian university libraries.

Adeyinka (2009) examined the attitudinal correlation of some selected Nigerian librarians towards the use and application of ICT in various libraries. A total of 41 librarians from automated libraries in the Oyo state of Nigeria formed the study's population. The surveyed instrument used for the collection of data was a computer anxiety and attitude towards microcomputer utilization (CAATMU) scale and a librarian attitude questionnaire. The main objective of the study was to find relationship between demographic variables of respondents, age, gender, prior knowledge/experience and training, educational qualification, computer anxiety and librarians' attitude towards ICT. The analysis of results showed that all the four out of the five variables age, gender, educational qualifications and knowledge of ICT significantly correlate with librarian attitude towards ICT; while the variable ICT anxiety correlate negatively with the attitude of librarian towards ICT. The study emphasized the need for libraries to embark on training their librarian who does not have knowledge of ICT.

Maesaroh and Genoni (2009) reported in a study the levels of education, skills, and awareness of Indonesian academic librarians, and provided an insight into their continuing professional development. The paper studied the qualifications of librarians in Indonesian academic libraries; and their type of continuing professional development and work place training in Indonesian academic libraries. The survey method was questionnaire delivered to all librarians employed in Indonesian Public Universities. It also covered a comparison of survey results on key indicators for Indonesian and Australian library and information staff and finds the relative shortcomings in the level and standard of education of Indonesian librarians. While Indonesian staff reported high levels of participation in some types of training, but their levels of satisfaction was lower than that of their Australian counterparts. The quality of education and CPD was not satisfactory for Indonesian professionals.

Singh and Nazim (2009) surveyed the impact of Information technology and role of libraries in the age of information and knowledge societies. The paper highlights the problems faced by the library and information services (LIS) sector in India and achievements over the years using modern technologies stress the role of libraries in performing pivotal role in disseminating and sharing the culture of knowledge. This study was concluded that the library and information services (LIS) sector in India has not kept pace with the paradigmatic changes taking place in society.

Safahieh and Asemi (2008) assessed the computer literacy skill of librarians in Isfahan University of Iran. The factors studied also include Librarians' computer use experience, extent of computer literacy, software used, purpose of computer use in their day-to-day work, benefits derived from computer usage and problems faced in effective use of computer. A questionnaire surveyed of 73 librarians (41 returned) was used to collect data on computing skills of librarians and their use of Microsoft word, excel, access, power point, library software *etc.* Data analysis revealed

that a majority of the respondents considered their level of computing skills as fair. In contrast, only few of the respondents had good computing skills. Majority of the participants are professional librarians with more than six years of experience. The results also indicate that majority of the librarians have acquired their computer skill through informal channels. Library software is the most commonly used software among librarians and the less used software was database management software. The most common problem cited in computer usage was frequent breakdown of system, electric power failure, inadequate computers in the libraries and librarians' inadequate computer skill. The study recommended that the management of the university libraries to organize training programs to educate librarians with the latest advancement of information technology.

Kannappanavar and Vijayakumar (2001) surveyed the use of hardware and software facilities in University of Agricultural Science Libraries in Karnataka. The aim of the study was to evaluate the access of networks, information services and barriers in information technology applications. The survey also covered collections of the agricultural university libraries, in house database, use of IT in administration and the impact of IT applications on libraries. Results revealed that none of the University libraries at the time of study is having databases and full implementation of IT applications in their libraries. Though the agricultural university libraries were having hardware and software facilities to some extent, the results were not reaching the clientele. It recommended that the librarians should approach the university authorities to train the library personnel on IT application and approach funding agencies like INFLIBNET and ICAR for their library automation and provide IT based information services to their clientele.

Al-Qallaf and Al-Azmi (2002) in a survey studied the availability and use of information technology in public libraries in Kuwait. The study includes hardware/software, patterns of connectivity such as LANs, Internet, etc., training and development activities. The study showed that few libraries had internet connectivity, limited use of ICT applications, and the implementation of an automated library system were very slow. Factors impeding the development of information technology were planning, funding, human resources, and building structure. The survey also showed that there was a positive attitude among library personnel towards IT.

Baruchson-Arbib and Bronstein (2004) reported a Delphi study conducted in Israel during 1998-2000 to examine the views of library science experts regarding the future of library science profession and the skills of library science professionals due to developments in information technology. 40 experts participated in the study through e-mail. The questionnaire includes three main issues: traditional versus virtual library model, user-centered approach, and library professionals' skills and roles. A highly optimistic picture of the library science profession is drawn from the study. Library and information centres will survive, and both traditional and virtual model will co-exist in a symbiotic relationship. The most salient skill the library professional was to acquire the training and act as guides in information technology related issues. The LIS professionals needed to promote and market their skills and thereby acquire necessary social and communication skills.

Jeevan and Saji (2004) presented the results of a survey

conducted among the premier libraries in Thiruvananthapuram, Kerala to assess the Information Technology adoption in these libraries. A survey using questionnaire and interview was used for getting information about the different IT components useful for better library organization and comprehensive as well as swift information services. Eighteen scientific, technical and research libraries both under Central and State Governments based in Thiruvananthapuram participated in the survey. All eighteen libraries were of the opinion that IT had a positive impact on the day-to-day work of the library and that IT played a positive role in enhancing services, user satisfaction, meeting users' demands, and overall library image. Problems faced in IT adoption included inadequacy of funds, shortage of IT skilled manpower, difficulties in periodic up-gradation of infrastructural facilities, frequent change and advancement of technology, high hardware and software costs, insufficient training of professionals and absence of hands-on training.

Cholin (2005) provided overview of Information Technology implementation in different university libraries in India that provides effective access to resources available within universities and elsewhere. This study was an attempt to understand the use of information technology in university libraries by studying the status of information technology applications in Indian university libraries at various levels. The survey method was used to study the application of information technology in the Indian Universities. The study was conducted among 66 university libraries which was approximately 25% of the total number of universities during the period of the study and the responses were received from 54 (81.8%) of the total libraries covered. The factors studied include manpower in the universities, user population, budget, IT infrastructure-hardware, software, network tools, database development, etc. The author predicts that the universities across the country can overcome distance and time with the use of ICT tools in universities and UGC Infonet to provide scholarly access to resources. The study revealed that the university libraries in India are at various stages of development in the application of information technology tools in their day-to-day activities.

Suku and Pillai (2005) presented the results of a survey to assess the status of automation in the university libraries of Kerala. A structured questionnaire was used to elicit data from the Librarian/Librarian in-charge of the Central libraries of six Universities. The survey mainly covered various aspects of library automation such as information technology infrastructure, in-house activities, information services and their usage, manpower development, and budget. The study also deals with the role of INFLIBNET Centre in supporting the automation activities of university libraries. It is seen that library automation has been rather slow in Kerala due to various reasons like absence of University Librarian in most of the libraries; and lack of adequate qualified professional staff. 50% of university libraries in Kerala, introduced comprehensive automation of housekeeping activities. LAN facility is available in all university libraries. All university libraries in Kerala were using computers for their services. All the libraries, without any exception, were using only personal computers for the entire range of automation activities. The survey also revealed that all university libraries have conducted

sufficient number of training programs to its staff members before acquiring the new technology.

Singh and Negi (2009) reported a study of the current state-of-the-art use and applications of ICT in LICs in Noida. The study is based on 25 LICs of public, government, corporate, public and private enterprises in Noida. The data was collected through a structured questionnaire through mail/e-mail among the librarians of selected institutions. The study tries to find the opinion of the librarians about the barriers in application of ICT in LICs and their attitudes towards adopting the technology. The results showed that that lack of awareness, interest and initiation of library professionals towards ICT application in the library are the major barriers of ICT application in the LICs even though the attitude of the librarians towards ICT application/use in the LICs was very positive. The majority of LICs in Noida had good hardware, software facilities to some extent but ICT based services, and products were not reaching the users to the extent expected due to the problems of inadequate finance, infrastructure, and trained library professionals leaving available ICT infrastructure underutilized. Therefore, it is essential that ICT resources should be enhanced; ICT skilled staff should be increased or trained in using and handling ICT.

