Impact of Information Communication Technology (ICT) on Professional Development and Educational Needs of Library Professionals in the Universities of Kerala

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DECLARATION

I hereby declare that the thesis entitled "**Impact of Information Communication Technology (ICT) on professional development and educational needs of library professionals in the Universities of Kerala**" is the authentic record of research work carried out by me, for my Doctoral Degree under the supervision and guidance of Dr (Mrs) M.D Baby, Professor and Head, School of Library and Information Science, Rajagiri college of Social Sciences, Kochi & Rtd. University Librarian, CUSAT and that no part thereof has previously formed the basis for the award of any degree or diploma or any other similar titles or recognition.

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Certificate

This is to certify that the thesis entitled **"Impact of Information Communication Technology (ICT) on Professional development and Educational Needs of Library Professionals in the Universities of Kerala"** is a record of the bona fide research work done by Ms Susan Mathew K, Part-time Research Scholar, Dept of Computer Science under my supervision and guidance. The thesis is the outcome of her original work and has not formed the basis for the award of any degree, diploma, or any other similar title.

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ABSTRACT

The shift from print to digital information has a high impact on all components of the academic library system in India especially the users, services and the staff. Though information is considered as an important resource, the use of ICT tools to collect and disseminate information has been in a slow pace in majority of the University libraries This may be due to various factors like insufficient funds, inadequate staff trained in handling computers and software packages, administrative concerns etc. In Kerala, automation has been initiated in almost all University libraries using library automation software and is under different stages of completion. There are not much studies conducted about the effects of information communication technologies on the professional activities of library professionals in the universities in Kerala. It is important to evaluate whether progress in ICT has had any impact on the library profession in these highest educational institutions.

The aim of the study is to assess whether the developments in information communication technologies have any influence on the library professionals' professional development, and the need for further education and training in the profession and evaluate their skills in handling developments in ICT. The total population of the study is 252 including the permanently employed professional library staff in central libraries and departmental libraries in the main campuses of the universities under study. This is almost a census study of the defined population of users. The questionnaire method was adopted for collection of data for this study, supplemented by interviews of Librarians to gather additional information.

Library Professionals have a positive approach towards ICT applications and services in Libraries, but majority do not have the opportunities to develop their skills and competencies in their work environment. To develop competitive personnel in a technologically advanced world, high priority must be given to develop competence in ICT applications, library management and soft skills in library professionals, by the University administrators and Library associations. Library science schools and teaching departments across the country have to take significant steps to revise library science curriculum, and incorporate significant changes to achieve the demands and challenges of library science profession.

Abbreviations

ICT	Information Communication Technology
IT	Information Technology
KUL	Kerala University Library
MGUL	Mahatma Gandhi University Library
CUSTL	Cochin University of Science and Technology Library
SANKUL	Sree Sankaracharya University Library
CHMKL	CH Mohammed Koya Library, University of Calicut
KANUL	Kannur University Library
KAUL	Kerala Agricultural University Library
KAN	Kannur University
KAU	Kerala Agricultural University
SSU	Sree Sankaracharya University
MGU	Mahatma Gandhi University
UOC	University of Calicut
CUSAT	Cochin University of Science and Technology
UOK	University of Kerala
CEP	Continuing Education Programmes
INFLIBNET	Information and Library Network
DELNET	Developing Library Network
IGNOU	Indira Gandhi National Open University

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Chapter 1
INTRODUCTION

1.0 Introduction

Information needs and diverse information tools have affected our daily life as well as research and developmental activities. Latest devices for information communication have resulted in the expeditious dissemination of information and revolutionized the information handling activities in research and academic libraries in India. Academic libraries, mostly attached to universities and research institutions as centers of information services, have largely benefited by the rapid changes in technology. The advent of digital computer advances in telecommunication and audiovisual technologies has opened up new ways of collecting, organizing and disseminating scientific and technical information. Academic libraries have already transformed their specific functions by utilizing effectively innovative information technologies to enhance and integrate their specific information resources and services. Eventually, library and information professionals in academic libraries need to update their knowledge and skills in information and communication technology (ICT) as they play the role of key success factor in enabling the library to perform its role as an information support system for society.

1.01 Librarianship in the digital era

Technology has drastically changed the way librarians define themselves and the way they think about their profession and the institutions they serve. The librarian in the digital world now acts as a guardian of information, as a consultant to the users, an information broker and also a continuous learner (Balakrishnan, 1996). The platform of Internet and WWW has helped to change the ways of accessing and locating information and thereby change the functions of an academic librarian and academic library in the modern information society. The role of librarians and the importance of libraries in this digital era are even now based on the basic principles of library science described by Dr S.R Ranganathan in his Five Laws of Library Science.

- Books are for use
- Every reader his book
- Every book its reader
- Save the time of the reader
- Library is a growing organism (Ranganathan, 1931)

Several attempts have been made to reinterpret these fundamental laws by others, but they do not encompass the whole of library and information science as achieved by Ranganathan's laws (Deegan &Tanner, 2002). These five laws furnish an interpretative explanation of the empirical facts of experience and technology necessary in experience in relation to library service (Bhattacharya, 1988).

The biggest challenges facing the library profession today is preparing the professionals to use technology effectively. An academic library professional will be required to serve as an information service consultant with specific information technology skills (Li, 2009). As technology has saturated all levels of library's operations and services, the library professional in an academic institution has to anticipate the changing expectations of users, and be flexible in adapting and adopting new skills and levels of awareness. While being trained in IT skills, what every library professional chooses to ignore is the management aspect of a library. In addition to the technical and professional skills, commitment to user centered services and skills for effective oral and written communication; they must have other skills, including business and management, teaching, leadership, etc.

1.02 Library and Information Science Education

Library and Information Science is now a discipline that has made immense developments in modern times, but library profession has not yet attained equal status as that of other professions. According to Singh (2000), the growth of library profession is influenced by the growth of library and information science education, for it is the education and training that gives direction to the profession. In India a formal course in library science was first started by W. A. Borden in Baroda (1911) and later by A.D Dickinson in Punjab University (1915). The certificate course started by Madras Library Association in 1929 was taken over by Madras University in 1931 under Dr S.R Ranganathan and was subsequently converted into a postgraduate course of one-year duration in 1937. Other Universities which started Library science courses in the early periods are Andhra University (1935);Banaras Hindu University (1941); University of Delhi (1947); Aligarh Muslim University (1952), etc.

In India about 118 universities and institutions impart Library and Information Science (LIS) education .While Bachelor of Library and Information Science (BLIS) is offered by 105 universities, Master of Library and Information Science (MLIS) courses is provided by 78 universities and 21 universities offer two-year integrated courses . Seventeen universities provide M.Phil in Library and Information Science, 53 universities provide Ph.D in Library and Information Science and 2 universities provide D.Litt Degree (Jain, Kaur, & Babbar, 2007). Out of 17 institutions offering a M.Phil degree, 14 are regular universities and three are under distance education. Dr. B.R. Ambedkar Open University, Hyderabad (then known as Andhra Pradesh Open University), is the first Open University in India offering Library and Information Science programs through correspondence at Bachelor's Degree and Masters Degree from 1985 and 1998 respectively, followed by the University of Madras. Indira Gandhi National Open University (in 1989) started BLISC and later MLISc and PhD programs. IGNOU has played a major role in popularizing distance education in India by providing educational opportunities at distance in many disciplines, including Library and Information science. IGNOU has a number of study centres spread across the country. The academic programmes of the University have multi-media support with facilities for audio, video, radio, television, interactive radio and video counselling, as well as tele-conferencing. IGNOU is the nodal agency for running a 24-hour educational TV channel, Gyan Darshan, in collaboration with other institutions of higher learning. Gyan Vani is emerging as a huge cooperative network of FM radio stations, exclusively devoted to education (IGNOU, 2010). Other open universities in India offering library science courses are Annamalai University, Algappa University, S.V. University Tirupati, University of Madras, Madurai-Kamaraj University, Madurai etc. Today there are more than 20 Library and Information Science schools in India offering LIS courses through distance mode (Naushad Ali & Bakshi, 2006).

In all levels of higher education, ICT is creating a significant change in the traditional concepts of teaching and learning. This shift from the traditional environment has forced LIS education and training to attempt to improve the quality of programs and hence, LIS curricula need to consolidate ICT concepts, knowledge, skills and

proficiency into core competencies, and LIS schools need to provide adequate content and practice that will enable the professionals to use ICTs effectively. The trends noted in the context of Indian LIS programmes are relocation of the academic administration of LIS schools (Information Science at the University of Madras and NISCAIR in New Delhi), and expansion of LIS departments (Ramesha & Ramesh Babu, 2007). Information technology oriented MTech course is being offered by International School of Information Management (ISiM), University of Mysore, two-year graduate training programme by IIT Madras, PGDLAN (IGNOU ,University of Hyderabad), etc. In addition, DRTC and NISCAIR have been providing advanced courses in Library science, viz., Master of Science in Library and Information Science (MS-LIS), and Associateship in Information Science (AIS) respectively, which is equivalent to Master's degree in Library & Information Science. The different LIS courses available in India, including regular and distance education, are as follows:

- Certificate course in Library and Information Science (C.Lib.Sc)
- Diploma in Library and Information Science
- B.Lib.Sc. /BLIS (Bachelor Degree in Library and Information Science)
- M.Lib.Sc. /MLIS (Master Degree in Library and Information Science)
- MS-LIS(Master of Science in Library and Information Science)
- AIS (Associateship in Information Science)
- PGDLAN (Post Graduate Diploma in Library Automation and Networking)
- M.Phil (Master of Philosophy) in Library and Information Science
- Ph.D (Doctor of Philosophy) in Library and Information Science
- D.Litt in Library and Information Science

Another major trend is the Digital learning environment or e-learning, facilitated by the application of ICT, which has revolutionized continuing education for learners of all ages. Initiatives across the world include ALA online continuing education of American Library Association and ACRL, Association of College and Research Libraries, Special Library Association e-learning Series and in India, Flexi learn of IGNOU, etc., are few examples of providing open learning space for LIS professionals. MIT, Massachusetts Institute of Technology (USA) and NPTEL, National Programme on Technology Enhanced Learning (India) provide free e-learning modules on different subjects.

1.02.1 Library and Information Science Education : Scenario in Kerala

Although Kerala had many major libraries, including public libraries and college libraries with very large collection of books during the early 1960s, there was a shortage of qualified librarians for the management of libraries. However, developments in the field of library science and library education in the country have paved the way for starting proper training programmes for librarians in the state. The Kerala Grandhasala Sangham (KGS) was started in the year 1945 to encourage the development of public libraries in Kerala. In the early stages, the sangham conducted a certificate course and some other training programmes, which they later discontinued. The state government started a certificate course of 4 months' duration in Trivandrum Public Library (now State Central Library) in 1965. In 1977, Grandhasala Sangham was taken over by the state government and it has been conducting short-term courses regularly at different libraries from 1986 onwards (Kumar, 2008). At present, the Kerala State Central Library (Trivandrum Public Library) also conducts six months' certificate courses in Library and Information Science.

Out of the seven major Universities Kerala University, Mahatma Gandhi University, Calicut University and recently Kannur University offer library and information science courses. The Department of Library and Information Science in University of Kerala was founded in 1961 on the initiative of the then University Librarian Professor K A Isaac and is the premier school of librarianship and information science in Kerala .The post-graduate B.Lib.Sc course started by the University was renamed as B.LISc in 1979. The University introduced Master of Library and Information Science (MLISc.) in 1979 with six seats, out of which three were reserved to practicing librarians. The total number of seats was subsequently enhanced to 12 and in 1998, a Part-time MLISc course was introduced, as a self-financing course, and that too in response to the demands from the practicing librarians for opportunities for their professional development. Since 1996, MLISc. is offered as a semester course, consisting of two semesters, each of 5 months' duration, with total credits of 38, out of which 32 are for core courses and 6 for electives. In 2002, MLISc, a two-year integrated course was introduced, consisting of four semesters, with total credits of

76, out of which 64 are for core courses and 12 for electives (DLIS,University of Kerala, 2010). Since 1982-83 the Department has been enrolling Scholars for Ph.D. The Department started the M.Phil course in Library and Information Science in 1998. With a view to mould library professionals with good expertise in Information Technology and its application in information storage and retrieval, the department also introduced a Post-graduate Diploma (PG-DIT) Course in 1996, which was later discontinued.

The Department of Library and Information science in the University of Calicut was established as a full-fledged department of study and research in 1985. Though a one-year Bachelor of Library and Information Science (B.L.I.Sc.) course was being offered since 1977, in 1992 the Department launched a one-year Master of Library and Information Science (M.L.I.Sc) course. In lieu of these two programmes, the Department now offers a two-year Master of Library and Information Science (M.L.I.Sc.) course through Choice Based Credit Semester System (CCSS). It has also launched M.Phil and Ph.D programmes (part-time and full-time) in Library and Information Science (University of Calicut,Department of Library and Information Science, 2010). In Mahatma Gandhi University, Library science course was started in 1995 under the School of Communication and Information Science (SCIS); however, the course got delinked from SCIS. Now DLIS is a full-fledged academic department in the self-financing sector of Mahatma Gandhi University with BLISc and MLISc courses, which was started in 1997. In Kannur University, Master of Library and Information Science is now offered as a credit semester system with 2 years' duration, divided into 4 semesters. While the Library Science departments of Universities of Kerala and Calicut have full-time and part-time research programmes, Cochin University of Science and Technology under the Faculty of Technology is offering part-time research facilities. In addition, two colleges affiliated to Calicut University and six colleges affiliated to M.G University conduct Library science courses in the regular and the self-financing scheme respectively (Baby & Sreekala, 2007).

1.03 Importance of Professional Development and Continuing Education

In the changing environment the role of the professional librarian as handler and manager of information, need flexible, adaptable individuals who can manage change effectively. This will require well-educated professionals, constantly developing through a varied programme of continuing professional and personal development (Elkin, 1994). The challenge before library education is to make the society aware of the importance of librarianship and thus gain an identity to library profession. A restructuring of LIS education maintaining uniformity in course contents, incorporating changes in the traditional subjects and giving more importance to the practical aspects of the profession is essential to meet the challenges of librarianship. It is the responsibility of LIS departments to develop the right personnel with basic competence to manage the libraries and information centres of varied scope and nature, ranging from small rural library to a well-established digital library. (Varalakshmi, 2007).

The developments and innovations in ICT have facilitated changes in the development of curriculum in library and information studies. In spite of the efforts done by the UGC in developing the modular curriculum (2001), and demanding all the teaching departments to revise their syllabi introducing more IT components, the LIS profession experiences challenges due to many factors. Lack of sufficient equipments for teaching ICT oriented practical work. lack of ICT trained manpower, lack of uniformity in course contents, proliferation of courses and numbers, lack of accreditation, shortage of budgetary provision, etc., are some of the problems faced by library science schools(Mahapatra,2006). Most of the fresh graduates, having been introduced to the latest developments in information communication technology applications through their revised library science curriculum, have the advantage over other experienced professionals in that they have a basic idea about the advancements in ICT. However, in almost all universities, majority of the experienced professionals have completed their library education without much exposure to the practical aspects of ICT applications. Therefore, continuing education and training programmes in ICT applications are to be made mandatory for library professionals irrespective of their experience or category to develop basic competencies and thereby improve the quality of library services.

UGC has played a major role in promoting career development for academic librarians to keep current with skills, knowledge, and competencies to face new challenges. One major step was the launching of Academic Staff Colleges at various Universities and initiating training programmes to library personnel in universities and colleges through refresher courses and various professional developmental activities. In 1986, Mehrotra committee of UGC recommended National Eligibility Test (NET) as a requirement for lecturers, assistant librarians, documentation officers and college librarians to improve the standards of the profession. According to Bhattacharya (1994), the continuing education programmes must take account of the following:

- Sponsor conferences, symposia, seminars, workshops, refresher courses, special lectures, etc.
- Offer opportunities to professionals to attend the continuing education programmes and
- Identify areas appropriate for refresher courses, and support their organization by competent implementing agencies.

Short term training programmmes were initiated by the Indian National Scientific Documentation Centre (INSDOC) [presently National Institute of Science Communication and Information Resources (NISCAIR)]. NISSAT (National Information System for Science and Technology), has conducted several short-term courses in computerization, including CDSIS and WINISIS software. At present, workshops are organized regularly by DELNET(Developing Library Network) in KOHA and other open software. DRTC(Documentation Research and Training Centre) also conducts regular workshops on Open software, Green Stone Digital Library(GSDL), and other ICT applications relevant to library profession. INFLIBNET (Information Library Network), in association with UGC, organizes various workshops across the country in Library software, like Soul, Digital Library software, etc. To create awareness among the academic community, INFLIBNET also conducts regular user awareness programmes for online journals and E resource management training to Library professionals across the country. Recently, due to the

developments in open source software, many libraries have started organizing workshops for imparting practical training on open software to the staff members and also to professionals of other institutions. Various publishers are also offering training programmes to access their products mainly E-resources to increase their usage. The library associations in India, Indian Library Association (ILA), Indian Association of Special Libraries and Information Centres (IASLIC), etc., organize yearly conferences, which encourage the professionals to participate in conferences and to publish their research output.

1.1 Significance of the study

The shift from print to digital information has a high impact on all components of the academic library system in India, especially the users, the services and the staff. Though information is considered as an important resource, the use of ICT tools to collect and disseminate information has been in a slow pace in majority of the University libraries. This may be due to various factors like insufficient funds, inadequate staff trained in handling computers and software packages, administrative concerns, etc. In Kerala, automation has been initiated in almost all University libraries using library automation software and is under different stages of completion, but this has been extended to only a few department libraries in each university. In the library system in the Universities, comprising of a Central library and departmental libraries, the application of ICT has changed the type of services delivered through University libraries in the state, but a dynamic change is not yet reflected in the infrastructure and manpower development in the university libraries and the whole of library profession.

The Ministry of Human Resource Development (MHRD) and UGC has played a major role in modernizing library services across the country by providing sufficient funds for modernizing infrastructure and by initiating consortia based subscription to online journals and databases through INFLIBNET and INDEST. This has revolutionized the research activities in the country and increased the demand for more user centric information services. Now users are more knowledgeable in using computers and the Internet for their research, and expect to have access to it in their

times of need. Most of the University libraries are not full-fledged in terms of implementing ICT based applications in their services, but there has been an obvious change in the attitudes of library professionals towards ICT application. To meet the demands for individual and collective information of the academic community, the constant improvement of the professional performance of those who provide information is very important. To develop in this direction, there is a need for library professionals to gain a comprehensive perception of the role of computers and communication technology.

There are not much studies conducted about the effects of information communication technologies on the professional activities of library professionals in the universities in Kerala. It is important to evaluate whether progress in ICT has had any impact on the library profession in these highest educational institutions. Hence, this study is considered relevant to assess the infrastructure of university libraries in Kerala, the professional development of library professionals, their skills and expertise in handling ICT and also the implications on the educational needs of library professionals.

The study stresses the urgent need for administrators and library educators to evaluate the effectiveness of present day library education in moulding the library professionals to meet the demands of future information work. It is the responsibility of the employers to provide opportunities for library and information professionals to update their skills, knowledge and competencies to keep pace with the rapidly changing environment of academic libraries.

1.2 Statement of the problem

Considering the above factors, the statement of the present study is entitled as “Impact of information communication technology on professional development and educational needs of library professionals in the universities in Kerala”. It is hoped that the study will give an insight about how far the library professionals have been able to be abreast of the advances in information communication technologies, their

professional development activities, whether their education in library and information science has helped them in handling the latest technologies and their need for further education and training in the profession.

1.3 Definitions

Definitions of important terms are as follows:
Oxford Dictionary and Thesaurus (2001) defines impact as immediate effect or influence, or consequence. The Webster's New World College Dictionary (2005) defines impact as the power of an event, idea, etc., to produce changes, move the feelings, etc. Collins Dictionary (1987) terms it as profound effect or collision.

The term Information Technology (IT) is commonly used to mean a combination of computer and communication technologies used for information storage and dissemination. In an academic environment, the term ICT or Information Communication Technology is more commonly used. It is generally used both as singular and plural nouns. There are various definitions for ICT and a few that are relevant to this study are described here. In the UNESCO training module for ICT, Information Communications Technologies (ICT) are described as the technologies that enable society to create, collect, consolidate, communicate, manage and process information in multimedia and various digital formats for different purposes, i.e., computing and telecommunications technologies like the personal computer, CD-ROM, cable TV, cellular phones and the Internet (David, 2001). Information communication technologies can be split into three components: the technology part; information that the technology helps deliver; and a communication process that the technology facilitates and serves as a medium for the information. (Rhine, 2006). Hamelink (1997) classifies ICT according to five different functionalities-capturing technologies (like input devices), storage technologies (magnetic tapes and disks), processing technologies (systems and application software), communication technologies and display technologies (e.g. output devices for display of digitized information).

Professional development is the process by which professionals keep current the knowledge, skills, and abilities needed to function effectively in their profession. It is assumed that to maintain competence, the professional must participate in updating activities (Chan & Auster, 2003). Online dictionary of library and information science defines Professional development as "further study undertaken during employment by a person, trained and educated in a profession, sometimes at the initiative of the employer and also through voluntary attendance at conferences, workshops, seminars or enrolment in postgraduate courses, particularly important in professions that have a rapidly changing knowledge base"(Odlis, 2010)**.** In another definition, Professional development refers to skills and knowledge attained for both personal development and career advancement. Professional development encompasses all types of facilitated learning opportunities, ranging from college degrees to formal coursework, conferences and informal learning opportunities situated in practice. It has been described as intensive and collaborative, ideally incorporating an evaluative stage. There are a variety of approaches to professional development, including consultation, coaching, communities of practice, lesson study, mentoring, reflective supervision and technical assistance.(Wikipedia, 2009)

Educational needs in this study imply the need for further education and training for library professionals in their career.

The term Library professional in this study refers to all those individuals who have acquired their undergraduate or postgraduate qualification in a formal education programme of library and information science.

1.4 Objectives of the study

The aim of the study is to assess whether the developments in information communication technologies have any influence on the library professionals' professional development, and the need for further education and training in the profession and evaluate their skills in handling developments in ICT. Briefly, the objectives of the study are summarised as follows:

1. To assess the infrastructure facilities in the University Libraries in Kerala.
2. To evaluate the professional development activities of Library professionals in the Universities in Kerala.
3. To study whether ICT has influenced professional development.
4. To study the attitudes of library professionals towards continuing education programmes.
5. To study whether ICT has influenced the educational and information needs of library professionals
6. To study whether library science education has helped to attain necessary skills for library professionals
7. To suggest topics to be included in library science curriculum
8. To assess the ICT skills and expertise of library professionals in the Universities of Kerala, based on age, qualification, experience, etc.
9. To evaluate the attitude of library professionals towards the application of ICT in University libraries.
10. To study the problems faced by library professionals in the effective use of ICT applications.
11. To recommend methods for improving the knowledge/skills of library professionals.

1.5 Hypothesis

The following hypotheses have been formulated for the present study:

1. Professional activities of library professionals are influenced by personal factors.

2. Opinion about Library science education related to respondent's characteristics.

3. Library professionals' ICT skills and awareness of various technologies depend on their personal attributes

1.6 Limitations of the study

The study is limited to the library professionals working in the central and departmental libraries functioning in the main campus of the seven Universities. The study does not cover the quality of services provided by the libraries and hence a user satisfaction survey was not undertaken.

1.7 Organization of Chapters

The study and the findings are reported in six chapters. The citation and the bibliographic reference follow APA style with slight variations.

Chapter I introduces the problem of the study. It includes a brief description of the subject, the significance of the study, definitions of key terms, objectives, hypothesis and limitations.

Chapter II deals with literature survey of related studies covering information communication technology, Library education and professional development.

Chapter III gives an outline of the applications of ICT in university libraries.

Chapter IV describes the methodology of research, briefly describing the population of the study, data collection methods, design of questionnaire, etc.

Chapter V includes the analysis of data and its interpretation.

Chapter VI gives a summary of the important findings, suggestions and recommendations based on the study.

References

1. Baby, M. D., & Sreekala, S. (2007). Library and Information Science Education in Kerala : Quantity vs Quality: A Case Study of Rajagiri School of Library and InformationScience. *NACLIN 2007* (pp. 506-513). New Delhi: DELNET.

2. Balakrishnan, N. (1996). Impact of information Technology on Library Science. In N. M. Malwad (Ed.), *Digital Libraries: Dynamic Storehouse of Digitized Information* (pp. 115-118). NewDelhi: New Age International Ltd.

3. Bhattacharya, G. (1988). A Stable Theory in terms of Five Normative Principles. In T. S. Rajagopalan, *Relevance of Ranganathan's Contributions to Library Science* (pp. 11-16). New Delhi: Vikas Publishing.

4. Bhattacharya, G. (1994). Structural Planning for the Development of Manpower for Secondary Information Work and Service. In A. Tejomurthy(Ed), *Restructuring of Library and Information Science Curriculum* (p. 25). New Delhi: Concept Publishing Company.

5. Chan, D. C., & Auster, E. (2003). Factors Contributing to the Professional Development of Reference Librarians. *Library & Information Science Research , 25*, 265–286.

6. *Collins English Dicitionary.* (1987). London: W.m Collins Sons & Co.

7. David, T. L. (2001). *ICT for Library and Information Professionals: A Training Package for Developing Countries(ICTLIP).* Retrieved June 26, 2009, from eLibraryDownloadPage: http://www2.unescobkk.org/elib/publications/ictlip/index.htm

8. Deegan, M., & Tanner, S. (2002). *Digital Futures:Strategies for the Information Age.* London: Library Association Publishing.

9. *DLIS,University of Kerala.* (2010). Retrieved June 4, 2010, from http://www.dliskerala.org/history.htm

10. Hamelink, C. J. (1997). *New Information and Communication Technologies Social Development and Cultural Change.* Geneva: UNRISD.

11. *IGNOU*.(2010).Retrieved February 13, 2010, from http://www.ignou.ac.in/ ignou/ aboutignou/ profile/2

12. Jain, P. K., Kaur, H., & Babbar, P. (2007). *LIS education in India : challenges for students and professionals in the Digital Age.* Retrieved March 20, 2010, from http://dspace.fsktm.um.edu.my/ bitstream/1812/231/1/ 45IND_Jain_Harvin_Babbar.pdf

13. Kumar, P. S. (2008). *Library Movement and Library Development in Kerala and Lakshadweep.* New Delhi: B R Publishing.

14. Li, L. L. (2009). *Emerging Technologies for Academic Librarians in the Digital Age.* London: Chandos Publishing.

15. Mahapatra, G. (2006). *LIS education in India: Emerging paradigms, challenges and propositions in the digital era*. Retrieved March 14, 2010, from http://arizona.openrepository.com/arizona/ bitstream/ 10150/106109/1/89.Gayatri_Mahapatra.long.pdf

16. Naushad Ali, P. M., & Bakhshi, S. I. (2006). *Problems and prospects of LIS education in India with special reference to distance mode*. Retrieved March 14,2010,from http://www.bibliotheksportal.de/fileadmin/0bibliotheken/ Bibliotheken_International/dokumente/indien_1.pdf

17. *Oxford Dictionary and Thesaurus.* (2001). Oxford University Press, 932p.

18. Ramesha, & Ramesh Babu, B. (2007). Trends, Challenges and Future of Library and Information Science Education in India. *DESIDOC Bulletin of Information Technology 27* (5), 17-26.

19. Reitz, J. M. (2010). *Online Dictionary of Library and Information Science*. Retrieved March 20, 2010, from ODLIS-Online Dictionary of Library and Information Science: http://lu.com/odlis/

20. Rhine, L. (2006). The Impact of Information Technology on Health Information Access in Sub-Saharan Africa: the divide within the divide. *Information Development 22,* 242.

21. Singh, S. (2000). Library and Information Science Education in India : Growth and Trends. *University News , 38* (6), 45-48.

22. University Grants Commission. (2001). *UGC Model curriculum: Library and Information Science.* New Delhi: UGC.

23. *University of Calicut,Department of Library and Information Science.* (2010). Retrieved June 4, 2010,from http://www.universityofcalicut.info/ index.php?option=com_content&task=view&id=56&Itemid=133

24. Varalakshmi, R. S. (2007). Need for National Consensus on Library and Information Science Education in India. *DESIDOC Bulletin of Information Technology , 27* (2), 13-20.

25. *Webster's New World College Dictionary.* (2005). Massachusetts,USA: Merriam-Webster.

26. Wikipedia. (2009). *Professional Development.* Retrieved December 12, 2009, from Wikipedia: http://en.wikipedia.org/wiki/Professional_development

Chapter 2

REVIEW OF LITERATURE

2.0 Introduction

Review of related literature is conducted to enable the researcher to get a clear understanding about the specific field of study. It also helps the researcher to have an insight into the tested methods, procedures and interpretations of similar studies conducted elsewhere. Considerable amount of literature is available regarding application of Information Communication Technology (ICT) in libraries, professional development and continuing education needs of library professionals. But studies are relatively few regarding the impact of ICT on professional development and educational needs of library professionals. A survey of the literature found that most of the studies are reported from foreign countries and that such studies are not given due importance by the researchers in library and information science. An attempt is made in this chapter to present a survey of the literature available in India and abroad under the subheadings listed below. The studies are further grouped under national, international and arranged in a chronological sequence.

1. ICT in libraries

2. ICT and library professionals

3. Professional development and educational needs of library professionals.

4. Thesis

5. Reviews

2.1 ICT in libraries

ICT has changed the traditional methods of library activities and services providing new dimensions for teaching, learning and research in higher educational institutions. With the help of ICT tools, it is possible to store, retrieve, disseminate and organize information by creating websites and databases. Information is now published both electronically and by print making it accessible to users according to their demands. It is important to assess the ICT applications in library and information centres in the

context of changing user needs. This section includes studies related to the application of ICT in libraries both in India and abroad.

2.1.1 National studies

Kannappanavar and Vijayakumar (2001) survey 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 covers collections of the agricultural university libraries, In house database, use of IT in administration and the impact of IT applications on libraries. Results reveal 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 are having hardware and software facilities to some extent, the results are not reaching the clientele. It recommends 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.

Jeevan and Saji (2004) present 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) provides an 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 is 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 reveals 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) present 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 cover 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 are using computers for their services. All the libraries, without any exception, are using only personal computers for the entire range of automation activities. The survey also reveals that all university libraries have conducted sufficient number of training programs to its staff members before acquiring the new technology.

Walmiki and Ramakrishnegowda (2009) in a survey of 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 reveals 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) reports 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 show 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 eventhough the attitude of the librarians towards ICT application/use in the LICs was very positive. The majority of LICs in Noida has good hardware, software facilities to some extent but ICT based services, and products are 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.

Sampath Kumar and Biradar (2010) observe the use of information communication technology (ICT) in 31 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 questionnaire, observation and informal interview with selected college

librarians show that lack of budget, lack of manpower, lack of skilled staff and lack of training are the main constraints for not automating library activities. Even though library professionals have 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.

2.1.2 International studies

Siddiqui(1997)reports 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 tries 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 are using these information technologies to provide excellent services to library users. In addition all seven academic libraries are using IT in performing their day-to-day work of processing and services.

Al-Qallaf and Al-Azmi (2002) in a survey study 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 shows that few libraries have internet connectivity, limited use of ICT applications, and the implementation of an automated library system are very slow . Factors impeding the development of information technology are planning, funding, human resources, and building structure. The survey results also show that there is a positive attitude among library personnel towards IT.

Baruchson-Arbib and Bronstein(2004) reports 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 is to acquire is the training role and act as guides in information technology related issues. The LIS professionals need to promote and market their skills and thereby acquire necessary social and communication skills.

2.2 ICT and Library Professionals

In a changing environment when most of the library services are ICT based, it is important for library professionals to be well informed and updated regarding developments in ICT. This section deals with different studies regarding the use of ICT based applications by library professionals, their attitudes towards ICT, skills in handling new technologies, need for training in the new technologies etc.

2.2.1 National studies

Srivastava (1997) reports 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 form 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 reveals 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) evaluates 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, shows their keen interest in professional development to keep pace with the trends of electronic

information era. Results show 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) evaluate the biomedical information centres and libraries (ICLs) in India. The main objectives of the study are 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 have been used to determine the relationships between IT development and its applications in biomedical ICLs by users and professionals .The survey reveals that there is an increase in number of technologies available and adequate hardware and software facilities in ICLs.The study shows that computer based networking facilities are gaining importance in biomedical ICLs. Biomedical information users depend more on computer facility for various purposes. The users are of view that all staff should have higher qualifications for the effective use of IT based services.

Temjen and Saraf (2003) studies the attitudes of academic and research library professionals towards information technology and its relationship with library and information science courses in India. The study identifies 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 are anxiety, efficiency, work performance, use confidence and acceptance..He reports 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, Vinchurkar and Chaukande (2005) reports 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 reveals that majority of library professionals are computer literate and are not reluctant to make use of IT applications in their libraries. Automation is progressing in all the college libraries under study and they are providing library services of which 50% are IT oriented.

Jange and Samy (2006) evaluate the use of the Internet as an information source by libraries of National Institutes of Technology in India. Using the questionnaire method data is collected from seventeen National Institutes of Technology spread across the country. Some of the main objectives of the study are to understand the perceptions of Internet technology by library professionals, to identify the purpose of using Internet by library, and to explore the use of Internet services and its impact on library activities and services. It is observed that all the libraries perceive Internet as a communication tool and see it as a supplement to the online library. Among the Internet services, email, online databases and WWW are the most frequently used Internet services by the librarians. The results indicate that, the libraries make use of Internet mainly for identifying latest books and journals in acquisition and serials control activities of library. Search engines are the ultimate mode of searching information and colleagues assist in getting the desired information. The results indicate that the libraries of NIT accept the significance of Internet in library activities and services. The librarians have to reorient themselves, and adopt the new technology to generate services and resources where skills of structuring and organizing resources are put to its best use.

Nath, Bahl and Kumar(2007) reports a survey of librarians of Chandigarh city to assess the ways in which librarians use ICT's , their level of knowledge and skills, problems faced in the use of ICT's and their training needs. The study also investigates the extent of adoption of ICT in Chandigarh city libraries as modern tools of providing library service to users. A questionnaire was used to survey the ICT skills and knowledge of librarians with 9 sections on respondent's background, file

management, word processing, spreadsheets, databases, presentations, E-mail and Internet. Survey of 21 academic and public libraries reveal a low level of ICT knowledge among librarians and a general lack of formal training among the academic librarians. The study recommends library education with a balanced curriculum including both traditional as well as ICT knowledge and skills.

Ramesh Babu, Vinayagamoorthy and Gopalakrishnan (2007) reports a survey of the ICT skills among librarians in engineering educational institutions in Tamil Nadu. The main objective was to identify the types of ICT skills possessed by the librarians, assess the level/extent of different types of ICT skills, the means of acquiring ICT skills, and identify the constraints in acquiring ICT skills by the librarians. The knowledge in ICT relates to operating systems, packages and programming languages, library automation software, web awareness, knowledge of online facilities/services, and also technical skills and managerial skills. The results show that the librarians of these institutions are acquiring considerable basic skills in ICT. However, they need to concentrate more on network-based services and digital library services.

Choudhury and Sethi (2009) study 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 are computer literate, having undergone computer courses like PGDCA, DCA and other short-term courses. They are also aware of the use of E-resources, evaluation of web resources, IPR, webopac, search engines etc. The authors recommend that library professionals are to be encouraged to attend various training programmes on different advanced concepts of information technology.

Mohamed Haneefa and Shukoor (2010) reports the Information and Communication Technology (ICT) literacy among the library professionals of Calicut University. The study includes only the library professionals in the central library and departmental libraries 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 need training or orientation in library automation, digital library and institutional repository software.

2.2.2 International studies

Vespry and Kitiyadisai (1992) survey the application of information technology (IT) among academic libraries in Thailand .The survey shows that Librarians are generally aware of the role of IT in libraries and keen to automate their library services . It also shows that the speed of IT implementation in academic libraries depend to a large extent on administrator's support **.**

Muirhead (1993) reports the results of a survey, funded by the British Library, Research and Development Department, of systems librarian posts in UK libraries. Survey include 503 UK public, academic and other libraries to determine the activities of systems librarians and the nature of the employing organizations. The survey findings concern what systems librarians actually do, the kinds of stress they are 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 indicates that for a considerable majority there has 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.

Shiao-Feng(1993) reports the results of a questionnaire survey to determine the attitudes of professional academic library staff in Taiwan towards computerized library systems. Responses were collected from university libraries known to have installed computerized library systems and follow up telephone interviews were conducted. Results on comparison with those of an earlier study in the USA which related to professional academic library staff in 13 academic libraries in the Midwest, shows very little difference between the attitudes of librarians in the two countries.

One of the hypotheses guiding the study was that no significant differences exist between the attitudes of librarians in Taiwan and the USA. 'Student t' tests of the categorizations of attitudes indicate that librarians in Taiwan are significantly more negative towards computers in general than they are about the effects on people and services. Results suggest that there is scope for improvement in the overall computerized systems environment in academic libraries in Taiwan.

O' Neill (1998) examines the current status of continuing education courses in American schools of Library & Information science,with special emphasis on Librarians working in collection development and acquisitions. A survey of American library schools reveals that only a small percentage of the continuing education workshops deal with technical services. Most of the continuing education workshops are technology oriented. A number of LIS schools offer semester long courses through various technologies, world wide web, satellite, videotape etc. The author suggests that LIS professionals must be more actively involved in the continuing education programms at schools of library and information science

Tran and Gorman (1999) reports results of a survey questionnaire survey 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 intends to discover what librarians have been doing with computers and to describe current electronic resources available in libraries. It also identifies knowledge and skills needed for the provision of electronic services. Most librarians indicate that they need to be trained in the use of computers, new IT, CD-ROMs, Internet services, etc.

Chisenga (1999) surveys the use of internet for professional development by library professionals in Sub-Saharan Africa. A survey of 47 librarians through mailed questionnaire reveals that internet and electronic mail facilities are mainly accessed at workplaces. The use of facilities for accessing E-journals, discussion groups and other web resources was quite low and in some cases nonexistent due to the shortage of computers , poor telecommunication lines and inadequate internet use skills. The study finds that the library professionals have the opinion that internet could play an important part in facilitating professional networking and sharing of information.

Ondari-Okemwa (2000) reports a study undertaken to examine the specific training needs of practising 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 examines 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 needs 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) illustrate the Internet and IT skills that are 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 stresses that though IT skills, particularly in relation to the Internet are essential, some of the more basic skills that are important to the information professional should not be abandoned.

Mugwisi and Ocholla (2003) examine 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) describes 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) determines 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 study 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) identifies 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 an 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.

Adeyoyin (2005) surveys the levels of ICT literacy among library staff in Nigerian libraries. The questionnaire method was used for this study. The data, collected on a self-assessment basis, covered 18 Nigerian university libraries. It shows that Nigerian university libraries, which form the basis of knowledge for the country, do not have professional librarians whose skill-set is adequate to meet the ICT applications which are indispensable for the acquisition, organization, provision and dissemination of knowledge. Library management, for its part, should acknowledge the wide-ranging benefits of both ICT and raise levels of ICT literacy for university libraries and their mother institutions.

Ashcroft and Watts (2005) in a study of ICT Skills for Information Professionals in Nigeria observes that Information professionals are 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.

Hoskins (2005) investigates the ICT knowledge and skills of subject librarians at the university libraries of KwaZulu-Natal. A study population of 43 subject librarians, in the university libraries were surveyed by means of a mailed questionnaire to establish in what ways subject librarians were using ICTs, what the level of ICT knowledge and skill was amongst the subject librarians, what problems the subject librarians faced in the use of ICTs and what their ICT training needs were. Interpretation of the results revealed a low level of ICT knowledge and skill amongst subject librarians and a general lack of formal training for ICTs amongst the subject librarians. The findings of the study showed that subject librarians generally do not have the knowledge to explore and take advantage of the opportunities technology creates, nor did they have the skill or ability to perform the applications functions and operations described above effectively. By identifying the problems that subject librarians face in the use of ICT, it is evident from the findings that the majority of these problems were as a result of a lack of understanding, knowledge, skill, and a lack of training. The author suggests that Library schools should provide a curriculum that is balanced so that it provides for an education in traditional librarianship as well as ICT knowledge

Adeyoyin (2006) reports a survey conducted among the professionals, paraprofessionals and other members of staff of 28 university libraries in West Africa to ascertain the information and communication technology (ICT) literacy level among the staff of English-speaking university library staff and their counterparts in French-speaking university libraries. The results show that out of about 370 professional librarians, only 179 of them were ICT literate while the remaining 191 professional librarians were ICT non-literate. Also, out of 526 paraprofessionals, only 84 of them were ICT literate while the remaining 442 were ICT non-literate. Some of the findings were that; there was a need for knowledge acquisition among the librarians in Nigerian university libraries to be able to offer efficient services in the

emerging ICT era and that the ICT literacy among the librarians was low and hands-on practical experience was lacking among the librarians in some cases. The application of information and communication technology in West African university libraries and their subsequent use require that these technologies should become part of library staff training.