Siddiqui (1997) reported the use of Information Technology in seven university libraries of Saudi Arabia. Questionnaires to deans of academic libraries and interviews of individual library professionals was used to get information about availability and use of information technology like computers, networks, electronic mail, online information retrieval, CD-ROMs, facsimile transmission, personal computers (PCs) and the Internet in the academic libraries. The survey also tried to determine computerized library systems, databases and services used in the libraries, the most widely used automation systems (DOBIS and MINISIS) and the numbers of online and CD-ROM databases acquired by specific libraries. The survey results show that information technologies used by the academic libraries are: automation, networks, electronic mail, online searching, CD-ROM searching, telefacsimile and personal computers. The academic libraries were using these information technologies to provide excellent services to library users. In addition, all seven academic libraries were using IT in performing their day-to-day work of processing and services.

Srivastava (1997) reported results of a questionnaire survey conducted in 22 R & D institutions in India to determine the extent of usage of IT components by library professionals and the coverage of IT in their graduate and post graduate library science programmes. IT components formed an integral part of library operations and services. DOS/UNIX databases, library applications software, CDROM databases, word processing, bar coding, multimedia *etc.* are important to library professional. The study revealed that library and information science courses must expose students and practicing library professional to various components of IT, regularly redesigning the syllabus of LIS course to include the advancements in technology

Ramesh Babu and Parameswaran (1999) evaluated the automation of public library and information services in and around Chennai and the attitudes of library professionals towards the application of information technology. A survey among 50 staff members in the public libraries of Chennai using questionnaires, showed their

keen interest in professional development to keep pace with the trends of electronic information era. Results showed that IT applications improve communication facilities and helps in enhancing technical knowledge, providing better services, improving library status, change information handling methods and reduce workload.

Singh and Garg (2002) evaluated the biomedical information centres and libraries (ICLs) in India. The main objectives of the study was to assess the state of the art infrastructure available in biomedical ICLs, to determine the impact of computers on biomedical librarianship, use of computers by ICLs users and information professionals and to identify the impact of computers on career development in ICL services. Three sets of questionnaires had been used to determine the relationships between IT development and its applications in biomedical ICLs by users and professionals. The survey revealed that there was an increase in number of technologies available and adequate hardware and software facilities in ICLs. The study showed that computer-based networking facilities were gaining importance in biomedical ICLs. Biomedical information users depended more on computer facility for various purposes. The users were of view that all staff should have higher qualifications for the effective use of IT based services.

Temjen and Saraf (2003) studied the attitudes of academic and research library professionals towards Information Technology and its relationship with library and information science courses in India. The study identified the attitudes of library professionals working in the seven states of North eastern part of India, based on already developed and tested scales of attitudes towards computer and information technology. A total of 163 library professionals working in these libraries were given a questionnaire having 81 items and 122 responded. Statistical analyses performed on the data using SPSS 7.5 version are factor analysis and analysis of variance (ANOVA). The five variables identified through factor analysis were anxiety, efficiency, work performance, use confidence and acceptance. It was reported that anxiety ranks highest among the different variables of attitude towards information technology and suggests various information technology infrastructural facilities and training and education in Information technology to library professionals working in North east to be at par with the main stream.

Watane and Chaukande (2005) reported a study of the computer literacy of library professionals and the use of information technology related services in the college libraries of Amaravati City. The main objectives of the study were to find the awareness of IT application among the professionals and the proportion of application of IT in libraries. A questionnaire survey of selected 38 college libraries was conducted and the results using simple statistical analysis revealed that majority of library professionals were computer literate and were not reluctant to make use of IT applications in their libraries. Automation was progressing in all the college libraries under study and they were providing library services of which 50% are IT oriented.

Vespry and Kitiyadisai (1992) surveyed the application of Information Technology (IT) among academic libraries in Thailand. The survey showed that Librarians were generally aware of the role of IT in libraries and keen to automate

their library services. It also showed that the speed of IT implementation in academic libraries depend to a large extent on administrator's support.

Muirhead (1993) reported the results of a survey, funded by the British Library, Research and Development Department, of systems librarian posts in UK libraries. Survey included 503 UK public, academic and other libraries to determine the activities of systems librarians and the nature of the employing organizations. The survey findings concerned what systems librarians actually do, the kinds of stress they were exposed to, and the rewards of the job. As IT penetrates further into LIS the extent to which the applications of IT fall within the systems librarian's purview was an objective of the survey. This survey indicated that for a considerable majority there had been a widening of their role. Majority said they were involved in IT developments additional to managing their library housekeeping system. standard office automation, CD-ROM, PC-based applications, and network management were among the most frequently mentioned areas.

It was reported results of a survey questionnaire surveyed administered to 36 information professionals in Vietnamese libraries, which explores progress in the implementation of Information Technology (IT) in the library and information sector. It intended to discover what librarians had been doing with computers and to describe current electronic resources available in libraries. It also identified knowledge and skills needed for the provision of electronic services. Most librarians indicated that they need to be trained in the use of computers, new IT, CD-ROMs, Internet services, *etc.* (Tran and Gorman, 1999).

Ondari-Okemwa (2000) reported a study undertaken to examine the specific training needs of practicing professional librarians in the Kenyan public university libraries. Two methods were used for the study. One was observing library staff in the Kenyan public university libraries at their places of work over a period of two years; the second was the use of personal interviews with the librarians. The author examined the need for continuous training of library staff in Kenya because of the rapid changes in information technology (IT). Library staff must be equipped with new techniques of handling and managing information. The training needed as evaluated from the study are Information and telecommunication technologies, evaluating and using computer hardware and software, understanding computer and information concepts, understanding systems analysis, and accessing information via the Internet., self-management skills , teamwork skills, verbal, non-verbal, and interpersonal communication skills, marketing skills, training in virtual librarianship and total quality management training.

Biddiscombe (2001) illustrated the Internet and IT skills that were required by information professionals in their support for learning, teaching and research within the changing context of the higher education sector in the UK and the development of managed (or virtual) learning environments. The author stressed that though IT skills, particularly in relation to the Internet were essential, some of the more basic skills that are important to the information professional should not be abandoned.

Mugwisi and Ocholla (2003) examined Internet use, trends by academics and librarians at the Universities of Zimbabwe and Zululand, with specific reference to the use of resources for research and teaching. Results of a survey

by means of a questionnaire among the study population indicate high computer and Internet skills among librarians from both institutions. The results also indicate that e-mail and the Web were used most for work and personal use, while telnet, other library OPACs and electronic journals were used most for work purposes. The study also highlights somewhat similar problems facing the two institutions in terms of Internet accessibility. Access was a major concern, due to inadequate provision of computers and the existing connection to the Internet. Article also highlights inadequate training in the use of Internet resources and lack of awareness among academics and other potential users.

Edwards (2004) described several interviews with reference librarians in two libraries of the University of North Carolina at Chapel Hill in USA .The interviews were conducted to determine how the advancements of electronic media have changed the role of reference librarians in academic libraries. One significant finding was how reference librarians have now taken on more of a teacher role or that of an "information educator". Data gathered throughout the course of each interview confirmed that the role of the reference librarian in academic libraries has changed in a number of ways due to the advancements of electronic media. This role involves training and guiding patrons (faculty, staff, and students) through the use of electronic media to retrieve information. It also involves introducing patrons to various types of electronic media, (ex. databases, chat resources and search engines) and training them in operational skills.

Ramzan (2004) determined the extent of Information Technology (IT) utilization in libraries in Pakistan together with librarians' level of knowledge in IT and their attitudes toward IT in libraries through a survey of 244 librarians in Pakistan. Respondents were asked to indicate the extent of computers, CD-ROMS, network servers, and other hardware, email, Internet, software, and electronic databases available, use of IT-based systems and resources by the library staff and patrons, and the degree of changes occurring in IT applications in their libraries. The respondents level of knowledge in IT was examined through measuring the extent of knowledge of technology, rate of keeping abreast of IT, and how much they had written or published about IT in libraries. Regarding the extent of knowledge of technology, the data shows 13.5 per cent of the respondents had no knowledge in technology, 33 per cent had little knowledge, while the majority, 41 per cent of the respondents had a moderate level of knowledge in technology. The findings of the study also reveals that availability of appropriate IT and its proper utilization are important variables that are capable of increasing the librarians' attitudes more positive toward IT which implies that librarians require continuing education and exposure to increase their level of knowledge of new technologies.

Scherrer(2004) reports a studied of the reference librarians from academic health sciences libraries to examine how their roles changed over the past years and what challenge these changes present. A series of eight focus groups selected from reference librarians were studied. The survey results confirm the role changes of librarians as a result of advancements in information technology. In addition to providing traditional reference services, it was found that librarians engage in teaching, designing web pages, engage in outreach through liaison initiatives etc. Librarians strived

to meet their patrons' needs by developing Web pages to facilitate patrons' finding the resources they needed as easily as possible. Librarians identified areas for further training in specialized databases, resources needed by researchers and other modern technologies. Implications for library education and continuing professional development is also stressed.

Obioha (2005) identified the role of ICT in information seeking and use amongst research officers in Research Institutes in Nigeria. The study examines awareness, use, exposure to ICT; role of ICT and improvements on ICT tools. It shows that ICT plays a significant role in information sourcing, generation, processing, storage, retrieval, dissemination and also entertainment. It also proves that for ICT to be used maximally there is need to have regular power supply, stable infrastructure and provision of more ICT tools and centres.

Ashcroft and Watts (2005) in a study of ICT Skills for Information Professionals in Nigeria observed that Information professionals were increasingly required to adapt their skills and practice in order to gain an awareness of technological advances. A research project based at Moores University (LJMU) investigated the provision of electronic information resources in Nigerian libraries. Focusing on Nigeria as an example of a developing country, the project examined existing electronic information resources and identified barriers obstructing the effective provision of electronic information. Responses to questions about the measures required to support future use of e-resources demonstrated an overwhelming need for training/education/skills. Frequently occurring comments stressed the need for increased ICT literacy, training and retraining of staff.

Obajemu (2006) reported a survey of 84 participants at the Cataloguing, Classification and Indexing Group of the Nigeria Library Association Workshop in 2004 to determine the impact of the annual workshop on the application of information and communications technologies (ICT) to cataloguing and classification in Nigerian libraries. The work covers 43 libraries, universities, and polytechnics, colleges of education, research institutes and ministries in Nigeria. The data analysis shows that the workshops had encouraged the participants to further pursue ICT. The findings also reveal that the workshops had positive impact on the participants with respect to the application of ICT to cataloguing and classification.

National Based Studies

Ramaiah and Moorthy (2002) described the need and impact of Continuing Education Programmes (CEP) for library and information science (LIS) professionals in India, particularly for college librarians. Authors stress the importance of CEP due to the emergence of new technologies, Internet, Management techniques, Communications, multimedia and networking. The subjects of the questionnaire-based survey were the participants of a CEP at Dr BAM University, Aurangabad. Majority of the participants attended the course to improve basic knowledge/skills and improve library services. The survey also shows that most of the participants prefer CEP courses on library automation and IT applications.

Nyamboga (2004) described the results of a study of training opportunities for library and information

professionals in India and how a selection of Indian university libraries was providing information skills and information literacy programmes for their users. The author stresses the need for training students, researchers and staff to make appropriate use of resources made available in libraries. Library and information professionals need continuing professional development courses as new ways of providing information resources are developed. The study reveals that librarians conducted library orientation programmes (including information on specific aspects such as computer laboratory facilities within the library, library automation and networking activities), although sometimes systems librarians or information technologists undertook this task.

Kannappanavar and PraveenKumar (2005) evaluated the training programmes pertaining to Library and Information science and their effectiveness as stated by library professionals in selected Agricultural Science Libraries in India. Most of the library professionals in agricultural university libraries have attended these training programmes and they stress the need for more specialized training programmes based on skills and competencies. All agricultural science libraries have been partially computerized and the information stored in digital format. It is found that the workshops organized are generally designed to provide practical training on IT applications, but they are not assessing the training needs of library professionals.

Sagolsem, Purnima Devi and Vikas (2007) reported a survey conducted among the library professional staff working in public libraries and NGO libraries of Manipur. The main objectives of the study was to find the status of digital environment in Manipur public libraries, to evaluate the need of manpower training for IT application, attitude of staff towards IT application, their career opportunities and problems in IT application. A questionnaire was used for the survey among 50 library staff in the public libraries of Manipur. The study reveals that public libraries lack sufficient professional staff with required knowledge of IT. Though most of them had a favourable attitude towards IT application majority were not satisfied with their opportunities to enhance qualifications. The problems in IT application include lack of qualified professionals, high cost of IT infrastructure and insufficient computer facilities. The study recommends the importance of continuing education programmes to upgrade professional competencies and suggests that the government should provide more grants for library development in the state.

International Based Studies

Roberts and Konn (1989) reported a study conducted on about 52 university and 30 polytechnic librarians about forms of continuing education and training in their libraries. Induction and further education issues were explored, as well as attitudes to the idea of continuing education. Response shows marked differences in practices between polytechnic and university libraries. Responses indicated a growing interest in continuing education, and respondents repeatedly referred to developments occurring outside their own libraries, which were powerfully influencing their own education and training attitudes and practices. The impact of technological developments upon continuing education requirements was evident in a number

of responses. Further education and training include study for higher degrees, part-time or full-time; inhouse or external training; attendance at conferences and professional meetings; demonstrations; purposive visits to other libraries; *etc.*

Elkin (1994) stressed the need for continuing education in the modern information environment. She points out that education and training must become a continuous lifelong process to keep abreast of change as professional knowledge is becoming increasingly complex and specialised so that individuals need constant updating to keep in touch with their area of specialization. She reviews the profile of LIS courses in 16 universities in the UK. Potential employers expect students to have skills in IT, in analysis, synthesis and repackaging, as well as high quality management and personal transferable skills, allied to the ability to communicate effectively through a range of media. The author outlines skills which may be seen as the solid core of library and information studies as information-handling skills, training skills to help people to use libraries and information resources in any media, evaluative skills and concern for the customer.

Leach, Arundale and Bull (1996) reported the use of information networking for continuing professional development. With the help of 2 postal surveys, assess the extent of librarians and information professionals' interest in CPD which include computer networks, network-based course materials and teleconferencing. The degree of professional demand for such programmes is analyzed. One survey was conducted in the institutions conducting library and information science education in Europe, N.America, Australia, South Africa and Jamaica to establish their involvement in CPD. The second survey collected opinions on the requirements of CPD and its delivery through electronic networks. The main conclusion was that the professionals were interested to accept training through networks, but the technical infrastructure was insufficient to provide distance learning through network

Rice-Lively and Racine (1997) explored the current role of information professionals in academic settings. Based on a university library case study, it suggests skills and attitudes they need to develop to cope with change. The study group used in this inquiry included students, LIS faculty, and library professionals affiliated with a large research university. It shows that the information professionals today should possess a number of specific human relations skills of communication, intuition, interpretation, and translation to assist the user in the electronic environment.

Feret and Marcinek (1999) from a Delphi study conducted between December 1998 and April 1999 involving 23 key library experts from ten countries finds the most important trends that are occurring in academic libraries and their impact on the role of the academic library with focus on the skills and characteristics of librarian in the new millennium. The study shows that the library will play an important role in the overall university information infrastructure and the academic librarian's most important characteristics will be very good interpersonal and communication skills, language proficiency, team-working skills, user friendliness and customer orientation. Training its users will be one of the most important services of the user-oriented library, therefore teaching and training skills are essential for the librarian of the future, and library and IT skills. The author stresses the importance of librarians of the future to be

prepared for lifelong learning.