Obajemu (2006) reports 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.

Wilson and Halpin (2006) discusses the effects of operational convergence, and the subsequent growth of the hybrid library model, upon the professional identity of academic library staff. Information communication technology and electronic information services have had a profound and far reaching effect upon learning and information services (LIS) in British academia. As a result academic LIS professionals have evolved to become new hybrid information professionals. Main themes of investigation include the extent of professionalism in academic librarianship, in terms of how LIS staff perceive their careers changing and developing, and the extent to which professional standing and identity are valued and prioritized. A case study of Learning and Information Services (LIS) departments at four British universities was undertaken, to study the development of a new, generic key skills base and the relevant CPD and training. The study covered the process of work assimilation; the growing profile of the para-professional; changing job titles and descriptions; and the growing conflict between commitment to the employer or the profession. Semi structured interviews were used to interview library managers.ICT skills featured strongly in the responses and the importance of being multi-skilled and being able to adapt quickly and effectively are also stressed.

Safahieh and Asemi (2008) assess 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 survey 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 reveals 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 recommends the management of the university libraries to organize training programs to educate librarians with the latest advancement of information technology.

Ademodi and Adepoju (2009) report a study of academic librarians in Nigeria. The aim of the study was 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 finds that the academic libraries in these states have very few computers and these computers are used more for administrative duties and Internet browsing than library routines. Most of the librarians are computer literate, but have no computers to use. The rate of computer skill and competence is low.The study recommends that librarians must be properly trained to acquire computer skill and more attention and funds should be committed to training and procurement of ICT infrastructure in Nigerian university libraries.

Adeyinka (2009) examines the attitudinal correlates 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 survey 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 show 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 emphasizes the need for libraries to embark on training their librarian who does not have knowledge of ICT.

2.3 Professional development and educational needs of library professionals

Professional development is the process by which professionals keep current the knowledge, skills, and abilities needed to function effectively in their profession. It is assumed that to maintain professional competence, the professional must participate in updating activities. Continuing education is fundamentally a responsibility of the individual professional. A librarian's motivation for continued learning involves a mixture of social responsibility, desire for advancement, professional pride, a concern for future libraries, the need to keep abreast of new knowledge and technology, as well as an interest in supplementing professional training. (ALA,1980) Efficiency of a library depends to a large extent on the competence of its staff. Hence it is important to assess the library professionals' needs for continuing education and professional development in a changing electronic environment of academic library.

2.3.1 National studies

Singh (1988) reports the results of a survey conducted to study the career advancement of academic library professionals in New Delhi. The study intends to find out the factors leading to the advancement in library profession , to establish possible relations between some characters of professionals and their advancement in career. One of the major findings of the study was that majority of the library

professionals avail leave for pursuing BLibsc and MLibsc courses. Professional and academic qualifications, participation in conferences , seminars and workshops were found to be associated with promotion. The suggestions include improving career prospects by developing skills required for the profession and publishing papers in library science .

Jani, Parekh and Sen (1991) reports a survey undertaken to discover the individual perceptions of librarians towards professional development. The objectives were to identify the factors that are instrumental in facilitating or inhibiting professional advancement,to identify areas,agencies and strategies suited for additional knowledge and skills input that will lead to professional development. The study reveals that librarians gave more importance to self education and reading for professional development. Reference and information work was the area often cited which required additional knowledge skills.

Ramaiah and Moorthy (2002) describe 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) details the results of a study of training opportunities for library and information professionals in India and how a selection of Indian university libraries are 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.

In a survey of higher educational institutions in Jaipur, Srivastava and Srivastava (2004) studies the opportunities available for the professional development of librarians and their satisfaction level. Out of the total population, 30 librarians were selected and a survey was conducted using questionnaire. Results reveal that librarians need opportunities for higher education, opportunities for attending conferences and are mostly ignorant of the developments in information technology. The authors report that most librarians are dissatisfied with their job and suggest that authorities should encourage library professionals to participate in professional development activities and provide opportunities for higher education.

Kannappanavar and PraveenKumar (2005) evaluates 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) report 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.

2.3.2 International studies

Broadbent and Grosser (1987) outlines the study conducted on 85 Melbourne based special librarians and Information centre managers to ascertain their continuing professional development (CPD) activities. Investigations was based on interviews to assess the nature of organizational support for professional development , the formal programmes attended ,the present and future educational needs for CPD. The study shows that over 70% of interviewees had participated in at least one workshop , conference or seminar during the previous two years. Though the funds were provided by organizations, the amounts spent were low and suitable courses were few for professional development. Educational needs mainly concentrated around information technology and management skills.

Roberts and Konn (1989) reports a study conducted on about 52 university and 30 polytechnic librarians about forms of 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 includes 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.

Aina (1993) evaluates the curricula of library schools in Africa to know whether their courses are relevant to the emerging library and information science market based on a standard list of topics, ranging from computer technology, information, and records management to information repackaging and journalism. Data used in the study was based on prospectuses from the schools supplemented with visits. Only schools

having bachelors or postgraduate programmes were considered; library schools that run only undergraduate diploma programmes were excluded, assuming that information professionals are those who have undergone a bachelor's or postgraduate training programme. Results suggest that a substantial proportion of the institutions in Africa have incorporated courses like information management, information repackaging, systems analysis, design etc that are appropriate to the emerging market in their curricula. Though the relevance of computer technology is stressed, only a few institutions have incorporated computer technology in their syllabus. Recommends that funding agencies should provide assistance in the training of information professionals in Africa by sponsoring visiting lecturers and scholars to training institutions where these lack skilled work force to teach certain courses, and by making the necessary equipment available. The importance of continuing education for trainers is also stressed.

Elkin (1994) stresses 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.

Freeman (1995) explores the possibility of LIS professionals undertaking research for a doctorate (PhD) as an option of continuing professional development. He reviews Doctorate in Library Studies (DLS) being offered by British library schools, together with the opportunities offered in business schools in UK. He points out that for most librarians, full-time study as a doctoral candidate will not be feasible, and they will have to investigate the part-time modes or distant learning options. Library professionals have a duty to advance their knowledge in the profession and are faced

with a rapidly evolving and converging discipline containing many interesting topics for research.

Leach, Arundale and Bull (1996) reports 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) explores 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.

Anwar (1998) details the results of a questionnaire survey of academic librarians' perceptions of their continuing professional needs in Malaysia. The continuing professional development environment in academic libraries, duration of such programmes, the skills required in the areas of management, information and communication technology, research skills etc are some of the factors studied in the survey. He also suggests methods to promote professional development programmes for academic librarians.

Edem (1999) in a survey studies the issues and obstacles affecting the career advancement prospects of librarians in Nigerian universities. The main objectives of the study were to identify the career advancement structure in Nigerian universities, and to evaluate the career advancement opportunities for librarians. Respondents were

selected from 22 universities in Nigeria using random sampling. The survey results indicate that career advancement structure has seven main grades or ranks. Further, publication productivity and professional experience are required for librarians' career advancement. One of the main problems faced in career advancement was lack of higher educational qualification. Other factors include lack of inadequate norms for promotion, and unnecessary emphasis on publication requirement.

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) presents 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) reports 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

Elgohary (2000) investigates the preparation of entry-level research Librarians in Florida research libraries and describes the relationship between formal library education and work in research libraries from the perceptions of entry-level librarians and their supervisors through a web based survey. The main goal of the study is to help library schools prepare future research librarians and equip them with in-demand knowledge and skills. In addition, it aims to identify the current and the potential required skills for entry-level research librarians. The study focuses on subject-knowledge skills, management and marketing skills, information technology skills and interpersonal skills of librarians in academic and research libraries of florida . The results of the study identify different methods for library schools to consider in the curriculum development process. Conducting systematic revision based on analyzing market demands for information professionals in different library and information settings is essential for library schools. It recommends internships as a requirement for the MLIS degree to help graduate students acquire more experience that is

practical. Adding more management and marketing curricula will help MLIS students to deal with some of the important issues raised in libraries, information centers, and information technology curricula that focus on issues such as information system and database design.

Chaudhary (2001) reports the continuing education needs of librarians and information professionals in the University libraries of Pakistan. The study explore the needs of university librarians in Pakistan and Azad Jammu and Kashmir, and determine the obstacles to the continuing education programs. It also tries to identify different methods to motivate librarians toward continuing education programs. It is expected that the results of this study will be of practical importance to design continuing education programs for the university librarians.

Bii and Wanyama (2001) analyze 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 llibrary 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.

Broady-Preston and Bell (2001) evaluates the importance of continuing professional development for library and information science professionals through a case study of MLIS distance programme of Department of library and information studies, University of Wales in UK. A questionnaire survey among the students reveals that most of the students enroll for MLIS programme with an aim to update and refresh qualifications, keep abreast of new ideas, acquire and enhance management skills etc.

It is clear that students view MLIS course as a means of CPD that would allow them to enhance their current position and create options for future opportunities. The survey also reveals that continuing professional development (CPD) add value to personal and professional life but only if the employee is motivated to ask for training, design a programme or follow through sometimes at his /her own expense.

Desai (2001) reports the results of a questionnaire survey conducted to analyze the continuing education needs of science and technology librarians. Survey questions include 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) examines the pattern of staff development activity in Australian University libraries, State Libraries, the National Library etc. The study reveals 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.

Terry (2001) reports organizations' approach to continuing education, with the help of e-mail interviews of a sample of publishers, librarians (academic, research, and corporate), subscription agents, serials aggregators, and library system vendors. The types of training and staff development opportunities available (both formal and informal), the interviewee's personal experience with training, and the organization's annual budgets for continuing education activities per employee are also included in the survey. All of the organizations interviewed had highly developed and customized internal training programs. The one principal skills requirement mentioned by all interviewees was in the area of technology, software and hardware skills. Apart from

computer skills, a prevalence of training was reported in the communication/ presentation skills, negotiation skills, knowledge management skills, time management skills, management training, and user outreach/customer service training.

Yang (2001) presents the results from a survey to assess the training and educational needs of government documents librarians. The survey included 450 government documents librarians in the United States, randomly selected from the seventh edition of American Library Association's Directory of Government Document Collections and Librarians (1997). Two hundred and forty-four librarians responded to the questionnaire. The survey included questions concerning the primary means by which government documents librarians gained knowledge about government documents as well as questions on the areas of government publications perceived by them that is covered in greater depth in library school curricula. In addition, government documents librarians were asked whether there were enough government documents workshops/seminars to meet their continuing education needs and what topics were perceived as important to be discussed or presented in future workshops. Topics included the management of electronic resources; effective methods of searching government documents on the Web; how to use the various formats of census publications fully; GIS application and its use; government statistical sources and the use of electronic statistical sources etc. A few respondents stated that working with documents provided an opportunity to become experts in a specialized area of librarianship. The survey responses indicated that self-instruction is the primary means by which government documents librarians have gained knowledge of government publications. Respondents were positive about library school curricula in general, but they suggested a number of areas that should be covered in greater depth, particularly statistical data sources and census publications.

Anwar and Ansari (2002) report the results of an investigation in current continuing professional development practices, perceptions of academic library employers about the skills to be developed in their staff in six Gulf co-operation council countries. Through mailed questionnaires, data was collected from 15 publicly funded institutions. Analysis shows that a systematic staff development programme was lacking in most of the institutions. Information and communication technology skills

preferred relates to automated systems, electronic resources, networking and multimedia applications. Writing and research skills relating to measurement and evaluation, studying information needs, and report writing receive higher ranks in the survey.

Hewitson (2002) reports 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 EIS s regularly, used it for their own research or after joining some form of professional development such as a PhD.

Breen et.al (2002) evaluates 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) analyses 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 cataloging 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 cataloging standards and new developments, librarians need to improve their skills constantly.

Powell et al. (2002) reports a study on LIS practitioners' involvement in research, 1,444 questionnaires were sent to members of the American Library Association, the American Society for Information Science and Technology, the Medical Library Association, and the Special Libraries Association. An analysis of 615 responses reveals the following: almost 90% of LIS practitioners in the United States and Canada regularly read at least one research journal, nearly 62% regularly read research-based articles, approximately 50% occasionally apply research results to professional practices, and 42% occasionally or frequently perform research related to their job or to the LIS profession. The data analysis also identified factors related to practitioners' involvement in research and determined how practitioners assess their research training and skills

Khurshid (2003) review 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 catalogers. Analysis reveal 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

knowledge of cataloging 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) reports 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.

Adomi and Nwalo (2003) in their study surveys the prospects for continuing professional education (CPE) of library and information science (LIS) professionals in Nigeria using Delta State as a case study. Fifty-one practitioners made up of professionals and paraprofessionals from academic, public, special libraries and information centre were used in the study. Authors note that though LIS professionals and paraprofessionals desire to update their skills and knowledge through continuing professional development (CPD). However some constraints, such as lack of IT components for practice/work, lack of self and organizational motivation, financial difficulty, amongst others, hamper staff from taking advantage of CPD in countries such as Nigeria .Work skills necessary for the respondents are managerial in nature and most of who are already playing managerial roles in their libraries. Conclusions

based on findings recommend that LIS organisations should be more committed to the CPE of their staff; that practitioners should commit their personal funds to their CPE if their organisations fail to support them and that the professional association should develop clear cut programmes for the development of practitioners.

Chan and Auster (2003) explores the extent to which professional development of reference librarians was occurring , based on a survey of 733 professional librarians with reference duties who were working in large, urban public libraries in Ontario. Reference librarians once relied solely on print resources; they can now answer the majority of questions accurately using only Web-based sources. .Authors examine those competencies reference librarians were choosing to acquire through formal and informal professional development activities, and explore barriers that might be preventing reference librarians from participating in these activities. In their professional development activities, the most popular topics were related to internet and more than half the respondents studied electronic resources, office applications, integrated library system applications, communication skills and public service skills. Instructional skills and management skills were studied by about 40 percent of the respondents

Shiholo and Ocholla (2003) outlines 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 provides 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) outline 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.

Henry and Neville (2004) through a web based survey investigates the research, publication, and professional activities of Florida academic librarians. The study seeks to reveal about the various promotion, tenure, and professional advancement processes and opportunities. Survey questions investigate whether there is a perceived difference in the importance attached to various types of research and publications. It shows 46% of all the Florida academic librarians who responded have been engaged in either book, book chapter, or refereed article publication since 1995.The survey

also finds that librarians believe in having or obtaining a second degree for success in advancement or for promotion

Zhang (2004) uses a questionnaire to assess and identify areas of training and development of library support staff in selected academic libraries in Oklahoma and Kansas. Questions include opinions on the importance of training topics on computer skills, interpersonal skills, and supervision /management skills that they perceive as important to their job and the importance of library/organizational supports that encourage them to participate in training and development. It is seen that support staff highly rated computer skills like web browsers, MS Office Suites (e.g., word processing, spreadsheet, etc.), e-mail management etc that help their job and oral/written communication, working with difficult people, managing priorities etc as important training topics on interpersonal skills.

Clyde (2005) reports a descriptive study undertaken to gain an overview of library and Information workplace needs for library professionals with knowledge and skills related to user education and information literacy instruction. The study describes a small-scale research project that used content analysis techniques to study job advertisements posted to the international LIBJOBS listserv over a period of three months. The findings of the study, and recent literature, indicate that skills associated with user education and information literacy instruction are important for today's library professionals.

Eells and Jaguszewski (2005) reports 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) study 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 verify 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 experts 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) reports 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.

Mayer and Terrill (2005) report a survey of academic librarian's opinion about the need for advanced subject degrees. Academic librarians have various opinions on the importance of advanced-subject degrees in addition to a master's in library science (MLIS). The authors using an online survey collect opinions from academic librarians on this topic. Arguments in favor of having advanced-subject degrees include development of research skills, credibility, and overall improved job performance. Arguments against include the fact that the MLS is and should continue to be library professionals' terminal degree. The need for advanced-subject degrees may vary by many factors, including individual career goals and local institutional culture.

Spackman.et.al (2005) reports the results of a continuing education survey conducted at the end of 2005.The mail survey began with an open-ended question, asking respondents to list three topics in science librarianship they were interested and 24 topics on a five-point Likert scale. The survey also covered questions on professional involvement, professional organization membership and conference attendance. The top continuing education needs of science librarians include new technologies, professional development and keeping current, institutional repositories/digital archives, promoting science information literacy, collaboration between faculty and librarians, and finding free high-quality online data. It was seen that science librarians prefer continuing education in a number of different formats, whether in person or remote like teleconferencing, E-mail tutorials etc. On comparison with previous surveys, information literacy was the strong interest of science librarians.

Bradley (2006) explores barriers and motivators for new professionals who write for the professional literature. Authors from the ALIA New Librarians' Symposium held in December 2006 in Sydney, Australia were surveyed about their experiences of writing and presenting early in their career. Majority of respondents would like to

improve their research, writing and presenting skills. There is a strong interest amongst new professionals to write and publish, as found in the survey. They are motivated to make an impact on the profession and to develop their own careers. However there remain many varied barriers, and a lack of support structures to develop skills after graduating from library and information qualifications. Encouraging the new library professionals to report on their professional practice and providing the support for them to do so will be to the benefit of their peers who will have greater access to knowledge about activities and innovations in other libraries.

Professional development is essential for academic librarians to keep current with skills, knowledge, and competencies in rapidly changing times. Cassner and Adams (2006) surveys 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) investigates 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.

Kavulya (2007) investigates the types of skills, knowledge and values that are needed by LIS professionals in Kenya if they are to fulfill the current information needs of the society. The survey collects data on the respondents' perceptions on the status of job market for LIS professionals in Kenya, adequacy of current curriculum and training resources in local LIS training institutions, priority areas of training and ICT skills that are critical for information professionals. Respondents were of the opinion that unless steps are taken to improve the quality of LIS training in Kenya, persons from other professional fields will be better placed to perform some information functions than LIS professionals. The study also finds that LIS curriculum should include hardware and software skills, database construction, website development; digitization process; electronic information, internet use and evaluation, information storage and retrieval. Other IT courses identified as useful are electronic publishing, HTML and programming. Author suggests that to provide information services that address specific targets, LIS schools have to select areas to include in the curriculum, depending on the manpower they would like to produce.

Adanu (2007) reports research carried out among professional librarians in the five state-owned university libraries in Ghana. The study was to find out if their work environment encouraged Continuing professional development (CPD). The results of the survey using questionnaire and interview show that the library environment in the state-owned universities was supportive largely of CPD. The study reveals that the professional librarian's involvement in CPD was a shared responsibility of the library and the individual. The study reveals that CPD activities might lead to job advancement, competence, or both. A vast majority of the respondents, 92.7 per cent, saw involvement in CPD as a great aid to promotion as well as career advancement. The three main activities that respondents felt resulted in better job performance were reading professional literature (78.2 per cent), workshops (72.7 per cent) and networking with colleagues (36.4 per cent). It also shows that research and publishing was not rated high as a contributory factor to enhancing competence. The author stresses the need for CPD and workplace learning to meet the challenges and changes faced by the library profession due to the developments in ICT.

Leong (2008) in a case study tracks how academic reference librarians at the UNE, New South Wales, Australia have faced changes in library services during the period

from 2000 until January 2007. It reviews the steps involved in managing change and the approaches that were taken. The reference department had responsibility for reference work, information literacy, including Endnote bibliographic database classes and troubleshooting, selection work including electronic database assessment, collection assessment and cooperation with faculty. To provide for this broad scope of work, competencies were developed in addition to the reference competencies. The study shows that staff responded positively to the challenges, developing new skills for a changing environment, for new areas of work and taking innovative approaches to improving service.

Gerolimos and Konsta (2008) reports the results of a research to investigate the qualifications and skills of librarian's profession as they are seen through the job advertisements studied from the UK, Canada, Australia and the USA in 2006 and 2007. The data were derived from known web sites. The study concerns many aspects and problems of the information professional in the new environment and especially the types, the education needed, the skills and qualifications required, the extent to which the profession should or will change etc. Degree in LIS and working experience skills, Communication skill, Development of digital collections skill etc record highest percentage of skills needed in the survey.

Maesaroh and Genoni (2009) report a study of levels of education, skills, and awareness of Indonesian academic librarians, and provides an insight into their continuing professional development. The paper studies 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 covers 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 thn that of their Australian counterparts. The quality of education and CPD was not satisfactory for Indonesian professionals.

2.4 Thesis

Nair (1997) reports 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) surveys 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 assesses 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 identify 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

Muhammed Salih (2004) surveys 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 Inflibnet 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 evaluates their professional manpower in the IT environment. He studies 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 .

Vijayakumar (2007) evaluates manpower utilization in the university libraries of Kerala, through a survey of university libraries and library professionals in five universities with well equipped university library system. He makes a detailed study of the various university libraries in Kerala with details regarding central library and various departmental libraries with the help of data sheets and questionnaire for library staff. Data includes details of documentary sources, budget allocation, infrastructure and manpower of all libraries. From the analysis of the qualifications and skills of library professionals it is seen that 83% of professional staff had higher qualifications than the entry level requirement. He states that library professionals must acquire more management skills in addition to computer skills and recommends restructuring the manpower in university libraries in the light of induction of new technologies.

2.5 Reviews

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, metadatabases, 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

Barden (1997) describes the skills required by the information worker of the future. He refers to Librarians as information workers and suggests that information workers

have to develop technology skills and network management .They must be customer focused, need to have a sophisticated knowledge of media management, storage, retrieval, and they will be required to be acutely aware of the financial and business implications of their activities. The author also suggests a manifesto for training and development for information workers, which will see them as being major contributors to, and shapers of the 21st century

Bryant (1997) identifies nine core competencies for solo librarians and discusses five of them, which are organizational culture; management skills; communication; library/information skills; and networking. The full list also includes interpersonal skills; information technology; subject knowledge; and personal development. The author suggests that this list is relevant to the professional development needs of all information services practitioners.

Kajberg (1997) explains the need for competency development and upgrading of public librarians' knowledge in the field of information technology (IT). 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) identifies 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 .

Ilyas (1998) gives an overview of librarianship in Pakistan in the 21 st century. He observes that new skills and a change in attitude on the part of librarians in Pakistan are required if they are to be able to provide efficient and effective information services to users into the next century. The available data show that there are only a few opportunities for M.Phil and Ph.D. studies in the library schools of Pakistan and most of the professionals trained by these schools are thus deprived of chances of getting higher education. About 250 professionals are produced annually through the library schools in Pakistan; excluding those trained by the Allama Iqbal Open University through distance education. Hence, there is an intense need to tune the profession according to the multifaceted needs of the emerging scenario of information technology and the communications revolution.

Sreenivasulu, V (2000) highlights 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.

Dalton, Mynott, and Shoolbred (2000) based on the findings of the Library and Information Commission (LIC) report on Cross-sectoral mobility in the LIS profession and considers some of the barriers to career development within the Library and Information Services profession. It focuses specifically upon difficulties experienced by LIS professionals in moving to different sectors of the profession. It discusses issues such as professional segregation; employer prejudice; poor employment strategies; lack of confidence among LIS professionals; training; and

lack of professional support. ICT skills were considered to be of value in all sectors. Other skills include basic LIS skills, communication and interpersonal skills, and self-management skills. In addition to outlining some of the barriers to the career development of LIS professionals; the paper offers a number of recommendations for employers, professional bodies and LIS professionals that may help to lessen many of these barriers.

Orick (2000) reviews 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) emphasizes the challenging role of librarians and information professionals in the present internet era and describes 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) examines 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) discusses 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, IIITM, 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) observes 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) discusses 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) reports 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) reviews 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.

Guha (2006) outlines the opportunities that Digital Learning Environments has put forward for teaching and learning. Focusing on a particular aspect of professional development i.e., continuing professional education (CPE) in the light of Information and communication technology (ICT), the paper discusses about the changed scenario. It also presents an Open access Continuing Education Virtual Classroom,

developed to provide a continuing professional education platform to LIS professionals in India

Islam and Rahman (2006) outlines 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) describes 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) discusses the knowledge and skills required for information professionals with respect to the changing concept of Information management. Briefly describes 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) discuss the impact of information technology and role of libraries in the age of knowledge and information societies. The paper highlights 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.

2.6 Conclusion

The survey of literature has given an insight into the research carried out in the related fields of study. Further, it has helped to know the tools and methods relevant for the study. Majority of the studies are conducted with the help of questionnaire survey and personal interview. The literature survey has also revealed that most of the ICT related studies are conducted abroad. In India there are comparatively few studies related to ICT applications and professional development of library professionals. The pace of developments in ICT in the field of library and information science is rather slow when compared to other sectors. It is clear that technological change clearly affects library staff and there is a need to develop guidelines and policies to train the professionals in providing frontline services in academic libraries.

References

1. Adanu, T. S. (2007). Continuing professional development (CPD) in state-owned university libraries in Ghana. *Library Management , 28* (6/7), 292-305.

2. Ademodi, D. T., & Adepoju, E. O. (2009). *Computer Skill among Librarians in Academic Libraries in Ondo and Ekiti States, Nigeria (June)(online)*. Retrieved March 25, 2010, from http://www.webpages.uidaho.edu/~mbolin/ademodi-adepoju.htm

3. Adeyinka, T. (2009, January/June). *Attitudinal Correlates of Some Selected Nigerian Librarians towards the Use of ICT*. Retrieved June 14, 2010, from International Journal of Information Science and Management, Vol. 7, No. 1: http://www.srlst.com/ijist/ijism-Vol7No1/ijism71-15-30.pdf

4. 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.

5. Adeyoyin, S. O. (2005). Information and communication technology (ICT) literacy among the staff of Nigerian university libraries. *Library Review , 54* (4), 257-266.

6. Adomi, E. E., & Nwalo, K. I. (2003). Prospects for continuing professional education for library and information science professionals in Nigeria: the case of Delta State . *New Library World , 104* (1194/1195), 499-508.

7. Aina, L. O. (1993). The challenges of the emerging market and the education and training of information professionals in Africa . *Journal of Librarianship and Information science , 25* (4), 197-201.

8. ALA. (1980). In-service training. In *ALA World Encyclopedia of Library and Information Services* (p. 601). Chicago: American Library Association.

9. Alemna A, A. (1998). Education and training of the future librarian in Ghana. *Librarian Career Development , 6* (1), 3-6.

10. Al-Qallaf, C., & Al-Azmi, H. M. (2002). InformationTechnology in Public Libraries in Kuwait: A First Study. *International Information and Library Review* 289-308.

11. Anwar, M. A. (1998). Continuing professional development of Malaysian academic librarians. *Libri , 48* (1), 26-34.

12. Anwar, M. A., & 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.

13. Barden, P. (1997). Training and development for library and information workers for the future: A Manifesto. *Librarian Career Development , 5* (1), 30-33.

14. Baruchson-Arbib, S., & 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.

15. Bawden, D., Vilar, P., & Zabukovec, V. (2005). Education and training for digital librarians: A Slovenia/UK comparison . *Aslib Proceedings: new information perspectives , 57* (1), 85 -98.

16. 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.

17. Bii, H. K., & 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.

18. Bradley, F. (2006). Writing for the profession: The experience of new professionals. *Library Management , 29* (8/9), 729-745.

19. Braun, L. W. (2002). New roles: a Librarian by any name. *Library Journal , 127* (2), 46-49.

20. Breen, C., & et.al. (2002). New information management opportunities in a changing world. *Library Review , 51* (3/4), 127-138.

21. Broadbent, M., & Grosser, K. (1987). Continuing professional development of special library and information centre managers. *Journal of Education for Library and Information Science. , 28* (2), 99-115.

22. Broady-Preston, J., & Bell, S. (2001). Motivating mid-carrier LIS professionals : the Aberystwyth experience. *New Library World* (1169), 372-381pp.

23. Bryant, S. L. (1997). Pursuing professional development: the core competencies. *One-Person Library , 14* (5), 1-4.

24. Cardina, C., & Wicks, D. (2004). The changing roles of academic reference librarians over a ten-year period. *Reference & User Services Quarterly , 44* (2), 133–42.

25. Cassner, M., & Adams, K. E. (2006). Assessing the professional development needs of distance librarians in academic libraries . *Journal of Library Administration , 45* (1), 81-99.

26. Chan, D. C., & Auster, E. (2003). Factors contributing to the professional development of reference librarians. *Library & Information Science Research , 25*, 265–286.

27. Chaudhary, M. Y. (2001). Continuing professional education of librarians working in the university libraries of Pakistan and Azad Jammu. *Inspel , 35* (1), 67-73.

28. Chisenga, J. (1999). A study of use of the Internet among library professionals in Sub-Saharan Africa. *Internet Reference Services Quarterly , 4* (1), 37-50.

29. 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.

30. Choudhury, B. K., & Sethi, B. B. (2009). Computer literacy of library professionals in the university libraries of orissa: an analytical study. *IASLIC Bulletin , 54* (1), 15-30.

31. Clyde, L. A. (2005). Librarians and breaking barriers to information literacy: Implications for continuing professional development and workplace learning. *Library Review , 54* (7), 425-434 .

32. Desai, C. M. (2001). *Continuing education needs of science and technology librarians: results of the 2001 sts continuing education committee survey*. Retrieved July 13, 2007, from http://www.ala.org/acrl/sts/conted/survey.htm

33. Edem, S. U. (1999). Issues in career advancement prospects among librarians in Nigerian universities. *Library Management , 20* (2), 76-83.

34. Edwards, C. V. (2004, April). *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.* Retrieved June 15, 2009, from http://etd.ils.unc.edu/dspace/bitstream/1901/25/1/carlaedwards.pdf

35. Eells, L. L., & Jaguszewski, J. M. (2008). IT competence for all: propel your staff to new heights. *Technical Services Quarterly , 25* (4), 17-35.

36. Elgohary,A.(2003).*Educational preparation of entry-level professional librariansemployed by florida research libraries.*Retrieved July14,207 from http://etd.lib.fsu.edu/theses/available/etd-08312003-231256/unresrticted/ Dissertation.pdf

37. Elkin, J. (1994). The role of LIS Schools and departments in continuing professional development. *Librarian Career Development , 2* (4), 19-23.

38. Feret, B., & 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

39. Feret, B., & Marcinek, M. (1999). The future of the academic library and the academic librarian: a Delphi study. *Librarian Career Development , 7* (10), 91-107.

40. Flatley, R. K., & Weber, M. A. (2004). Perspectives on professional development opportunities for new academic librarians. *The Journal of Academic Librarianship 30* (6), 488–492.

41. Freeman,M.(1995).The doctorate: a possible continuing professional development route for library and information service practitioners. *Librarian Career Development , 3* (1), 26–27.

42. Gerolimos, M., & Konsta, R. (2008). Librarians' skills and qualifications in a modern informational environment. *Library Management , 29* (8/9), 691-699.

43. Gosine-Boodoo, M. (2006). Profiling the Caribbean special librarian: demography, skills and professional progress. *Information Development , 22* (4), 292-299.

44. Gosine-Boodoo, M., & McNish, M. (2005). Comparing polarized perspectives: librarians' professional skills and development. *New Library World , 106* (7/8), 363-377.

45. Griffiths, J. M. (1995). The changing role of librarians: managing new technologies in libraries. *Vistas in Astronomy , 39*, 127-135.

46. 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

47. Gulati, A. (2004). Use of information and communication technology in libraries and information centres:an Indian scenario. *The Electronic Library , 22* (4), 335-350.

48. Henry, D. B., & Neville, T. M. (2004). The research, publication, and service patterns of florida academic librarians. *Journal of Academic Librarianship , 30* (6), 435-451.

49. 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.

50. Hoskins, R. (2005). Information and communication technology (ICT) knowledge and skills of subject librarians at the university libraries of KwaZulu-Natal. *South African Journal of Libraries and Information Science , 71* (2), 151-163.

51. Ilyas, M. (1998). Librarianship in Pakistan into the 21st Century. *Information Development , 14* (3), 127-132.

52. Islam, A., & Rahman, A. (2006). Growth and development of information and communication technologies in Bangladesh. *The Electronic Library , 24* (2), 135-146.

53. Jain, P. (1999). On-the-job training: a key to human resource development. *Library Management , 20* (5), 283-294.

54. Jange, S., & Sami, L. K. (2006). Influence of Internet on library and information centres of National Institutes of Technology in India. *Annals of Library and Information Studies , 53*, 184-197.

55. Jani, N., Parekh, H., & Sen, B. (1991). Individual perceptions of professional advancement. *Libri , 41* (3), 183-193.

56. Jeevan, V. K., & 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.

57. Jestin, J., & Parameswari, B. (2002). Challenges for library professionals in india in the new millennium. *Library Philosophy and Practice , 4* (2), 20-24.

58. Kajberg, L. (1997). Emerging public librarian roles and skills : A literature review. *Librarian Career Development , 5* (1), 12-22.

59. Kannappanavar, B. U., & 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.

60. Kannappanavar, B. U., & 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.

61. Kavulya, J. M. (2007). Training of library and information science (LIS) professionals in Kenya : A needs assessment. *Library Review , 56* (3), 208-223.

62. Khurshid, Z. (2003). The impact of information technology on job requirements and qualifications for catalogers. *Information technology and libraries , 22* (1), 18-21.

63. Kwasik, H. (2002). Qualifications for a serials librarian in an electronic environment. *Serials Review , 28* (1), 33-37.

64. Leach, K., Arundale, J., & Bull, G. (1996). *The use of information networking for continuing professional development.* Yorkshire: British Library. Research and Development Department.

65. Leong, J. (2008). Academic reference librarians prepare for change: an Australian case study. *Library Management , 29* (1/2), 77-86.

66. Maesaroh, I., & Genoni, P. (2009). Education and continuing professional development for Indonesian academic librarians: A Survey. *Library Management , 30* (8/9), 524-538.

67. Marjariitta, V. (1999). Educational needs of Finnish polytechnic librarians . *Librarian Career development , 7* (11), 113-119.

68. Mayer, J., & Terrill, L. J. (2005). Academic librarians' attitudes about advanced-subject degrees. *College and research libraries , 66* (1), 59-73.

69. Minishi-Majanjaa, M. K., & Ocholla, D. N. (2003). Information and communication technologies in library and information science education in Kenya. *Education for Information , 21,* 243–262.

70. Mohamed Haneefa, K. (2004). *Application of information and communication technologies in special librarie:PhD Thesis.* Department of Library and Information Science,University of Calicut.

71. Mohamed Haneefa, K., & Abdul Shukkoor, C. K. (2010). Information and communication technology literacy among library professionals in Calicut University, Kerala. *DESIDOC Journal of Library & Information Technology , 30* (6), 55-63.

72. Mohana Kumar, T. (2007). *Professional library manpower development for college librarians in kerala in the IT environment : PhD Thesis.* Trivandrum: Department of Library and Information Science, University Of Kerala.

73. 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

74. Mugwisi, T., & Ocholla, D. N. (2003). Internet use among academic librarians in the Universities of Zimbabwe and Zululand. *Libri , 53* (3), 194-201.

75. Muhammed Salih, T. K. (2004). *Computerisation of university libraries :PhD Thesis.* Department of Library and information science,University of Calicut.

76. 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.

77. Nath, A., Gautam, B., & Parveen, K. (2007). Information and communication technology knowledge and skills of librarians in the Chandigarh city libraries. *International Caliber-2007 : Information and knowledge management in a networked world.* (pp. 713-726). Chandigarh: Inflibnet Centre.

78. Nyamboga, C. M. (2004). Information skills and information literacy in Indian university libraries. *Program , 38* (4), 232-239.

79. O'Neill, A. L. (1998). What's for dinner ? Continuing education after the MLIS. *Library Acquisitions : Practice and Theory , 22* (1), 35-40.

80. 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.

81. 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.

82. Omekwu, C. O. (2006). Managing information and technology: critical roles for librarians in developing countries. *The Electronic Library , 24* (6), 847-863.

83. 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.

84. Orick, J. T. (2000). The virtual library: changing roles and ethical challenges for librarians. *International Information and Library Review , 32*, 313-324.

85. Patel, D. (2006). *E-learning and its Impact on LIS Profession.* Retrieved January 16, 2010, from https://drtc.isibang.ac.in/bitstream/handle/1849/231/ paperX_Dimple.pdf

86. Powell, R. R., Baker, L. M., & Mika, J. J. (2002). Library and information science practitioners and research. *Library & Information Science Research , 24*, 49–72.

87. Rajyalakshmi, D. (2007). Information professionals –knowledge and skills ,for information management. *ILA Bulletin , 43* (4), 8-15.

88. Ramaiah, C. K., & Moorthy, A. L. (2002). The impact of continuing education programmes on library and information science professionals. *Library Review , 51* (1), 24-31.

89. Ramesh Babu, B. P., Vinayagamoorthy, & Gopalakrishnan, S. (2007). ICT Skills among Librarians in Engineering Educational Institutions in Tamil Nadu . *DESIDOC Bulletin of Information Technology , 27* (6), 55-64.

90. Ramesh Babu, B., & Parameswaran, R. (1999). Automation of public library and information services iin the context of electronic information era:public library staff opinion survey. *ILA Bulletin , 35* (1-2), 1-4.

91. Ramzan, M. (2004). Effects of IT utilization and knowledge on librarians' IT attitudes. *The Electronic Library , 22* (5), 440-447.

92. Rice-Lively, M. L., & Racine, D. J. (1997). The role of academic librarians in the era of information technology. *The Journal of Academic Librarianship* , 31-41.

93. Roberts, N., & Konn, T. (1989). Continuing education and training for academic library staff. *Journal of Librarianship and Information Science , 21*, 109-128.

94. Safahieh, H., & 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.

95. Sagolsem, M., Purnima Devi, T., & 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 knowlege management in networked world* (pp. 570-578). Chandigarh: Inflibnet centre.

96. Sampath Kumar, B. T., & Biradar, B. S. (2010). Use of ICT in College Libraries in Karnataka, India: a Survey. *Program: Electronic Library and Information Systems , 44* (3), 271 - 282.

97. 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.

98. Shiholo, B. M., & 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

99. 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.

100. Singh, D. K., & Nazim, M. (2008). *Impact of information technology and role of libraries in the age of information and knowledge societies.* Retrieved January 16, 2010, from http://ir.inflibnet.ac.in/dxml/bitstream/handle/1944/1229/3.pdf?sequence=1

101. Singh, D. R. (1988). A study of career advancement of academic library professionals in Delhi. *Library herald , 26* (1-4), 143-148.

102. Singh, K. P., Sharma, N., & 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.

103. Singh, N. (2001). Internet: importance and usage for library and information professionals. *DESIDOC Bulletin of Information Technology , 21* (3), 17-28.

104. Singh, S. N., & 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.

105. 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

106. Somanathan Nair, K. P. (1997). *A study of the attitude of the librarians in Kerala towards the use of Information Technology and information activities:PhD Thesis.* Trivandrum: Department of Library and Information Science, University of Kerala.

107. Song, Y. (2005). Continuing education in Chinese university libraries: Issues and approaches. *Libri , 55* (1), 21-30.

108. Spackman, E., & et.al. (2006). *The 2005 Continuing education survey: what science librarians want to know.* Retrieved July 14, 2007, from Issues in Science and Technology Librarianship: http://www.istl.org/06-fall/sts.html

109. Sreenivasulu, V. (2000.). The role of a digital librarian in the management of digital information systems (DIS). *The Electronic Library , 18* (1), 12-20.

110. 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.

111. Srivastava, A., & Srivastava, A. (2004). Opportunities for professional development of librarians: a study of the level of satisfaction among librarians of institutions of higher education in Jaipur. *ILA Bulletin , 40* (4), 31-34.

112. Su, S.-F. (1993). Attitudes of academic library professionals towards computer-based systems in Taiwan. *Journal of Librarianship and Information Science , 25* (3), 143-152.

113. Suku, J., & Pillai, M. G. (2005). Perspectives on automation of university libraries in Kerala: status,problems and prospects. *Journal of Academic Librarianship , 31* (2), 151-159.

114. Temjen, T., & Saraf, V. (2003). Attitudes towards IT adoption : A study of library professionals in North East India. In T. A. Murthy (Ed.), *Proceddings of PLANNER 2003* (pp. 81-94). Shillong: INFLIBNET Centre, Ahmedabad.

115. Terry, A. A. (2001). . Continuing education in the scholarly continuum : back to school with publishers and vendors . *Serials review , 27* (3/4), 62-78.

116. Tran, L. A., & Gorman, G. E. (1999). The implementation of information technology in vietnamese libraries:results of a survey . *Asian Libraries , 8* (10), 380-395.