Jain (1999) presented the main findings of the study conducted by the author, On-the-job training: a tool for professionalism and productivity a case study of Botswana National Library Service, which was carried out in order to explore and identify on-the-job training (OJT) needs for library staff. A total of 64 library users and 64 library staff, including 31 professionals and 33 diploma holders were surveyed. The main OJT training needs were identified as: information technology, job orientation, customer service/public relations, marketing/publicity, refresher courses and managerial skills. The survey shows that the ability to use information technology is the most important skill among the library professionals. It shows that usually there is a lack of technological training for the staff. Information technology encompassed computer literacy, information management through technology, and the use of all other equipment such as photocopiers and video cameras. Participants also felt that IT will improve a library's productivity, because staff will be exposed to a new spectrum of information which can motivate them to help the users with recently available information. The survey stresses the need for effective IT training to make the most effective usage of computers and appropriate software applications pertinent to a specific job.

Marjariitta (1999) reported a study carried out in order to identify the educational needs of the library staff of Finnish polytechnics. The educational needs identified by the library staff concerning four main topics (library work, leadership and management, information technology, and learning and learning environment) as well as the main topics for continuing professional education. Most of the library staff needed to learn more about how to teach information skills, how to integrate libraries into the context of polytechnic information management and how to use information networks effectively. About 70 per cent of the respondents were interested in learning more about these three topics. Half of them (53 per cent) recognised the design of the learning environment as an educational interest and they wanted to improve teaching and training skills. The respondents have no problems with IT applications and Word, Excel, PowerPoint etc. but they prefer to learn more about the networks. As the polytechnic libraries are not integrated into polytechnic information management, the professionals need continuing education and training in information technology and management.

Bii and Wanyama (2001) analyzed the impact of automation on the job satisfaction among the staff of Margaret Thatcher library, MOI University Kenya. Using interviews and questionnaire to all the library staff researchers find that there are problems within the library regarding training and access to automated systems. The main objective of the study is to find the problems staff members face because of automation of the library, and how the library management has tried to resolve them and/or how can they be solved for sustained job satisfaction among the staff. Eighty eight percent of the MTL staff members had received in-house training on various aspects of computerised library applications, albeit some to a basic level. The staff views automation as an enrichment and a source of satisfaction for their jobs. The study recommends structured in-house training, free access to the available software, additional systems staff, and centralised databases, among others, to be implemented Regular in-

house training is a necessity to gain maximum benefit from the available hardware and software.

Desai (2001) reported the results of a questionnaire survey conducted to analyze the continuing education needs of science and technology librarians. Survey questions included teaching tips, web designing, career development, various current topics etc. She finds that science and technology librarians are highly interested in information literacy in sciences, technologies and learning more about electronic resources, designing web tutorials, selection management, electronic reference services etc. Career advancement and management topics were the least accepted among them.

Smith (2001) examined the pattern of staff development activity in Australian University libraries, State Libraries, the National Library etc. The study revealed various factors influencing staff development. Most of the responses show that increased information technology applications have led to a greater need to train staff in IT applications. There is a good balance between training in specific knowledge and job skills and broader professional developmental programs and activities. In many instances the libraries report that they have a preference for staff development that can be undertaken in-house and the growing role of libraries in teaching literacy, knowledge management skills etc has resulted in a need to develop these skill in their staff.

Hewitson (2002) reported results of an investigation, undertaken at Leeds Metropolitan University, to study the awareness and extent to which university academic staff use and assimilate electronic information services (EISs) into their work. The study is based on the findings of a quantitative survey, which addressed four specific areas: the characteristics of the respondents (age, gender, and faculty); the level of the information technology (IT) literacy of staff; the frequency of use by academic staff of different EISs offered by the university; and academic staff's perception of student use. The study also investigates how academic staff at the university obtains information for their work and what they do with the information they obtain. The other factors studied include awareness of staff about EISs; the barriers that exist to their use; the extent to which academic staff are integrating the use of EISs into students' educational experience; and what the university can do to support staff better in their use of EISs. It concludes from the results that the internet is the most popular information source but the factors affecting use at the expense of subscription-based services are complex. University staff, especially those with low-level IT skills, frequently uses the internet because it is easy to access and provides instant results. It is clear that members of staff, who used EISs regularly, used it for their own research or after joining some form of professional development such as a PhD.

Breen et.al (2002) evaluated the traditional library skills in relation to the information technology developments in the workplace. It shows that as LIS courses are not reoriented most jobs are lost to library professionals. A survey to establish the extent to which the curricula of current information studies departments teach the relevant skills, shows that there are two courses under LIS one for employment in library sector, and other for information management. Authors point out that LIS courses must adapt to provide professionals with the necessary skills to take new role in the working place.

Kwasik (2002) analyzed the skills required for a serials librarian to manage electronic information. The study conducted analyzing job announcements in academic institutions during the years 1999-2001 examines the most frequently required and preferred qualifications and knowledge demands for a serials librarian. Most preferred qualifications include traditional skills such as knowledge of MARC formats, AACR2, the Library of Congress (LC) classification system, the Library of Congress Subject Headings (LCSH), familiarity with the OCLC etc. Relatively new skills such as knowledge of Dublin Core standards, knowledge of markup language, Web design, or experience in cataloguing electronic publications were usually listed as desired qualifications. Based on the study the author suggests some professional development activities to improve competencies for serials librarian due to the progress in information technology and introduction of electronic journals in library collections. To stay current with all the cataloguing standards and new developments, librarians need to improve their skills constantly.

Khurshid (2003) reviewed job advertisements published in American Libraries (AL) and College and Research Libraries News (C&RL NEWS) to assess the impact of automation and use of IT in libraries on job requirements and required skills of qualifications for cataloguers. Analysis revealed that most preferred qualification is a master's degree in library and information science, or in some libraries a master's degree in computer science or relevant field, or a subject master's degree with library experience. However, major changes are occurring in the skills area. In addition to 48 knowledge of cataloguing principles and procedures, the requirements also include familiarity and experience with an integrated library software, one or more bibliographic utilities, basic computer applications, and emerging metadata schemes and tools.

Minishi-Majanjaa and Ocholla (2003) reported a project that aims to record and review the types, nature and diffusion of ICTs in LIS education and training programmes in Africa. One of the main objectives of the study was to determine the extent to which ICTs are taught and used in teaching, learning, research, and academic administration in LIS schools in Africa. The findings show that LIS schools in Kenya have embraced the use of ICTs, but there are major differences in terms of application. Though LIS Schools offers a wide range of relevant ICT courses, not all of them offer practical training for their students. In teaching and learning, only a few LIS schools use ICTs to deliver lectures, the majority still favour age-old methods of face-to-face classroom teaching. In research, the lack of ICT facilities has resulted in partial and minimal use of ICTs, especially since academic staff has to pay to access the Internet. In terms of academic administration, most LIS schools have computerised but most activities still are conducted offline due to networking inadequacies. The study recommends that Kenyan LIS schools should increase the use of ICTs in teaching and learning to promote greater efficiency. Kenyan LIS schools should make every effort to provide online and distance education in order to open more learning opportunities for the nation.

Shiholo and Ocholla (2003) studied the changing trends in the training of information professionals in Kenya based on a literature review representative of popular publications

and research reports from 1970 to the current time. The paper gives an insight into Library and Information Studies (LIS) education in Africa. The demand for competency in technology has led to the proliferation of training programs in information technology, leaving out other information areas. There is a need for the development of new programmes and the need for curriculum review that comprises a strong component of information management and IT. Authors stress that information technology, management and user-oriented studies (information needs, seeking, interfacing, use and impact) will occupy a central place in LIS education in Kenya. The paper concludes that core knowledge and skills for information providers ought to be reviewed regularly and that support from LIS education stakeholders, such as national library associations and national experts, should be enlisted in determining such requisite skills.

Cardina and Wicks (2004) in a study of reference librarians working in academic libraries of United States, assess the role changes that occurred from 1991 to 2001. It provided information related to the types of job activities performed and the relative amount of time spent on these activities by the librarians who took part in the study. A list of traditional as well as newly developed duties of reference librarians was developed. Duties incorporated into a questionnaire were distributed to reference librarians currently working in academic libraries. The results of the data analyzed using the Statistical Program for the Social Sciences (SPSS) show that changes occurred in the types of jobs most frequently performed, as well as for time spent on particular jobs. The number of reference tools used by librarians increased over the ten-year period surveyed. Use of the Internet, email and electronic resources saw a sharp rise in use from 1991 to 2001.

Flatley and Weber (2004) examined professional development activities for new academic librarians. The authors review various professional development activities including publishing, presentations, involvement in professional organizations, continuing education, and institutional and community service that is required for an academic librarian. The article points out the benefits for librarians in the profession by publishing articles in journals, books, and in web etc. The authors brief the importance of academic librarians to keep abreast of the profession as it changes rapidly and one of the best ways to do this is by attending professional workshops, lectures, seminars etc. Workshops include technology and electronic competency workshops covering database training, software training and new technology awareness. The paper stresses that the benefits of being a librarian is the expertise and service, which touches all aspects of the academic side of the institution.

Eells and Jaguszewski (2005) reported the study of a task force of the University of Minnesota libraries which developed a list of core information technology (IT) skills that could be expected of all 300 staff including technical services, reference services and stacks maintenance. Once this list was developed, the task force designed and administered an online self-assessment survey to identify the computer skills of library staff. In the study the development of the core competencies and the administration of the assessment are discussed. Authors point out some recommendations for the future, including use of assessment reports and data gathered in the process

to develop a training and professional development curriculum focused on the specific identified training needs of staff.

Bawden, Vilar, and Zabukovec (2005) studied the approaches to the education and training of librarians for work in digital libraries and identify the important competencies required by information professionals in creating and managing digital libraries. The method used is literature analysis of the skill sets required by librarians working with digital materials and evaluation of formal education and professional development programmes in the UK and in Slovenia. The study assesses how the educational needs are met; the means by which competencies are treated in LIS education and training, and the methods of developing the information professions. Their findings show that formal education and continuing development training cover aspects of the digital library environment, both in the UK and in Slovenia. Curriculum development includes redesign of degree programmes, training courses and Digital library skills.

Feret and Marcinek (2005) in a continuation of the Delphi study conducted in 1999 verified the results of the previous study (comparison of the experts' predictions with the reality as of the year 2005) and assess the competencies that librarians should develop as professional information suppliers and experts, to meet future needs. Closed questions included four main areas: the Internet as a competitor to the library, local versus remote access, printed versus electronic media, staff and user training. New factors identified by the experts (not mentioned in the previous study) include a raise of user's expectations, the Internet tools e.g. Google and other search engines challenging the library etc. Regarding the skills of librarians, the expert's opinion was that IT and communication skills are the most important and subject knowledge is as much important as managerial skills. The study also predicts that IT progress and changes in higher education will play a predominant role in shaping the image of future libraries and their important role will be information management and access, teaching, support for research and cooperation.

Gosine-Boodoo and McNish (2005) reported the results of a survey to identify whether the particular country environment of today's professional librarian impacts upon his/her skills capabilities as well as upon his/her access to opportunities for continued development. The satisfaction level of librarians with regard to six recommended skills and characteristics like communication; training; information technology (IT); managerial; commitment and subject knowledge/profiling was measured. Secondly, professional development opportunities were measured via skills, services and attitudes, key areas also recommended for staff development and training. An important finding of this study illustrates that what significantly contributes to the librarian's overall satisfaction with professional development is the level of competence with his/her skills set. The emerging need for improved IT and managerial skills is important for librarians' professional relevance and progress.

Cassner and Adams (2006) surveyed distance librarians in academic libraries to determine their professional development needs. Respondents were asked to indicate which professional development activities they are currently participating in and those they are likely to

engage in within the next five years. Findings from the survey show that Listservs targeting distance librarians, distance learning conferences, and professional journal articles are the most important in meeting professional development needs of distance librarians. Blogs, which provide currency, analysis, and quick communication, are increasing in importance. Authors suggest that core activities that will be most important in the next five years are instructional design, Web page design, and marketing/public relations.

Gosine-Boodoo (2006) investigated Caribbean special librarians to study their demographics, perception of skills satisfaction and opportunities for career development. The study shows that special librarians are multi-skilled in technical, technological and managerial skills and some perform all major library functions in combination with management or IT. Their IT related skills in combination with managerial skills, enable them to function as website, database and e-resource managers. One of the recommendations includes commencing a joint venture between the organization and the individual librarian with the goal of establishing a programme of relevant continuing education and training. Author also suggests the formation of "special interest" groups with or without the support of library and information professional bodies or employer organizations.

Thesis

Nair (1997) reported a study of the attitude of librarians in Kerala towards the use of information technology in library and information activities in his thesis. (The main objective of the study was to find out the nature of attitude of librarians towards information technology (IT). The study was conducted on a representative sample of 284 professionally qualified librarians in different libraries of Kerala. The tools used include a scale of attitude towards information technology, general data sheet and job satisfactory inventory for library professional. The results of the study showed that majority of librarians showed favourable attitude towards information technology. They were prepared to accept modern technology in library activities. Librarians considered IT not as a means to reduce their workload but as a device to render effective information service to patrons. Librarians engaged in different professional work were similar in their attitude towards information technology.

Moorthy (2001) surveyed the impact of electronic media on library and information centres with special reference to India, to assess the infrastructure available in libraries, the level of automation and extent of usage of electronic media in library and information work. The study includes R& D institutions in science and technology and Universities. The survey method includes questionnaire with open and closed type questions and interview with Librarians. The study covers topics related to infrastructure, hardware and software, databases created, availability of Library LAN, internet connectivity, CD ROM based services etc. It also evaluates the training and orientation needs of the library staff to cope with the electronic media. The study reveals that the extent of use of electronic media is improving with the impact of digital libraries, online journals etc in the library system. One of the major concerns is the training and computer literacy of library staff and users. He points out the need to restructure the curriculum of library and

information science courses in India by including various aspects of ICT applications.

Mohamed Haneefa (2004) in a study of special libraries assessed in detail the application of information and communication technologies in special libraries in Kerala. The survey using structured questionnaires, semi-structured interviews and observations, provides a state-of-art application of ICT in automated special libraries of premier research institutions in Kerala. The study identifies the factors that promote or hinder application of ICT, user's satisfaction, ICT skills of library professionals and the facilities for training in ICT in special libraries. It also assesses the attitude of users and librarians towards the application of ICT. Survey results show that majority of the libraries have basic hardware and software facilities. Majority provide training for their library staff in ICT based services. The librarians and users have a highly positive attitude towards ICT application and the main barrier to ICT application is inadequately trained library professionals.

MuhammedSalih (2004) surveyed the computerization of university libraries in Kerala for his Doctoral thesis. The main objective is to identify and compare the application of computers in housekeeping operations in university libraries, infrastructure, finance, library services etc. The study also aims to identify the personnel engaged in computerised activities and their competency for work in terms of their qualifications. The study covers four major university libraries of Kerala, viz. University of Kerala, M.G University, Cochin University of science and technology and University of Calicut. Data was collected using questionnaires to librarian, person in charge of computerization, users and from websites of the university libraries. The survey shows that none of the university libraries is totally computerized. All the libraries under study had Infflibnet support, had university LAN and providing internet services to users. User awareness about various library and information services was found to be poor. One of the main suggestions includes setting up of a Consortium of Universities to share the resources between university libraries in Kerala.

Mohana Kumar (2007) in his study of college librarians in Kerala evaluated their professional manpower in the IT environment. He studied the present position of library manpower in college libraries and develop a professional library manpower measurement scale PLMM. The study found limited use of IT in college libraries and inadequate staff to provide relevant services. Majority have attended conferences, continuing education programmes, computer training etc. But only a very few have publications and he recommends more IT related training programmes for college librarians to provide effective services for users in their respective institutions.