117. Vespry, H. A., & Kitiyadisai, K. (1992). Information technology in Thai academic libraries : report on a survey. *Information Development , 8* (3), 164-171.

118. Vijayakumar, J. K., & Vijayakumar, M. (2003). Knowledge, connections, and communities:A special reference to Indian university libraries. *International Information and Library Review , 35*, 375-382.

119. Vijayakumar, K. P. (2007). *Manpower utilization in the university libraries of Kerala:PhDThesis.*Trivandrum: Department of Library and Information Science,University of Kerala.

120. Walmiki, R. H., & Ramakrishnegowda, C. K. (2009). ICT infrastructure in university libraries in Karnataka. *Annals of Library and information studies , 56*, 236-241.

121. Watane, A., Vinchurkar, A. W., & Choukande, V. (2005). Library professional's computer literacy and use of information technology application in college libraries of Amaravati city. *IASLIC Bulletin , 50* (3), 131-141.

122. Wilson, K. M., & Halpin, E. (2006). Convergence and professional identity in the academic library. *Journal of Librarianship and Information Science , 38* (2), 79-91.

123. Yang, Z. Y. (2001). An assessment of education and training needs for government documents librarians in the United States. *Journal of Government Information , 28* , 425–439.

124. Zhang, S. L. (2004). *Effectiveness of Support Staff Training and Development in Selected Academic Libraries in Kansas and Oklahoma.* Retrieved July 14, 2007, from http://www.amigos.org/fellowship/2004_effectiveness.pdf

Chapter 3

INFORMATION COMMUNICATION TECHNOLOGIES IN UNIVERSITY LIBRARIES

3.0 Introduction

Information is a valuable resource in all types of libraries, but the ICT tools that are important to create, collect, consolidate and communicate information are not yet used in majority of libraries. Information can be represented as a vertical and non-interactive structure through which people communicate or rather inform data, information or ideas to a larger number of receivers where the receivers remain passive in this one-way approach, whereas communication is a two-way process in which receiver is also a transmitter or giver and is thus a horizontal process characterized by interaction, which includes exchange of ideas, information, point of view, and experiences between persons and groups. Though information has priority over communication, it is the technology that makes communication both interactive and astir (Savio, 1990). The rapid developments in Information Communication Technologies (ICT) have given a solid foundation for revolutionary changes in the information handling capabilities of academic libraries and information centers all over the world. ICT includes acquisition, processing, storage, retrieval and dissemination of information by means of computers and communicating systems. In a dynamic and interactive academic learning environment, information communication technology also includes repro-micrographic technology, database creation and use, in addition to computer technology, digital technology, multimedia technology, network technology, telecommunication technology, barcode technology, web technology, etc.

One of the most relevant outcomes of ICT is the introduction of advanced communication network or the internet, which has necessitated a major shift in the role of academic libraries from ownership model to access model, from print to electronic media, from libraries as archives to libraries as access points, and from information collection to information analysis and repackaging (Goswami, 2009). The change from print to digital information has a high impact on libraries, information centers and other institutions directly involved in processing information. The ability of computers to perform high volume error-free repetitive tasks at speeds much faster

than human beings, along with the emerging developments in the area of computing; telecommunications, networking and resource sharing, has made access to information anytime, anywhere possible (David, 2001). Now Librarian in an academic environment has the role of mediator between the vast network of resources and its users, and library, an access point providing access to different types of information resources.

3.1 Information technology in LIS

'Information technology' is a generic term with wider implications. In the present context it includes computer and telecommunication technologies used for collecting organizing and disseminating information. According to Rowley (1996), information technology includes the following four major areas:

- Methods and tools of recording knowledge like computer storage media (Magnetic: Floppy disk, hard disk, tapes and Optical Storage Devices – like CD-ROM, DVD (Digital Versatile Disk) Rewritable CDs and DVDs)
- Methods of keeping records (Computer hardware, software, creating databases, etc.)
- Methods of indexing documents and information (Computerized indexes, Machine readable catalogues, etc.) and
- Methods of communicating knowledge (Electronic mail, facsimile transmission, Electronic journals, teleconferencing and data communication networks).

The application of Information technology in library services and the resultant changes in information activities from conventional practices to the advanced methods can be summarized in the following table:

Table 3.1 Developments in Information activities (Source*:* Kumar, 2003)

Information Activity	**Conventional Method**	**New Technology**
Generate, Originate	Writing, Typing	Word Processing, Text Editing Voice Recognition etc
Preserve, Store	Manuscript, Paper, Print Media	Electronic Publishing, Magnetic tape, Video Text, Tele-Text, CDROM
Process	Cataloging, Classification, Indexing	Electronic Data Processing, Artificial Intelligence/Expert Systems etc
Retrieval	Catalogues, Indexes	DBMS, Information Retrieval Online/ Offline etc
Disseminate , Communicate	Lists, Bibliographies, Abstracts, Hard Copies	E- Mail, Electronic Document Delivery, Teleconferencing, Tele Facsimile etc
Destroy	Physical weeding	Magnetic Erasers, Optical Erasers, Reuse the Medium

The computer has evolved from 'abacus,' which was introduced about 5000 years ago, to aid basic arithmetic to several generations of computers as a mere device to one that is used for information access. Today, advances in CPU speed, storage capacity, and features like low power consumption and multitasking have resulted in the design and development of highly advanced microprocessors. Even though new personal computers and notebooks have evolved in the market, the conventional personal computers will remain the main computing device for providing basic services in an academic environment. According to Battin (1984), early efforts to apply computer technology to library activities took place between 1960 and early 1980s as the first generation of library computing. During this period, development of networks, the first online public access catalogue (OPAC), International protocols, evolution of Internet, etc., made the transfer of information easier across national boundaries. Though the concept of audio and video technologies are said to have initiated in the 1880s it was in mid 1980s many libraries in US started using video

technology for recording and displaying visual information (Panda & Gautam, 1999). Libraries have used microfilms, microfiches; aperture cards, etc., from 1920s to develop and manage their collections, reproduce and preserve library materials. Microform collections were the most preferred substitute for printed materials as they saved storage space, binding costs and. also reduced chances of damage. Developments in optical storage technologies had a great impact on library field in the mid 1980s. The late 1980s saw the introduction of a number of new optical storage products, including erasable systems.

CD-ROM, one of the most popular optical medium, can be considered as the modern papyrus used widely in numerous service areas of LIS (Panda, 1994). Several reference tools like the 20th edition of DDC, Oxford English Dictionary, etc., were brought out in CD-ROM format. Video disks or read only optical disks, including Video CD and Digital Video CD (DVD) were used to store digitized data like full-length videos of films and back files of large bibliographic databases. CDROMs and DVDs are popular in the academic community enabling easy access and mass storage of data. Developments in storage media have thus evolved from the traditional data storage media like magnetic tapes, floppy disks, etc., to CD-ROM, DVD Rewritable CDs and DVDs, to hybrid formats of CD and DVD called as Dual disc, Blue ray disc (which allows for five times more storage than on a DVD), USB flash drive, etc. Now USB flash drive is more popular because of its lightweight, and easy to carry options. A USB flash drive consists of a flash memory data storage device integrated with a USB (Universal Serial Bus) 1.1 or 2.0 interfaces. Its memory capacity can vary from 16 MB to 8 GB or even 64 GB.

Communication has evolved from machine codes and punched cards to keyboard, mouse, scanner, bar code readers, graphics tablets, joysticks, touch screen, etc., and output devices like monitor, printer, etc. Keyboards are widely used, as they are a flexible method of data entry and are used in most applications. Magnetic ink character recognition (MICR), Optical mark readers (OCR) and Optical character recognition (OCR) are faster and cheaper than keyboard entry, but in libraries, the most commonly used input hardware in encoding bibliographic information of books and other materials are keyboards, barcode scanners for reading barcodes and member IDs, and flatbed scanners for images and other documents. In the future, academic libraries will be able to make use of voice recognition software, which is also a

powerful tool for assisting disabled users. The common output devices used in academic libraries are printers like Dot-Matrix printers, Ink-jet printers, Laser printers and Monitor. Computer output microform (COM) is a further means of outputting large quantities of data. Voice outputs, which present output in the form of speech and multimedia kiosks with wide applications in advertising, are also different forms of output devices.

Multimedia is an interactive education tool providing an environment friendly system to the library, integrating various media like audio, text, graphic and animation into one platform for efficient information handling. (Mohandas & Shet,1999). Multimedia systems denote computers, which have the capability to handle the audio, video and graphic information in addition to text at the same time. Computer-aided learning using multimedia has assisted students at all levels of education. The development of expert systems along with availability of low-cost computers as a means of providing high-level intellectual support for the human experts has evolved as an innovation in man-machine interface. Expert systems are computer-based systems, which use artificial intelligence techniques to provide advice and make judgments to aid in solving complex problems in subject areas requiring the use of specialized knowledge and expertise (Kawatra, 2000).

In a University Library, the most common computer software used are library automation software, database management software, antivirus software and application software like word processing, spread sheet, etc. In most University Libraries, Microsoft Windows is the popular operating system, including Windows 2003 and Windows XP. In a few libraries, Linux-based operating system is also used where open-source software is used for automation purposes. Linux is used as it has comparatively less virus issues. Word processing tools commonly used are Word 2003 and 2007 and spreadsheet, Microsoft Excel. Microsoft Word 2007 has many advanced features being a powerful tool allowing users to export and save their file in portable document format or PDF and XML format. An ideal Library automation software is the one which can handle all the housekeeping operations of the library such as acquisition, circulation and serial control. The database management systems (DBMS) commonly used in University Libraries are Oracle, MySQL, PostgreSQL and Microsoft SQL server, etc. MySQL and PostgreSQL are examples of open-source database software popular around the world. For small and medium-sized libraries,

MySQL forms one of the components of LAMP (Linux, Apache, MySQL, and PHP/Perl) and it is the database software used in Koha library software. Microsft SQL server is the software used for Microsoft Windows operating system.

The free and open-source movement has been one of the most important revolutions taking place in ICT applications worldwide. It was started in 2001 by Richard Stallman and it refers to the software that is developed, released and can be modified by anyone free of cost. Users can access the source code to see how the software works. Open–source software are gaining popularity because of the reduced maintenance cost and ease of customization. It is widely used in academic libraries to design and develop integrated library systems (ILS). Koha, PhPMy Library, OpenBiblio, etc., are some examples of popular open-source library software. Koha is developed by Katipo communications in New Zealand and the modules include acquisition, Circulation, Cataloging, Online public access catalog, Serials, etc.

3.2 Communication technology

The progresses in communication technology and media have helped to increase access to educational resources and thereby enhance the quality of education. The use of interactive communication media has facilitated expansion of opportunities for higher education. To meet the increase in demands to access, locate and transform large amounts of data, libraries are struggling to make the best use of available telecommunications technology. A communication network provides interconnection of several computers wherein a user can communicate with any computer as local user. The system will have facilities to create, transmit and print a message or document electronically (Kawatra, 2000).

Email or electronic mail is one of the most commonly used communication method by which a person can create and transmit messages electronically to an individual or group of individuals. In an academic institution, email is used effectively for providing better services like Current awareness service, SDI, Alert service for new books, etc. Voice mail is an advanced form of email where a person can dictate or transmit a message over telecommunication lines using modem.

Facsimile transmission or Tele fax is a useful system for communicating data images over telecommunication lines enabling a user to transmit a text or graphics securely. It

is used in some academic libraries for document delivery and other scholarly communications. A dedicated telephone line and fax machine is to be installed for this purpose. Video conferencing is another communication technology that uses high-speed telecommunication network to transmit audio and video allowing people to conduct meetings across the world. In an academic institution, this can be applied effectively to link several classrooms to hold debates or discuss topics with an eminent person.

Networking in libraries play a major role in information resource sharing and support activities through a network of computer and databases with the help of telecommunication. Network technology is the backbone of data communication and dissemination in academic libraries. A network can be local within an institution, i.e., local area network, LAN, or it can be national, regional or international, i.e., Wide area network or WAN. Examples of national networks are ERNET, DELNET, and INFLIBNET. International networks include UNISIST, AGRIS, etc. UGC through INFLIBNET has initiated a major project of networking university libraries all over India and recently extended to selected colleges, by providing consortia-based subscription to online journals in collaboration with ERNET. Another initiative of networking library resources is INDEST, a project of Ministry of Human Resources Development (MHRD) and AICTE linking IITs and technical institutions all over India.

Internet is now a common term, which signifies interconnections of multiple networks (both LANs and WANs), located in different parts of the world enabled through the TCP/IP protocol. It is a powerful means of speedy dissemination and retrieval of information in text, graphics, audio or video format. It is a boon for the academic community worldwide, providing infrastructure to support digital libraries, virtual learning, research, collaboration and publications. The “Web” or World Wide Web provides a means of accessing and sharing information on the internet using hypertext transfer protocol or HTTP. The Web now enables the user to access bibliographic databases, full texts of journals, courseware and provide links to other library catalogs through Online Public Access Catalog or OPAC. Internet has helped to integrate all library activities like email, discussion through list serves, support reference service through remote databases, avail interlibrary loan, ordering journals and books online, etc. (Singh, 2001).

There are innumerable applications of Internet and web based services .Some of these are Subject gateways, Portals, Subject directories, Search Engines, etc. Subject gateways are internet services where all internet resources on a particular subject are indexed for the users to access easily. Examples are SOSIG in social sciences and PINAKES, a comprehensive index of subject gateways. Portals provide information services to a specific group of users. The information provided by portals includes web searching, news, shopping information, reference tools and communication in the form of chat and email. Examples are consumer portals like Yahoo, MSN, AOL, etc. Subject directories include categories and sub categories of subjects indexed in such a way that users can go through several subject layers to get to an actual web page. It gives a collection of links to resources organized under different subjects (Mutula & Wamukoya, 2007). Search engine, one of the most popular internet application widely used around the world is a software used to search a database. Search engine is useful to get an idea about a subject or concept. Examples are Google, Bing, etc.

3.2.1 Wireless Network technology

Though there are a lot of developments in wireless network technology, in most academic libraries in India, cabled computer networks are more common than wireless broadband network. The emerging wireless, mobile and internet technologies may take some more time to have an effect in the University Libraries; however, a brief outline of some of the recent developments in wireless, mobile, internet and web technologies are listed below.

Bluetooth is an emerging wireless technology meant for broadband wireless communication between devices like digital cameras, laptops, mobile phones, Personal computers, printers, scanners, etc., within a short range. 3G telecommunication or third-generation wireless communication technology is meant for wide area wireless cellular telephone network. It can process audio, graphics, video, etc., at high speed. WiMAX (Worldwide Interoperability for Microwave Access) is a broadband wireless access capable of transmitting data over 30 metres of area. It provides data rates up to 70mbps greater than Wi-Fi's 54 mbps. GPRS or General Packet Radio Service is a mobile technology that helps to download web pages and send text messages in cell phones quickly. It helps the users to have uninterrupted access to internet through mobile phones or computer.

VoIP or Voice over Internet Protocol is an internet technology to transfer digitized voice over broadband network. As communication is over internet, the cost of phone call is less than that of regular phone. VoIP can empower academic libraries to promote and expand their distance learning services, virtual reference services and other global collaboration services. RFID or Radio Frequency Identification or electronic tagging is a non contact automatic wireless identification technology to track objects at a distance from a couple of inches to 20 to 30 ft away (Li, 2009). It uses microchip, which transmits a stored code to a reader, which can be fixed or hand-held. Compared to traditional barcode technology RFID has many advantages like quick access, greater storage capacity, resistance to high temperatures, water-resistance, etc. RFID implementation in University libraries will help to increase efficiency in circulation section, in better security management and can be used for stock verification. Before implementing RFID tags in University Libraries, the cost involved, the range of frequencies applicable, and other issue-related standards, health issues, etc., are to be solved.

Semantic Web is an intelligent web technology that allows machines to understand the meaning or "semantics" of information on the World Wide Web. World Wide Web Consortium (W3C) director Tim Berners-Lee coined the term. According to W3C, the core of semantic web is the resource description format (RDF), an XML-based mark-up language for defining metadata about web information (Semantic Web, 2010). The semantic web is a vision of information that is understandable by computers, so that computers can process the information on the web.

3.3 Electronic Publishing

Electronic publishing covers all aspects of traditional publishing, but in a digital environment, it is another major technological development facilitated by the convergence of computer and communication network. Electronic publishing means the use of electronic devices in the publication and distribution of information. The end product of electronic publishing can be print-based or non print based. In the non print form, the end products are accessed electronically through traditional medias like CDROMs, or through Internet as Electronic journal, Online databases , E-book, or in the form of OPACs, blogs, wikis, podcasts, etc.

Digital Library is a virtual library providing access to information based on resources, including text, images, audio, video and other scholarly library materials that have been electronically converted or in electronic formats. There are many different kinds of digital libraries creating, delivering and preserving digital objects from many different formats of data. It is a managed collection of digital objects, created or collected according to principles of collection development (Deegan & Tanner, 2002). A digital library provides instant access to digitized information and offers a solution to the problems of storage and maintenance. It can provide access to simultaneous users from multiple locations. Another example of electronic publishing is electronic journal, which is a full text journal published electronically, and can be accessed on the web. Either an electronic journal can be free or subscription based. Advantages of electronic journal are its ease of access and regular updating, ease of downloading articles, etc. Many publishers now offer electronic journals along with print version with sometimes free access to the electronic journal on subscribing to the print version. An increasing number of journals are now available only electronically whereas online databases are large amounts of information stored in a search tool's website. It refers to information transferred to hard disks, magnetic tape, etc., which are accessed through communication network (Mutula & Wamukoya, 2007). Libraries subscribe various types of online database depending on the subject requirements of the academic community. Most of the online databases have a user-friendly search interface to search the database and save the required results for future use. Examples are Ebsco, (Humanities and social sciences), Web of science, Library and Information Science Abstracts (LISA), Manupatra (Legal studies), etc. E-books are the latest addition in the world of electronic publishing. E-books are designed to use with E book readers. Though they can save a lot of space, due to the high cost, E-books are not very popular in academic libraries. With the progress in electronic publishing, a number of academic institutions are making available their collection of doctoral thesis and dissertations online. NDTLD digital thesis and in India, Vidyanidhi digital thesis, Shodhganga of INFLIBNET, Electronic thesis collection of Mahatma Gandhi University and Cochin University of Science and Technology (Dyuthi), etc., are examples.

3.4 Web 2.0 in Libraries

Technological innovations together with the influence of Internet and WWW have transformed the methods of communication, entertainment, teaching, and learning in the academic community and society as a whole. The developments in web applications and services are now termed as the Social Web or Read /Write Web or Web 2.0. There are different definitions for Web 2.0 .It is a user-centric web, including various web tools like Blogs, Podcast, Wikis, RSS feeds, Social networks, Social bookmarking, Mash ups, etc. The application of Web 2.0 in libraries can be termed as Library 2.0. Some of the tools that are relevant to libraries are briefly described here.

An individual with regular entries, events or materials such as graphics or video usually maintains Weblogs or Blogs. It is a kind of web portal containing chronological web publication for personal or professional purposes. There are different types of blogs defined by the method in which content is written, by type of media, device like mobile phone, by type of subject, etc. Blogs are created using blogging software available on the net. E.g., Blogger (free), Web logger (fee based). Its application in library setting is to organize a library's activities, news, notices, reports, etc., in a chronological order. It can be used to announce new services of library and publish web pages easily without depending on hardware and HTML skills. Librarians can get current information on different subjects, .e.g., forthcoming conferences through blogs and provide this current information to users through library blogs. Using blogs library staff can directly communicate with the users (Majumdhar and Roy, 2008).

Podcast is a pre-recorded piece of audio and sometimes video, available online. It is usually downloaded and saved for future listening. Librarians have to explore this method of content delivery as users can access different types of content from media and other service-oriented institutions. Libraries can experiment by sharing audio content and, including book reviews, interviews with authors, etc. Podcasts also enable students and teachers to share information, and teachers may create podcasts to be used as a preparation tool for students.

RSS or Really Simple Syndication is a service that transfers contents from blog or other syndicated content to an aggregator. It facilitates users to keep track of new

updates on selected web sites. All blogging software create an RSS feed as back end of HTML web pages (Stephens, 2007). RSS feeds is a family of web feed format used to publish frequently updated works such as blog entries, news headlines, audio, and video in a standardized format. Librarians can place RSS feeds of content on their web sites to build awareness about their new services, forthcoming books, etc.

Wiki is innovative server software, which permits any user or specified users to create and edit web contents via web browser or build knowledge management application. To enhance intranet communication, a library can use Wiki as an information gateway to access, create and edit information guides, resources, services, tutorials etc. Wikipedia is an example of Wiki.

Instant Messaging or IM service or 'Chat' enables real time conversation between two or more people on the internet platform. Google talk, Meebo, MSN and Yahoo messenger are leading free IM applications commonly used. In Libraries, it can be used for online reference service and real time consulting service.

Social Networks are websites that encourage interaction among users. These contain user-generated contents focusing on community where users get a chance to make connections, post pictures and share various types of information. Libraries can create a forum through social networking sites to discuss about library related issues, services and resources. Popular social networking sites are Orkut, My space, Linked In, Facebook, Twitter a microblogging service, Flickr an image hosting community, LastFm a music-sharing site, YouTube a video sharing, and hosting community.

Social bookmarking is a service for internet users to store, manage and organize web pages. Delicious is an example of Social bookmarking site. Yet another Web tool is Mashup, a hybrid application of the web, which combines two or three internet-based applications, or all applications of web 2.0 in one platform. It thus combines data or functionality from two or more external sources to create a new service For instance pictures uploaded on Flickr can be combined with Google Map to show correct location.

Librarians have started using Web 2.0 tools finding that their users are actively living and playing online. As new web tools are added, Librarians have to be alert to

familiarize these tools from a user's perspective and use their experience to devise new strategies and apply these developing tools to provide innovative library services.

3.5 ICT skills and competencies for library professionals

The dynamic environment of the library and information sector stresses the need for academic library professionals to remain flexible and adaptable to change. Effective organization of resources in the web and managing internet tools and services requires certain skills and knowledge for Library professionals, to meet the different information needs of faculty and students. They have to assist the academic community in getting relevant information using innovative methods. For this the mere enhancement of the present skills of traditional librarian may not be enough. It might require a total transformation of the skills and the way library professionals think and act. Using the platform of Internet and WWW, University libraries have to expand their resources and services by devising strategies to attract more users to the library when the users are now inclined to access the information they need outside the walls of the library.

A number of competency studies have been conducted in the field of library and information studies during the last few years in the wake of developments in information technology. Most of these studies were generally concerned with the common competencies needed by LIS professionals. The Special Libraries Association (SLA) undertook one of the major studies on competencies entitled Competencies for Special Librarians of the 21st Century, revised edition, June 2003. The SLA identified two main types of competency. These are two core competencies very essential for every library or information professional.

(1) Professional competencies related to the special librarians' knowledge in the areas of information resources, information access, technology, management and research and the ability to use these areas of knowledge as a basis for providing library and information services. Professional competencies further include four major competencies, each supported with specific skills:

A. Managing Information Organizations

B. Managing Information Resources

C. Managing Information Services

D. Applying Information Tools and Technologies

(2) Personal competencies comprise a set of skills, attitudes and values that enable librarians to work efficiently, be good communicators; focus on continuing learning throughout their careers; demonstrate the value-added nature of their contributions; and survive in the new field of work.

Web Junction supported in part by OCLC has made a compilation of competency statements that deal with a broad range of library practice and service. This includes Library Management, Technology (Core Skills and Systems & IT skills) and Personal/Interpersonal competencies.

Successful running of an organization require certain leadership skills and careful management techniques. It is important that academic librarians acquire the skills that will enable them to operate effectively in large and increasingly competitive organizations.

I. Important library management competencies are:

- Effective financial management using sound business and financial judgment.
- Use appropriate business and management approaches to communicate the library's value to university administrators.
- Promote the library as a center of lifelong learning for the community.
- Maintain good public relations through communication and promotion of library's services and needs to all stakeholders.
- Maintain a user friendly and safe physical environment to encourage library use by the academic community.
- Maintain an awareness of current law and policy that may impact library services, administration and up-to-date policies/procedures for staff communication.

- Understand the basic principles of marketing and how they apply to library services.

- The librarian has to assist the professional and personal development of people working within the information organization by creating development plans for staff to gain necessary competencies (knowledge, skills, abilities, behavior, and attitudes).

- Management of human resources effectively to increase productivity, which is highly important to achieve the library's mission and goals.

II. Personal and Interpersonal competencies

- The library professionals have to develop good communication skills to help build good relations with co –workers and users. Librarian must anticipate and maintain awareness of users' needs and wants through user surveys, complaint logs and other means.

- Developing interpersonal competencies helps to maintain effective relationship with other staff in the library and achieve common goals.

- Library professionals must understand the importance of lifelong learning for all levels of library work and actively pursue personal and professional growth through continuing education.

In an academic library environment, the librarian must be alert to the importance of library in the context of higher education (its purpose and goals) and the needs of students, faculty, and researchers and seek to provide services that will enhance these endeavors. Librarian must be familiar with the structure, organization, creation, management, dissemination, use, and preservation of information resources, new and existing, in all formats. The subject knowledge to support collection development within the library and research and teaching within the university will come under the competencies of technical services. Now the collection development of E-resources has assumed much prominence in the world of information. Academic institutions and librarians will continue to allocate more resources towards technology. Academic libraries will have a crucial role in not only providing technology for users but also in creating new information systems for managing, disseminating, and preserving

information regardless of format. At the same time, traditional library collections books, serials, sound recordings, maps, videos, films, photographs, archives, manuscripts, etc., will still need to be acquired, made accessible, and preserved (Shaping The Future: ASERL's Competencies For Research Librarians).

III. Technology competencies

As technology has saturated all levels of library's operations and services, the library professional in an academic institution has to anticipate the changing expectations of users, and be flexible in adapting and adopting new skills and levels of awareness.

Listed below are some of the basic technology competencies important for an academic librarian.

- Knowledge about relevant developments in information technology like email, internet, and web search strategies.
- Skills in basic computer hardware, troubleshooting and networking
- Knowledge about software applications and operating systems
- Automation of library services and its management
- Familiar with web tools like blogs, social networking, RSS feeds, etc.

In addition to the core technology competencies, there are other technology systems that control the operations in a library about which the librarian must have sufficient information. As lot of library's resources may be in digital format, especially in large academic libraries, a number of new skills and knowledge are involved in creating, selecting, organizing, managing and providing access to these digital resources. The academic librarian's skills have to be developed for designing and developing web based materials and documents for online use. Self-archiving in Open access repositories, metadata harvesting, electronic document management, etc., are presenting a new dimension of the information landscape. To summarize, understanding design and development of webpage, E-resource management, working knowledge of programming languages, network security, Intellectual property rights, and copyright issues, etc. are some other competencies required for a library professional in the current digital age.

3.6 Conclusion

Even though librarians are facing challenges for new and emerging skills, the most important aspect of this change is to be able to adapt the existing skills, many of which are traditional librarianship skills and the ability to remain flexible in a working environment that is constantly changing. The rapidly changing environment of academic libraries needs attention of the authorities that manage LIS education in the country. Information technology competencies demanded by most of the institutions require particular emphasis in our LIS curriculum.

References

1. Abels, E. (2003). *Competencies for information professionals of the 21st century*. Retrieved August 12, 2009, from Special Libraries Association: www.sla.org/content/learn/comp2003/index.cfm

2. Battin, P. (1984). The Electronic Library:A vision for the future. *Educom Bulletin , 9*, 12-17.

3. David, T. L. (2001). *ICT for Library and Information Professionals: A Training Package for Developing Countries(ICTLIP).* Retrieved June 26, 2009, from eLibrary Download Page: http://www2.unescobkk.org/elib/publications/ictlip/index.htm

4. Deegan, M., & Tanner, S. (2002). *Digital futures:strategies for the information age.* London: Library Association Publishing.

5. Goswami, P. R. (2009). *Academic librarianship in india: exploring strategic intent and core competencies in the present era.* Retrieved June 7, 2010, from International Conference on Academic Libraries ICADL 2009: http://crl.du.ac.in/ical09/papers /index_files/ical-57_148_324_2_RV.pdf

6. Kawatra, P. S. (2000). *2000 Plus : Library and information systems in the 21st century.* New Delhi: Crest PublishingHouse.

7. Kumar, P. S. (2003). Information Technology : Basics. New Delhi: B R Publishing Corporation.

8. Li, L. L. (2009). *Emerging technologies for academic librarians in the digital age*. London: Chandos Publishing.

9. Majumdhar, R. P., & Roy, S. (2008). Application of blog in library and information services. *IASLIC Bulletin , 53* (4), 241-246.

10. Mohandas, M. K., & Shet, K. C(1999). Multimedia based information retrieval system. In H. S. Chopra(Ed), *Library Information Technology in Modern Era: Libraries and Librarians in the New Millenium* (pp. 173-178). New Delhi: Commonwealth Publishers.

11. Mutula, S. M., & Wamukoya, J. M. (2007). *Web information management : A cross disciplinary approach*. London: Chandos Publishing.

12. Panda, K. C. (1994). CD-ROM:The modern papyrus. in *Some meins of modern librarianship* (pp. 1-11). New Delhi: Ajanta Publishers.

13. Panda, K. C., & Gautam, J. N. (1999). In'fo Technology (IT) on the cross'road : From Ab'acus to internet. Agra: Y.K Publishers.

14. Savio, R. (1990). Communication for development. *Development Journal , 2*, 7-8.

15. *Semantic Web*. (2010). Retrieved March 14, 2010, from Wikipedia: http://en.wikipedia.org/wiki/Semantic_Web

16. *Shaping the future:ASERL's competencies for research librarians*. Retrieved August 12, 2009, from ASERL: http://www.aserl.org/statements/competencies/competencies.htm

17. Singh, N. (2001). Internet: Importance and Usage for Library and Information professionals. *DESIDOC Bulletin of Information Technology , 21* (3), 17-28.

18. Stephens,M.(2007). Libraries and the Read/Write Web. In R. S. Gordon (Ed), *Information Tomorrow: Reflections on Technology and Future of Public and Academic Libraries*(pp. 97-111). New Jersey: Information Today Inc.

Chapter 4

RESEARCH METHODOLOGY

4.0 Introduction

Research methodology implies the methods used by the researcher to study a particular problem and the logic behind the methods in the context of the particular research study .This chapter describe the methodology used for this study. The main objective of the study is to assess the professional development, educational needs and ICT skills of library professionals in the Universities in Kerala in the changed information environment. In addition to the basic qualification and requirements for a career in library and information science, library professionals have to update continuously, their knowledge and skills to maintain and support user centered applications and services in the modern information society. In order to achieve the objectives of the study, data collection methods included survey method using questionnaire, observation and personal interviews. A comprehensive literature survey about the research topic was carried out on the topic of research and other related fields. For this purpose LISA database, and other reference sources like bibliographies, online information resources, conference proceedings, library science journals etc were scanned to collect relevant literature.

4.1 Research Population

The population of the present study includes the library professionals employed in the seven Universities in Kerala, viz. University of Kerala, Mahatma Gandhi University, Cochin University of science and technology (CUSAT), University of Calicut, Kannur University, Sree Sankaracharya University of Sanskrit Kaladi, and Kerala Agricultural University. The library system in all the universities follow a decentralized pattern with a Central library and department libraries attached to the teaching departments of the universities. All the library professionals are liable to work in the central and departmental libraries and transferable as per existing rules in each University. The total population of the study is 252 limited to the permanently employed professional library staff in central libraries and departmental libraries in the main campuses of the universities under study. This is almost a census study of the defined population of users.

4.1.1 Kerala University Library System

University of Kerala established in 1937 as University of Travancore and later after the formation of Kerala state in 1956 was renamed as University of Kerala. The University has at present 16 faculties and 41 departments of teaching and research.

The Kerala University Library system comprises of the Central Library located at Palayam, the Campus Library at Kariavattom campus, and the Departmental libraries at Kariavattom and within the city, the Study Centre libraries at Alappuzha, Pandalam, Kollam and College of Engineering Library at Kariavattom.

The University Central Library was established in 1942 and caters to the academic and research needs of the faculty, students and others. The library primarily functions as a research centre serving a vast and varied clientele.The collection includes more than 3 lakh books, around 300 Indian journals, more than 40 foreign journals, etc. Library has a membership of more than 30,000 of which 12,000 are students. The library was automated using LIBSYS software and is now in a transitional stage modernizing its facilities. Access to online journals is being provided by the Central library, Campus Library and departmental Libraries with the assistance from UGC INFONET. The Kerala University Library Net Information Centre (KULNIC) was established during August 2002 with the financial assistance from the Information Technology Department, Government of Kerala. Kerala University Library is providing the E-Journal access to its users, though this centre.

The Campus library located at Kariavattom is mainly a reference library , providing reprographic, Internet and Infonet services to the academic community in the campus. It supplements the library resources of the department libraries and functions in two shifts.

The teaching departments of the university have their own independent libraries managed by library professionals, except for a few departments, which do not have library staff. There are thirty two departmental libraries at Kariavattom campus, six at senate house campus and three other departments at Thycaud, Vazhuthakad and Department of library and Information science at the University library building. All

the departments at Kariavattom campus are connected through campus LAN and steps are being taken to form a network of Central library and other department libraries. Though some of the departments have client computers, computerization of department libraries are at different stages of development. The university college of Engineering has a library managed by three professionals with a collection of around 7000 books.

4.1.2 Mahatma Gandhi University Library system

Mahatma Gandhi University was established in 1983 to meet the higher educational needs of central Kerala. The university has a main campus at Priyadarshini Hills Kottayam, which houses the administrative office, central library and most of the departments. The library system consists of the central library, department libraries, four study centre libraries and college of engineering library at Thodupuzha. The central library started functioning in 1989. The University Library has been fully automated using the library software package SOUL developed by the INFLIBNET Centre. As a member of UGC-Infonet E-journals Consortium; the University library provides access to more than 4000 journals and databases. The departments of M.G University are located at the main campus and at various locations in and around Kottayam. All the teaching departments /schools and the library of College of engineering have well equipped libraries managed by professional staff.

4.1.3 Cochin University of Science and Technology Library System

The University of Cochin was established in 1971 to develop higher education in applied science, technology, industry, and commerce and was renamed as Cochin University of Science and Technology (CUSAT)in 1986.The university has three major campuses located at Thrikkakara,Marine science campus at Lakeside, Ernakulam and College of Engineering at Pulinkunnu,Alappuzha. CUSAT has at present 27 departments of study and research offering postgraduate programmes in different disciplines, especially in the advanced areas of science and technology.The CUSAT library system includes the Central Library at main campus, departmental libraries and college of engineering library at Pulinkunnu campus.

The Central library was established in 1977 as a central agency to meet the requirements of the academic community. The library has a collection of more than 80,000 books including bound volumes of journals and patents. It is also an active member of the UGC infonet consortium of INFLIBNET. The library was automated in 1999 using ADLIB software with the assistance of Netherlands government as a part of MHO project. The central library, departmental libraries are connected through a campus wide network, and all the library holdings are accessible through online catalog. As a part of promoting Open Software, the Central Library is in the course of converting all its records into Koha Open software for all its operations and services. All the teaching departments have well equipped libraries with one or more professional staff depending on the book collection and the student strength. Excepting one or two departments, permanent library staff manages all departmental libraries. The department libraries are also in the process of computerizing its holdings using Koha software and in future aims to develop a union catalog of all library holdings. The college of engineering library is managed by three library professionals at Pulinkunnu, and has a good collection of around 11000 books and 20 journals.

4.1.4 Calicut University Library System

University of Calicut came into existence in 1968 to foster higher education in the northern districts of Kerala. All the main teaching departments, Central Library and administrative office are located at the main campus of the University at Tenhipplam. The Calicut University Library, was established in 1971 and later renamed after C.H.Mohammed Koya, the former Minister for Education, Government of Kerala. The central library is primarily concerned with the conservation and dissemination of knowledge to its users. It has a collection of about eighty five thousand books and subscribes to 200 Journals. The library was automated using Libsys software in 1998. Apart from the University Library, the library system includes departmental libraries, a study center library at Calicut and Library of the University institute of engineering and technology. All 29 teaching departments have one or two library professionals depending upon the number of books in the collection.

4.1.5 Kannur University Library System

Kannur University was established in 1995 as a teaching-cum-residential and affiliating University to provide for the development of higher education in Kasaragod and Kannur. Following the multi-campus concept as envisaged in the Kannur University Act, the University is setting up campuses at different locations in its jurisdiction. Mangattuparamba Campus located at Kannur, has the administrative wing and Departments of Physical Education, Information Technology, Pedagogical Science, Distance education etc are functioning here. Thalassery Campus is the full-fledged campus of the University located at Palayad in Thalassery. Most of the teaching Departments of the University is situated in this campus. Other departments are located at Payyannur ,Mananthavady ,Kanhangad and Kasaragod Campus

The University library was established in 1998. It is located in a rented building at Kannur town. The library has been serving various section of the University community viz., faculty, students, staff, graduates and there is also facility of temporary membership to others for utilizing the library services. It is also a recognized research centre of the University.It has a collection of about 26200 books, 150 journals and a good collection of electronic resources. The library is managed by a Deputy librarian and seven other library professionals .The library is partially computerized using the library software SOUL. Thalassery campus library is situated at Palayad and its services are coordinated by a Junior Librarian and other professional library staff. The library has a LAN with computer facilities and library management software is SOUL.

4.1.6 Sree Sankara University Library System

Sree Sankaracharya University of Sanskrit (SSUS) named after the famous sage and philosopher Sree Sankaracharya was established in 1993 in Kalady. Besides conducting academic courses, it also works towards the publication and preservation of manuscripts and books in Sanskrit and other languages. The university is presently functioning through nine regional centres, namely Kalady (main campus), Thiruvananthapuram, Thrissur, Panmana, Thuravoor, Ettumanoor, Tirur, Koyilandy and Payyannur.

The university conducts a wide range of courses in Sanskrit Core, Music, Dance ,and in Indian culture and languages .The University has a Central Library in the main campus at Kalady. The library has a well-balanced collection of ancient and modern books mainly in Sanskrit, Social Science and Humanities. With a unique collection of around 53,000 Books and 350 rare Manuscripts, apart from Journals, Periodicals, Newspapers, Thesis & Dissertations, the Central Library caters to the University community at all levels.

Three study centres and campus library has a library professional each. A senior library professional in the grade of Reference Assistant and twelve other library professionals manage the Central library. The operations of the library are automated by Alice software for windows. As part of UGC Infonet consortium, the library provides online journal access to its users.

4.1.7 Kerala Agricultural University Library System

The Kerala Agricultural University (KAU) established in 1971 , started functioning of its main campus at Vellanikkara,Thrissur in 1977.The university has different colleges instead of schools or departments located at thirty six campuses all over the state. The KAU central library was established only in 1998 at the main campus at Vellanikkara. The Kerala Agricultural University Library system (KAULIS)consists of the central library and ten constituent college libraries. Though the library has a collection of only 18,000 books, it has a commendable collection of electronic resources. University Library purchase and maintain reference books, foreign journals and other documents that are required for more than one station for common use to avoid duplication. The library use Soul software for its housekeeping operations. Central library functions as a research centre to the students and faculty of the university and to the researchers from outside the institution. Except two, all the ten constituent colleges located at seven different campuses of the university have good library facilities.

4.2 Data Collection Tools

The questionnaire method was adopted for collection of data for this study, supplemented by interviews of Librarians to gather additional information. A draft

questionnaire was designed based on discussions with professional colleagues and related research studies.

Two sets of structured questionnaires were prepared; one questionnaire to the University Librarian or Librarian in Charge and another to the library professionals in the central and departmental libraries in the universities selected for the study. The purpose of questionnaire to the librarian was to get data regarding the infrastructure of University libraries, budget, total collection, membership details, ICT services, history of automation, networking facilities, databases created, staff strength, staff training details and problems of ICT application.

The questionnaire meant for library professionals is divided into four sections 1.General information, 2. Professional development, 3.Educational needs, and 4.ICT skills and awareness. Section I includes personal information and details of educational qualifications, designation, experience etc. Section 2 is meant to get information regarding the professional activities of library professionals including participation in continuing education programmes (CEP), attitudes towards CEP, publication trends etc. Section 3 is designed to get information about the educational and informational needs, opinion about library science education and Section 4 deals with skills and awareness of library professionals with respect to ICT application and services.

The questionnaire was pretested using a small population of library professionals from Cochin University to find out the limitations in the design of questionnaire and to improve it in order to achieve the objectives formulated. The questionnaire was revised taking into consideration the respondents' comments and suggestions. The modified questionnaire was used for the final survey conducted between December 2009 and May 2010 in the universities covered under the study.