Professional Development and ICT Applications

In addition to various research studies in areas related to professional development and ICT applications, a lot of literature is published on the theoretical aspects of professional development, ICT applications and skills. A few are reviewed in this section. Griffiths (1995) opines that the traditional information access and management roles played by the information professions are expanding, particularly in the design and development of new information products and services and of tools to support

information seeking and selection, the analysis and synthesis of information content on behalf of users, and information user instruction. The role of information professionals is to mediate the interface between users and knowledge resources, using tools and technologies. In addition to the computer-based and telecommunications technologies, there are tools like classification schemes, indexing systems, data structures, directories, metadata bases, and so on. He observes that librarians will increasingly be involved in the creation activity, will create more and more bibliographies, guides, and syntheses, and higher-level abstractions of information content, directories etc

Kajberg (1997) explained the need for competency development and upgrading of public librarians' knowledge in the field of information technology. The range of skills needed by today's public library professional includes skills in developing local full-text databases, Intranet design; designing innovative multi-media based OPACs, electronic publishing, homepage creation, and Internet navigation and searching. He discusses new roles and emerging professional identities for librarians such as the net navigator, the educator, the information consultant, and the gatekeeper.

Alemna (1998) identified the education and training needs of future librarians in Ghana based on the assumption that librarians and information scientists are to assume new responsibilities due to the developments in information technology. This also means that both short- and long-term training programmes must be developed based on assessed needed skills – actual and potential. He observes that any changes in the curriculum of the Library School in future must also consider the need to keep a proper balance between theory and practice. Consideration must be given to the amount of time that should be devoted to practical work and when and how practical fieldwork would be organised, supervised, quality controlled and evaluated. The author points out the areas such as Personnel and Financial Management, Marketing of Information Services, Information Technology and Communication Networks, Management and Maintenance of Computers, Bookbinding, Conservation and Restoration, Records Management, inter lending and Document Supply, User Education that are to be included in the future training of library professionals.

Sreenivasulu (2000) highlighted the roles and functions of a Digital Librarian in information retrieval, content delivery, navigation, and browsing. In his article, he stresses the need for professional education and training for digital librarians in the management of digital information systems. It denotes the DL's interface functions, roles, skills and competencies for the management of digital information systems in the important areas of imaging technologies, optical character recognition, markup languages, cataloguing, metadata, multimedia indexing and database technology, user interface design, programming, and Web technology. The author finally advocates and targets the task of creating a new job title – digital librarian – to take care of digital libraries and to manage the digital information system.

Orick (2000) reviewed the changing role of librarians. The information revolution and availability of wide range of information on web have created new challenges to the traditional professional ethics of librarianship. The

globalization of information means that access to information is not limited by what is available in the local collection. The librarian is no longer the primary "gatekeeper" or guide to information. Today most libraries are struggling to maintain a "transitional library" collecting and organizing both print and electronic resources. Ability to access full-text resources electronically from within the institution or from any PC provides the user with convenient and immediate access to information. The digital library requires the librarian not only to collect, organize, and teach patrons about those resources in the local collection, but also to acquire access to the vast amount of aggregated information housed on computers throughout the world and to guide users to this information. In the author's view, technology will continue to change, and libraries and librarians will use the changing technology to provide the best access and service to their patrons.

Singh (2001) emphasized the challenging role of librarians and information professionals in the present internet era and described the impact of internet on various library processes. Internet has changed the traditional library services like document acquisition, technical processing circulation, reference service resource sharing, document delivery etc. The role of internet to provide different user-friendly services in a library is described in detail. Integration of library activities through email, list serves, search of remote databases, participating in interlibrary loan etc. The paper also stresses the role of librarians in designing and maintaining libraries' website /web page leading to increase in library use and efficiency.

Braun (2002) examined some of the ways in which the Internet has brought new duties and new organizational structures to traditional library jobs. Observes that the biggest change has been in the teaching role of library staff that now provide users with classes in both general computer skills and information literacy. Often librarians do not have the skills required to organize, manage, and run computer-training sessions. The demands of technology have also led to a greater use of teamwork and to flatten the traditional hierarchical organizational structure that allows all levels of staff to be trained in the required skills and to be able to be members of project teams.

Gulati (2002) discussed the status of information and communication technologies in Indian libraries with special reference to special libraries and the efforts made by various institutions to propagate e-information products and services. This paper highlights the consortia efforts in India like JCCC Consortium, INDEST Consortium, CSIR E-journal Consortia, and UGC Infonet. It further discusses digitisation efforts in India at NISCAIR, New Delhi, IITM, Kerala, C-DAC Pune, and the Digital Library of India. In addition, it incorporates details on major information systems in India (such as NISSAT) and major library networks in India (such as INFLIBNET, DELNET, CALIBNET, etc.) It also details the challenges for library and information science professionals in the present IT environment.

Jestin and Parameswari (2002) observed that electronic environment of the 21st century will demand a range of skills from library and information science (LIS) professionals, including technical skills, IT skills, and managerial skills. Users may turn for help and advice on search techniques, database quality, database development,

and the range of databases that are available. Librarians will need organized training programs, which can be in the form of workshops, conferences, seminars, symposia etc. Vijayakumar and Vijayakumar (2003) discussed the changing nature of academic libraries and librarianship. Authors stress the need of librarians to be involved in teaching and education through information management and information access, building collections and making them accessible, creating electronic libraries, cooperation and resource sharing, support for research and reference, etc. They also point out that future academic librarian should be skilled in communication/training, IT, management, and subject knowledge/profiling.

Song (2005) reported that the changing educational environment in China requires new functions for university libraries, and these functions demand that librarians possess different skills and talents. The quality and skills of university library staff are decisive factors for the development of both librarianship and national education in China's digital and networked environment. On-line distance learning is playing a more and more important role in improving both the theoretical knowledge and practical ability of practitioners in LIS. In China, over 40,000 staff work in more than 1,000 university libraries, but the lack of staff with professional education in some libraries is the main issue and continuing education offerings need to be strengthened. The issues faced by University libraries at all levels of professional education are analysed. Suggestions are put forward on how to expand the scope of education, and how to utilise the networked environment to supply e-learning to library staff to improve their ability in organising information resources and in providing higher quality information services.

Omekwu (2006) reviewed the trends in information handling and the transition from information to knowledge management systems in developing countries and the internet usage status, information and communication technology facilities in Africa. Author also discusses the changing role of Librarians in the knowledge age. He suggests that library professionals must participate in information and knowledge creation, undertake information resources documentation, provide an information identification service and evolve new means of preservation of resources. He points out that information professionals from developing countries must re-evaluate their roles in terms of how they contribute to the management of technology and information in the knowledge age.

Islam and Rahman (2006) outlined the present status of information and communication technology (ICT) in Bangladesh to represent the scenario of growth and development of ICT in relation to the evolution of the information explosion with the aim of providing better library and information services in Bangladesh. The status of Information technology (IT) in Bangladesh is not at par with the other developed countries, but recently the situation has changed significantly. Libraries and information services centers are expected to get immense facilities to access and cooperate with information world. A UNDP funded Program SDNP virtual library has prepared a union catalogue of 13 libraries, all of which are using CDS/ISIS software for bibliographic record keeping.

Patel (2006) described the changing role of libraries and LIS professionals in the digital learning environment and

discusses about the library services in an integrated environment where digital libraries and e-learning programme goes hand in hand. It highlights e-learning scenario in India with special reference to the initiatives taken by educational institutions and emphasizes the need to initiate LIS education in Digital Learning Environment, particularly in India.

Rajyalakshmi (2007) discussed the knowledge and skills required for information professionals with respect to the changing concept of Information management. Briefly described the areas to be included in the curriculum for training of information personnel such as Artificial Intelligence, Economics of Information, Manpower skills, Information systems etc. The author also discusses the impact of information technology, resources in information management, the changes in work environment of libraries, and the current trends in information management.

Singh and Nazim (2008) discussed the impact of information technology and role of libraries in the age of knowledge and information societies. The paper highlighted the problems faced by the Library & Information Service (LIS) sector in India and achievements over the years using modern information technologies. Stress the role of libraries in performing pivotal roles in disseminating and sharing the culture of knowledge. Developments in information communication technology (ICT) have enabled libraries to provide access to all, and bridge the gap between the local, the national and the global. Yet the Library and Information Services (LIS) sector in India has not kept pace with the paradigmatic changes taking place in society.

References

1. Ademodi, D.T. and Adepoju, E.O, (2009). Computer skill among librarians in Academic Libraries in Ondo and Ekiti States, Nigeria (June) (online). Retrieved ON November, 16, 2012. From <http://www.webpages.uidaho.edu/~mbolin/ademodi-adepoju.htm>.
2. Adeyinka, T. (2009). Attitudinal Correlates of some selected Nigerian Librarians towards the use of ICT. Retrieved November 16, 2012, from International Journal of Information Science and Management, vol. 7, No.1: <http://www.sr1st.com/ijist/ijism-vol.17,No.1/ijism71-15-30pdf>.
3. Adeyoyin, S.O. (2006). ICT literacy among the staff of West African University Libraries. A comparative study of anglophone and francophone countries. The Electronic library, **24(5)**, 694-705.
4. Alemna, A.A. (1998). Education and training of the future librarian in Ghana. Librarian Career Development, **6(1)**, 3-6.
5. Al-Qallaf, C, and Al-Azmi, H. M. (2002). Information Technology in Public Libraries in Kuwait: A First Study. International Information and Library Review 289-308.
6. Anwar, M.A. and Al Ansari, H. (2002). Developing working LIS professionals in the Gulf Cooperation Council countries: a study of the perceptions of deans and directors of academic libraries. Electronic Library, **20(3)**, 231-241.
7. Baruchson-Arbib, S. and Bronstein, J. (2004). A view to the future of library and information profession: A Delphi study. Journal of the American Society for Information Science and Technology, **53**: 397-408.

8. Bawden, D., Vilar, P. and Zabukovec, V. (2005). Education and training for digital librarians: A Slovenia/UK comparison. *Aslib Proceedings: new information perspectives*, **57**(1), 85-98.
9. Biddiscombe, R. (2001). The development of information professionals' needs for Internet and IT skills: experiences at the University of Birmingham. *Program*, **35**(2), 157-166.
10. Bii, H.K., and Wanyama, P. (2001). Automation and its impact on the job satisfaction among the staff of the Margaret Thatcher Library, MOI University. *Library Management*, **22**(6/7), 303-310.
11. Braun, L.W. (2002). New roles: a Librarian by any name. *Library Journal*, **127**(2), 46-49.
12. Breen, C., et.al. (2002). New information management opportunities in a changing world. *Library Review*, **51**(3/4), 127-138.
13. Cardina, C., and Wicks, D. (2004). The changing roles of academic reference librarians over a ten-year period. *Reference & User Services Quarterly*, **44**(2), 133-42.
14. Cassner, M. and Adams, K. E. (2006). Assessing the professional development needs of distance librarians in academic libraries. *Journal of Library Administration*, **45**(1), 81-99.
15. Chan, D.C. and Auster, E. (2003). Factors contributing to the professional development of reference librarians. *Library & Information Science Research*, **25**, 265-286.
16. Cholin, V.S. (2005). Study of the application of information technology for effective access to resources in Indian university libraries. *International Information and Library Review*, **37**(3), 189-197.
17. Choudhary, B.K. and Sethi, B.B. (2009). Computer literacy of library professionals in the University of Orissa: an analytical study. *IASLIC Bulletin*, **54**(1), 15-30.
18. Dalton, P., Mynott, G., and Shoolbred, M. (2000). Barriers to career development within the LIS profession. *Library Review*, **49**(6), 271-276.
19. Desai, C.M. (2001). Continuing education needs of science and technology librarians: results of the 2001 sts continuing education committee survey. <http://www.ala.org/acrl/sts/contd/survey.htm> (accessed on 30/12/2012)
20. Edwards, C.V. (2004). How has the role of the reference librarian in academic libraries changed due to the advancements of electronic media? A Master's paper for the M.S. in L.S. degree. <http://etd.ils.unc.edu/dspace/bitstream/1901/25/1/carlaedwards.pdf> (accessed on 15/11/2012)
21. Elkin, J. (1994). The role of LIS Schools and departments in continuing professional development. *Librarian Career Development*, **2**(4), 19-23.
22. Feret, B. and Marcinek, M. (1999). The future of the academic library and the academic librarian: a Delphi study. *Librarian Career Development*, **7**(10), 91-107.
23. Feret, B. and Marcinek, M. (2005). The future of the academic library and the academic librarian: a Delphi study reloaded. Retrieved August 10, 2009, from *New Review of Information Networking*: <http://dx.doi.org/10.1080/13614570500268381>
24. Flatley, R.K. and Weber, M.A. (2004). Perspectives on professional development opportunities for new academic librarians. *The Journal of Academic Librarianship*, **30**(6), 488-492.
25. Gosine-Boodoo, M. (2006). Profiling the Caribbean special librarian: demography, skills and professional progress. *Information Development*, **22**(4), 292-299.
26. Gosine-Boodoo, M. and McNish, M. (2005). Comparing polarized perspectives: librarians' professional skills and development. *New Library World*, **106**(7/8), 363-377.
27. Guha, N. (2006). ICT for Continuing Professional Education for LIS Professionals. Retrieved January 16, 2010, from https://drtc.isibang.ac.in/bitstream/handle/1849/222/paperO_nabonita.pdf?sequence=1
28. Hewitson, A. (2002). Use and awareness of electronic information services by academic staff at Leeds Metropolitan University: A qualitative study. *Journal of Librarianship and Information Science*, **34**(1), 43-52.
29. Islam, A. and Rahman, A. (2006). Growth and development of information and communication technologies in Bangladesh. *The Electronic Library*, **24**(2), 135-146.
30. Jain, P. (1999). On-the-job training: a key to human resource development. *Library Management*, **20**(5), 283-294.
31. Jeevan, V. K. and Nair, S.S. (2004). Information technology adoption in libraries of Kerala: A survey of selected libraries in Thiruvananthapuram. *Annals of Library and Information Studies*, **51**(4), 137-144.
32. Jestin, J. and Parameswari, B. (2002). Challenges for library professionals in India in the new millennium. *Library Philosophy and Practice*, **4**(2), 20-24.
33. Kajberg, L. (1997). Emerging public librarian roles and skills: A literature review. *Librarian Career Development*, **5**(1), 12-22.
34. Kannappanavar, B.U. and Praveen Kumar, K. (2005). Effectiveness and usefulness of training programmes for library professionals in India: survey of the library professionals working in agricultural science university libraries. *ILA Bulletin*, **41**(4), 18-22.
35. Kannappanavar, B.U. and Vijayakumar, M. (2001). Use of IT in university of agricultural science libraries of Karnataka: A Comparative Study. *Desidoc Bulletin of Information Technology*, **21**(1), 21-26.
36. Khurshid, Z. (2003). The impact of information technology on job requirements and qualifications for catalogers. *Information Technology and Libraries*, **22**(1), 18-21.
37. Kwasik, H. (2002). Qualifications for a serials librarian in an electronic environment. *Serials Review*, **28**(1), 33-37.
38. Leach, K., Arundale, J., and Bull, G. (1996). The use of information networking for continuing professional development. *Yorkshire: British Library. Research and Development Department*.
39. Maesaroh, I. and Genoni, P. (2009). Education and continuing professional development for Indonesian academic librarians: A Survey. *Library Management*, **30**(8/9), 524-538.
40. Mandal, Arup Kumar and Bandyopadhyay, A.K. (2010). Application of ICT and Related Manpower Problems in the College Libraries of Burdwan. *DESIDOC Journal of Library & Information Technology*, Vol. 30 (4):44-52.
41. Marjariitta, V. (1999). Educational needs of Finnish polytechnic librarians. *Librarian Career Development*, **11**, 113-119.