The questionnaire with a covering letter briefly explained the research topic and assured the respondents that the information provided would be confidential and used for research purpose only. The questionnaires were personally distributed to the library professionals in the central libraries and departmental libraries functioning in the main campus of the Universities covered, excepting a few which were mailed by post. Data about the Universities' main libraries was collected through a separate

questionnaire to the Librarian (or Librarian In charge). All the seven questionnaires given to the University librarians were returned. Out of the population of 252 library professionals, questionnaires were distributed to 203 (80.6%). While a few refused to receive the questionnaire, even after repeated attempts the investigator could not meet some of the respondents in some universities. As the survey included only the permanent professional staff, temporary staff and apprentices who were appointed in the vacant posts were not covered. Out of the total questionnaires distributed 185(91.1%) were returned. A follow-up of non- respondents yielded few results.

4.3 Data Analysis Techniques

Data collected from the respondents through questionnaires and interviews was evaluated and analyzed to find the results. The data was processed using Microsoft Excel and Statistical Package for Social Sciences (SPSS).The comparative details of University libraries to study the infrastructure, budget, membership, staff strength etc were analysed using simple percentage analysis. The Chi-square test and ANOVA was used to find the relation between variables wherever applicable.

Chi-square symbolically written as $\boldsymbol{X^2}$ is a common test for analyzing data from surveys .It is an inferential statistical test that is used to examine relationship between two variables with nominal or ordinal data. The Chi-square value measures the discrepancy between the observed frequencies and the expected frequencies. The larger the Chi-square score, the larger the discrepancy, and the more likely that the two variables being studied are related. If the calculated value of Chi-square is less than the table value it indicates that the difference between actual and observed frequencies is due to chance of variation and can be ignored. The Chi-square calculation can be summarized into a mathematical formula, which can be applied to contingency tables with any number of cells as follows:

$$X^2 = \sum (f_o - f_e) / f_e$$

Here f_o stands for observed frequency and f_e represents the expected frequency. The $\sum$ sign means to add together the differences for all cells. For the present study, Chi-Square test was used to test the association between two categories wherever appropriate. Analysis of variance or ANOVA is an inferential statistical test used to

determine if the differences among three or more sample means are statistically significant. ANOVA test can be applied only if : a) the sample groups are randomly and independently selected, b) the data are of interval or ratio type c) there is normal distribution in the population from which the sample is selected and c)the variability within groups are fairly similar(Vaughan,2009). ANOVA test is used only in a few instances in this particular study.

References

1. *Cochin University of Science and Technology*. (2010). Retrieved June 14, 2010, from http://www.cusat.ac.in

2. *Kannur University*. (2010). Retrieved March 20, 2010, from http://www.kannuruniversity.ac.in

3. *Kerala Agricultural University Central Library*. (2010). Retrieved June 11, 2010, from http://www.kaucentrallibrary.org

4. *Kerala University Library*. (2010). Retrieved March 20, 2010, from http://www.kulib.in/library.html

5. Kothari, C. R. (2004). Research Methodology : Methods and Techniques. New Delhi: New Age International (P) Ltd, Publishers.

6. *Mahatma Gandhi University*. (2010). Retrieved March 20, 2010, from http://www.mgu.ac.in

7. *Sreesankaracharya Sanskrit University*. (2010). Retrieved February 14, 2010, from http://www.ssus.ac.in

8. *University of Calicut*. (2010). Retrieved March 20, 2010, from http://www.universityofcalicut.info

9. Vaughan, L. (2009). Statistical Methods for the Information Professional. New Delhi: Ess Ess Publications.

Chapter 5

ANALYSIS OF DATA AND INTERPRETATION

5.0 Introduction

The aim of this survey is to find the impact of Information communication technologies on the library professionals' professional development and educational needs. The study also intends to compare the infrastructure available in University Libraries and evaluate the awareness of library professionals about the developments in technology.

Analysis of data and findings are presented under two sections:

1. General features and Infrastructure of University Libraries
2. Survey of Library Professionals

5.1 General features of University Libraries

Given below are the details of analysis of data regarding the seven University libraries included in the study, viz., University of Kerala (KUL), Mahatma Gandhi University (MGUL), Cochin University of Science and Technology (CUSTL), University of Calicut (CHMKL), Kannur University (KANUL), Sree Sankaracharya University of Sanskrit (SANKUL), and Kerala Agricultural University (KAUL). Data was collected through structured questionnaire to the Librarian / Librarian in Charge of each University library. One of the main objectives of this survey is to compare the facilities available in the University libraries which is studied under Library budget, Library collection, Membership, Professional Staff strength, Details of Hardware and Software used, Details of library automation, Networking facilities, Staff training in ICT and Problems in ICT application.

5.1.1 Budget allocation during 2007-2010

A comparative study of the average budget provision in the University libraries during 2007-2010 is shown in the table 5.1.1 and graphically presented in the Fig 5.1.1 An analysis of budget allocation is significant as it helps to know the library's

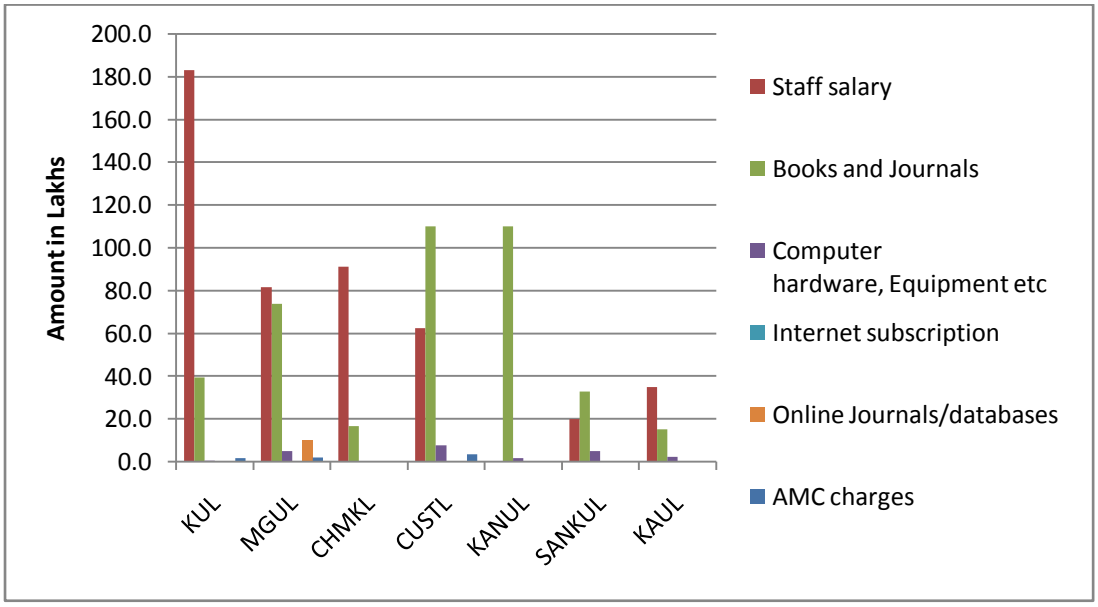
prospects for setting up ICT facilities. From the data, it is clear that a major share of budget in all University libraries is spent for staff salary and the next major portion to books and journals. The average budget allocation for ICT facilities like computer hardware was shown to be nominal in Kerala and Kannur University libraries in the study period.(It was noted that Kerala University library has allocated a good amount for purchase of computers in the current financial year and the library is in the process of modernizing its infrastructure.) Comparatively allocation of funds is better in CUSAT library, MGUL and SANKUL. In MG University library a provision in budget is seen given for the purchase of online databases, while in CUSAT library, online databases were purchased from the budget for Journals. A separate budget provision is provided for Internet only in Kannur University Library.

Table 5. 1.1 Average budget allocation during 2007-2010

Purpose	KUL	MGUL	CHMKL	CUSTL	KANUL	SANKUL	KAUL
Staff salary	182.98	81.67	91.33	62.56	5.6*	20.00	34.83
Books and Journals	39.33	73.88	16.77	110.00	110.00	33.00	15.33
Online Journals/ databases	--	10.00	--	--	---	….	….
Computer hardware, Equipment etc	.52	5.16	--	7.67	1.77	5.00	2.50
Internet subscription	--	---	--	---	.33	…	--
AMC charges	1.75	2.16	.44	3.47	--	….	--

(Amount in lakhs) *Out of total 28.3 lakhs , 22.67 not paid

Fig.5.1.1 Budget allocation in University Libraries during 2007-2010



5.1.2 Document Collection

Kerala University Library being the oldest library in the state possess the largest number of books in its collection with more than three lakhs as shown in the Table 5.1.2 followed by CHMKL and CUSTL. CUSTL has the most number of bound volumes of journals when compared to other libraries. Due to the escalating cost, number of journals especially foreign journals, subscribed by University Libraries is becoming lesser every year. All the University Libraries except KAUL, has access to consortia wise subscription to online journals through UGC Infonet. In addition to the online journals, libraries subscribe to print journals, in which case MGUL has the maximum number of current subscriptions ; 362 and followed by KAUL, which has the maximum number of foreign journals; 187. KAUL subscribes to Science Direct and other journals available in electronic medium are subscribed in that medium only, which is cost effective and convenient for speedy and efficient service. The thesis collection includes 6200 in KUL, followed by 5781 in CHMKL and 3020 in KAUL. In the non-book material collection, CUSTL has a significant collection of Indian patents, being a depository of Indian patents. M.G University subscribes to ten CDROM databases as seen from the table. All the Universities have good collection

of CDROM, 3200 in KUL, 1000 in KANUL and 800 in KAUL. CUSTL and KANUL subscribe to six online databases. CHMK library has a microform collection.

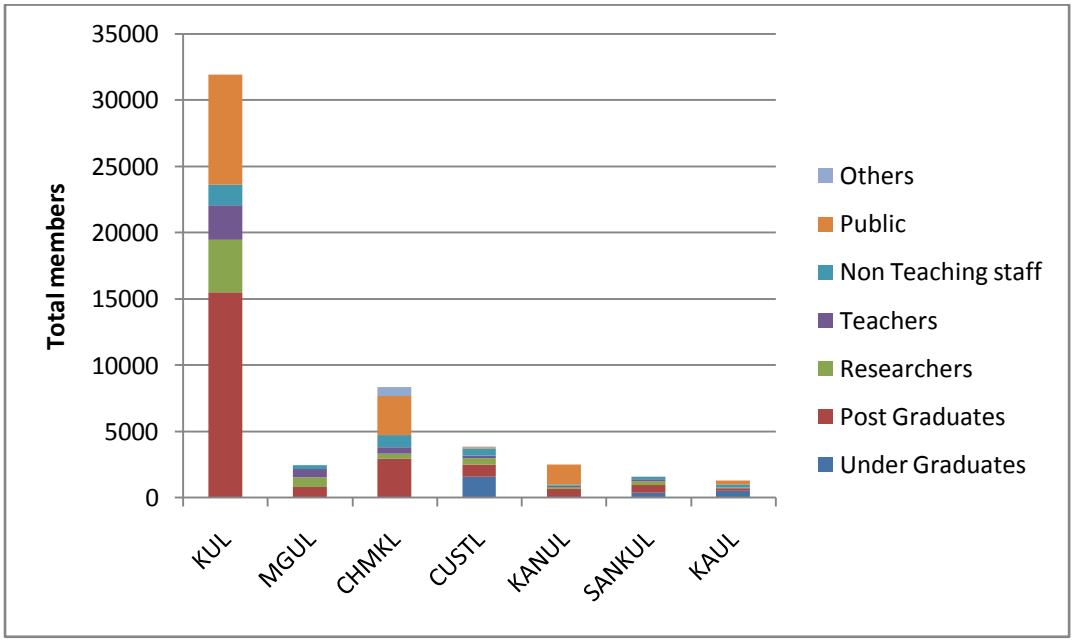
Table 5.1.2 Document Collection

Type of Document	KUL	MGUL	CHMKL	CUSTL	KANUL	SANKUL	KAUL
Books	315772	39123	84517	78555	26200	56573	25000
Journal Bound Volumes	Not available	3500	2105	9350	1130	1000	7019
Foreign Journals	31	128	36	132	9	78	187
Indian Journals	222	234	161	47	142	120	168
Online Journals	Infonet	Infonet	Infonet	Infonet	17	Infonet	2560
Theses/Disse -rtations	6200	1905	5781	1650	71	950	3020
Reports	--	215	--	--	100		70
Standards	--	15	--	--	--		--
Patents	--	--	--	34000	--		--
Technical reports	--	--	--	550	--		96
Online databases	--	--	--	6	6		1
CD ROM databases		10	--	2	--		10
CD ROM s	3200	--	300	650	1000	300	800
DVDs	--	73	--	--	5		25
Microforms	Nil	Nil	205	Nil	Nil	Nil	Nil

5.1.3 Membership details

Kerala University library being the oldest university library in the state, has the most number of registered members including public, non teaching staff ,Post Graduate and Graduate students, researchers, faculty etc. as shown in the Fig 5.1.3.

Fig.5.1.3 Membership details



5.1.4 Professional staff strength

The comparative staff strength in the University Libraries in the table 5.1.3 shows there are several vacant positions in the University Libraries in Kerala. Out of sanctioned 192 posts in University Libraries (Francis, 2008) only 163 were filled including 14 temporary professionals. The present status shows KUL has the highest number of professional staff and the lowest number in KAUL. MGUL has filled the post of University Librarian, while Deputy Librarian or Assistant Librarians in-charge is managing six other libraries for the past few years, which may have an effect on the general administration and development of libraries. In CUSTL both the posts of University Librarian and Deputy Librarian have been vacant for several years. No University Librarian has been appointed in SANKUL until date.

The qualifications and scale of pay of the Librarian, Deputy Librarian and Assistant Librarian were equal to that of the equivalent UGC scales of teachers. However, professionals without UGC qualifications are also promoted as Assistant Librarians but in the state scale. At the time of survey, the entry cadres were vacant in M.G University Library. Around 14 professionals were employed on temporary basis in the Central library alone. In Kerala University Library, the Deputy Librarians are promoted on seniority basis, but in CUSAT, it is a UGC post for direct recruitment.

Table 5.1.4 Professional staff strength

DESIGNATION	KUL	MGUL	CHMKL	CUSTL	KANUL	SANKUL	KAUL	Total
University Librarian	vacant	1	vacant	vacant	vacant	--	vacant	1
Deputy Librarian	2	1	1	vacant	1	vacant	-	5
Assistant Librarian	24	9	12	10	-	-	1	56
Junior Librarian/ Reference Assistant	7	5	-	2	3	3	1	21
Prof.Assistant Gr.I / Technical Assistant	15	1	-	7	2	-	-	25
Prof.Assistant Gr.II / Library Assistant	5	14 (temp)	17	3	2	10	4	41
Total	53	31	30	22	8	13	6	163

5.1.5 Hardware facilities

A comparative study of the hardware available in University Libraries is shown in table 5 .1.5 As evident from the table there is no shortage of computer workstations in all University Libraries except in Kannur University Library which when compared to other University Libraries is in the early stages of development. The hardware details shows that MGUL has better facilities than other libraries. MGUL has five server machines while KUL, CHMKL and CUSTL have three each , KAU and SANKUL two, and KANUL one machine. All University Libraries have a number of personal computers around or more than 40, with KAUL having maximum number , seventy and minimum six in KANUL. Laptops are used only in KAU, SANKUL and MGUL. In the case of printers, laser printer is the most common, followed by dot matrix and ink jet printer. Only MGUL and CUSTL have network printers six and one respectively. Network printer is a highly powerful printer for providing print from internet for users. With the exception of CHMKL and KAUL,all University Libraries have one Bar code printer each which is used for printing bar code labels as part of library computerization. CUSTL has one extra card index printer for printing catalog

cards. Flatbed scanners are used in all University Libraries with KAUL having 5 scanners for scanning documents.

Table 5 .1.5 Hardware Facilities

Items	KUL	MGUL	CHMKL	CUSTL	KANUL	SANKUL	KAUL
Server machine	3	5	3	3	1	2	2
Client workstations	42	52	40	50	6	33	70
Laptop computers	-	1	-	-	-	2	3
Dot Matrix Printer	4	2	2	1	1	4	-
Ink Jet Printer	-	6	1	2+2 Deskjet	-	1	2
Laser Printer	3	3	2	4+1All in one printer	2	3	8
Network Printer	-	6	-	1	-	-	-
Barcode Printer	1	1	-	2+1 index cardprinter	1	1	-
Flat bed Scanner	1	2	1	2	1	2	5
Barcode Scanner	3	2	2	3	1	3	4
CD-ROM tower	-	1	-	1	-	1	1
CD server	1	1	1	-	-	1	1
LCD projector	1	1	1	1	-	1	2
UPS	5	6	5	3	2	9	5

CD-ROM tower is used in MGUL, CUSTL, SANKUL and KAUL used mainly in CDROM networking for providing access to CD's simultaneously to users in the LAN .CD server is used in libraries except CUSTL and KAUL. All libraries except KANUL has LCD projector. While all libraries has five or more number of UPS , CUSTL has three UPS only ,but it provides sufficient back up to all systems in the library., and KANUL has only two UPS considering the less number of PC's. It is found that all University Libraries covered in this study has basic hardware facilities, but some of the facilities were not used suitably or had no proper maintenance and some of the library professionals were mostly unaware of its functions.

Table 5 .1.6 Details of Software

Type of software	KUL	MGUL	CHMKL	CUSTL	KANUL	SANKUL	KAUL
Network Operating system	NT server	Windows Linux	Mandriva-Linux	Windows Linux	--	Windows	Windows 2003 server
Library management	Libsys 4	SOUL	Libsys	KOHA	SOUL 2.0	Alice	SOUL
Digital library Software	Techfocuz	Dspace, E prints	Techfocuz	Dspace	--	--	Greenstone
Database management	SQL	SQL	--	MYSQL	--	--	SQL
Antivirus software	Symantec	Symantec	--	Kaspersky	Avira	C.A	Kaspersky

5.1.6 Details of Software

University Libraries use different softwares for operating system, automation , digital library, database management and security purposes. From the table 5.1.6 it is clear that Windows is the common operating system used in all libraries, while in MGUL, CHMKL and CUSTL, Linux is also used in server systems. CUSTL has adopted open source software and Koha, an integrated library management software for its library operations. In CUSTL the systems for internet browsing and OPAC has Linux as operating system as Linux has better security protection than Windows. In KUL and CHMKL Libsys of Libsys corporation is the library software, while INFLIBNET developed SOUL 2.0 is the library software used in MGUL, KANUL and KAUL. In SANKUL Alice for windows developed by Softlink (Australia) is the software used for library automation.

Digital library software is used for digitizing documents, setting institutional repositories of research papers, thesis, dissertations, conference proceedings, question papers , etc., in University Libraries in this study. As shown in the table, while KUL

and CHMKL use Techfocus for setting up digital library, MGUL use D-space, and E-prints for its digitization activities, and KAUL use Greenstone digital library. The Institutional repository of MG University can be accessed at http://www.mgu.ernet.in/DLR/DLArchive/DLA.htm. MGUL thesis and dissertation project hosted using Nitya D'Arch software is the first online digital theses library covering more than 800 theses in Sanskrit, Malayalam, Hindi and English language and has earned recognition worldwide(http://www.mgutheses.org/). The archive has been selected as one of the very best web resources for education and research by INTUTE, the European Consortium of universities funded by Government of UK's Joint Information Systems Committee (JISC) and the Arts and Humanities Research Council (AHRC). MGU has also become the first University among Indian universities to adopt UGC's Regulation on E-Theses and contribute data to the UGC's Indian ETD repository *Shodhganga* at INFLIBNET.

CUSTL has digitized the documents like question papers and publications useful for the student community using Dspace available at http://dspace.cusat.ac.in/dspace/. In another project Dyuthi, funded by DST, CUSTL has digitized the theses, dissertations, research publications, preprints and conference proceedings of CUSAT (http://dyuthi.cusat.ac.in) using Dspace. Very soon, this repository of thesis will also be made available through *Shodhganga,* the thesis repository of INFLIBNET. Digital library software is not used in KANUL and SANKUL. Microsoft SQL is the software used in all libraries for database management except in CHMKL, SANKL and KANUL where there is no DBMS used. MYSQL is used in CUSTL as DBMS of Koha open software. Antivirus software is important to prevent virus attacks in a networked environment. KUL and MGUL use Symantec antivirus software, CUSTL and KAUL use Kaspersky in their network, while KANUL and SANKUL use Avira and C.A antivirus softwares respectively. CHMKL does not use any antivirus software in their LAN as their network operating system is Linux based.

5.1.7 Automation

All the University Libraries in Kerala started automation between 1994 and 1999 as evident from the Table 5.1.7. UGC and INFLIBNET centre, Ahmedabad have provided the impetus for automating University Libraries all over India by providing financial grants and manpower training through its various workshops and seminars. While KUL ,the oldest University Library in the state was the first to start automation in 1994, followed by CHMKL in 1996, KAUL started automation in 1997 , MGUL,

KANUL, and SANKUL in 1998 and CUSTL in 1999.The University library services computerized using automation software as per Table 5.1.6 are database creation, circulation, cataloging and acquisition.

Digital library services are provided by all libraries except KANUL and SANKUL. There is a definite improvement in the digitization of documents in University Libraries, as in a previous survey (Suku& Pillai 2005) it was reported that digitization was initiated in CUSTL only. Computerized reference services are provided only by MGUL and KAUL. The automation software is used for finance management in KUL, CHMKL and KAUL and for office file works in all libraries except MGUL, and in CUSTL office automation is only partial. Important features like barcode generation and Opac is supported by all automation packages used in the seven University Libraries , but only CUSTL has a Web Opac which is accessible through internet. Z39.50compatibility is available for Libsys and Koha software.

A stock verification module is available for Libsys (CHMKL) and Alice for windows (SANKUL). Stock verification is done with the help of computers in KANUL, SANKUL and KAUL and partially computerized in CUSTL. None of the automation packages supports security checkgate function.

It is clear that though all the libraries have used library management software for the automation of library operations, the softwares are not adequate to support all the activities in a University Library. In some libraries, the investigator found that some of the modules were not used properly or the library professionals were not aware of its function.

Table 5.1.7 Automation

Features	KUL	MGUL	CHMKL	CUSTL	KANUL	SANKUL	KAUL
Year of starting automation	1994	1998	1996	1999	1998	1998	1997
Database creation	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Circulation	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Acquisition	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cataloging	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Serials Control	Yes	No	Yes	Yes	No	Yes	Yes
OPAC	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Barcode generation	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Digitization of documents	Yes	Yes	Yes	Yes	No	No	Yes
Reference services	No	Yes	No	No	No	No	Yes
Z39.50 compatibility	Yes	No	Yes	Yes	No	No	No
Financial Management	Yes	No	Yes	No	No	No	Yes
Office file works	Yes	No	Yes	Partial	Yes	Yes	Yes
Stock verification	No	No	No	Partial	Yes	Yes	Yes
Security check gate	No	No	No	No	No	No	No

5.1.7.1 Databases created

Table 5.1.7.1 shows details of databases created in the seven University Libraries using automation software. All seven University Libraries have created database of books. KUL has the maximum number of records in its database ie. 175,000 followed by CHMKL with 84,517 records and CUSTL with 75,000 records. Database of serials are available only in KUL, CUSTL and KAUL. While MGUL and CUSTL have separate digital collection of thesis available online, KUL, KAUL and KANUL has also added the thesis collection to their database. None of the libraries have initiated any steps to create database of non book materials like audio visual collections, reports, patents etc.

Table 5.1.7.1 Databases created

Type of database	KUL	MGUL	CHMKL	CUSTL	KANUL	SANKUL	KAUL
Books	175000	40000	84517	75000	26200	45000	22690
Serials	1000	Nil	Nil	1578	Nil	Nil	2676
Theses	5000	1088	Nil	1483	45	Nil	2968

5.1.8 Networking facilities

All University Libraries have LAN facilities, except for KANUL which has a LAN within the library but does not have a campus wide network as shown in Table 5.1.8. As per the data provided all University libraries except KAUL have membership in INFLIBNET, and all libraries except KAUL, KUL and SANKUL has link with Developing Library Network or DELNET. One of the major projects of INFLIBNET was setting up of a Union catalogue of books, serials and thesis of all participating University libraries available from its website (http://www.inflibnet.ac.in) as a step towards resource sharing. DELNET databases are also available to the participating libraries through its website http://www.delnet.nic.in. None of the University Libraries have links with other international networks.

Table 5.1.8 Networking facilities

Type of Network	KUL	MGUL	CHMKL	CUSTL	KANUL	SANKUL	KAUL
Library LAN	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Campus LAN	Yes	Yes	Yes	Yes	No	Yes	Yes
Link with INFLIBNET	Yes	Yes	Yes	Yes	Yes	Yes	No
Link with DELNET	No	Yes	Yes	Yes	Yes	No	No
Link with any other networks	No	No	No	No	No	No	No

5.1.9 Internet connectivity

The table 5.1.9 shows the details of internet connection regarding the service provider, bandwidth and number of terminals to users. A 2Mbps Leased line connectivity is available for MGUL, SANKUL, 2Mbps broadband connection in KANUL (all under UGC Infonet) and in KAUL, while in KUL it is a 1Mbps leased line connectivity, whereas in CUSTL and CHMKL it has been upgraded to 10Mbps leased line. BSNL is the preferred service provider in all libraries except in KUL, and KAUL (Asianet) and in MGUL (Ernet).

Table 5.1.9 Internet connectivity

Features	KUL	MGUL	CHMKL	CUSTL	KANUL	SANKUL	KAUL
Connectivity	Leased line	Leased line	Leased line	Leased line	Broadband	Leased line	Leased line
Service provider	Asianet	Ernet	Bsnl	Bsnl	Bsnl	Bsnl	Asianet
Bandwidth	1Mbps	2Mbps	10Mbps	10Mbps	2Mbps	2Mbps	2Mbps

Table 5.1.10 ICT based Library services

Services	KUL	MGUL	CHMKL	CUSTL	KANUL	SANKUL	KAUL
Current awareness services	No	Yes	Yes	Yes	Yes	Yes	Yes
SDI services	No	No	No	Yes	No	No	Yes
Circulation of new additions	Yes	Yes	No	Yes	Yes	Yes	Yes
Electronic document delivery	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Multimedia service	No	Yes	No	Yes	No	Yes	Yes
CD/DVD based service	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Online databases	Yes	Yes	No	Yes	Yes	Yes	Yes
WebOpac	No	No	No	Yes	No	No	No
Library Website	Yes	Yes	No	Yes	No	No	Yes
Internet services & No.of terminals to users	Yes (11)	Yes (26)	Yes (40)	Yes (16)	Yes (5)	Yes (20)	Yes (10)
E journals	Yes	Yes	Yes	Yes	Yes	Yes	Yes
E books	No	No	Yes	No	No	No	Yes

5.1.10 ICT based Library services

The information services provided by a University Library depend on a large extent on the facilities available. The table 5.1.10 provides a broad picture of the ICT based services in all University Libraries. Current awareness services are provided by all University Libraries and SDI services especially for research scholars are given only in CUSTL and KAUL. With the exception of CHMKL, new addition lists are circulated by all libraries. CUSTL periodically updates the new addition list of books through its website.,while KAUL provides this service through ICAR institutions. The J-gate portal under UGC Infonet consortium is also being widely used by the students

for this service. Reference books in Multimedia formats are available in all libraries except KUL,CHMKL and KANUL.

All University Libraries provide CDROM or DVD based services. In KAUL several major databases in Agriculture and allied subjects like AGRIS, BIOTECHNOLOGY ABSTRACTS, AgECON CD, EconLit, TREE CD, LISA, etc. and CAB ABSTRACTS, the world's leading agriculture database from CABI (Centre for Agriculture and Biosciences International) is available. It is found that all University libraries except CHMKL provide access to online databases to its users. In addition to the online databases available to all University Libraries through UGC Infonet consortium, CUSTL has access to IEEE database through INDEST consortium, which is a joint project of by Ministry of Human Resource Development and AICTE. CUSTL also provides access to online database like Proquest, Manupatra (reference source in Law), Emerald database, ACM portal , CMIE prowess, Sci- Finder , and Crisil research. Web opac is available through Internet for CUSTL only and it has kept five terminals separately for searching OPAC.

Separate websites are available for MG University Library (http://mgu.ernet.in), Cochin University library (http://library.cusat.ac.in), Kerala University Library (http://www.kulib.in/library.html) and Kerala Agricultural University library (www.kaucentrallibrary.org). All libraries provide internet and e-journal services to its users through dedicated terminals. The UGC Infonet consortium enabled access to e-journals to four major University Libraries in Kerala in its first phase of implementation., ie., KUL, MGUL, CHMKL, and CUSTL. In the second phase, 50 more universities were added to the programme in the year 2005. These e-resources covers almost all subject disciplines including arts, humanities, social sciences, physical sciences, chemical Sciences, life sciences, computer sciences, mathematics and statistics, etc in three different phases (E-resource management, 2010). Now it is extended to other University libraries and selected college libraries .SANKUL and KANUL provide access to selected E resources through UGC Infonet. CHMKL provides the maximum number of systems (forty) to its users for internet-based services. While MGUL provide twenty six systems for internet services, SANKUL provides twenty terminals, CUSTL sixteen, KUL eleven, KAUL and KANUL fifteen and five each. Kerala University Library provides E-journal access to its users,

though KULNIC (Kerala University Library Net Information Centre). The users have to pay a nominal fee for using internet. Users are permitted to take printouts from Dot Matrix, Inkjet and Laser printers and can download journal articles in CDs or floppy diskettes. No separate charge is levied for CD writing. In KUL the investigator at the time of this survey observed that even though some of the sections were provided with one or two computers, the staff in some sections had no access to internet or other e-journal services. As IT facilities are provided as a separate section, the professionals were reluctant to use these facilities. The situation was not much different in CHMKL. In CUSTL, almost all professionals had access to internet on their desktop as the library had adequate workstations exclusively for staff alone. It is found that only CHMKL provides separate internet and other IT facilities for handicapped users .It is also found that access to E-books are provided by CHMKL and KAUL only .The administrative delay involved in acquisition of E-books has discouraged librarians to provide E book service to users in most Libraries.

5.1.11 Training for library professionals

The study shows that all University Libraries conduct training programmes, Individual training by supervisors or colleagues,In house workshops or workshops sponsored by library associations or agencies like UGC, NISSAT ,INFLIBNET etc . Except SANKUL all Libraries have conducted workshops or training programmes for the professionals in ICT based services, E-journal awareness programmes etc. Sponsored workshops by INFLIBNET or other agencies for library professionals were conducted only in MGUL, CUSTL and KAUL Training programmes are important to keep the professionals aware of the developments in ICT and to give confidence to the library professionals to use new the technological innovations.

Table 5.1.11 Training for library professionals

Training method	KUL	MGUL	CHMKL	CUSTL	KANUL	SANKUL	KAUL
Short training programmes	Yes	No	Yes	Yes	Yes	No	No
Individual training by supervisor/colleague	No	Yes	No	Yes	Yes	No	Yes
In house workshops	Yes	Yes	Yes	Yes	No	No	No
Sponsored workshops	No	Yes	No	Yes	No	No	Yes

5.1.12 Problems in ICT application

Librarians were requested to identify the problems faced in implementing ICT based services in the University Libraries and it is represented in the Table 5.1.12. Majority of the Librarians suggested that inadequate staff trained in ICT application is the main problem in ICT application. Though all library professionals are well qualified, a basic knowledge of ICT applications is essential to provide services in the present day environment. Second valid reason was lack of sufficient funds. Third important problem suggested was lack of support from authorities. Lack of initiative on the part of library staff was cited by a librarian as another problem for ICT application. Lack of ICT knowledge on the part of users and lack of standard library management software were also pointed out as a barrier in ICT application

Table 5.1.12 Problems in ICT application

S.no	Problems	Rank
1	Insufficient funds	2
2	Library staff are not interested in ICT adoption	-
3	Inadequate trained staff in ICT application	1
4	Lack of initiative on the part of library staff	5
5	Lack of ICT knowledge on the part of users	6
6	Increasing operating cost of ICT applications	-
7	Lack of standard Library management software	4
8	Lack of support from authorities	3

From the survey, it is clear that the hardware and software facilities available in University Libraries are not satisfactory. The Universities have only basic infrastructure to provide information services to the users, but it was observed that some of the hardware facilities were not utilized properly and there was no proper policy for periodical maintenance. Commercial software used by most of the University Libraries are costly and had problems related to local support, data conversion etc. In the case of open software even though the cost of maintenance is less when compared to other software's, the shortage of well experienced and trained professionals is a major hurdle in the day to day operations of the software. Implementation of standard library software in all University libraries can be a solution to these problems. Frequent breakdown of power supply, under utilization of

available funds, lack of administrative and professional support, inadequately trained library staff, lack of a permanent University Librarian in majority of University libraries, etc are some other reasons that delay the development of ICT infrastructure in University Libraries. Similar problems of ICT application were observed by Suku and Pillai(2005), Sheeja (2010). ICT application in University Libraries is to be properly planned and monitored continuously for the benefit of the academic community.

5.2. Survey of Library Professionals

Following are the details of analysis and interpretations of the data collected from the library professionals with the help of structured questionnaire.

The study attempts to find out whether the developments in ICT has any influence on library professionals with regards to their professional activities, educational and informational needs in the electronic era, the awareness of library professionals about developments in ICT and their skills in handling the new technologies. The study includes the permanently employed library professionals of the central and departmental libraries in the main campuses of the seven universities covered in the survey. The first part of the questionnaire is structured to get information of variables like age, gender, qualification, designation, experience, etc.

Table 5.2.1 Response Rate

University	**Questionnaires distributed**	**Questionnaires returned**	**Response rate**
Kannur University(KAN)	8	6	75%
Kerala Agricultural University (KAU)	8	7	87.5%
Sanskrit University (SSU)	12	12	100%
M G University(MGU)	21	17	80.9%
University of Calicut (UOC)	41	38	92.7%
Cochin University of Science & Technology (CUSAT)	48	47	97.9%
University of Kerala (UOK)	65	58	89.2%
Total	203	185	91.1%

5.2.1 Response Rate

Table 5.2.1 gives the response rate of the library professionals in the seven universities. Questionnaires were distributed to 203 Library Professionals. One hundred and eighty five (91.1%) responded to the survey. In Kerala University 89.2% responded to the survey, Cochin University of science and Technology (CUSAT) (97.9%), Calicut University(92.7%), M.G university (80.9%), All the professionals responded in Sanskrit University ,while in Kerala Agricultural University and Kannur University it is 87.5% and 75% respectively.

5.2.2 University wise Distribution

Table 5.2.2 shows the University wise distribution of library professionals who participated in the survey. From Kerala University (31.4%), CUSAT (25.4%), University of Calicut (20.5%), M.G University(9.2%), Sanskrit University (6.5%), Kerala Agricultural University (3.8%) and 3.2% from Kannur University.

5.2.3 Gender wise Distribution

Table 5.2.3 gives the gender wise distribution of respondents. From the table it is clear that majority of respondents (59.5%) are female and 40.5% are male. The majority of library professionals in University of Kerala (67.2%),University of Calicut (52.6%), CUSAT (55.3%),Sanskrit University (83.3%), Kerala agricultural University (57.1%) and Kannur University (66.7%) are female except in MG University where majority are male (58.8%) library professionals.

Table 5.2.2 University wise Distribution

University	Frequency	Percent
Kannur University(KAN)	6	3.2%
Kerala Agricultural University(KAU)	7	3.8%
Sanskrit University (SSU)	12	6.5%
MG University(MGU)	17	9.2%
University of Calicut (UOC)	38	20.5%
Cochin University of Science & Technology (CUSAT)	47	25.4%
University of Kerala (UOK)	58	31.4%
Total	185	100%

Table 5.2.3 Gender wise Distribution

Gender	UOK	UOC	CUSAT	MGU	SSU	KAU	KAN	Total
Male	19 (32.8%)	18 47.4%)	21 (44.7%)	10 (58.8%)	2 (16.7%)	3 (42.9%)	2 (33.3%)	75 (40.5%)
Female	39 (67.2%)	20 (52.6%)	26 (55.3%)	7 (41.2%)	10 (83.3%)	4 (57.1%)	4 (66.7%)	110 (59.5%)
Total	58 (100%)	38 (100%)	47 (100%)	17 (100%)	12 (100%)	7 (100%)	6 (100%)	185 (100%)

5.2.4. Age wise Distribution

Table 5.2.4 shows that most of the library professionals at the time of survey, fall in the age group above 36 years (37.8%).Only 30.3% of the professionals responded are below 35 years of age. The remaining 31.9% are above 46 years of age.

Table 5.2.4 Age wise Distribution

Age Group	UOK	UOC	CUSAT	MGU	SSU	KAU	KAN	Total
25 - 35 Years	16 (27.6%)	13 (34.2%)	18 (38.3%)	0 (0.0%)	5 (41.7%)	2 (16.7%)	2 (33.3%)	56 (30.3%)
36 - 45 Years	20 (34.5%)	10 (26.3%)	18 (38.3%)	10 (58.8%)	6 (50.0%)	3 (42.9%)	3 (50.0%)	70 (37.8%)
46- 55 Years	22 (37.9%)	15 (39.5%)	11 (23.4%)	7 (41.18%)	1 (8.3%)	2 (28.6%	1 (16.7%)	59 (31.9%)
Total	58 (100%)	38 (100%)	47 (100%)	17 (100%)	12 (100%)	7 (100%)	6 (100%)	185 (100%)

5.2.5 Professional Qualification of respondents

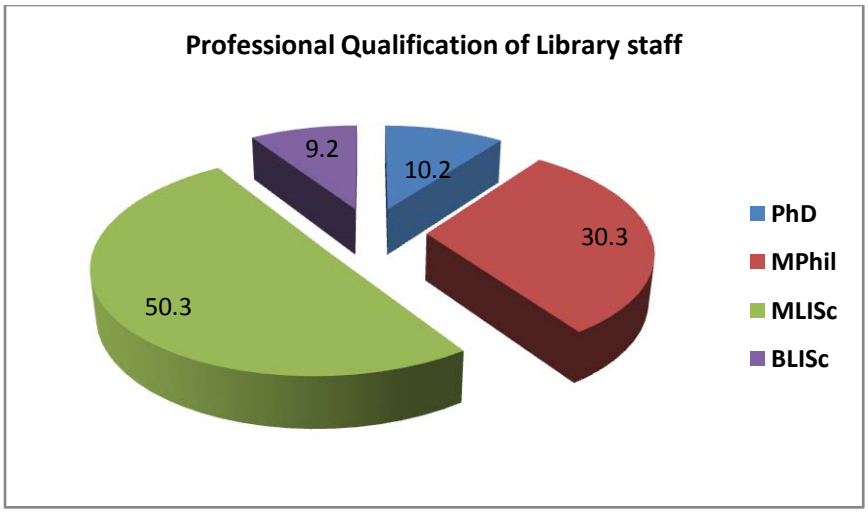
The qualification wise distribution as evident from Fig 5.2.5 and Table 5 .2.5 shows the high average of professional qualifications (LIS) of library professionals. The basic qualification for entry cadre as a Library professional in Universities being Degree with BLISc , it can be seen that professionals having only BLISc degree is 9.2%, while 50.3% of professionals have MLISc , 30.3% have Mphil degrees, and 10.2% have attained PhD. Most number of MLISc degree holders is in CUSAT

(66.0%), and Mphil holders in MG University (52.9%).It was also found that 44.3% of the professionals have a Post Graduate degree in their basic subject and 48.1% has basic degree. A few of the professionals have additional degrees like MBA (3.8%), PGDCA(7.6%), LLB(2.7%), and MCJ(.5%) in addition to the basic Post Graduate qualification.

Table 5.2.5 Professional Qualification (LIS) of respondents

Qualification	UOK	UOC	CUSAT	MGU	SSU	KAU	KAN	Total
PhD	9 (15.5%)	3 (7.9%)	3 (6.4%)	1 (5.9%)	1 (8.3%)	1 (14.3%)	1 (16.7%)	19 (10.2%)
MPhil	19 (32.8%)	9 (23.7%)	9 (19.1%)	9 (52.9%)	5 (41.7%)	3 (42.9%)	2 (33.3%)	56 (30.3%)
MLISc	26 (44.8%)	20 (52.6%)	31 (66.0%)	6 (35.3%)	4 (33.3%)	3 (42.9%)	3 (50.0%)	93 (50.3%)
BLISc	4 (6.9%)	6 (15.8%)	4 (8.5%)	1 (5.9%)	2 (16.7%)	0 (0.0%)	0 (0.0%)	17 (9.2%)
Total	58 (100%)	38 (100%)	47 (100%)	17 (100%)	12 (100%)	7 (100%)	6 (100%)	185 (100%)

Fig.5.2.5 Professional Qualification



5.2.6 Designation of Library Professionals

Table 5.2.6 shows the designation of Library Professionals, while 41.6% belong to Professional Assistant/ Library Assistant /Technical Assistant category, 37.3% to Assistant Librarian category, 17.8% to Junior Librarian / Reference Assistant and 3.2% to Deputy Librarian. Only Mahatma Gandhi University has a University Librarian, while all other 6 University Libraries are managed by Librarians in- charge. The designation of library professionals in the same scale of pay is not uniform in the Universities in Kerala. The entry cadre of Library Assistant in Kerala University and M.G University for, e.g., is Professional Assistant Gr II in CUSAT and Kannur University.

Table 5.2.6 Designation of Library Professionals

Designation	UOK	UOC	CUSAT	MGU	SSU	KAU	KAN	Total
Deputy Librarian	3 (5.2%)	1 (2.6%)	0 (0.0%)	1 (5.9%)	0 (0.0%)	0 (0.0%)	1 (16.7%)	6 (3.2%)
Assistant Librarian	23 (39.7%)	15 (39.5%)	20 (42.6%)	9 (52.9%)	0 (0.0%)	2 (28.6%)	0 (0.0%)	69 (37.3%)
Junior Librarian/ Reference Assistant	9 (15.4%)	6 (15.8%)	7 (14.9%)	4 (23.5%)	3 (25.0%)	1 (14.3%)	3 (50.0%)	33 (17.8%)
Professional Assistant / Library Asst/ Technical Assistant	23 (39.7%)	16 (42.1%)	20 (42.6%)	3 (17.6%)	9 (75.0%)	4 (57.1%)	2 (33.3%)	77 (41.6%)
Total	58 (100%)	38 (100%)	47 (100%)	17 (100%)	12 (100%)	7 (100%)	6 (100%)	185 (100%)

5.2.7 Experience of Library professionals

Table 5.2.7 shows the overall experience of Library professionals. Most of the Library professionals (49.2%) have 5-15 years experience. Of the professionals 11.4% have below 5 years experience, 31.3% have 16-25 years of experience and a few (8.1%) above 26 years of experience. The least experienced group is represented more in CUSAT (19.1%) and in Agricultural University (28.6%). In most of the Universities majority of the professionals, have 6 to 15 years of experience as clear from the table. i.e. Kerala (51.7%),CUSAT (51.1%),Sanskrit University (66.7 %), Kannur (83.3%) ,etc. The professionals with more than 16 years of experience are majority in MG University (58.8%) at the time of this study. The most experienced group of above 26 years is very few, except in Kannur (16.7%) and Calicut University (15.8%).

Table 5.2.7 Experience of Library professionals

Experience	UOK	UOC	CUSAT	MGU	SSU	KAU	KAN	Total
Below 5 years	3 (5.2%)	4 (10.5%)	9 (19.1%)	1 (5.9%)	2 (16.7%)	2 (28.6%)	0 (0.0%)	21 (11.4%)
5 to 15 years	30 (51.7%)	15 (39.5%)	24 (51.1%)	6 (35.3%)	8 (66.7%)	3 (42.9%)	5 (83.3%)	91 (49.2%)
16 to 25 years	19 (32.8%)	13 (34.2%)	12 (25.5%)	10 (58.8%)	2 (16.7%)	2 (28.6%)	0 (0.0%)	58 (31.3%)
Above 26 years	6 (10.3%)	6 (15.8%)	2 (4.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (16.7%)	15 (8.1%)
Total	58 (100%)	38 (100%)	47 (100%)	17 (100%)	12 (100%)	7 (100%)	6 (100%)	185 (100%)

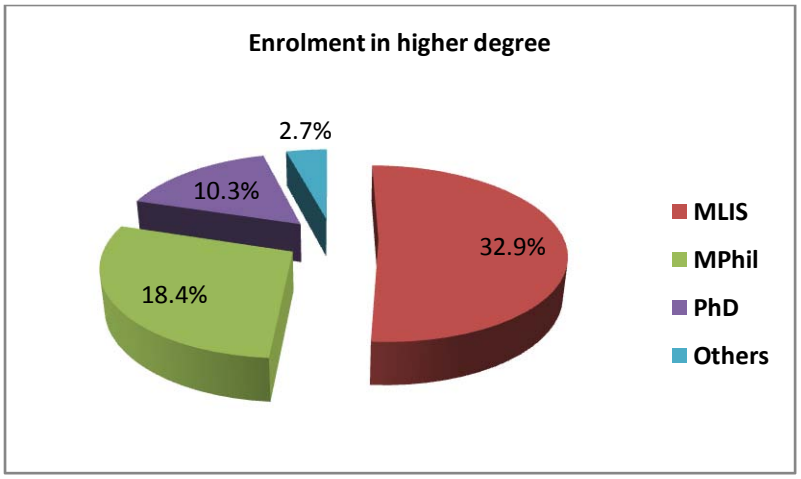
5.3 Professional Development

The objective of this section is to evaluate the professional developmental activities of the professionals in different universities including participation in Continuing Education Programmes (CEP), Publication pattern, membership in professional associations etc, to assess their attitudes towards Continuing Education Programmes and to know whether ICT has any influence on participation on CEP.

5.3.1 Enrolment in higher degree in library science

Fig 5.3.1 shows the enrolment in higher degrees in library and Information science (LIS) by the library professionals in all universities. After entering the profession, 64.3% of professionals have pursued higher degrees, for MLIS (32.9%), MPhil (18.4%), PhD (10.3%) and other degrees (2.7%).

Fig 5.3.1 Enrolment in higher degree in library science



The relation between enrolment in higher degree in Library science and respondents' characteristics are analysed and presented in Tables 5.3.1a to 5.3.1f

Table 5.3.1 a Enrolment in higher degree in library science according to University

University	Enrolment in higher degree		Total	Chi-square value
	Yes	No		
KAN	4 (66.7%)	2 (33.3%)	6 (100%)	8.87 NS
KAU	7 (100%)	0 (0.0%)	7 (100%)	
SSU	9 (75%)	3 (25%)	12 (100%)	
MGU	8 (47.1 %)	9 (52.9%)	17 (100%)	
UOC	22 (57.9%)	16 (42.1%)	38 (100%)	
CUSAT	28 (59.6%)	19 (40.4%)	47 (100%)	
UOK	41 (70.7%)	17 (29.3%)	58 (100%)	
Total	119 (64.3%)	66 (35.7%)	185 (100.0%)	

5.3.1 a Enrolment in higher degree in library science according to University

Details of analysis of enrolment in higher degree in library science according to University as in Table 5.3.1a shows that 66.7% of professionals have enrolled in higher education in Kannur University, 100% in Agricultural University, 75% in Sree Sanskrit, 47.1% in MG University , 57.9% in Calicut University , 59.6% in CUSAT, and a good majority 70.7% in Kerala University. The relation between enrolment in higher degrees and University was tested using Chi-square test .The computed value of Chi-square (8.87) was insignificant and hence it is proved that enrolment in higher degrees is independent of the University of library professionals

5.3.1 b Enrolment in higher degree in library science according to Gender

Table 5.3.1b shows the analysis of enrolment in higher degree according to gender. It is clear that higher education interests is almost similar in male(62.7%) and female professionals(65.5%).Chi-square tests reveal an insignificant value 0.15 which shows

that gender of library professionals has no relation to joining higher education courses.

Table 5.3.1b Enrolment in higher degree in library science according to Gender

Gender	Enrolment in higher degree		Total	Chi-square value
	Yes	No		
Male	47 (62.7%)	28 (37.3%)	75 (100.0%)	0.15 NS
Female	72 (65.5%)	38 (34.5%)	110 (100.0%)	
Total	119 (64.3%)	66 (35.7%)	185 (100.0%)	

5.3.1c Enrolment in higher degree in library science according to Age

Table 5.3.1c shows the age wise details of analysis of library professionals' enrolment in higher education. It is clear that 78.0% of professionals in the age group above 46 years has enrolled in higher education after joining the profession .In the age group 36-45 , 62.9% and among the younger age group (51.8%) have enrolled in higher education. Chi-square tests showed a significant value of 12.74 indicating that pursuing higher education is associated with the age of professionals.

Table 5.3.1c Enrolment in higher degree in library science according to Age

Age	Enrolment in higher degree		Total	Chi-square value
	Yes	No		
25 - 35 Years	29 (51.8%)	27 (48.2%)	56 (100.0%)	12.74 S
36 - 45 Years	44 (62.9%)	26 (37.1%)	70 (100.0%)	
Above 46 Years	46 (78.0%)	13 (22.0%)	59 (100.0%)	
Total	119 (64.3%)	66 (35.7%)	185 (100.0%)	

5.3.1d Enrolment in higher degree in library science according to Qualification

Table 5.3.1d shows the qualification wise details of library professionals' enrolment in higher education. 84.2% of the professionals having the highest degree ie PhD have pursued higher education and 75% of Mphil holders have joined higher courses, while MISc and BLiSc have comparatively lesser rate of enrolment ie 59.1% and 35.3% respectively. It is evident that majority of BLiSc degree holders (64.7%) have not pursued any higher education. Computation of Chi-square values is significant (14.6) and hence it is clear that enrolment in higher degree is related to qualification of professionals.

Table 5.3.1d Enrolment in higher degree in library science according to Qualification

Qualification	Enrolment in higher degree		Total	Chi-square value
	Yes	No		
PhD	16 (84.2%)	3 (15.8%)	19 (100.0%)	14.46 S
MPhil	42 (75.0%)	14 (25.0%)	56 (100.0%)	
MLISc	55 (59.1%)	38 (40.9%)	93 (100.0%)	
BLISc	6 (35.3%)	11 (64.7%)	17 (100.0%)	
Total	119 (64.3%)	66 (35.7%)	185 (100.0%)	

5.3.1e Enrolment in higher degree in library science according to Designation

Table 5.3.1e shows the designation wise details of library professionals' enrolment in higher education. It is seen that majority of 66.7% library professionals in the category of Deputy librarian, and 79.7% of Assistant Librarians have enrolled for higher education at some stage in their career. Whereas a lesser majority have joined higher education in the case of Junior Librarian(or Reference Assistant) (57.6%) and Professional Assistants (or Technical Assistant) (53.2%).Chi-square tests

showed a significant value (12.76) proving that there is a significant relation between enrolment in higher degree and designation.

Table 5.3.1e Enrolment in higher degree in library science according to Designation

Designation	Enrolment in higher degree		Total	Chi-square value
	Yes	No		
Deputy Librarian	4 (66.7%)	2 (33.3%)	6 (100.0%)	12.76 S
Assistant Librarian	55 (79.7%)	14 (20.3%)	69 (100.0%)	
Junior Librarian	19 (57.6%)	14 (42.4%)	33 (100.0%)	
Professional Assistant	41 (53.2%)	36 (46.8%)	77 (100.0%)	
Total	119 (64.3%)	66 (35.7%)	185 (100.0%)	

5.3.1f Enrolment in higher degree in library science according to Experience

Table 5.3.1f shows the experience wise details of library professionals' enrolment in higher education. The professional having 16-25(82.8%) and above 26 years of experience(80.0%) have pursued higher education to a greater extent than professionals having below 5 years experience (52.4%) and between 6 to 15 years of experience (52.7%). A significant chi-square value of 19.80 proves the dependency of experience on enrolment in higher education of library professionals.

Table 5.3.1f Enrolment in higher degree in library science according to Experience

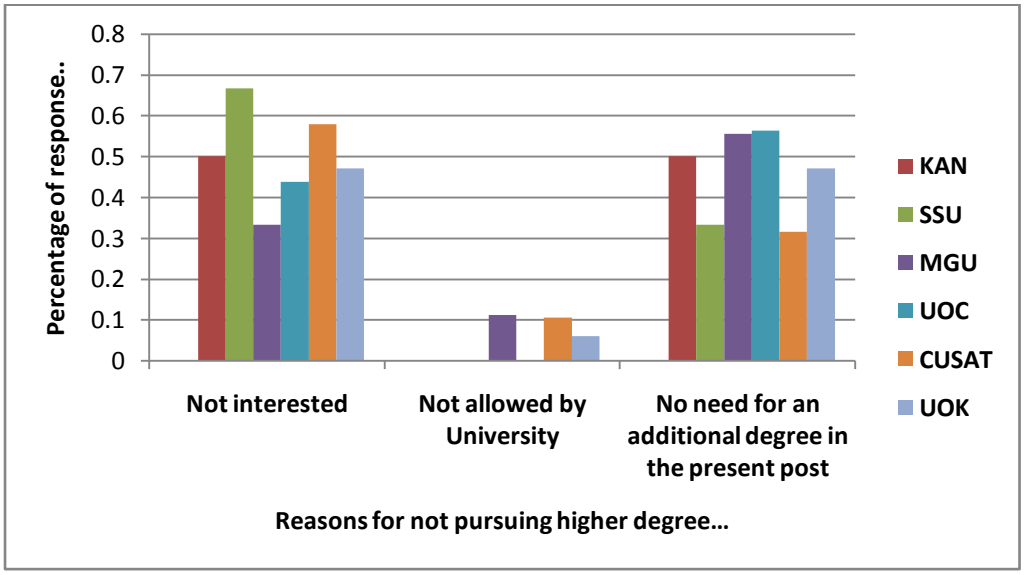
Experience	Enrolment in higher degree		Total	Chi-square value
	Yes	No		
Below 5 Years	11 (52.4%)	10 (47.6%)	21 (100.0%)	19.80 S
6 -15 Years	48 (52.7%)	43 (47.3%)	91 (100.0%)	
16 - 25 Years	48 (82.8%)	10 (17.2%)	58 (100.0%)	
Above 26 Years	12 (80.0%)	3 (20.0%)	15 (100.0%)	
Total	119 (64.3%)	66 (35.7%)	185 (100.0%)	

From the analysis is clear the characteristics like age, qualification, designation and experience influence the professionals' interest in higher education.

5.3.1.1 Reasons for not pursuing higher degree

Of the total professionals, 35.7% indicated that they have not enrolled for any higher degree for reasons as shown in Fig 5.3.1a . The reasons quoted were not interested (48.5%), not allowed by the university (6.1%) and there is no need for a higher degree in the present post (45.5%). A few also indicated that financial constraints prevented them from pursuing higher degrees. Mayer and Terrill (2005) found similar results in their study that Library professionals' need for advanced-subject degrees may vary by many factors.

Fig 5.3.1.1 Reasons for not pursuing higher degree



5.3.2 Enrolment in IT /Computer related courses

Table 5.3.2 shows the different IT or computer related degrees attained by Library professionals in all the Universities. Of the total professionals 23.8% professionals have attained computer related degree or diploma , 6.5% have PGDCA and DCA, 4.3% PGDLAN and .5% PGDIT, 5.9% have certificates from short term computer

courses and a few indicated that they already had the degree before entering the profession.

Table 5.3.2 Enrolment in IT /Computer related courses

University	Enrolment in IT/Computer related courses					Not enrolled	Total
	PGDCA	DCA	PGDIT	PGDLAN	Other short term courses		
KAN	1 (16.7%)	1 (16.7%)	0 (0.0%)	0 (0.0%)	1 (16.7%)	3 (50.0%)	6 (100.0%)
KAU	1 (14.3%)	3 (42.9%)	0 (0.0%)	1 (14.3%)	1 (14.3%)	1 (14.3%)	7 (100.0%)
SSU	0 (0.0%)	1 (8.3%)	0 (0.0%)	2 (16.7%)	1 (8.3%)	8 (66.7%)	12 (100.0%)
MGU	2 (11.8%)	0 (0.0%	0 (0.0%)	2 (11.8%)	1 (5.9%	12 (70.6%	17 (100.0%)
UOC	1 (2.6%)	4 (10.5%)	0 (0.0%)	0 (0.0%)	1 (2.6%)	32 (84.2%)	38 (100.0%)
CUSAT	4 (8.5%)	1 (2.1%)	1 (2.1%)	3 (6.4%)	1 (2.1%)	37 (78.7%)	47 (100.0%)
UOK	3 (5.2%)	2 (3.4%)	0 (0.0%)	0 (0.0%)	5 (8.6%)	48 (82.8%)	58 (100.0%))
Total	12 (6.5%)	12 (6.5%)	1 (0.5%)	8 (4.3%)	11 (5.9%)	141 (76.2%)	185 (100.0%)

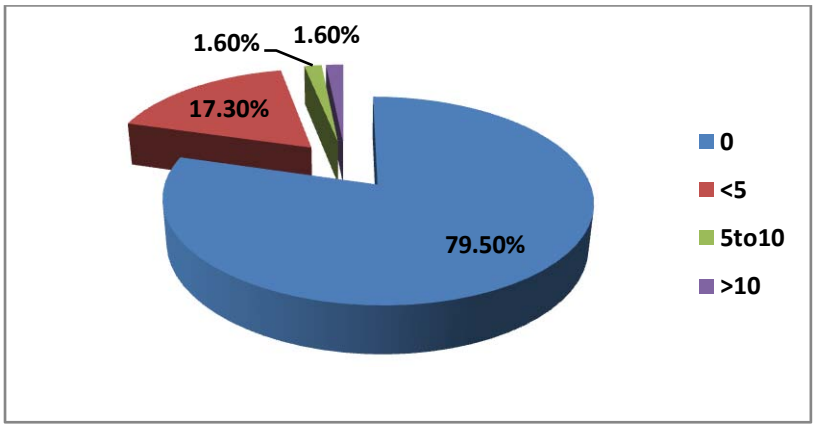
Analysis of enrolment in higher education shows that Library professionals have enrolled in Computer related degrees in addition to courses in Library and information science. This shows that ICT has influenced the professionals in pursuing higher education in Computer related courses. Only a few (3.8%) have degree in Management studies which is also important in library profession. Vijayakumar (2008) also found related results that Library professionals have gone for courses in IT skills, and none for management and allied courses.

5.3.3 Publication trends of library professionals

The publication pattern of library professionals is evaluated by analyzing the number of publications in journals, books, conference proceedings etc. As seen in Fig 5.3.3

majority of library professionals (79.5%) have no publications indicating the poor trend in publishing papers. Only 17.3% of the library staff have journal articles/ articles in books/conference papers etc, a very few (1.6%) have publications 5 to 10 and more than 10 publications each.

Fig 5.3.3 Publication trends of library professionals



The trends in publication by library professionals is studied on the basis of University, age, gender, qualification ,experience and designation of library professionals .

Table 5.3.3 a Publication trends of library professionals according to University

University	No.of Publications				Total
	0	Less than 5	5 to 10	More than 10	
KAN	5 (83.3%)	1 (16.7%)	0	0	6 (100%)
KAU	6 (85.7%)	0	1 (14.3%)	0	7 (100%)
SSU	11 (91.7%)	1 (8.3%)	0	0	12 (100%)
MGU	14 (82.4%)	3 (17.6%)	0	0	17 (100%)
UOC	32 (84.2%)	5 (13.2%)	1 (2.6%)	0	38 ((100%)
CUSAT	33 (70.2%)	11 (23.4%)	1 (2.1%)	2 (4.3%)	47 (100%)
UOK	46 (79.3%)	11 (18.9%)	0	1 (1.7%)	58 (31.4%)
Total	147 (79.5%)	32 (17.3%)	3 (1.6%)	3 (1.6%)	185 (100.0%)

5.3.3 a Publication trends of library professionals according to University

The University wise publication trends of library professionals is shown in the Table 5.3.3 a. It can be seen that in University of Kerala 18.9% have less than 5 publications,23.4% in CUSAT, University of Calicut (13.2%), MG University (17.6%), Kannur University (16.7%) and Sanskrit University very 8.3%.In Agricultural University 14.3% has more than 5 publications, and none less than 5. Chi square tests were used to calculate the relation between University and publication pattern and found insignificant value (23.06 ^{NS}) proving that publication by library professionals is independent of University.

5.3.3 b Publication trends of library professionals according to Gender

From the Table 5.3.3 b it is obvious that among the male professionals, 74.6% males do not have publications , and among the female professionals , 82.7 % lack publications of any kind. Only 25.3% male professionals and 17.3% female professionals have published papers in journals or conference proceedings. The computed values of Chi-square (1.71 ^{NS}) was found to be insignificant. Hence it is evident that publication trend is independant of the gender of library professionals.

Table 5.3.3 b Publication trends of library professionals according to Gender

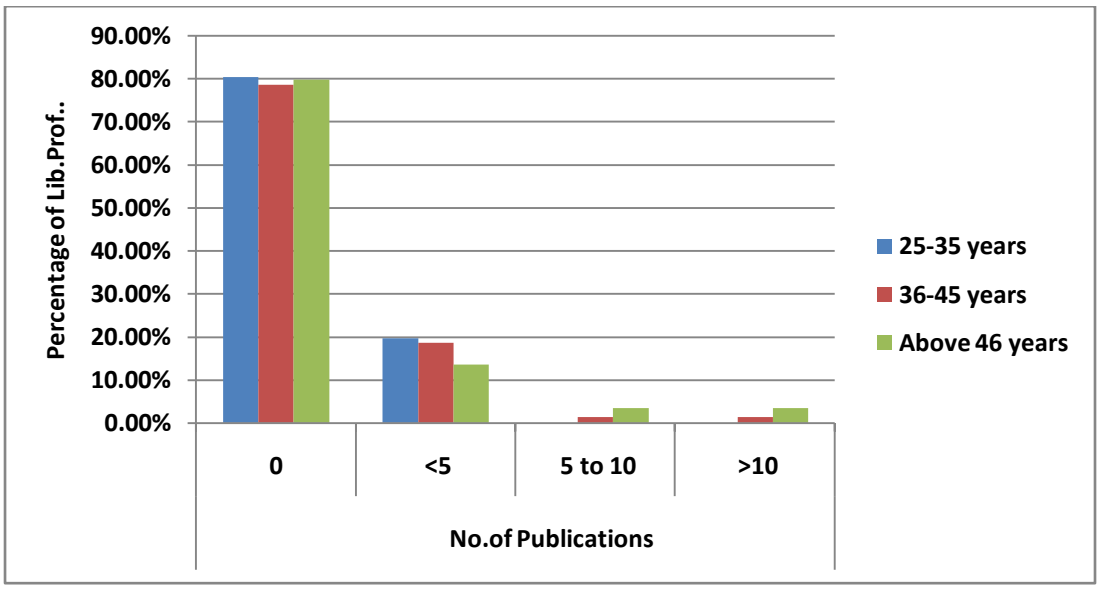
	No.of Publications				
Gender	**0**	**Less than 5**	**5 to 10**	**More than 10**	**Total**
Male	56 (74.6%)	15 (20%)	2 (2.7%)	2 (2.7%)	75 (100%)
Female	91 (82.7%)	17 (15.5%)	1 (0.9%)	1 (0.9%)	110 (100%)
Total	147 (79.5%)	32 (17.3%)	3 (1.6%)	3 (1.6%)	185 (100.0%)

5.3.3 c Publication trends of library professionals according to Age

The Fig 5.3.3c shows the publications of Library professionals according to Age. It is clear that the pattern of publication is almost similar among the three age groups. In the younger age group of 25-45 years, the total publication rate is 19.6%, while in the age group above 36 years it is 20.4% and above 46 years it is 20.6%. The relation

between the variable age and publication was calculated using Chi-square test and it was found that Chi-square values are insignificant(15.11)for age implying that publication is not dependant on age of respondent.

Fig 5.3.3 c Publication trends of library professionals according to Age



5.3.3 d Publication trends of library professionals according to Qualification

Table 5.3.3d presents the details of publications of library professionals according to their professional qualifications. It is found that 47.4% of professionals having a doctorate degree have less than 5 and 5.3% have 5 to 10 publications ,while total 14.3% MPhil degree holders have publications , 16.1% MLIS holders have less than 5 publications, 4.4% more than 5, and 5.9% BLIS degree holders have less than 5 publication among the professionals. The dependency of qualification on publication pattern was calculated using Chi-square test and showed significant values of Chi-square 14.53, which proves that qualification has a distinct relation to the publication pattern of library professionals.

Table 5.3.3 d Publication trends according to Qualification

Qualification	No.of Publications				Total
	0	less than 5	5 to 10	More than 10	
PhD	9 (47.4%)	9 (47.4%)	1 (5.3%)	0	19 (100.0%)
MPhil	48 (85.7%)	7 (12.5%)	0	1 (1.8%)	56 (100.0%)
MLIS	74 (79.6%)	15 (16.1%)	2 (2.2%)	2 (2.2%)	93 (100.0%)
BLIS	16 (94.1%)	1 (5.9%)	0	0	17 (100.0%)
Total	147 (79.5%)	32 (17.3%)	3 (1.6%)	3 (1.6%)	185 (100.0%)

Chi-square value 14.53^{s}

5.3.3 e Publication trends of library professionals according to Designation

The trends in publication or the productivity of different categories of library professionals including Deputy Librarian , Assistant Librarian, Junior Librarian (or Reference Assistant) Professional Assistant Gr I & II (or Library Assistant or Technical Assistant) is analysed and the findings shown in the Table 5.3.3e. It is found that 33.3% Deputy Librarians have less than 5 publications; 20.3% Assistant Librarians have less than 5 , 4.3% have more than 5 and more than 10 publications, while 15.2% Junior Librarian and 14.3% Professional Assistant category have less than 5 publications. The computed values of Chi-square(11.42) are found to be insignificant for designation which shows that publication has no relation to the designation of library professionals.

Table 5.3.3 e Publication trends according to Designation

Designation	No.of Publications				Total
	0	< 5	5 to 10	> 10	
Deputy Librarian	4 (66.7%)	2 (33.3%)	0 (0.0%)	0 (0.0%)	6 (100.0%)
Assistant. Librarian	49 (71.0%)	14 (20.3%)	3 (4.3%)	3 (4.3%)	69 (100.0%)
Junior Librarian	28 (84.8%)	5 (15.2%)	0 (0.0%)	0 (0.0%)	33 (100.0%)
Professional Assistant	66 (85.7%)	11 (14.3%)	0 (0.0%)	0 (0.0%)	77 (100.0%)
Total	147 (79.5%)	32 (17.3%)	3 (1.6%)	3 (1.6%)	185 (100.0%)

Chi-square 11.42^{NS}

5.3.3 f Publication trends of library professionals according to experience

The result of analysis of publication trends of library professionals according to their total years of experience in the profession is presented in the Table 5.3.3 f below. 19.1% of the junior professionals has less than 5 publications, 16.5% of professionals between 5 and 15 years of experience have less than 5 publications, and the more experienced professionals(17.2%) and 8.6% have more than 5 publications .The most experienced professionals with more than 26 years of experience (20%) have less than 5 publications. The computed value of Chi-square is found to be insignificant (19.85) for experience, which shows that publication pattern is independent of experience of library professionals.

Table 5.3.3 f Publication trends according to experience

Experience	No.of Publications				Total
	0	Less than 5	5 to 10	More than 10	
Below 5	17 (80.9%)	4 (19.1%)	0	0	21 (100.0%)
5 to 15	75 (82.4%)	15 (16.5%)	0	1 (1.1%)	91 (100.0%)
16 to 25	43 (74.2%)	10 (17.2%)	3 (5.2%)	2 (3.4%)	58 (100.0%)
Above 26	12 (80%)	3 (20%)	0	0	15 (100.0%)
Total	147 (79.5%)	32 (17.3%)	3 (1.6%)	3 (1.6%)	185 (100.0%)

Chi square value 19.85 ^{NS}

5.3.4 Membership in Professional Associations

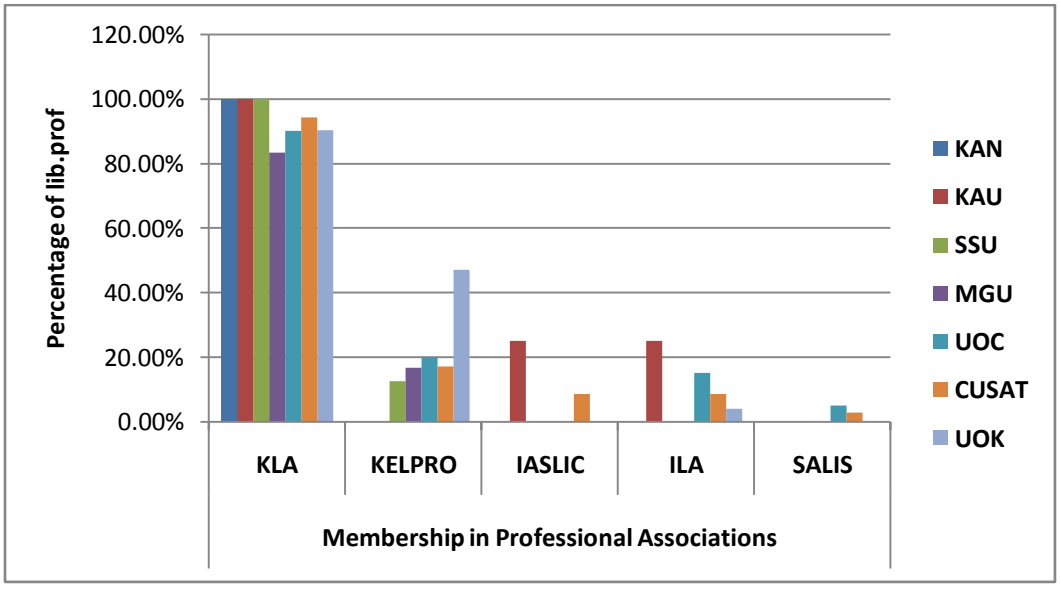
Professional associations have a major role in supporting and raising awareness in professional development at the national level and within the profession and providing opportunities to gain practical skill through active participation in professional activities. An effective national association is expected to influence the development of professional manpower in a variety of ways by enforcing standards for library and information education programmes, provision of better salary and service structure and developing a positive image about profession and professionals in the society (Rehman,et.al 1998).

Library professionals' membership in local, national and international associations is analysed as a part of the evaluation of their professional activities. Fig 5.3.4 gives an idea about the membership in different library associations by the library professionals of the seven Universities. It is found that library professionals in the Universities in Kerala are aware of the importance of library associations in the development of the profession.

69.2% of the library professionals have membership in one or two library associations. None has membership in Library associations at the International level. National level associations like IASLIC (3.1%) and ILA(7.3%) have very few members from the Universities of Kerala as evident from the Fig., and SALIS has 1.7% members.

All the professionals of KAU, SSU and KAN have membership in KLA and in general, 92.2% of the library professionals have membership in the state library associations of KLA and 28.1% in KELPRO.

Fig 5.3.4 Membership in Professional Associations



5.3.5 Attendance in Continuing Education Programmes (CEP)

The details of attendance of Library professionals in Continuing Education Programmes including Conferences, Workshops, Refresher courses, In house training

programmes etc is depicted in Table 5.3.5. The analysis shows that participation is more in In-house training conducted by Universities (52.4%),followed by Workshops sponsored (41.6%) and not sponsored (34.6%) , Conferences not sponsored (33.5%) and least attendance in sponsored Conferences (29.7%) and Refresher courses (23.8%). It shows that the library professionals have a positive attitude towards attendance in the training programmes and workshops conducted by each University

Table 5.3.5. Attendance in Continuing Education Programmes (CEP)

Continuing Education Programme	Attended	Not Attended	Total
Conference : Institution Sponsored	55 (29.7%)	130 (70.3%)	185 (100%)
Conference : Not Sponsored	62 (33.5%)	123 (66.5%)	185 (100%)
Workshop : Institution Sponsored	77 (41.6%)	108 (58.4%)	185 (100%)
Workshop : Not Sponsored	64 (34.6%)	121 (65.4%)	185 (100%)
Refresher Courses	44 (23.8%)	141 (76.2%)	185 (100%)
In-house Training Programmes	97 (52.4%)	88 (47.6%)	185 (100%)

5.3.5 a Attendance in CEP according to University

The University wise details of attendance of Library professionals in Continuing Education Programmes including Conferences, Workshops, Refresher courses, In house training programmes etc is depicted in Tables 5.3.5a and 5.3.5b. Attendance in sponsored conferences and in refresher courses is comparatively less in all Universities. Among the Universities CUSAT and Kerala Agricultural University (KAU) has a better average of attendance in Continuing Education Programmes and

library professionals in the University of Calicut and Kerala has less participation in Continuing Education Programmes.

Chi-Square tests were conducted to verify whether there is any association between University and participation in different types of Continuing Education Programmes . The computed values of Chi-Square are found to be significant in the case of sponsored conferences (23.80), sponsored workshops (Chi square value 48.59) and In-house training programmes (Chi square value 41.61), indicating that there is an association between attendance in these continuing education programmes and University in which the respondents are employed. Study results point to the important role that organizational factors play in the process of maintaining professional competence (Chan & Auster, 2003). Chi-Square values are found to be insignificant in the case of other Continuing Education Progammes which shows attendance in Conferences and workshops (not sponsored) and in Refresher courses has no relation to University.

Table 5.3.5 a Attendance in CEP according to University

University	Conference				Workshop			
	Sponsored		Not sponsored		Sponsored		Not sponsored	
	Attended	Not Attended	Attended	Not Attended	Attended	Not Attended	Attended	Not Attended
KAN	2 (33.3%)	4 (67.7%)	2 (33.3%)	4 (66.7%)	2 (33.3%)	4 (67.7%)	1 (16.7%)	5 (83.3%)
KAU	4 (57.1%)	3 (42.9%)	2 (28.6%)	5 (71.4%)	5 (71.4%)	2 (28.6%)	2 (28.6%)	5 (71.4%)
SSU	3 (25%)	9 (75%)	2 (16.7%)	10 (83.3%)	8 (66.7%)	4 (33.3%)	2 (16.7%)	10 (83.3%)
MGU	4 (23.5%)	13 (76.5%)	2 (11.8%)	15 (88.2%)	12 (88.2%)	5 (11.8%)	3 (17.6%)	14 (82.4%)
UOC	7 (18.4%)	31 (81.6%)	8 (21.1%)	30 (78.9%)	11 (28.9%)	27 (71.1%)	9 (23.7%)	29 (76.3%)
CUSAT	23 (48.9%)	24 (51.1%)	24 (51.1%)	23 ((48.9%)	25 (53.2%)	22 (46.8%)	22 (46.8%)	25 (53.2%)
UOK	12 (20.7%)	46 (79.3%)	20 (35.7%)	36 (64.3%)	14 (24.1%)	44 (75.9%)	25 (43.1%)	33 (56.9%)
Total	55 (29.7%)	130 (70.3%)	62 (33.5%)	123 (66.5%)	77 (41.6%)	108 (58.4%)	64 (34.6%)	121 (65.4%)
Total respondents	185(100.0%)		185(100.0%)		185(100.0%)		185(100.0%)	
	Chi square value=23.80 ^{S}		Chi square value=16.09 ^{NS}		Chi square value=48.59 ^{S}		Chi square value=15.00 ^{NS}	

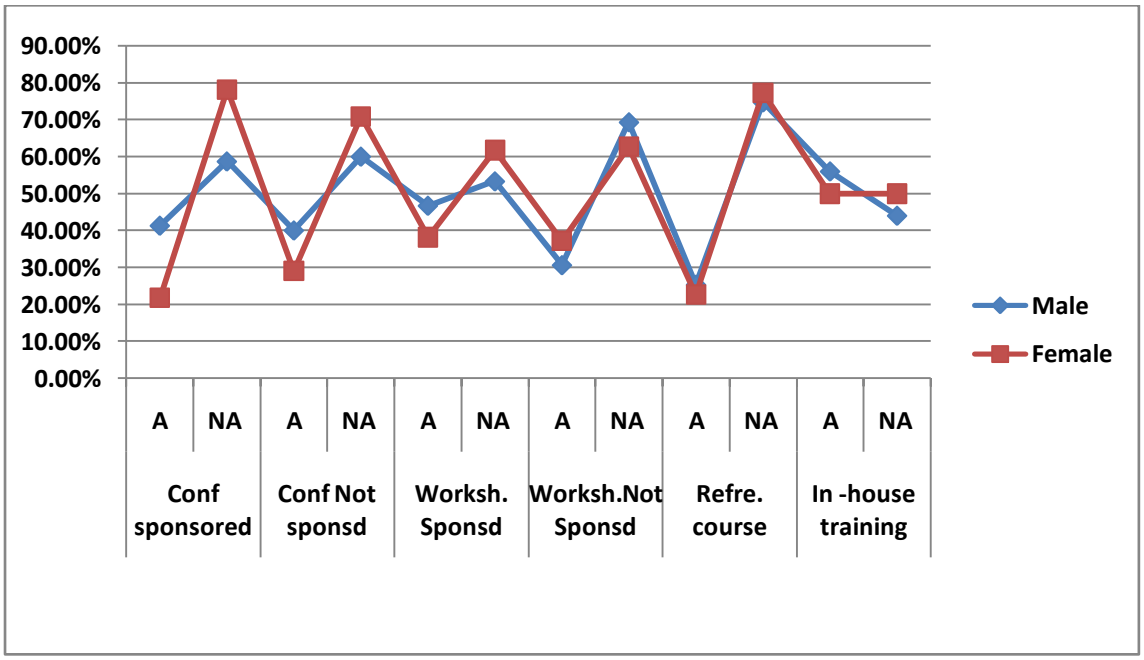
Table 5.3.5 b Attendance in CEP according to University

University	Refresher courses		In house training	
	Attended	Not attended	Attended	Not attended
KAN	2 (33.3%)	4 (66.7%)	2 (33.3%)	4 (66.7%)
KAU	1 (14.3%)	6 (85.7%)	2 (28.6%)	5 (71.4%)
SSU	2 (16.7%)	10 (83.3%)	2 (16.7%)	10 (83.3%)
MGU	9 (52.9%)	8 (47.1%)	11 (64.7%)	6 (35.3%)
UOC	12 (31.6%)	26 (68.4%)	16 (42.1%)	22 (57.9%)
CUSAT	8 (17.1%)	39 (82.9%)	41 (87.2%)	6 (12.8%)
UOK	10 (17.2%)	48 (82.8%)	23 (39.7%)	35 (60.3%)
Total Respondents	44 (23.8%)	141 (76.2%)	97 (52.4%)	88 (47.6%)
	185(100%)		185(100%)	
	Chi square value=20.62 ^{NS}		Chi square value=41. 61 ^{S}	

5.3.5.c Attendance in CEP according to Gender

Fig 5.3.5.c gives the Gender wise attendance (A) and non attendance (NA) in Conferences ,Workshops, Refresher courses and in house training programmes. The analysis of gender wise attendance in Continuing education programmes found that, an average 40% male professionals and 33.2% female professionals have attended the continuing education programmes .

Fig 5.3.5.c Attendance in CEP according to Gender



A-Attended NA - Not Attended

Table 5.3.5.c Chi-square values for comparing gender wise attendance in CEP

Continuing education programmes	Chi-square values
Conference Institution sponsored	8.74 ^{S}
Conference Institution Not sponsored	4.39 ^{NS}
Workshop Institution sponsored	2.57 ^{NS}
Workshop Institution not sponsored	1.42 ^{NS}
Refresher Courses	0.96 ^{NS}
In house training programmes	4.77 ^{NS}

Chi-Square tests conducted for testing the dependence of gender on attendance in Continuing education programmes found a significant Chi-square value (8.74) for attendance in Sponsored conferences which proves the relation between gender and sponsored conferences and in the case of all other programmes computed values of Chi-square were insignificant as shown in Table 5.3.5.c.