42. Minishi-Majanjaa, M.K., and Ocholla, D.N. (2003). Information and communication technologies in library and information science education in Kenya. *Education for Information*, **21**, 243-262.
43. Mohamed Haneefa, K. (2004). Application of information and communication technologies in special libraries: PhD Thesis. Department of Library and Information Science, University of Calicut.
44. Moorthy, A.L. (2001). Impact of electronic media on library and information centres with special reference to India. Retrieved December 23, 2009, from Vidyanidhi digital thesis: <http://dspace.vidyanidhi.org.in>
45. Mugwisi, T. and Ocholla, D.N. (2003). Internet use among academic librarians in the Universities of Zimbabwe and Zululand. *Libri*, **53**(3), 194-201.
46. Muhammed Salih, T.K. (2004). Computerisation of university libraries: PhD Thesis. Department of Library and Information Science, University of Calicut.
47. Muirhead, G.A. (1993). The role of the systems librarian in libraries in the United Kingdom. *Journal of Librarianship and Information Science*, **25**(3), 123-135.
48. Nyamboga, C.M. (2004). Information skills and information literacy in Indian university libraries. *Program*, **38**(4), 232-239.
49. Obajemu, A.S. (2006). A survey of librarians' attitudes to training programmes on ICT application to cataloguing and classification workshops in Nigeria. *African Journal of Library, Archives and Information Science*, **16**(1), 19-27.
50. Obioha, J. (2005). The role of ICT in information seeking and use amongst research officers in research institutes in Nigeria: The Nigerian Institute for Oceanography & Marine Research Institute Experience. *International Information and Library Review*, **37**(4), 303-314.
51. Omekwu, C.O. (2006). Managing information and technology: critical roles for librarians in developing countries. *The Electronic Library*, **24**(6), 847-863.
52. Ondari-Okemwa, E. (2000). Training needs of practising professional librarians in the Kenyan public university libraries: a critical analysis. *Library Management*, **21**(5), 257-268.
53. Orick, J.T. (2000). The virtual library: changing roles and ethical challenges for librarians. *International Information and Library Review*, **32**, 313-324.
54. Patel, D. (2006). E-learning and its Impact on LIS Profession.
55. https://drtc.isibang.ac.in/bitstream/handle/1849/231/paperX_Dimple.pdf>(accessed on 16/01/2010)
56. Powell, R.R., Baker, L.M. and Mika, J.J. (2002). Library and information science practitioners and research. *Library & Information Science Research*, **24**, 49-72.
57. Rajyalakshmi, D. (2007). Information professionals – knowledge and skills, for information management. *ILA Bulletin*, **43**(4), 8-15.
58. Ramaiah, C.K. and Moorthy, A. L. (2002). The impact of continuing education programmes on library and information science professionals. *Library Review*, **51**(1), 24-31.
59. Ramesh Babu, B. and Parameswaran, R. (1999). Automation of public library and information services in the context of electronic information era: public library staff opinion survey. *ILA Bulletin*, **35**(1-2), 1-4.
60. Ramzan, M. (2004). Effects of IT utilization and knowledge on librarians' IT attitudes. *The Electronic Library*, **22**(5), 440-447.
61. Rice-Lively, M. L. and Racine, D.J. (1997). The role of academic librarians in the era of information technology. *The Journal of Academic Librarianship*, 31-41.
62. Roberts, N. and Kohn, T. (1989). Continuing education and training for academic library staff. *Journal of Librarianship and Information Science*, **21**, 109-128.
63. Safahieh, H. and Asemi, A. (2008). Computer literacy skill of librarians: A case study of Isfahan university libraries, Iran. In A. Abdullah (Ed.), *ICOLIS* (pp. 51-58). 17-20 November, University of Malaya, Kuala Lumpur: LISU, FCSIT.
64. Sagolsem, M., Purnima Devi, T., and Vikas, T. (2007). Professional development in digital environment: A case study of public libraries in Manipur. In M. Kumar (Ed.), *International CALIBER 2007 : Information and knowledge management in networked world* (pp. 570-578). Chandigarh: Infilibnet centre.
65. Scherrer, C.S. (2004). Reference librarians' perceptions of the issues they face as academic health information professionals. *Journal of the Medical Library Association*, **92**(2), 226-232.
66. Shiholo, B.M. and Ocholla, D.N. (2003). Changing trends in training needs for information professionals in Kenya. Retrieved July 14, 2007, from Libres: <http://libres.curtin.edu.au/libres13n1/index.htm>
67. Siddiqui, M. A. (1997). The use of information technology in academic libraries in Saudi Arabia. *Journal of Librarianship and Information Science*, **29** (4), 195-203.
68. Singh, D. K., and Nazim, M. (2008). Impact of information technology and role of libraries in the age of information and knowledge societies. <http://ir.infilibnet.ac.in/dxml/bitstream/handle/1944/1229/3.pdf?sequence=1> (accessed on 16/01/2010)
69. Singh, D.K., and Nazim, M. (2009). Impact of Information Technology and role of Libraries in the age of information and knowledge societies. <http://ir.infilibnet.ac.in/dxml/bitstream/handle/1944/1229/3.pdf?sequence=1>. (accessed on 20/11/2010)
70. Singh, K. P. Sharma, N., and Negi, N. (2009). Availability, use and barriers to ICT in the R&D institutions: a case study of the libraries and information centres in Noida. *DESIDOC Journal of Library & Information Technology*, **29**(6), 21-31.
71. Singh, K.P., Sharma, N., and Negi, N. (2009). Availability, use and barriers to ICT in the R & D institutions: a case study of the libraries and information centres in Noida. *DESIDOC Journal of Library & Information Technology*, **29**(6), 21-31.
72. Singh, N. (2001). Internet: importance and usage for library and information professionals. *DESIDOC Bulletin of Information Technology*, **21**(3), 17-28.
73. Singh, S. N., and Garg, B. S. (2002). Impact of information technology (computers) on biomedical information centres and libraries (ICL) in India: a critical evaluation. *Annals of Library and Information Studies*, **49**(2), 51-66.

74. Smith, I.W. (2001). Staff development and continuing professional education policy and practice in Australian academic & research libraries. Retrieved July 14, 2007, from <http://archive.caul.edu.au/surveys/staff-development2001smith.pdf>
75. Song, Y. (2005). Continuing education in Chinese university libraries: Issues and approaches. *Libri*, **55**(1), 21-30.
76. Sreenivasulu, V. (2000). The role of a digital librarian in the management of digital information systems (DIS). *The Electronic Library*, **18**(1), 12-20.
77. Srivastava, A.K. (1997). Survey of use of information technology by library and information professionals and its implications in library science education. In R.G.Prasher, & P. B. Mangla (Eds.), *Library and Information science:Parameters and perspectives* (Vol. I, pp. 228-239). New Delhi: Concept.
78. Suku, J.andPillai, M.G. (2005). Perspectives on automation of university libraries in Kerala: status,problems and prospects. *Journal of Academic Librarianship*, **31**(2), 151-159.
79. Temjen, T.andSaraf, V. (2003). Attitudes towards IT adoption: A study of library professionals in North East India. In T. A. Murthy (Ed.), *Proceedings of PLANNER 2003* (pp. 81-94). Shillong: INFLIBNET Centre, Ahmedabad.
80. Tran, L.A. and Gorman, G.E. (1999). The implementation of information technology in Vietnamese libraries:results of a survey. *Asian Libraries*, **8**(10), 380-395.
81. Vespry, H.A.andKityadisai, K. (1992). Information technology in Thai academic libraries: report on a survey. *Information Development*, **8**(3), 164-171.
82. Vijayakumar, J.K. andVijayakumar, M. (2003). Knowledge, connections, and communities:A special reference to Indian university libraries. *International Information and Library Review*, **35**, 375-382.
83. Walimiki, R.H. andRamakrishnegowda, C.K. (2009).ICT infrastructure in University Libraries in Karnataka. *Annals of Library and Information Studies*, **56**, 236-241.
84. Watane, A., Vinchurkar, A.W. andChoukande, V. (2005). Library professional's computer literacy and use of information technology application in college libraries of Amaravaticity.IASLIC Bulletin, **50**(3), 131-141.