Table 5.3.5. d. Age wise attendance in Continuing Education Programmes (CEP)

Age	Conference Sponsored		Conference not sponsored		Workshop sponsored		Workshop not sponsored		Refresher courses		In house training	
	A	NA	A	NA	A	NA	A	NA	A	NA	A	NA
25-35	13 (23.2%)	43 (76.8%)	15 (26.8%)	41 (73..2%)	27 (48.2%)	29 51.8%)	19 (33..9%)	37 (75.5%)	1 (1.8%)	55 (98.2%)	28 (50%)	28 (50%)
36 -45	21 (30%)	49 (70%)	32 (45.7%)	38 (54..3%)	26 (37.1%)	44 (62.9%)	28 (40%)	42 (60%)	15 (21.4%)	55 (78.6%)	35 (50%)	35 (50%)
46- 55	21 (35.6%)	38 (64.4%)	15 (26.8%)	44 (73.2%)	24 (40.7%)	35 (59.3%)	17 (28.8%)	42 (71.2%)	28 (47.5%)	31 (52.4%)	34 (57.6%)	25 (42.4%)
Total 185 (100%)	55 (29.7%)	130 (70.3%)	62 (33.5%)	123 (66.5%)	77 (41.6%)	108 (58.4%)	64 (34.6%)	121 (65.4%)	44 (23.8%)	141 (76.2%)	97 (52.4%)	88 (47.6%)
Chi-square value	16.80 NS		19.73 NS		12.28 NS		12.97 NS		36.92 S		13.84 NS	

A-Attended NA-Not Attended

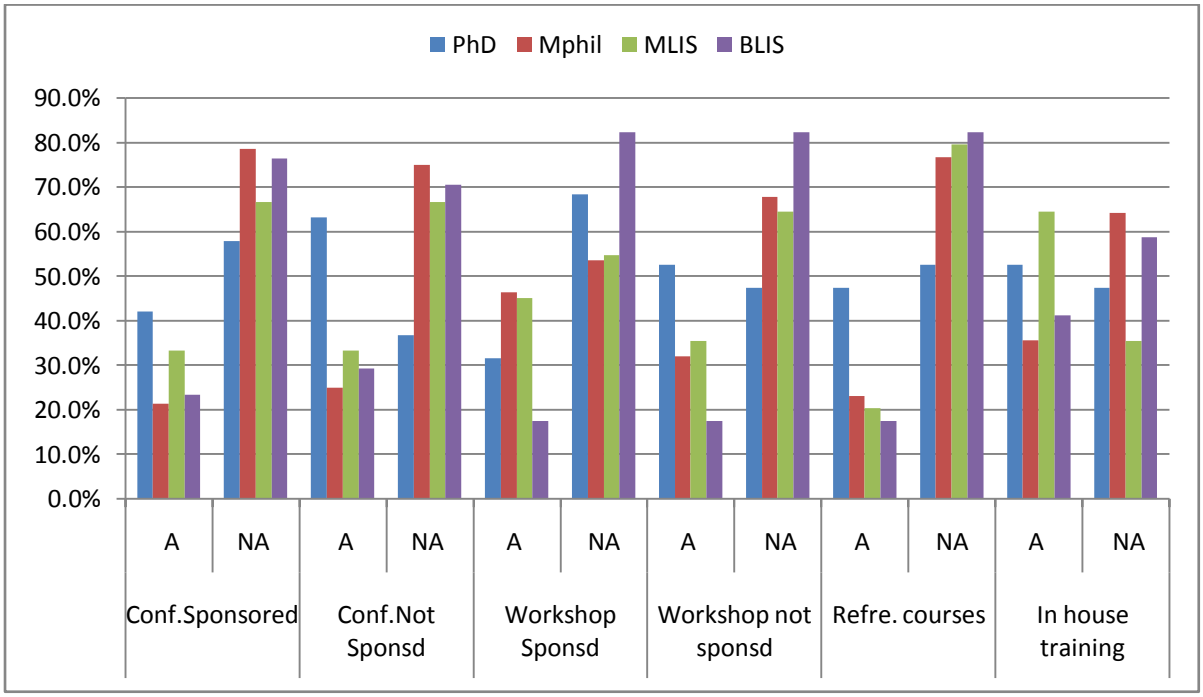
5.3.5 d. Age wise attendance in CEP

Age wise analysis as in Table 5.3.5.d indicates that attendance in Continuing Education Programmes is comparatively more in the age group 36- 45 and above 46 years. Participation in house training shows an almost similar pattern for all age groups studied. In the case of refresher courses attendance is higher in the age group above 46 years and minimum in the age group 25-35. Chi-square test was used to test the dependency of age on participation in Continuing Education Programmes and found that Chi-square values were significant in the case of refresher courses (36.92), which shows that there is a distinct relation between age group and participation in refresher courses. In other programmes the computed values of Chi-square showed insignificant values.

5.3.5.e. Qualification wise attendance in Continuing Education Programmes (CEP)

Analysis of attendance in Continuing Education Programmes according to qualification is depicted in Fig 5.3.5 e. Library professionals with PhD and MLISc have a comparatively better average of participation in conferences and workshops. The dependency of qualification on attendance in CEP is calculated using Chi-square tests given in Table 5.3.5.e .and it is found that Chi-square values are not significant in any of the CEP which implies that participation in professional development programmes does not depend on the qualification of library professionals.

Fig 5.3.5.e Attendance in CEP according to Qualification



A-Attended NA - Not Attended

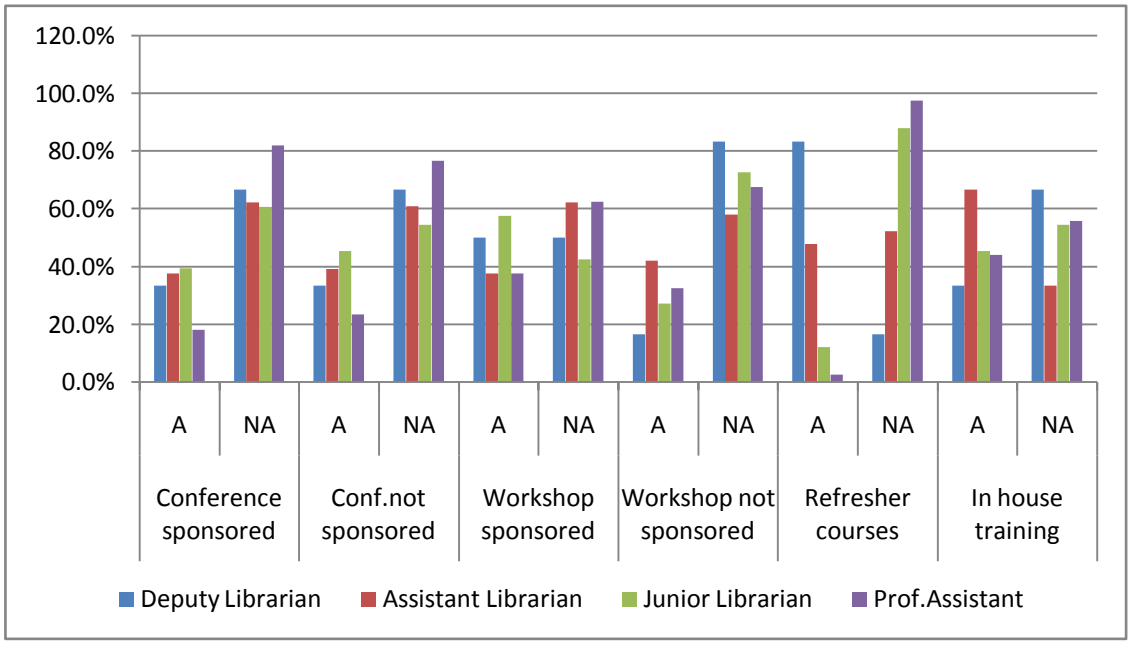
Table 5.3.5.e Chi-square values for comparing qualification wise attendance in CEP

Continuing education programmes	Chi-square values
Conference Institution sponsored	9.57 ^{NS}
Conference Institution Not sponsored	12.92 ^{NS}
Workshop Institution sponsored	6.95 ^{NS}
Workshop Institution not sponsored	8.14 ^{NS}
Refresher Courses	8.34 ^{NS}
In house training programmes	13.65 ^{NS}

5.3.5.f Designation wise attendance in CEP

A comparative study of attendance in Continuing Education Programmes according to the designation of library professionals is shown in Fig 5.3.5.f. It shows that the Professional Assistant/ Technical Assistant category have the least participation in CEP especially in Refresher course in which their participation is only 2.6%. Participation in sponsored conferences is 18.2%, not sponsored conferences is 23.4%, workshops sponsored is 37.7%, workshops not sponsored is 32.5%, and fair participation in- house training programmes (44.2%). The Assistant Librarian category has a comparatively better attendance in sponsored conferences(37.7%), not sponsored conferences (39.1%), sponsored workshops (37.7%), workshops not sponsored (42.0%), refresher courses(47.8%) and in- house training programmes (66.7%). Library professionals in the category of Deputy Librarian have high participation in refresher courses (83.3%) which is mandatory for attaining higher grades as per UGC norms, and fair average of attendance in conferences (33.3%), and sponsored workshops (50%). Junior Librarian category has as expected, very small attendance in refresher programmes (12.1%). Table 5.3.3.f shows the computed values of Chi-square for studying the association between designation and participation in continuing education programmes.Chi-square values are found to be significant (52.14) for refresher courses indicating dependency of designation and participation in refresher courses.

Fig 5.3.5f Designation wise attendance in CEP



A-Attended NA - Not Attended

Table 5.3.5.f Chi-square values for comparing Designation wise attendance in CEP

Continuing education programmes	Chi-square values
Conference Institution sponsored	11.29 ^{NS}
Conference Institution Not sponsored	13.27 ^{NS}
Workshop Institution sponsored	6.62 ^{NS}
Workshop Institution not sponsored	9.57 ^{NS}
Refresher Courses	52.14 ^{S}
In house training programmes	11.37 ^{NS}

5.3.5.g Experience wise attendance CEP

Table 5.3.5.g shows the comparative analysis of attendance in continuing education programmes according to experience of library professionals. It is found that the professionals having experience between 16 to 25 years have participated in more professional development programmes than the other professionals. The dependency of experience on attendance in Continuing education programmes was tested using Chi-square test. The results shows that Chi square values are significant(46.78) in the case of refresher courses. This proves that experience has relation only to participation in refresher courses, which is obvious, as participation in refresher courses is mandatory for career advancement of senior library professionals in the UGC cadre.

Table 5.3.5.g Experience wise attendance in CEP

Experience	Continuing Education Programme											
	Conference sponsored		Conference not sponsored		Workshop sponsored		Workshop not sponsored		Refresher course		In house training	
	A	NA	A	NA	A	NA	A	NA	A	NA	A	NA
Below 5 years	6 (28.6%)	15 (71.4%)	6 (28.6%)	15 (71.4%)	12 (57.1%)	9 (42.9%)	8 (38.1%)	13 (61.9%)	2 (9.5%)	19 (90.5%)	10 (47.6%)	11 (52.4%)
5-15 years	22 (24.1%)	69 (75.9%)	31 (34.1%)	60 (65.9%)	37 (40.7%)	54 (59.3%)	28 (30.8%)	63 (69.2%)	9 (9.9%)	82 (90.1%)	46 (50.5%)	45 (49.5%)
16-25 years	23 (39.7%)	35 (60.3%)	22 (37.9%)	36 (62.1%)	24 (41.4%)	34 (58.6%)	25 (43.1%)	33 (56.9%)	24 (41.3%)	34 (58.7%)	32 (55.2%)	26 (44.8%)
Above 26 years	4 (26.7%)	11 (73.3%)	3 (20%)	12 (80%)	4 (26.7%)	11 (73.3%)	3 (20%)	12 (80%)	9 (60%)	6 (40%)	9 (60%)	6 (40%)
Total	55 (29.7%)	130 (70.3%)	62 (33.5%)	123 (66.5%)	77 (41.6%)	108 (58.4%)	64 (34.6%)	121 (65.4%)	44 (23.8%)	141 (76.2%)	97 (52.4%)	88 (47.6%)
Chi -square values	14.50 ^{NS}		13.19 ^{NS}		9.08 ^{NS}		19.87 ^{NS}		46.78 ^{S}		24.47 ^{NS}	

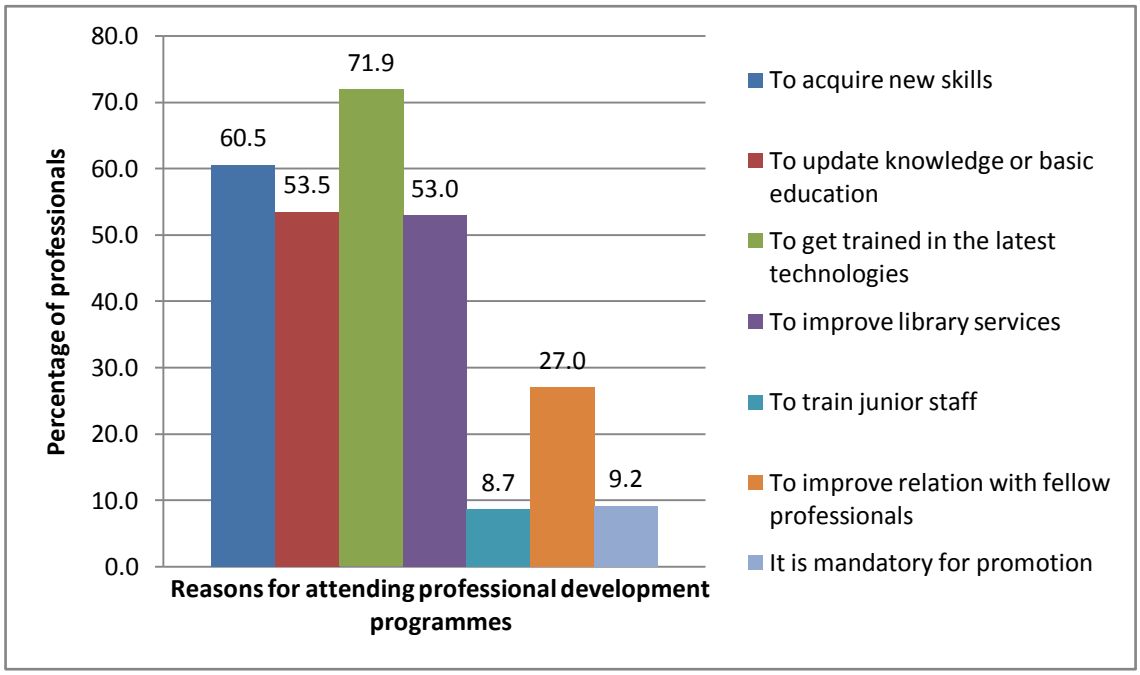
5.3.6 Attitude towards Continuing Education Programmes(CEP)

The attitude of Library professionals towards CEP is analysed in this section.

5.3.6.1 Reasons for attending Continuing Education Programmes(CEP)

The Library professionals were asked to indicate the importance of attending Continuing Education Programmes (CEP) and the results are shown in the Fig 5.3.6.1. It was found that 72% of the library professionals attend CEP to get trained in the latest technologies and 60.5% to acquire new skills, which shows developments in ICT has a positive influence on majority of library professionals participation in professional development programmes. 53.5% of the professionals indicated that they attend CEP to update knowledge or basic education while 53% preferred to attend CEP to improve library services .Training junior staff was indicated as one reason to participate in CEP by 8.6% of library professionals.27% professionals pointed out that CEP are necessary to improve relation with fellow professionals. Attending CEP are important for promotion, which was the opinion of 9.2% of library professionals. Ramaiah and Moorthy (2002) in a survey of participants in continuing education programmes had similar findings and suggested that majority of professionals attended CEP to improve basic knowledge/skills and improve library services.

Fig 5.3.6.1 Reasons for attending CEP



5.3.6.2 Reasons for not attending CEP

Analysis of the reasons for not preferring continuing educations revealed very few responses indicating that majority of the library professionals are in favour of Continuing education programmes.

As evident from Table 5.3.6.2.one of the reasons pointed out by library professionals was that CEP were restricted to a particular grade only (6%), while very few (.5%) were of the opinion that CEP do not influence their professional work. Financial constraints were also one reason pointed out by library professionals. 4.9% of the library professionals were not at all interested to attend any CEP. Adomi & Nwalo (2003) noted in their study that LIS professionals and paraprofessionals desire to update their skills and knowledge through continuing professional development (CPD), but some constraints, such as lack of IT components for practice/work, lack of self and organizational motivation, financial difficulty, amongst others, hamper staff from taking advantage of professional development programmes.

Table 5.3.6.2 Reasons for not attending CEP

Reasons for not attending CEP	**Frequency**
Restricted to a Particular grade	11 (6%)
Do not Influence Professional Work	1 (0.5%)
Financial Constraints	1 (0.5%)
Not Interested	9 (4.9%)

5.3.6.3 Opinion about effect of CEP on updating skills

The results of analysis of library professionals' opinion to know whether the Continuing education programmes have any effect on updating skills are shown in Table 5.3.6.3. Majority of the professionals were of opinion that CEP has helped to update skills to some extent (55.1%) , while 33% were of opinion that CEP has helped to update their skills to a great extent , very few even noted that CEP has not at all helped to update their skills(1.1%) and 10.8% failed to give any response.

Table 5.3.6.3 Effect of CEP on updating skills

CEP has helped to update skills	**Frequency**
To Some Extent	102 (55.1%)
To a Great Extent	61 (33.0%)
Not at all	2 (1.1 %)
No response	20 (10.8 %)
Total	185 (100.0%)

5.3.6.3a University wise opinion about effect of CEP on updating skills

The results of analysis to find the relation between respondent's characteristics and opinion about continuing education programmes is depicted in the tables below.

Table 5.3.6.3a shows University wise opinion of library professionals about effect of Continuing Education Programmes on updating skills. It shows that majority of professionals in the Universities have a positive opinion about CEP. More than 50% of professionals in all the Universities have opinion that CEP has helped to update their skills to some extent, except in CUSAT, where above 50% of professionals have

opinion that CEP has helped to update skills to a great extent. Chi-square tests was used to find whether there exists any relation between University and opinion about continuing education programmes . The tests showed significant Chi-square value 34.38 implying that there is an association between opinion about updating skills and University.

Table 5.3.6.3a University wise opinion about effect of CEP on updating skills

University	Whether CEP has helped to update skills				Total	Chi square value
	To some extent	To a great extent	Not at all	No response		
KAN	5 (83.3%)	1 (16.7%)	0 (0.0%)	0 (0.0%)	6 (100.0%)	34.38 S
KAU	5 (71.4%)	1 (14.3%)	0 (0.0%)	1 (14.3%)	7 (100.0%)	
SSU	6 (50.0%)	5 (41.7%)	0 (0.0%	1 (8.3%)	12 (100.0%)	
MGU	12 (70.6%)	4 (23.5%)	1 (5.9%)	0 (0.0%)	17 (100.0%)	
UOC	23 (60.5%)	10 (26.3%)	0 (0.0%)	5 (26.3%)	38 (100.0%)	
CUSAT	21 (44.7%)	26 (55.3%)	0 (0.0%)	0 (0.0%)	47 (100.0%)	
UOK	30 (51.7%)	14 (24.1%)	1 (1.7%)	13 (22.4%)	58 (100.0%)	
Total	102 (55.1%)	61 (33.0%)	2 (1.1%)	20 (10.8%)	185 (100.0%)	

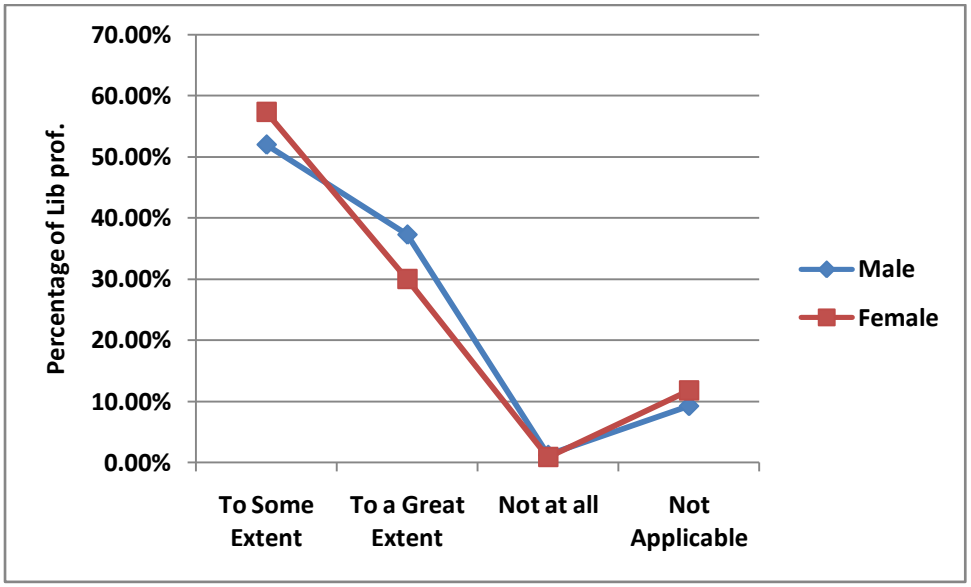
5.3.6.3b Gender wise opinion about effect of CEP on updating skills

The results of analysis to find the relation between respondents' gender and opinion about continuing education programmes is depicted in the Fig 5.3.6.3.b below. The graph shows almost similar opinion among the two groups. 52% of the male professionals and 57.3% of female professionals have the opinion that CEPs' has helped to update skills to some extent, while 37.3% males and 30% females have the opinion that CEP has helped to a great extent to update skills.

Chi square tests to determine dependency of gender on opinion about effect of CEP on updating skills showed insignificant Chi-square value of 1.28, which proves that

there is no relation between opinion about continuing education programmes and gender of library professionals.

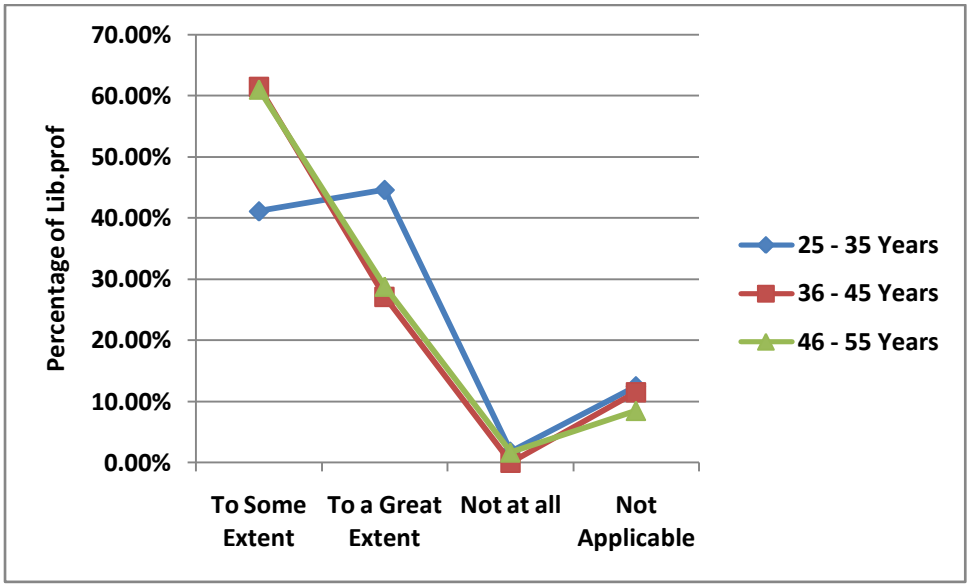
Fig 5.3.6.3b Gender wise opinion about effect of CEP on updating skills



5.3.6.3 c Age wise opinion about effect of CEP on updating skills

The results of analysis to find the relation between respondents' age and opinion about CEP is depicted in the Fig 5.3.6.3.c below. The age group 36-45 years and 46-55 years have almost similar opinion about CEP contribution to update skills of library professionals, while the younger age group have almost equal choice of opinion about effect of CEP to update skills to a great extent(44.6%) and to some extent(41.1%) Here Chi-square tests show insignificant value of 18.09 which proves that there is no relation between age and opinion about continuing education programmes.

Fig 5.3.6.3c Age wise opinion about effect of CEP on updating skills



5.3.6.3d Qualification wise opinion about effect of CEP on updating skills

The results of analysis to find the relation between respondents' qualification and opinion about continuing education programmes is depicted in the Table 5.3.6.3d below. Library professionals with PhD (47.3%), MPhil (60.7%), MLISc (55.9%), and BLISc(41.2%) had opinion that CEP helped to update skills to some extent. While 42.1% having PhD, 26.8% with MPhil , 33.3% with MLISC and 41.2% with BLISc had opinion that CEP helped to update their skills to a great extent. Chi square tests to determine dependency of qualification on opinion about effect of CEP on updating skills showed insignificant Chi-square value of 7.89 which proves that opinion about continuing education programmes is independent of the qualification of library professionals

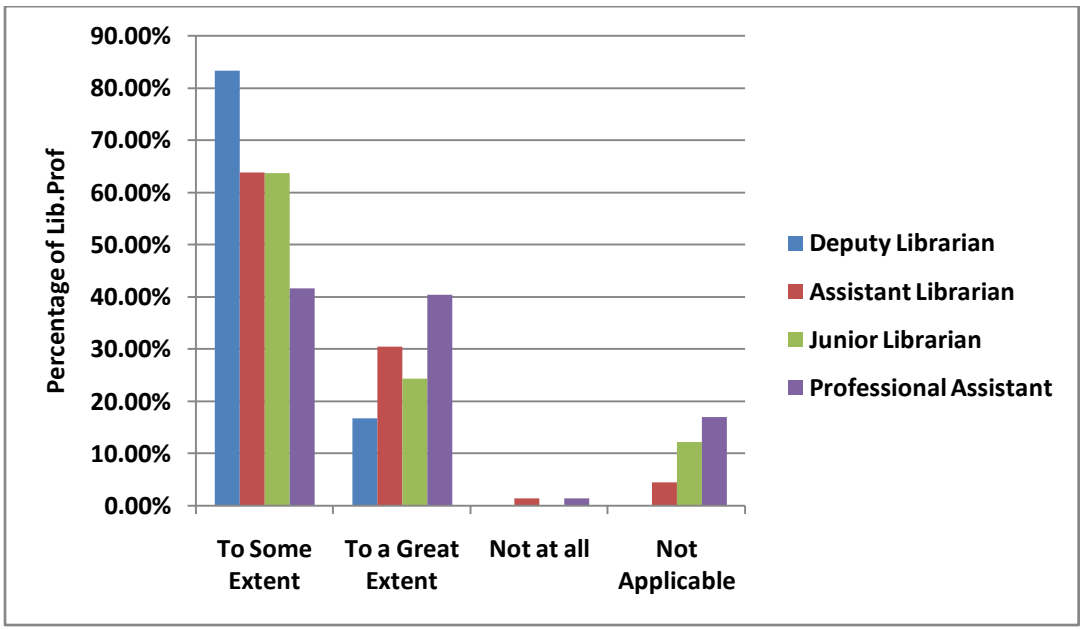
Table 5.3.6.3d Qualification wise opinion about effect of CEP on updating skills

Qualification	Opinion about effect of CEP on updating skills				Total	Chi-Square value
	To some extent	To a great extent	Not at all	No response		
PhD	9 (47.3%)	8 (42.1%)	1 (5.3%)	1 (5.3%)	19 (100.0%)	7.89^{NS}
MPhil	34 (60.7%)	15 (26.8%)	0	7 (12.5%)	56 (100.0%)	
MLISc	52 (55.9%)	31 (33.3%)	1 (1.1%)	9 (9.7%)	93 (100.0%)	
BLISc	7 (41.2%)	7 (41.2%)	0	3 (17.6%)	17 (100.0%)	
Total	102 (55.1%)	61 (33.0%)	2 (1.1%)	20 (10.8%)	185 (100.0%)	

5.3.6.3e Designation wise opinion about effect of CEP on updating skills

The result of analysis to find the relation between respondents' qualification and opinion about CEP is depicted in the Table 5.3.6.3e below. Assistant Librarians (63.8%) noted that CEP helped them to update skills to some extent while 30.4% indicated that CEP helped to update their skills to a great extent. Among the Junior librarians 63.6% and 24.3% indicated their positive opinion about CEP and Professional Assistants had almost similar preferences about CEP role in updating skills and 10.8% did not respond to this question. Majority of Deputy Librarians were of opinion that CEP helped them to update their skills to some extent. For testing the dependency of designation on CEP the computed values of Chi-square (14.04) was found to be non-significant. Hence, it can be concluded that opinion about continuing education programmes is independent of the designation of library professionals.

Fig 5.3.6.3e Designation wise opinion about effect of CEP on updating skills



5.3.6.3f Experience wise opinion about effect of CEP on updating skills

The results of analysis to find the relation between respondents' experience and opinion about continuing education programmes is depicted in the Table 5.3.6.3f below. It was found that the results are similar as in the case of analysis by gender, age, qualification, and designation of library professionals. Majority of the experienced and less experienced indicated positive attitude towards the effect of continuing education programmes on updating skills. The computed values of Chi-square (14.76) were not significant indicating that experience is independent of opinion about effect of continuing education programmes on updating skills.

Table 5.3.6.3f Experience wise opinion about effect of CEP on updating skills

Experience	To Some Extent	To a Great Extent	Not at all	Not Applicable	Total
Below 5 Years	6 (28.6%)	12 (57.1%)	0 (0.0%)	3 (14.3%)	21 (100.0%)
6- 15 Years	50 (54.9%)	28 (30.8%))	1 (1.1%)	12 (13.2%)	91 (100.0%)
16 - 25 Years	37 (63.8%)	17 (29.3%)	1 (1.7%)	3 (5.2%)	58 (100.0%)
Above 26Years	9 (60%)	4 (26.7%)	0 (0.0%)	2 (13.3%)	15 (100.0%)
Total	102 (55.1%)	61 (33.0%)	2 (1.1%)	20 (10.8%)	185 (100.0%)

The analysis of professional developmental activities like enrolment in higher education, publication pattern, membership in professional associations and participation in continuing education programmes proves that some of the personal characteristics influence library professionals in their professional activities. Chan and Auster (2003) have also made similar observations in their study that individual characteristics are significant factors in participation in updating activities.

The analysis also shows that majority of the library professionals have a positive approach to continuing education programmes and it is clear from the results that they participate in such programmes to get trained in the latest technologies and acquire new skills. Analysis of the opinion about continuing education programmes help to prove that participation in such programmes has helped to update their skills to some extent. It is also proved that respondent's characteristics influence the participation in CEPs and their attitudes towards CEP. Roberts and Konn (1989) in a related study reported the growing interest and attitudes of government and polytechnic librarians towards continuing education. The impact of technological developments upon continuing education requirements was also stressed in a number of responses in the study.

5.4 Educational and Information needs

The educational and information needs of library professionals in the electronic environment are analysed in this section. The use of information sources, electronic sources, online educational sources, educational programmes on visual media, E-learning modules etc are included

5.4.1 Use of information sources

The library professionals were asked to indicate their preference for different information sources to support their educational and information needs. It was found that Internet resources was preferred mode of information source by 38.9% of Library professionals, while all print resources including Journals/Periodicals (20.0%),Books (24.3%)and Conference papers(5.4%) was preferred by 49.4% of library professionals , and 11.4% indicated other types of sources for their information needs..The preference for different information sources according to University ,Age, Gender, Qualification, Designation and Experience is depicted in Tables and figures from 5.4.1 a to 5.4.1 f

Table 5.4.1 a Use of information sources according to University

University	Journals/ Periodicals	Books	Conference Papers	Internet sources	Other	Total
KAN	1 (16.7%)	1 (16.7%)	1 (16.7%)	3 (50.0%)	0 (0.0%)	6 (100.0%)
KAU	1 (14.3%)	1 (14.3%)	0 (0.0%)	4 (57.1%)	1 (14.3%)	7 (100.0%)
SSU	1 (8.3%)	4 (33.3%)	1 (8.3%)	5 (41.7%)	1 (8.3%)	12 (100.0%)
MGU	3 (17.6%)	2 (11.8%)	1 (5.9%)	9 (52.9%)	2 (11.8%)	17 (100.0%)
UOC	14 (36.8%)	10 (26.3%)	1 (2.6%)	8 (21.1%)	5 (13.2%)	38 (100.0%)
CUSAT	7 (14.9%)	7 (14.9%)	4 (8.5%)	27 (57.4%)	2 (4.3%)	47 (100.0%)
UOK	10 (17.2%)	20 (34.5%)	2 (3.4%)	16 (27.6%)	10 (17.2%)	58 (100.0%)
Total	37 (20.0%)	45 (24.3%)	10 (5.4%)	72 (38.9%)	21 (11.4)	185 (100.0%

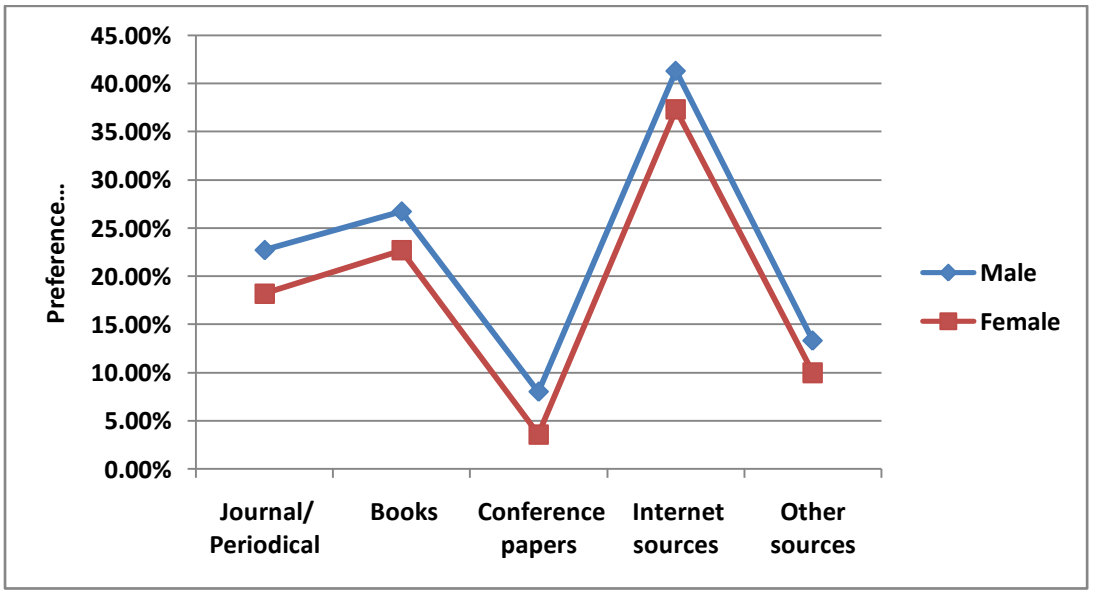
5.4.1 a Use of information sources according to University

Table 5.4.1 a shows the preference to information sources by the professionals in all the Universities. It is clear that there is an inclination towards use of internet sources to satisfy the information requirements of the professionals. The library professionals in all the Universities except University of Calicut and University of Kerala prefer internet resources to other sources of information. The professionals in University of Calicut prefer journals/ periodicals (36.8%) and books (26.3%) more than internet sources (21.1%).Whereas in Kerala University books are more preferred (34.5%) than internet sources (27.6%) and journals and other sources (17.2%). In all other Universities, internet sources are more preferred than books and journals. The preference to internet sources is more in CUSAT (57.4%), Kerala Agricultural University (57.1%), M.G University (52.9%) ,Kannur University (50.0%) and Sanskrit University (41.7%). As seen in the table the least preferred source is conference papers (5.4%).

5.4.1 b Use of information sources according to Gender

The Fig 5.4.1 b shows the preference of information sources according to age of library professionals. The graph shows an almost similar pattern of accessing information sources. While 41.3 % of males use internet sources more than books (26.7%) and journals (22.7%), the preference to internet sources is comparatively less among the female library professionals (37.3%).

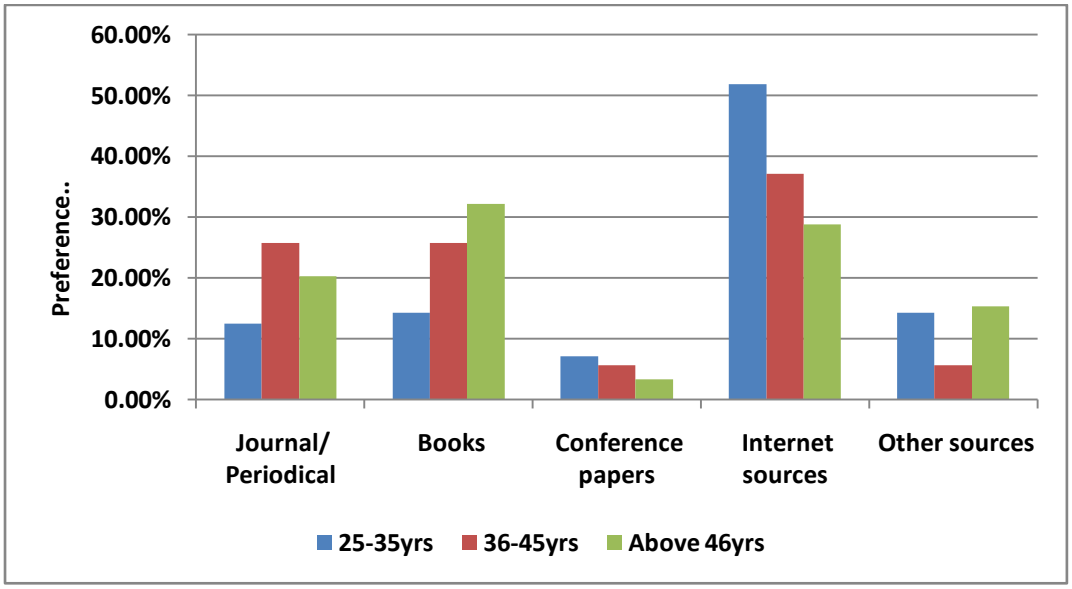
Fig 5.4.1 b Use of information sources according to Gender



5.4.1 c Use of information sources according to Age

Age wise use of information sources is shown in Fig 5.4.1 c. It is clear that the professionals in the younger age group have a tendency to access internet sources (51.8%), more than books (14.3%) and journals (12.5%). While in the age group, 36-45 the use of internet sources is (37.1%), books and journals are equally preferred (25.7%). The older group of professionals prefer to use books (32.2%) more than internet sources (28.8%), journals/periodicals (20.3%) and other sources of information (15.3%).

Fig 5.4.1 c Use of information sources according to Age



5.4.1 d Use of information sources according to Qualification

Table 5.4.1 d shows the qualification wise use of information sources by the library professionals. Library professionals with Doctorate degree use journals / periodicals, internet sources (31.6%) more than books, and conference papers (15.8%). Those with MPhil degree access internet resources (44.6%) more than books and journals (17.9%) and MLISc holders also have preference to internet sources (40.9%) when compared to books (25.8%) and journals (18.3%). It is found that books are main sources of interest to graduates in library science (47.1%) than internet (17.3%) and Journals (23.5%).

Table 5.4.1 d Use of information sources according to Qualification

Qualification	Journals/ Periodicals	Books	Conference papers	Internet sources	Other sources	Total
PhD	6 (31.6%)	3 (15.8%)	3 (15.8%)	6 (31.6%)	1 (5.3%)	19 (100.0%)
MPhil	10 (17.9%)	10 (17.9%)	2 (3.6%)	25 (44.6%)	9 (16.1%)	56 (100.0%)
MLISc	17 (18.3%	24 (25.8%)	4 (4.3%)	38 (40.9%)	10 (10.8%)	93 (100.0%)
BLISc	4 (23.5%)	8 (47.1%)	1 (5.9%)	3 (17.6%)	1 (5.9%)	17 (100.0%)
Total	37 (20.0%)	45 (24.3%)	10 (5.4%)	72 (38.9%	21 (11.4%)	185 (100.0%)

5.4.1 e Use of information sources according to Designation

Table 5.4.1 e shows the designation wise use of information sources by the library professionals. It is found that Deputy Librarians depend more on books (50.0%) than internet sources, journals/periodicals and conference papers(16.7%). Library professionals in the category of Assistant Librarian also prefer internet sources (34.8%) to journals/periodicals (29.0%), books (21.7%) and conference papers (7.2%).Whereas among Junior Librarians and Professional Assistants preference to internet resources is higher (42.4% and 42.9%) than journals / periodicals and books.

Table 5.4.1 e Use of information sources according to Designation

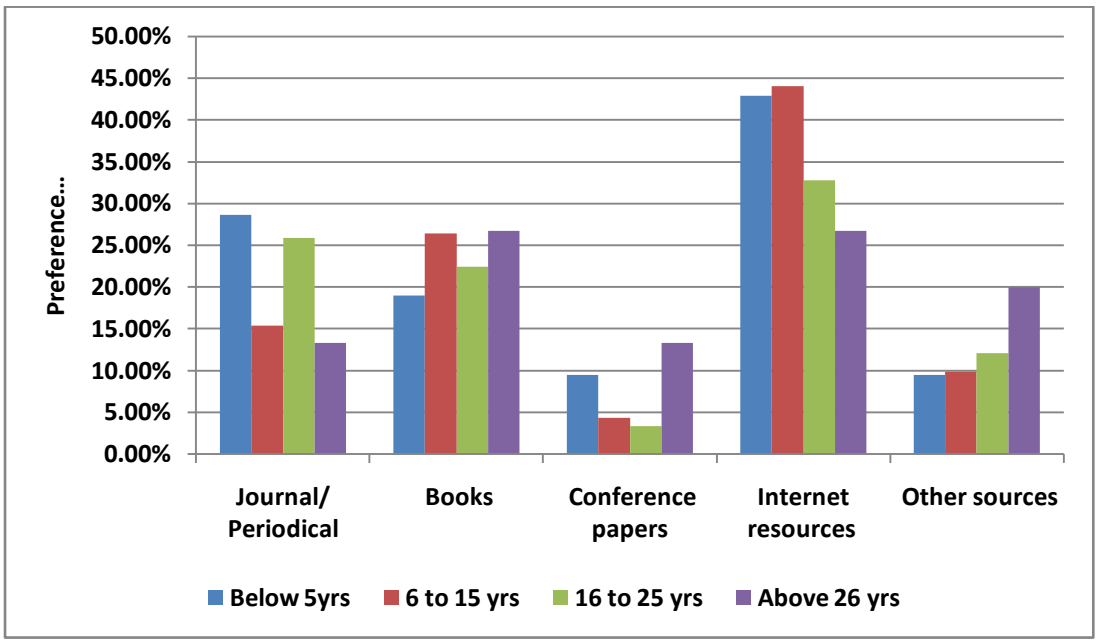
Designation	Journals/ Periodicals	Books	Conference papers	Internet sources	Other sources	Total
Deputy Librarian	1 (16.7%)	3 (50.0%)	1 (16.7%)	1 (16.7%)	0 (0.0%)	6 (100.0%)
Assistant Librarian	20 (29.0%)	15 (21.7%)	5 (7.2%)	24 (34.8%)	5 (7.2%)	69 (100.0%)
Junior Librarian	6 (18.2%)	6 (18.2%)	3 (9.1%)	14 (42.4%)	4 (12.1%)	33 (100.0%)
Professional Assistant	10 (13.0%)	21 (27.3%)	1 (1.3%)	33 (42.9%)	12 (15.6%)	77 (100.0%)
Total	37 (20.0%)	45 (24.3%)	10 (5.4%)	72 (38.9%)	21 (11.4%)	185 (100.0%)

5.4.1 f Use of information sources according to Experience

The experience wise analysis of library professionals' preference to information sources is shown in Fig . 5.4.1 f. The access of journals/periodicals among the junior most professionals is 28.6%, while use of books is 19 %, conference papers 9.5% and

internet sources 42.9%. The professionals having 6 to 15 years of experience in the library use internet sources more than other professionals (44.0%). Next, they prefer to use books 26.4% and then journals/periodicals 15.4%. The professionals with 16-25 years experience prefer to use internet sources (32.8%), journals/periodicals 25.9%, books 22.4% , and conference papers 3.4%.The senior most professionals' use of books and internet sources is 26.7% and that of journals /periodicals is 13.3%.

Fig 5.4.1 f Use of information sources according to Experience

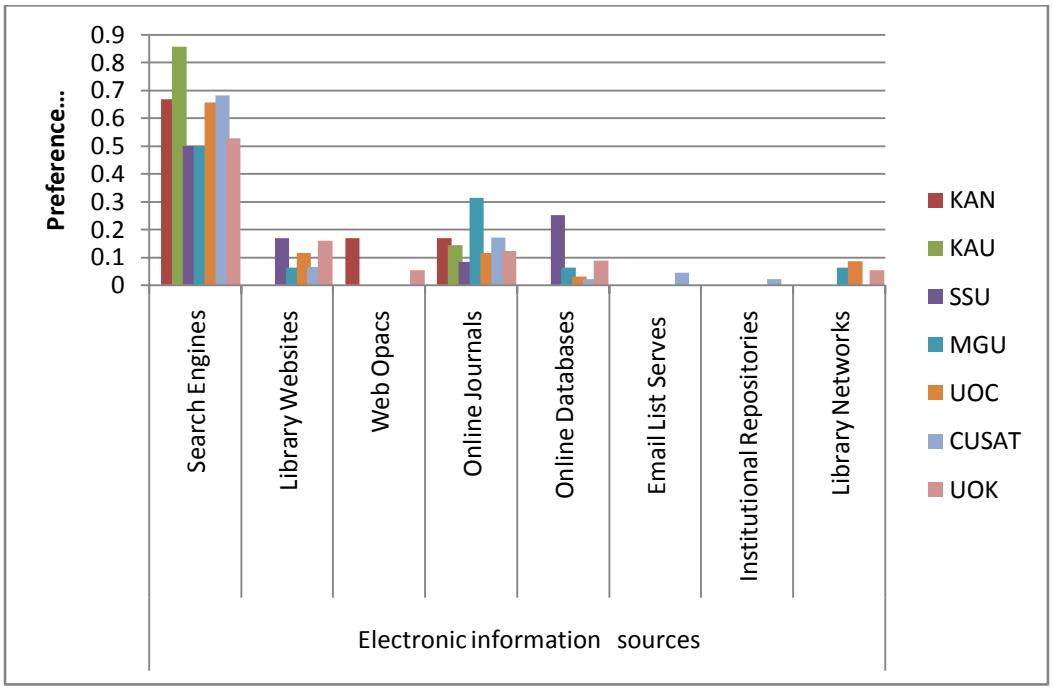


From the analysis of use of information sources it is evident that there is a preference for internet based sources to satisfy information and educational needs especially among the younger library professionals. The younger users are inclined to use electronic resources when compared to print as found in a study by Sarasvady and Khatri(2007).The variations with respect to variables like age, status and academic position were also found to be significant in a related study of use of electronic resources (Tenopir, 2003) . In some Universities there is an increasing trend towards the use of web-based information sources may be because of the ease of access to electronic resources in such institutions.

5.4.2 Use of electronic information sources

Several sources are available on the web to get information on wide-ranging subjects. The library professionals' preference for different electronic resources is depicted in Fig 5.4.2. It is clear from the Fig. that search engines are the most preferred form of electronic information source among the library professionals in all the Universities.

Fig 5.4.2 Use of electronic information sources



While 60.6% of the professionals depend on search engines, only 15.0% access online journals to meet their information needs. The use of other information sources is very low as seen from the fig. The use of Library websites is 10.6%, Online databases 6.1%, Library Networks 3.9%, Web Opacs 2.2% , Email List Serves 1.1%, and Institutional repositories 0.6%.

5.4.3 Use of Online Educational sources

Online education has influenced education sector to a great extent and is expected to play an important role in future education in all areas of knowledge. IGNOU has been engaged in providing educational courses in the distance mode in many disciplines including library and information science. In addition, IGNOU through its online programmes supplement the teaching and learning processes for professional, need-based, vocational and other academic programmes. Consortium for Educational Communication (CEC) is an Inter-University Centre created by the UGC with the responsibility of utilizing electronic media in education ,and implements E-content development Scheme on Higher Education. . CEC coordinates the management and production of programmes in the 17 Media Centres set up by the UGC in various Universities of India. These programmes are telecast through VYAS-24 hour higher education channel in association with IGNOU, targeted at providing learning opportunities to masses across the length and breadth of the country. The channel telecasts 8 hours of educational program daily which are repeated twice during the

course of the day so as to ensure convenient and suitable access to a wide variety of learners across the country and is viewed on DTH Platform of DD Plus. (IGNOU, 2010)

5.4.3.1a Whether watched Educational Programmes on TV

In order to study the educational sources accessed, the library professionals were asked to indicate whether they watch any educational programmes broadcasted on Television network. It was found that only 48.1 % saw such programmes of educational interests, while 51.9% of professionals have not viewed any educational programmes on T.V. Library professionals of Sanskrit University (58.3%), CUSAT (53.2%) and University of Kerala (50.0%) have more interest to watch educational programmes, than the professionals in Calicut University (47.4%), MG University (35.3%), Kannur University (33.3%) and the least interest by those in Agricultural University (28.6%) as seen in Table 5.4.3 .1a.

Table 5.4.3.1a Whether watched Educational Programmes on TV

University	Whether watched educational programmes		Total
	Yes	No	
KAN	2 (33.3%)	4 (66.7%)	6 (100.0%)
KAU	2 (28.6%)	5 (71.4%)	7 (100.0%)
SSU	7 (58.3%)	5 (41.7%)	12 (100.0%)
MGU	6 (35.3%)	11 (64.7%)	17 (100.0%)
UOC	18 (47.4%)	20 (52.6%)	38 (100.0%)
CUSAT	25 (53.2%)	22 (46.8%)	47 (100.0%)
UOK	29 (50.0%)	29 (50.0%)	58 (100.0%)
Total	89 (48.1%)	96 (51.9%)	185 (100.0%)

As shown in the table 5.4.3.1b of the total professionals who made use of such programmes, 37.1% of library professionals watched UGC programmes, 21.3% preferred to watch IGNOU programmes, and 21.3% other educational programmes(eg Victer), 20.2 % liked to see both UGC and IGNOU programmes.

Table 5.4.3.1b Preference to Educational Programmes on TV

University	Educational Programmes on TV				Total
	UGC Programmes	IGNOU Programmes	Other Educational Programmes	Both UGC & IGNOU	
KAN	0 (.0%)	0 (.0%)	2 (100.0%)	0 (.0%)	2 (100.0%)
KAU	1 (50.0%)	0 (.0%)	0 (.0%)	1 (50.0%)	2 (100.0%)
SSU	2 (28.6%)	1 (14.3%)	3 (42.9%)	1 (14.3%)	7 (100.0%)
MGU	2 (33.3%)	1 (16.7%)	2 (33.3%)	1 (16.7%)	6 (100.0%)
UOK	7 (38.9%)	5 (27.8%)	1 (5.6%)	5 (27.8%)	18 (100.0%)
CUSAT	6 (24.0%)	7 (28.0%)	9 (36.0%)	3 (12.0%)	25 (100.0%)
UOK	15 (51.7%)	5 (17.2%)	2 (6.9%)	7 (24.1%)	29 (100.0%)
Total	33 (37.1%)	19 (21.3%)	19 (21.3%)	18 (20.2%)	89 (100.0%)

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5.4.3.2a Whether accessed E- learning Programmes

The analysis of the use of E- learning programmes shows that only 23.2% have accessed online modules or E-learning modules , while a great majority(76.8 %)have not made use of any of the E-learning course modules available for their informational or educational needs. The table table 5.4.3.2a.shows the use of E-learning programmes by library professionals. It was found that the professionals in Kerala Agricultural University (42.9%) and CUSAT (40.4%) are familiar with Elearning programmes more than that of Sanskrit University (25.0%), MG University (17.6%) , Calicut University (18.4%) ,University of Kerala (13.8%) and Kannur University where none has used E-learning modules.

Table 5.4.3.2a Whether accessed E- learning Programmes

University	Whether accessed E-learning modules		Total
	Yes	No	
KAN	0 (0%)	6 (100.0%)	6 (100.0%)
KAU	3 (42.9%)	4 (57.1%)	7 (100.0%)
SSU	3 (25.0%)	9 (75.0%)	12 (100.0%)
MGU	3 (17.6%)	14 (82.4%)	17 (100.0%)
UOC	7 (18.4%)	31 (81.6%)	38 (100.0%)
CUSAT	19 (40.4%)	28 (59.6%)	47 (100.0%)
UOK	8 (13.8%)	50 (86.2%)	58 (100.0%)
Total	43 (23.2%)	142 (76.8%)	185 (100.0%)

5.4.3.2 b Details of Use of E- learning Programmes

The table 5.4.3.2b shows the preference to different E-learning programmes among the library professionals in different universities. Among the total professionals who have accessed E-learning it is clear that the most preferred module is that of IGNOU (76.7%), followed by few who used NPTEL modules (9.3%),MIT course modules and other E-learning programmes available(7.0%).

Some of the other E-learning programmes available in Library and Information science include Online Degrees in Library Science provided by Drexel University Online, and I-Mark an E-learning initiative in agricultural information management developed by FAO and partner organizations. The I-Mark module includes creation of digital libraries and the preservation of materials in digital format. Also included are lessons covering copyright issues, electronic formats for text and images, metadata standards and subject indexing, as well as a comprehensive overview of the creation and management of digital documents**,** digital library software – Greenstone etc.

Table 5.4.3.2b Details of Use of E- learning Programmes

University	E-Learning programmes				Total
	MIT Course Modules	NPTEL Course Modules	IGNOU	Others	
KAU	0 (.0%)	0 (.0%)	3 (100.0%)	0 (.0%)	3 (100%)
SSU	0 (.0%)	0 (.0%)	3 (100.0%)	0 (.0%)	3 (100%)
MGU	0 (.0%)	0 (.0%)	2 (66.7%)	1 (33.3%)	3 (100%)
UOC	2 (28.6%)	0 (.0%)	4 (57.1%)	1 (14.3%)	7 (100%)
CUSAT	1 (5.3%)	2 (10.5%)	15 (78.9%)	1 (5.3%)	19 (100%)
UOK	0 (.0%)	2 (25.0%)	6 (75.0%)	0 (.0%)	8 (100%)
Total	3 (7.0%)	4 (9.3%)	33 (76.7%)	3 (7.0%)	43 (100.0%)

5.4.4 Library and Information Science curriculum

Developments in information communication technologies have influenced library science education which has in turn contributed to restructuring the curriculum of Library science courses**.** Most of the Universities have incorporated technology related topics in the LIS curriculum but it is inadequate to create required skills in library professionals to meet the growing demands of the present society.

5.4.4.1 Opinion about restructuring curriculum

The library professional's opinion about restructuring the present curricula of library and information science was analyzed and found that a good majority(83.2%) were positive about restructuring curriculum and only .5% pointed out that it was not necessary .While 16.2% of the professionals refused to give any comment on this question. The University wise analysis of the opinion about restructuring curriculum is presented in Table 5.4.4.1. It was found that all the professionals (100%)surveyed in Kannur University had an opinion that LIS curriculum is to be revised, while 85.7% in Agricultural University , 83.3% in Sanskrit University, 88.2% in MG University, 76.3% in University of Calicut , 87.2% in CUSAT, and 81.0% in Kerala University pointed out the need to revise LIS curriculum. Others did not offer any

comments regarding this question. Only .5% from Kerala University noted that there is no need to revise the curriculum.

Table 5.4.4.1 Opinion about restructuring curriculum

University	Need to restructure LIS curriculum			Total
	Yes	No	No Comments	
KAN	6 (100.0%)	0 (.0%)	0 (.0%)	6 (100.0%)
KAU	6 (85.7%)	0 (.0%)	1 (14.3%)	7 (100.0%)
SSU	10 (83.3%)	0 (.0%)	2 (16.7%)	12 (100.0%)
MGU	15 (88.2%)	0 (.0%)	2 (11.8%)	17 (100.0%)
UOC	29 (76.3%)	0 (.0%)	9 (23.7%)	38 (100.0%)
CUSAT	41 (87.2%)	0 (.0%)	6 (12.8%)	47 (100.0%)
UOK	47 (81.0%)	1 (1.7%)	10 (17.2%)	58 (100.0%)
Total	154 (83.2%))	1 (.5%)	30 (16.2%)	185 (100.0%)

Varalakshmi (2006) conducted a study of LIS alumni who graduated from LIS schools of Andhra University, Visakhapatnam, from 2002-2005 and LIS professionals working in higher academic institutions and special libraries, seeking their opinion on various aspects of curriculum and training components of LIS education programs in India. On the need for revision of the existing curriculum, 90% responded positively and suggested "increase in the scope of I.T. and management courses," She also noted that “there are varying degrees of skills required in library profession and all aspects need to be taken care of while devising a curriculum. The existing course structure is inflexible to accommodate emerging needs of the information society. It needs revision, as suggested by budding as well as experienced professionals. The library professionals are not satisfied with the outcome of library schools and believe that preparing students for the future does involve teaching them technology skills, soft

skills, and management skills. It is time for LIS schools to respond to the needs of the information society, even though it may be burdensome to them to change the admission criteria and syllabi frequently."

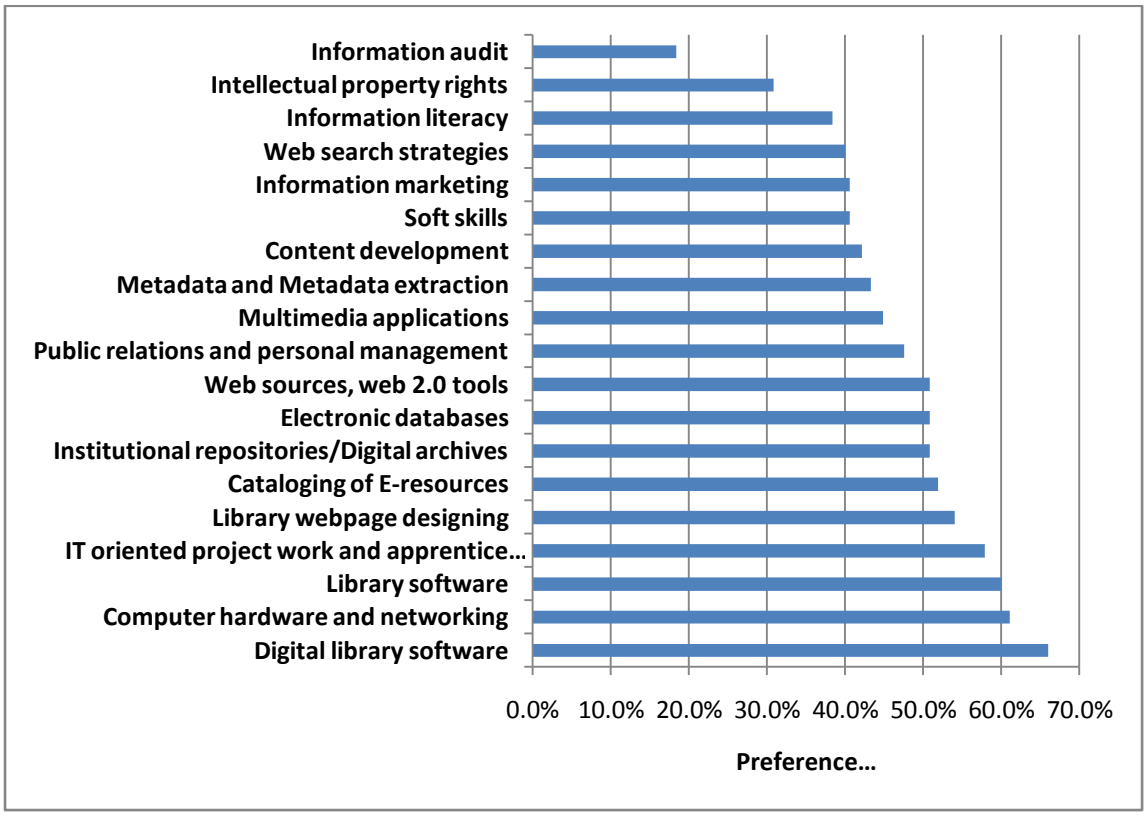
5.4.4.2 Opinion about topics to be added to LIS curriculum

The University library professionals were asked to indicate the topics to be added to the library science curriculum**.** It is to be noted that all the professionals both young and experienced hands suggested revising curriculum of library and information science courses. Recently qualified professionals had covered most of the topics related to IT, but they too pointed out the need to include more IT oriented topics. Some professionals pointed out that topics like Information audit, Information marketing, Information literacy etc has been taught along with the conventional subjects modifying the same. It was also suggested that in an integrated course of four semester conventional areas can be modified and papers covering Essentials of Information management, Open Source, Linux, Networking, Management, Office application software, Database management, FOSS in LIC including Institutional repositories and Digital Libraries can be included.

Either most of the University libraries are automated fully or partially using library softwares .The library professionals are to be trained in library softwares to properly administer the library services. One month internship or training in important libraries during the course of study has been introduced in some of the Universities for MLIS programme. This has been beneficial to the newly recruited professionals only. Cataloging of electronic resources is relevant in this era where a big share of library resources is electronic or online. In order to keep up with the current digital environment, the American Library Association has created a new standard called Resource Description and Access (RDA). RDA is the next step for catalogers to project the library science field into the 21st century. The new rules are framed for the digital environment and include guidelines and instructions that cover description and access for all digital and analog resources, and records that can be used in a variety of digital environments (the Internet, Web OPACs, etc.) RDA provides guidelines for cataloging continuing resources and web pages and allows librarians to enter Web 2.0 by allowing users to create tags for local library OPACs (Hubbell, 2010).

The analysis of topics to be included in the curriculum in the order of preference is depicted in the Fig 5.4.4.2. It was found that Digital library software is the most recommended topic pointed out by 65.9% of professionals. Majority of the library professionals may not be having sufficient knowledge about the hardware aspects of computer, hence computer hardware and networking was the next important topic preferred by 61.1% of library professionals.. Library software was another main topic suggested by majority (60.0%) of library professionals. IT oriented project work and apprentice training was suggested by 57.8% of library professionals. Library Web page designing was another topic favored by 54.1% of professionals. Cataloging of E-resources was a topic found important by 51.8% of library professionals. Other topics preferred by library professionals are in the order Institutional repositories/Digital archives, Electronic databases and Web2.0 tools (50.8%), Public relations and personal management (47.6%), Multimedia applications (44.9%), Metadata extraction (43.2%), content development, (42.2%),Soft skills and Information Marketing(40.5%),web search strategies(40.0%), Information Literacy(38.4%), Intellectual property rights(30.8%), and Information audit (18.4%).

Fig 5.4.4.2 Opinion about Topics to be added to LIS curriculum



5.4.4.3 Opinion whether LIS Education has helped to acquire necessary skills

In the present ICT environment Library science professionals have to acquire various skills and knowledge to provide enhanced services to the user community. The library professionals were asked to indicate how far their formal library science education has helped them in their career. The analysis of the responses are categorized in to two groups and shown in Fig 5.4.4.3a & 5.4.4.3b .

It was found that most of the Library professionals were of the view that their formal education has not helped in getting expertise in topics like evaluating information resources in electronic format (43.3%), handling multimedia systems and LCD projection aids (55.7%). In the case of using current methods of cataloguing for print & e-resources 57.3% of the professionals indicated that education has helped to get knowledge of the subject. LIS education helped to get familiarity with automated acquisition and serial control for 44.4% of professionals, and evaluating library automated systems 44.3%. A good majority of library professionals agreed that library education has helped to get knowledge of research methodologies (76.7%) and conducting user education programme (66.5%),

Fig 5.4.4.3 a Whether LIS education has helped to acquire necessary skills

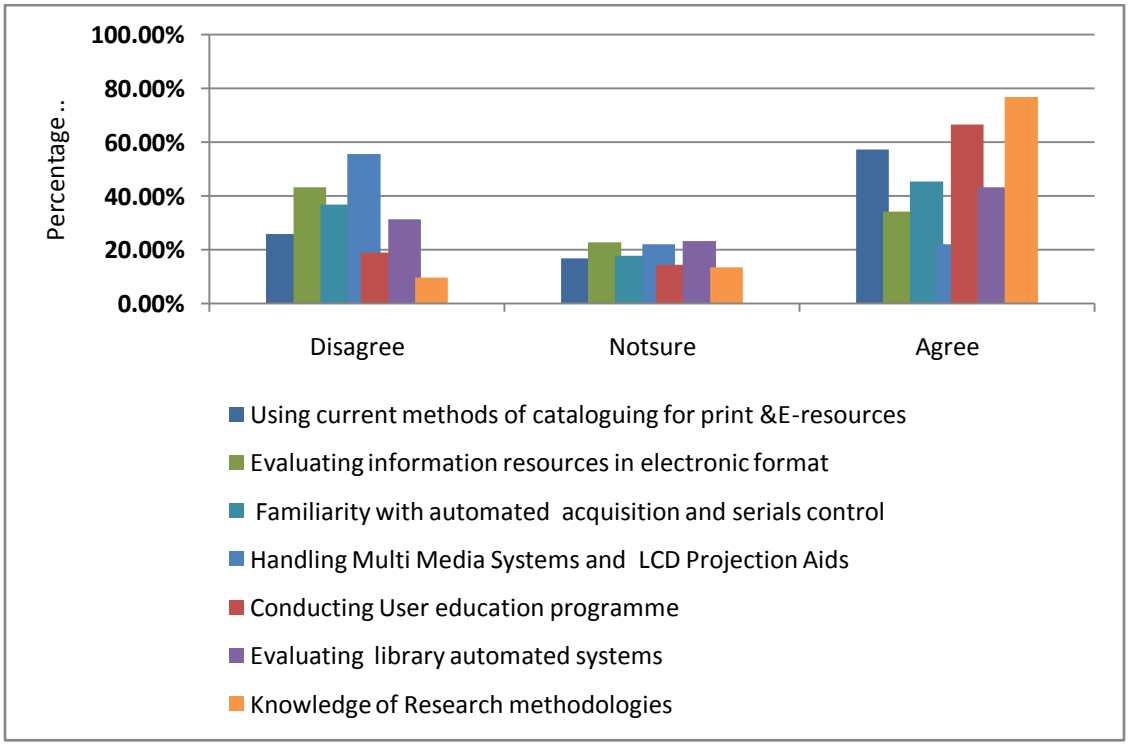
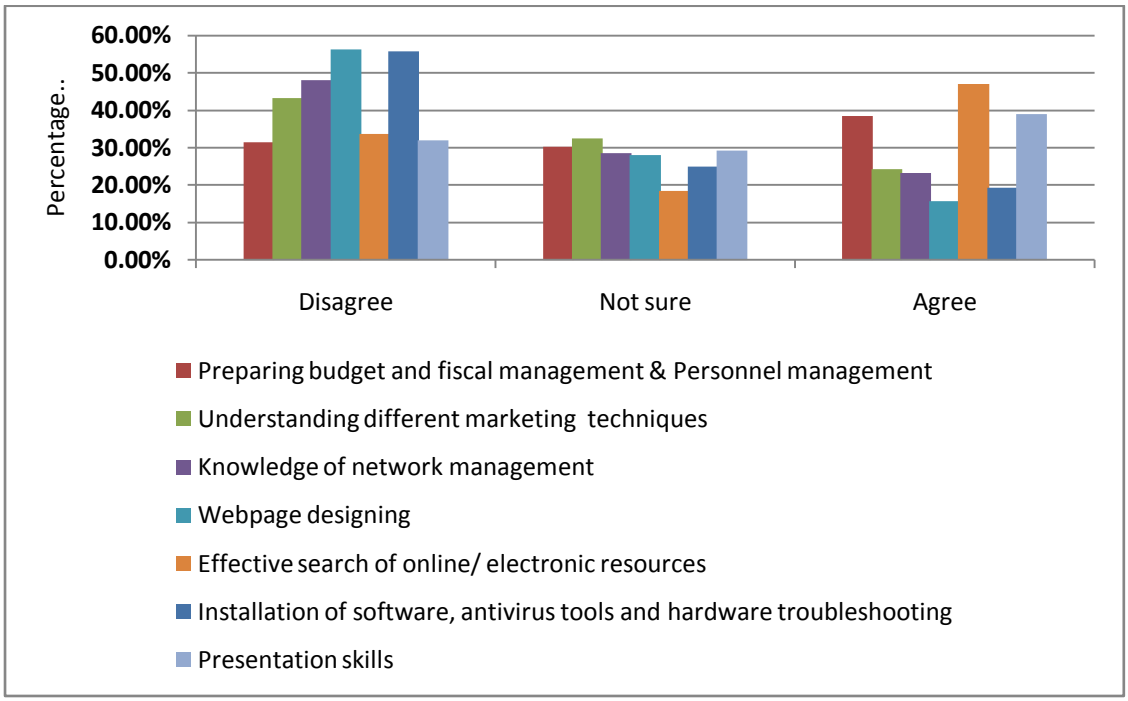


Fig 5.4.4.3 b Whether LIS education has helped to acquire necessary skills

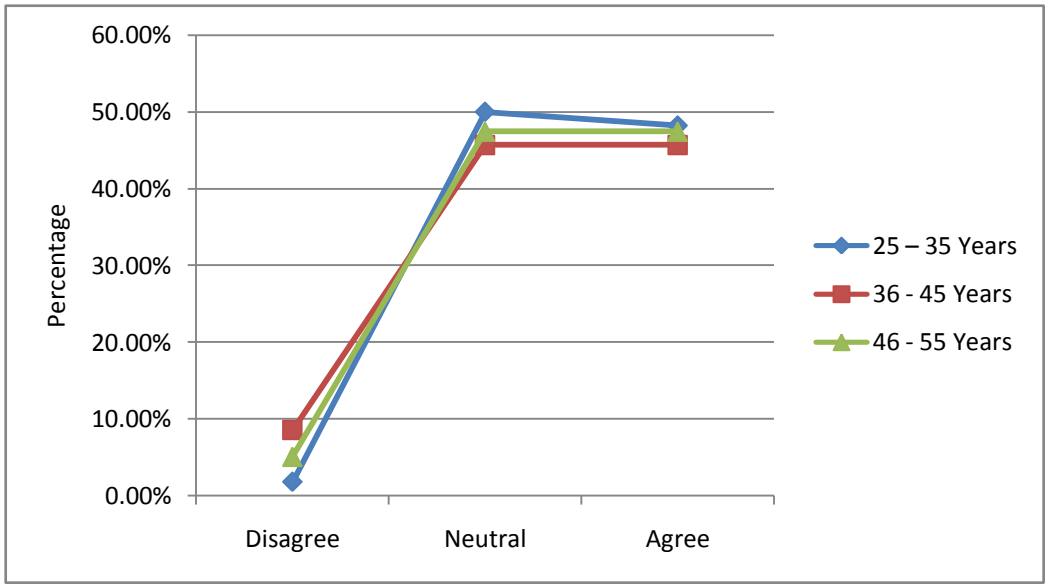


Knowledge about fiscal and personnel management was found to be satisfactory for 38.4% professionals while 31.4% disagreed and almost equal 30.3% were not sure. From the Fig 5.4.4.3b it is clear that professionals did not have a positive opinion about understanding different marketing techniques (43.2%), knowledge of network management (48.1%), webpage designing (56.2%), installation of software, antivirus tools and hardware troubleshooting (55.7%). While 47% of the professionals agreed that LIS education was of use for effective search of online/electronic resources, presentation skills was developed to some extent (38.9%) with the help of formal library education.

5.4.4.3 c Age wise opinion whether LIS education has helped to acquire necessary skills

Results of the analysis of average opinion about library science education according to age group are shown in Fig 5.4.4.3c. It was found that very few disagreed that formal education has assisted in acquiring various skills required for the profession. Majority was either uncertain or agreed that library science education has helped them in the career of library science. The opinion showed a similar pattern in the different age groups among the respondents.

Fig 5.4.4.3 c Age wise opinion whether LIS education has helped to acquire necessary skills



5.4.4.3d Designation wise opinion whether LIS education has helped to acquire necessary skills

Average opinion about whether Library science education has helped to acquire necessary skills on the basis of designation of library professionals is presented in the table 5.4.4.3d. It was found that majority of the professionals in all categories agreed or was uncertain about library science education, but only a few had opinion LIS education has not assisted in acquiring necessary skills.

Table 5.4.4.3d Designation wise opinion whether LIS education has helped to acquire necessary skills

	Formal education assisted in acquiring skills			
Designation	Disagree	Neutral	Agree	Total
Deputy Librarian	0 (0.00%)	3 (50.00%)	3 (50.00%)	6 (3.24%)
Assistant Librarian	5 (7.25%)	33 (47.83%)	31 (44.93%)	69 (37.30%)
Junior Librarian	2 (6.06%)	14 (42.42%)	17 (51.52%)	33 (17.84%)
Professional Assistant	3 (3.90%)	38 (49.35%)	36 (46.75%)	77 (41.62%)
Total	10 (5.4%)	88 (47.6%)	87 (47.0%)	185 (100.00%)

5.4.4.3e Experience wise opinion whether LIS education has helped to acquire necessary skills

Analysis of experience wise opinion about LIS education is tabulated in Table 5.4.43e. Majority of the professionals (66.7%) above 26 years of experience were uncertain about LIS education and only a few (20.3%)agreed that LIS education has helped them in their career. All other group of professionals was either uncertain or agreed that LIS education has assisted them in acquiring skills.

Table 5.4.4.3e Experience wise opinion whether LIS education has helped to acquire necessary skills

Experience	Formal education assisted in acquiring skills			Total
	Disagree	Neutral	Agree	
Below 5 Years	1 (4.76%)	11 (52.38%)	9 (42.86%)	6 (3.24%)
5 - 15 Years	5 (5.49%)	39 (42.86%)	47 (51.65%)	69 (37.30%)
16 - 25 Years	2 (3.45%)	28 (48.28%)	28 (48.28%)	33 (17.84%)
Above26 Years	2 (13.33%)	10 (66.67%)	3 (20.00%)	77 (41.62%)
Total	10 (5.4%)	88 (47.6%)	87 (47.0%)	185 (100.00%)

ANOVA test was used to check whether there is any relationship between the respondents' characteristics and the dependent variable and is presented in the table 5.4.5f. It shows that experience of library professionals is a factor that influences the opinion regarding library science education.

Table 5.4.4.3f Relationship between respondent's characteristics and opinion about LIS education

Variables	Sum of Squares	df	Mean Square	F	Sig.
University	489.098	6	81.516	1.068	0.384 NS
Gender	72.736	1	72.736	0.953	0.330 NS
Age	812.722	5	162.544	2.130	0.064 NS
Qualification	265.901	3	88.634	1.162	0.326 NS
Designation	58.722	3	19.574	0.257	0.857 NS
Experience	1019.359	6	169.893	2.227	0.043 S

Analysis of opinion about library science education reflects the opinion of all the Library professionals including who had recently qualified and had less experience in the profession and the professionals who have acquired Library science degree much before ICT based topics were added to the curriculum. Hence, it can be said that there are still areas where changes are to be introduced in the library and information science curriculum incorporating more Hardware aspects, Network management, E-resource management, Designing web pages, Library Management including personnel and marketing management etc. As the emergence of electronic media has opened up new avenues, it is high time to consider these things in framing a curriculum for LIS. Librarians without ICT knowledge and skills will encounter problems in employment (Singh,2010).

5.5 Information Communication Technology (ICT) Skills and Awareness

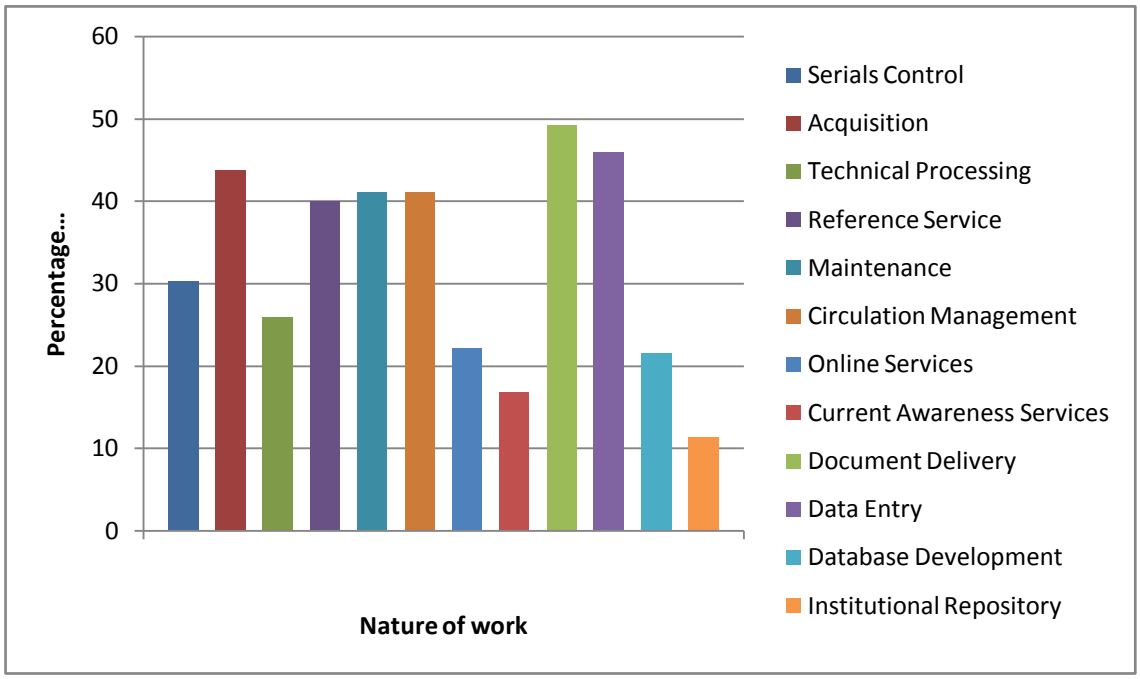
For a library professional Information communication technology represents the technologies and systems like computers, multimedia, telecommunication technologies, reprographic technologies, library technologies, technical communication etc. ICT skills or IT skills can be referred to the overall competencies (knowledge, know-how, skills and attitudes) necessary to create, store, analyze, organize, retrieve and disseminate digital information (text, images, sounds) in digital libraries or any type of information. (Sreenivasulu, 2000) . Library professionals have

to update continuously, to face the challenges posed by ICT in the storage, retrieval and dissemination of information. In this section, an attempt is made to analyse the skills and awareness of library professionals in developments in ICT based technologies, ICT applications, Web tools, Library software packages and Digital library software. The professionals' attitudes towards application of ICT , problems faced in the effective use of ICT applications because of the developments in the present information environment and suggestions for updating skills of library professionals are analysed.

5.5.1 Nature of work in the present post

In order to get an idea about the work environment the library professionals were asked to indicate the nature of work in their present post. The details of professionals' nature of work is illustrated in the Fig 5.5.1

Fig 5.5.1 Nature of work in the present post



It was observed that the nature of work is diverse and that in some Universities due to the scarcity of qualified staff the junior professionals are assigned duties in different sections. A person responsible for serials control has additional duty in database management and circulation. Library professionals in charge of the departmental libraries, manage all the services except in cases where there is additional library

staff. The analysis of the range of duties showed that most of the professionals are allotted conventional duties except in some cases. Forty nine percent are involved in document delivery both conventional and electronic. Around 46% of the professionals are associated with data entry operations, around 40-44% in conventional services like acquisition, reference service, circulation and 30.3% in serials control. Technical processing jobs were managed by 26% of library professionals while other ICT based services like online services (22.6%), current awareness services (16.8%), database development (21.6%) and institutional repositories found participation of comparatively less number of library professionals. It is evident that most of the professionals are not directly linked with ICT based services. In most of the Universities, a small group of trained library professionals or computer professionals is providing ICT based services and the work arrangement is such that other library professionals have no chance to work in those sections. Hence, it creates a problem among the qualified professionals, as they do not get an opportunity to be familiar with ICT services and facilities in their own institution.

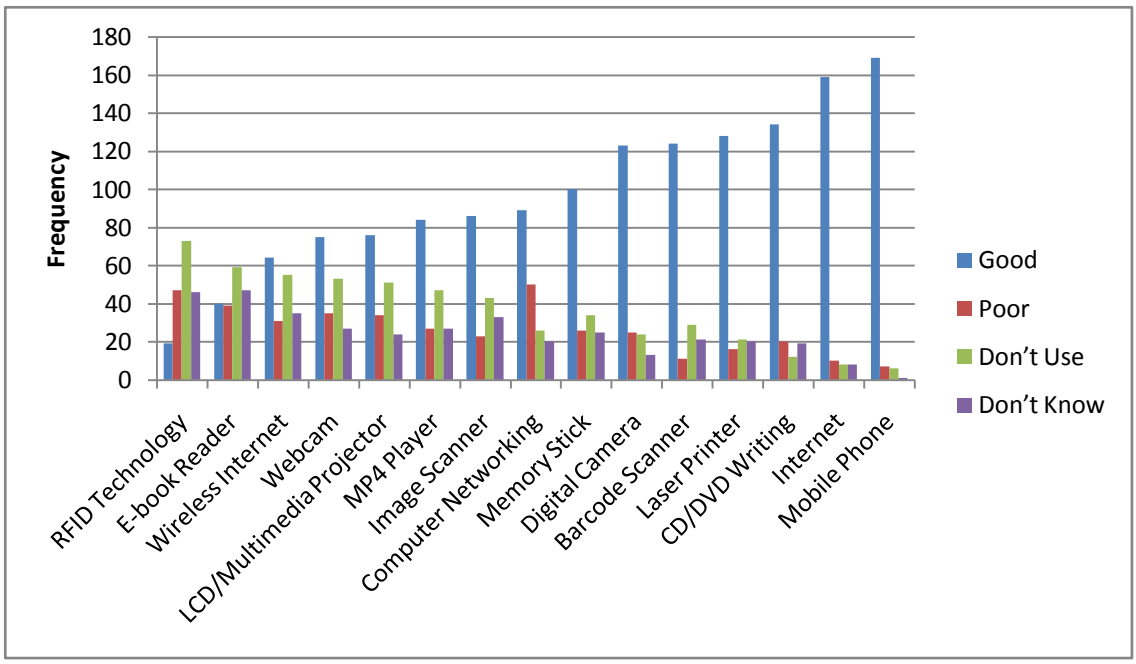
5.5.2 Awareness/skill and use of different technologies

In the changing information age, library professionals have to gain extensive knowledge about developing technologies and improve their skills to manage these technologies. Computers, connectivity, and electronic information have redefined the image of library profession and the services provided by librarians. Library professionals were asked to specify their awareness or skill in the use of various technological devices including computer hardware, mobile technology, digital camera, laser printer, scanner, etc.

The fig 5.5.2 represents the library professionals' familiarity with the various technologies listed. From the figure, it is clear that the library professionals are moderately skilled in the use of different technologies and devices relevant in the present information era. It was found that mobile phone (91.4%) and internet (86%) is the most used and familiar of all the technologies.Only a few have indicated that they don't use mobile phone (3.2%) or internet (4.3%). CD/DVD related technology is the next known item commonly known to 72.4% of professionals.

Other familiar technological devices are Laser printer, (69.2%), Barcode Scanner (67%), Digital Camera (66.5%), Memory Stick like flash drive or USB (54%). Other items familiar to less than 50% of professionals are computer networking (48%), Image Scanner (46.5%), MP4 Player (45.4%), LCD/Multimedia Projector (41.1%),Webcam (40.5%), Wireless Internet (34.6%), E-book Reader (21.6%), and the least familiar and least used among library professionals RFID Technology (10.3%).The professionals who have not used RFID technologies are 39.5% and 24.9% are unaware of it.

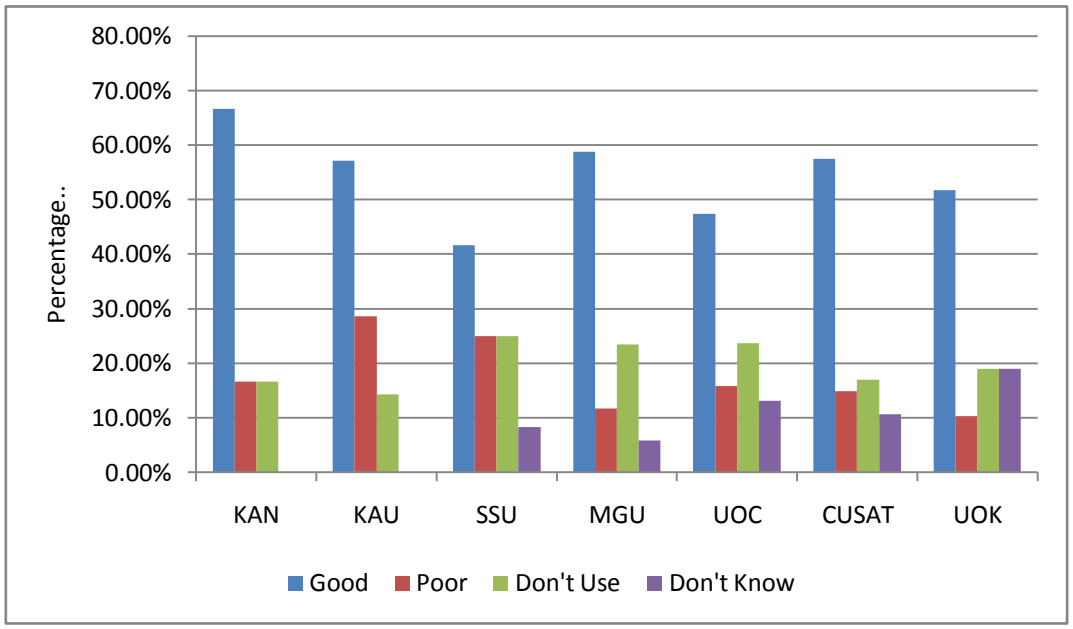
Fig 5.5.2 Awareness /skill and use of different technologies



5.5.2 a University wise awareness and use of different technologies

Fig 5.5.2 a shows an average representation of the use and skill of various technologies by library professionals in different Universities. It is clear that the library professionals in all Universities are moderately skilled (above 50%) in the use of various technologies except in the case of Sanskrit University (41.7%) and University of Calicut (47.4%) .

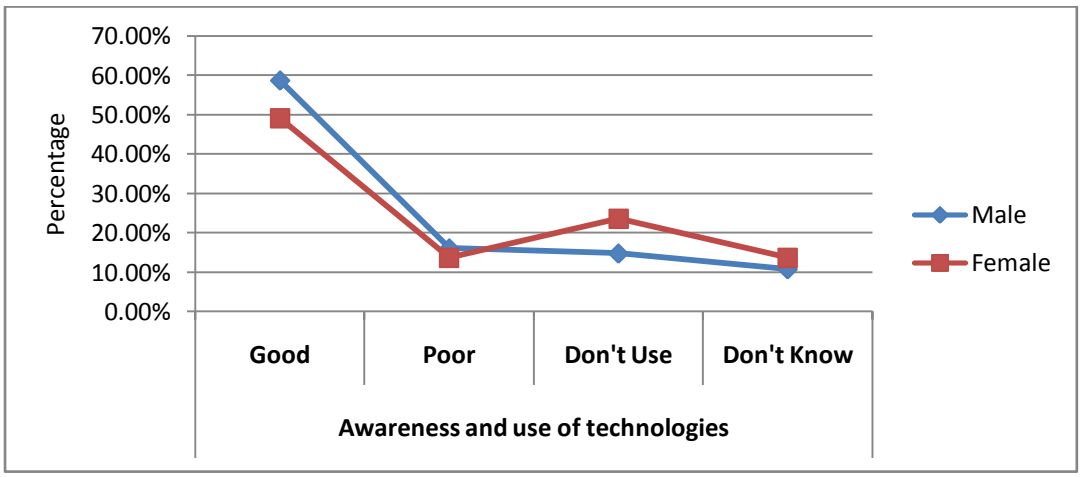
Fig 5.5.2 a University wise awareness and use of different technologies



5.5.2 b Gender wise awareness and use of different technologies

Fig 5.5.2 b shows the average use and awareness of various technologies by library professionals according to their gender. It is evident that the level of awareness and skill is slightly higher among the male professionals(58.7%)than female professionals (49.1%).

Fig 5.5.2 b Gender wise awareness and use of different technologies



5.5.2 c Age wise awareness and use of different technologies

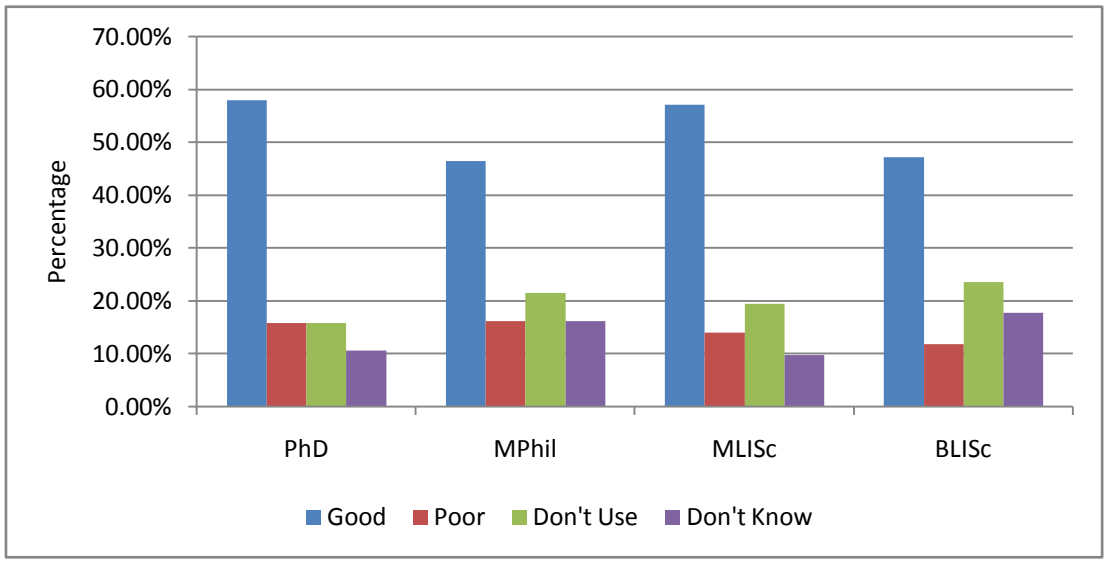
Table 5.5.2 c shows age wise representation of average awareness and usage of technologies by library professionals. It is evident that awareness and skill of technologies is high among the younger age group of 25-35 years(64.3%) while the

usage and awareness is comparatively less among the age group of 36-45years (52.9%) and 46 -55years (42.4 %)

Table 5.5.2 c Age wise awareness and use of different technologies

Age	Rate of awareness and use of technologies				Total
	Good	Poor	Don't Use	Don't Know	
25 - 35Years	36 (64.3%)	7 (12.5%)	9 (16.1%)	4 (7.1%)	56 (30.3%)
36 - 45 Years	37 (52.9%)	10 (14.3%)	15 (21.4%)	8 (11.4%)	70 (37.8%)
46-55 Years	25 (42.4%)	10 (16.9%)	13 (22.0%)	11 (18.6%)	59 (31.9%)
Total	98 (52.9%)	27 (14.6%)	37 (20%)	23 (12.4%)	185 (100.0%)

Fig 5.5.2d Qualification wise awareness and use of different technologies



5.5.2 d Qualification wise awareness and use of different technologies

Table 5.5.2d shows qualification wise analysis of awareness and use of various technologies by library professionals. It is evident that professionals with PhD and MLISc degree as their highest qualification have good awareness (more than 50%) and better familiarity with the use of technologies when compared to other professionals.

Table 5.5.2 e Relation between awareness of different technologies and respondent's characteristics

Variables	Sum of Squares	df	Mean Square	F	Sig.
University	437.468	6	72.911	0.656	0.686 ^{NS}
Gender	1402.174	1	1402.174	12.609	0.001 ^{S}
Age	1226.843	5	245.369	2.206	0.056 ^{NS}
Qualification	1417.244	3	472.415	4.248	0.006 ^{S}
Designation	840.458	3	280.153	2.519	0.060 ^{NS}
Experience	904.074	6	150.679	1.355	0.236 ^{NS}

Analysis of Variance test indicates that gender and qualification is significant proving that the use and awareness of various technologies is related to the gender and qualification of library professionals.

5.5.3 Awareness /skill for ICT based applications and services

In order to evaluate the skills in using various ICT based applications and services in general, the library professionals were asked to specify their awareness about Operating systems, Management of electronic resources, Designing web pages, Programming languages ,Software Installation, System administration, and concepts like Metadata and HTML/XML formats.

UGC Infonet project in joint collaboration with INFLIBNET has played a major role in modernizing University Libraries and it has helped in providing access to online resources of major publishers on the desktop. Access to online journal resources has been activated to almost all the University Libraries.Most of the library professionals are familiar with the E-resources and it has contributed not only to the research output of the academic community but also to an extent has helped the research oriented library professionals.

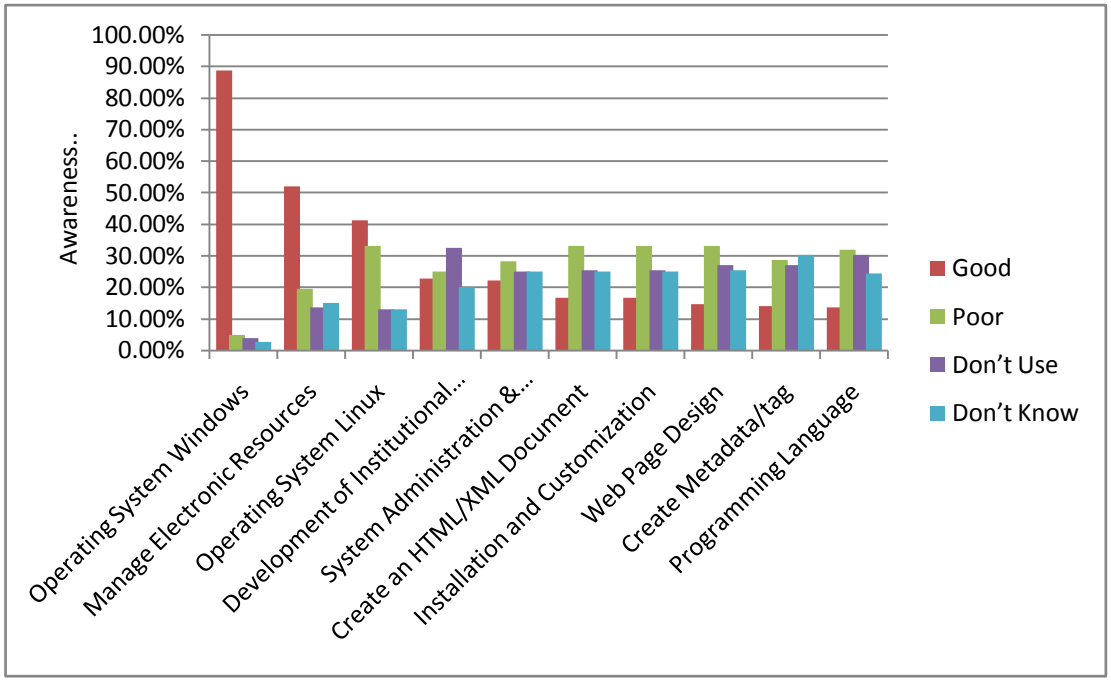
Though Microsoft Windows is most commonly used by University libraries,Linux is also getting popular among library professionals.At the initiative of the state government and Kerala state IT mission, use of open source software is encouraged in educational institutions. As part of promoting FOSS in Kerala, KSITM (Kerala State IT Mission) has been conducting training programmes for Government employees. Linux operating system is operational in some of the Universities , mainly because it is less susceptible to virus attacks. Library software available in open source like KOHA is being implemented in University Libraries for automating library services.

Institutional repository in a University is mainly concerned with the scholarly output including research papers, conference proceedings and thesis in digital format. Among the Universities in Kerala, CUSAT and MG University has developed institutional repositories (IR) of research publications and thesis. Computer system administration and maintenance is a task evaded by most of the library professionals. In Universities, computer staff usually supervises it, but library professionals have to develop some technical skills for the appropriate maintenance of systems in their control. Another advanced application is HTML, or Hyper Text Mark Up Language used to write web pages. In an HTML page, tags are entered to change the appearance of text, to show a graphic, or make a link to another page. When a page is viewed in a browser, the results of the tags are seen .Whereas XML stands for EXtensible Markup Language, it is similar to HTML, but it was designed to carry data, is a set of rules for encoding documents electronically, and not display data like HTML.

The degree of awareness of library professionals in ICT based applications and services are graphically represented in Fig 5.5.3. It is clear that a good majority (88.6%) of the library professionals is skilled in Operating system Windows. Management of electronic resources is reasonably known to 51.9% of professionals. It is interesting to note that 41.1% of the professionals are skilled in Linux operating system while the remaining is either unaware or less skilled in Linux. Further analysis of the skills of library professionals shows that 22.7% are skilled in IR based activities while 20% are not skilled and 32.4% don't use it. About 22.2% of the professionals have good skills in system administration and maintenance and others are not aware or never undertake such tasks. Only 16.7% professionals have skills in creating an HTML / XML document. While skills in software installation and web page

designing found 16.7% and 14.6% of professionals, for creating metadata only 14% of professionals are found to be skilled. Least number of professionals are skilled in programming languages (13.5%), and the remaining all are either not skilled or never use programming languages. Thus, it is evident that though in an electronic environment these skills are relevant, the application of such skills in University libraries in Kerala is very limited.

Fig 5.5.3 Awareness /skill for ICT based applications and services



5.5.3 a Awareness /skills for ICT based applications and services according to University

Awareness and skills of library professionals for various ICT based applications, services was analysed according to University and the average use, and awareness is represented in the Table 5.5.3a. From the table it is clear that in the case of ICT based applications and services only an average 31.4% of the professionals have good skills .

Table 5.5.3a Awareness/skills for ICT based applications and services according to University

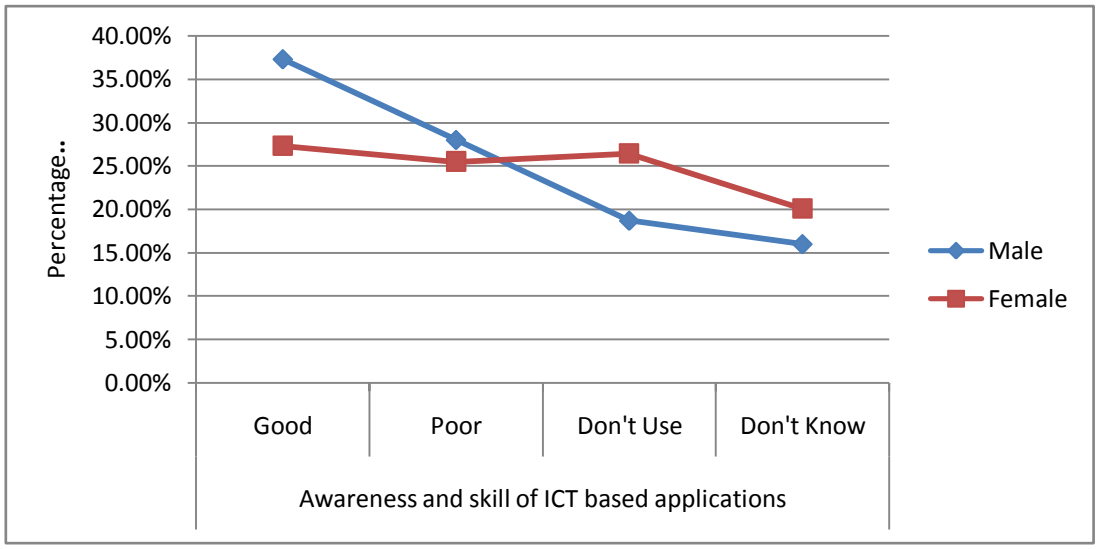
University	Awareness and skill of ICT based applications				Total
	Good	Poor	Don't Use	Don't Know	
KAN	2 (33.33%)	2 (33.33%)	0 (0.00%)	2 (33.33%)	6 (3.2%)
KAU	2 (28.57%)	2 (28.57%)	2 (28.57%)	1 (14.29%)	7 (3.8%)
SSU	2 (16.67%)	3 (25.00%)	6 (50.00%)	1 (8.33%)	12 (6.5%)
MGU	4 (23.53%)	6 (35.29%)	5 (29.41%)	2 (11.76%)	17 (9.2%)
UOC	11 (28.95%)	11 (28.95%)	7 (18.42%)	9 (23.68%)	38 (20.5%)
CUSAT	18 (38.30%)	14 (29.79%)	9 (19.15%)	6 (12.77%)	47 (25.4%)
UOK	19 (32.76%)	11 (18.97%)	14 (24.14%)	14 (24.14%)	58 (31.4%)
Total	58 (31.35%)	49 (26.49%)	43 (23.24%)	35 (18.92%)	185 (100.0%)

While 33.3% of library professionals in Kannur University was equally skilled and unaware of the applications, almost similar range was shown in Agricultural University and Calicut University (28.6%), and in Sanskrit University the professionals who don't use the applications were much higher (50%) than the those who had good skills (16.7%).In MG university 23.5% had good skills and 35.3% and 29.4%showed poor awareness . In CUSAT the rate of awareness was comparatively better (38.3%) and in University of Kerala the 32.8% had good skills and remaining had low level of skills.Adomi & Anie(2006), Rehman(1998) found similar low level of ICT based skills in library professionals

5.5.3 b Awareness /skills for ICT based applications and services according to Gender

Analysis of library professionals' awareness and skills in ICT based applications and services based on gender are represented in the fig 5.5.3 b. Male professionals have better skills in ICT based applications than females. It was found that 37.3% of the male professionals had good skills in ICT based services, while 28% had low level of awareness, and the rest 18.7% and 16% do not use or are unaware of the same. In the case of female professionals, 27.3% had good skills and the rest had low level of awareness or skills in ICT based services.

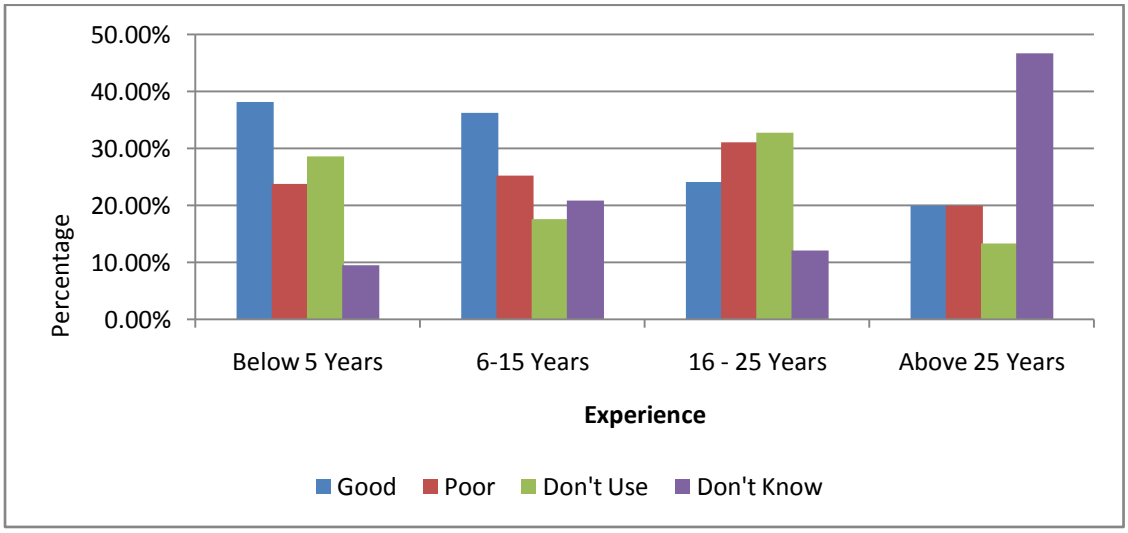
Fig5.5.3 b Awareness /skills for ICT based applications and services according to Gender



5.5.3c Awareness /skills for ICT based applications and services according to Experience

The skills of library professionals on the basis of experience was analyzed and the average results are represented in Fig 5.5.3 c. It was found that the professionals with less experience are more skilled in ICT based applications than the more experienced hands. The professionals having less than 5 years of experience (38.1%) and 36.3% of professionals with 6 to 15 years of experience were found to have good skills, whereas 24.1% and 20% of professionals with experience of 16-25 years had good ICT skills. 46.7% of senior professionals have less awareness about ICT applications .

Fig5.5.3c Awareness /skills for ICT based applications and services according to Experience



5.5.3d Awareness /skills for ICT based applications and services according to Designation

Designation wise awareness of ICT based skills of library professionals is presented in Table 5.5.3.d. It was found that Professional assistants (35.1%) have comparatively better skills than other category of professionals. Deputy librarians (33.3%) had good and poor skills, whereas in the case of Assistant Librarian and Junior Librarian it was 29% and 27.3% respectively.

Table 5.5.3d Awareness /skills for ICT based applications and services according to Designation

Designation	Awareness and skill of ICT based applications				Total
	Good	Poor	Don't Use	Don't Know	
Deputy Librarian	2 (33.3%)	2 (33.3%)	1 (16.7%)	1 (16.7%)	6 (3.2%)
Assistant Librarian	20 (29.0%)	21 (30.4%)	13 (18.8%)	15 (21.7%)	69 (37.3%)
Junior Librarian	9 (27.3%)	8 (24.2%)	9 (27.3%)	7 (21.2%)	33 (17.8%)
Professional Assistant	27 (35.1%)	18 (23.4%)	20 (26.0%)	12 (15.6%)	77 (41.6%)
Total	58 (31.4%)	49 (26.5%)	43 (23.2%)	35 (18.9%)	185 (100.00%)

Table5.5.3e Relation between skills for ICT based applications and respondent's characteristics

Variables	Sum of Squares	df	Mean Square	F	Sig.
University	60.447	6	10.075	0.185	0.981 ^{NS}
Gender	598.679	1	598.679	11.015	0.001 ^{S}
Age	151.544	5	30.309	0.558	0.732 ^{NS}
Qualification	396.335	3	132.112	2.431	0.067 ^{NS}
Designation	820.409	3	273.470	5.031	0.002 ^{S}
Experience	782.053	6	130.342	2.398	0.030 ^{S}

Analysis of variance test shows significant values for gender, designation and experience, which proves that awareness / skills for ICT based applications, are dependent on respondents' characteristics.

5.5.4 Use of Web Tools and Services

In the last few years developments in Web has brought out a variety of online tools and platforms, which has helped people to communicate with their thoughts, opinions and experiences. Web 2.0 encompasses a wide range of applications and tools ranging from blogs to social networking sites to wikis that has also influenced the field of library and information science. Library 2.0 is the integration of Web 2.0 features in library web-based services. It can be called as a personalized OPAC that includes access to Instant messaging, RSS feeds, Blogs, Wikis etc within the library's network. It is virtual reality of the library, a place where one can not only search for books and journals, but interact with the academic community, librarian, and share knowledge and understanding with them (Maness,2006). There is immense pressure on University libraries to modernize the services they offer to the academic community. Library professionals can apply Web 2.0 tools to provide innovative library services and deliver its services in the ways that its modern users expect.

The frequency of use of some of the important Web based services, tools by the library professionals are analyzed , and the results are presented in the Table 5.5.4.

Around 13% of professionals did not respond to the questions on Web tools. It was found that Email/Instant messaging or Chat was frequently used by 85.9% of professionals, and a few 2.3% has never used it. Wikis was frequently used by 69.1 % and never used by 13.0%. Discussion groups was the next known web service frequently used by 42.8% and never used by 21.7% of professionals. Social networking sites was used regularly by 41.6% professionals, less frequently by 29.5%, and never used by 28.9%. Listservs was found commonly used by (33.3%), but more number of professionals (40.4%) never used such services. Audio/video sharing/webcasting tools like YouTube, Flickr was often used by 28.8%, but never used by 31.9%. Weblogs was often used by 25.2% and never used by 36.5% professionals. Other less frequently used Web tools are Social book marking/aggregating (16.6%), RSS feeds (11.9%), and the least accepted web application was Content management systems used by very few (3.8%), less commonly used by (22.5%) and never used by majority of library professionals (73.8%). It is evident that the developments in web tools and services is not fully utilized by most of the professionals mainly because the applications of web tools is yet to be popular in the University libraries.

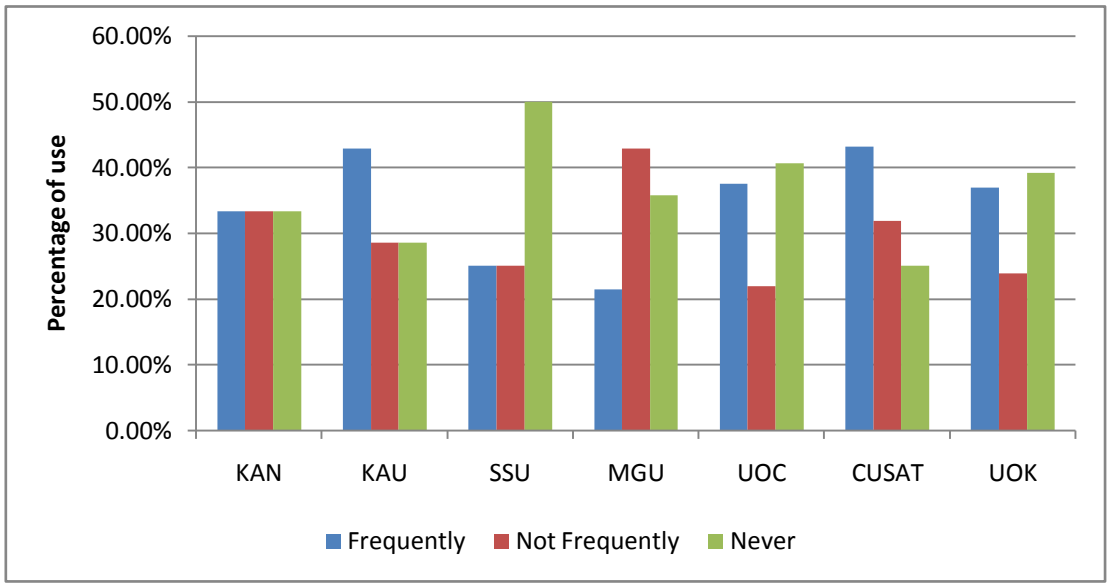
Table 5.5.4 Use of web tools and services

Web Tools/Services	Frequently	Not Frequently	Never	Total Response
Blogging (e.g., Twitter, weblogs)	42 (25.2%)	64 (38.3%)	61 (36.5%)	167 (100.0%)
Audio/video sharing/webcasting (e.g., Flickr, Skype, YouTube)	46 (28.8%)	63 (39.4%)	51 (31.9%)	160 (100.0%)
Email/instant messaging/chat	152 (85.9%)	21 (11.9%)	4 (2.3%)	177 (100.0%)
Discussion groups (e.g, Google/Yahoo! Groups)	71 (42.8%)	59 (35.5%)	36 (21.7%)	166 (100.0%)
Listservs (e.g., Lisforum, Nmlis)	52 (33.3%)	41 (26.3%)	63 (40.4%)	156 (100.0%)
RSS feeds	24 (16.6%)	42 (29.0%)	79 (54.5%)	145 (100.0%)
Wikis (eg. Wikipedia , LISWiki)	112 (69.1%)	29 (17.9%)	21 (13.0%)	162 (100.0%)
Social book marking/aggregating e.g., Delicious, FriendFeed)	18 (11.9%)	41 (27.2%)	92 (60.0%)	151 (100.0%)
Social networking (e.g., Orkut, Face book)	69 (41.6%)	49 (29.5%)	48 (28.9%)	166 (100.0%)
Content management systems eg. (Drupal, Joomla)	6 (3.8%)	36 (22.5%)	118 (73.8%)	160 (100.0%)

5.5.4a Use of web tools and services according to University

The average use of web tools and services by professionals in the Universities was analysed and the results presented in the Fig 5.5.4 a. An equal percentage of 33.3 library professionals in Kannur University used the web tools frequently, less frequently or never. In Kerala Agricultural University 42.9% used these services frequently and in CUSAT 43.2% used web tools frequently, 31.8% less frequently. In Sanskrit University 25%, professionals used the services frequently and not frequently whereas 50% of the professionals who responded never used web tools. In MG University 21.4% used web tools frequently,42.9% less frequently and in University of Calicut 37.5% frequently used web tools and in Kerala university the rate of frequent users was 37 %, 23.9% less frequently and never used 39.1%.

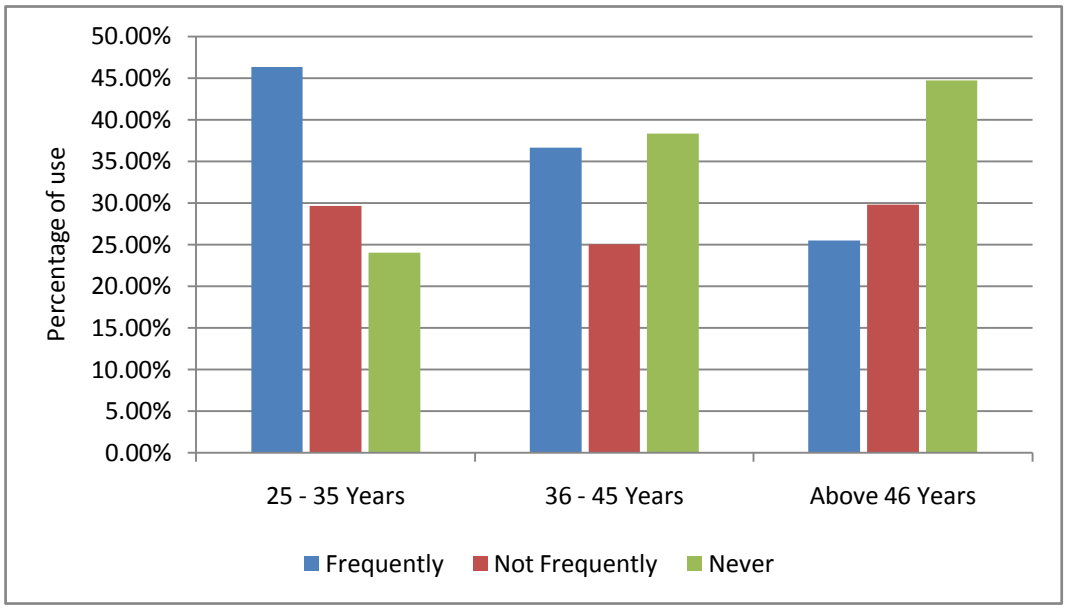
Fig 5.5.4a Use of web tools and services according to University



5.5.4b Use of web tools and services according to age

Average use of web tools and services based on the age of library professional is depicted in the Fig 5.5.4b. It was found that 46.3% of the younger age group used web tools frequently 29.6% less frequently and 24.1% never used web tools. Whereas 36.7% of the professionals among the age group 36-45 years used web tools frequently, 2 5 % not frequently and 38.3% never used web tools. Still lesser number (25.5%) of senior professionals above 46 years used web tools frequently, 29.8% not frequently, and more number 44.7% never used web tools. It is thus clear that the usage of web tools and services is comparatively more among the young professionals.

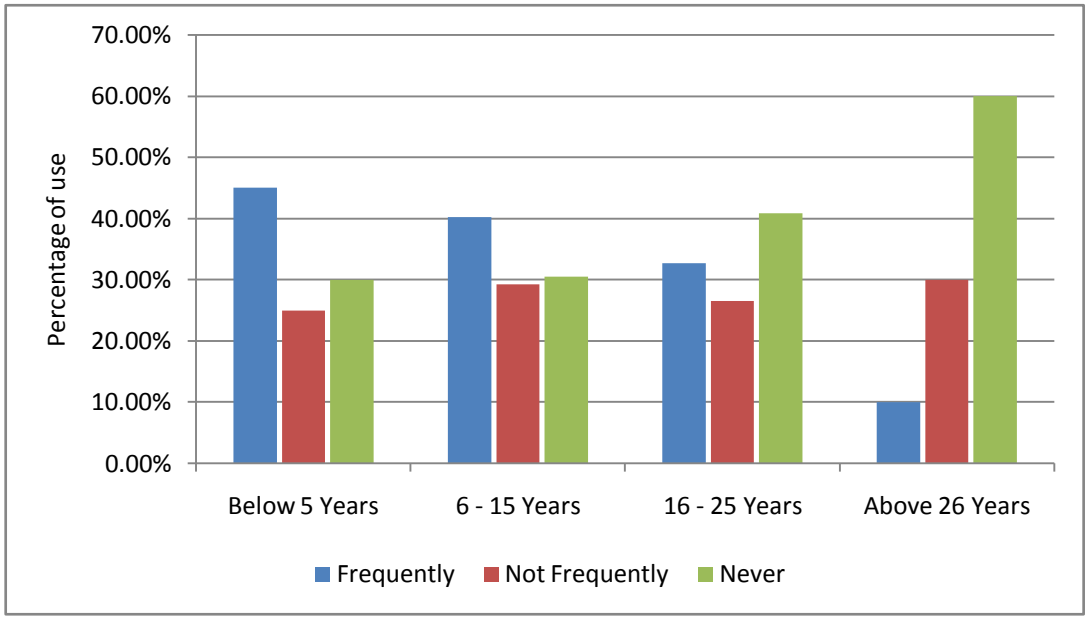
Fig 5.5.4b Use of web tools and services according to age



5.5.4c Use of web tools and services according to experience

Fig 5.5.4c shows the results of experience wise analysis of library professionals' use of web tools. It is evident that the professionals with less experience in library profession use web tools frequently than the experienced persons. While 45% and 40.2% of professionals with less than 5 years and between 6 and 15 years use web tools frequently, the use percentage above 16 years is 32.7% and 10% among the professionals having above 26 years experience. Majority of professionals above 26 years experience never use web tools.

Fig 5.5.4c Use of web tools and services according to experience



The relation between the use of web tools and the respondent's characteristics was computed using Chi-square test and found significant values for university (21.45 ^{S}), age (27.37 ^{S}) and experience of respondents (32.18 ^{S}). Non-significant Chi-square values were found for gender (4.22), qualification (12.27) and present post (9.05) proving that usage of web tools is dependent on the variables : university, age and experience of library professionals.

5.5.5 Awareness of Library automation software

The library professionals' knowledge of various library automation softwares available was analyzed and the results are depicted in the Table 5.5.5 below. It is found that CDS /ISIS is the most common software known to a good majority of 71.4% library professionals. LIBSYS is the software used in the Universities of Kerala and Calicut, and is also known to 70.8% of the library staff. While SOUL is

the automation software used in MG University and Kannur University libraries, it is familiar to 61.6% professionals. KOHA open source library software was implemented recently in CUSAT library system. It is found to be known to 53.5% of professionals. WINISIS, the windows version of CDS/ISIS is known to 44.9%. Professionals are familiar with LIBSOFT (37.3%) commonly used in college libraries in Kerala. ALICE for windows is not very popular but it is used in Sanskrit university and known to 20.5% professionals. Other lesser known and not favored software are NEWGENLIB (7%), LIBRARY MANAGER (4.3%), ABCD and OPENBIBLIO (3.2%), EVERGREEN (2.2%) , PHP MY LIBRARY and MANDARIN 1.6% and 1.1% respectively. Other software not listed but reported as known to library professionals are ADLIB which was the software used in CUSAT for library automation, VIRTUA and TECHLIB plus.

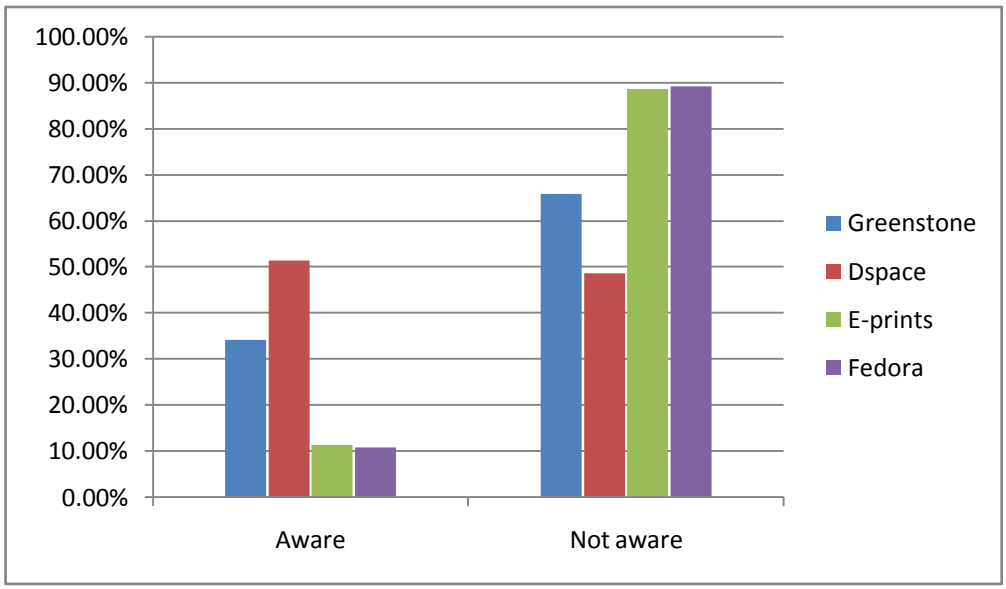
Table 5.5.5 Awareness of Library automation software

Library Software	Aware	Not aware	Total
CDS/ISIS	132 (71.40%)	53 (28.60%)	185 (100%)
LIBSYS	131 (70.80%)	54 (29.20%)	185 (100%)
SOUL	114 (61.60%)	71 (38.40%)	185 (100%)
KOHA	99 (53.50%)	86 (46.50%)	185 (100%)
WINISIS	83 (44.90%)	102 (55.10%)	185 (100%)
LIBSOFT	69 (37.30%)	119 (62.70%)	185 (100%)
ALICEfor Windows	38 (20.50%)	147 (79.50%)	185 (100%)
NEWGENLIB	13 (7.00%)	172 (93%)	185 (100%)
LIBRARY MANAGER	8 (4.30%)	177 (95.70%)	185 (100%)
ABCD	6 (3.20%)	179 (96.80%)	185 (100%)
OPENBIBLIO	6 (3.20%)	179 (96.80%)	185 (100%)
EVERGREEN	4 (2.20%)	181 (97.80%)	185 (100%)
PHP MY LIBRARY	3 (1.60%)	182 (98.40%)	185 (100%)
MANDARIN	2 (1.10%)	183 (98.90%)	185 (100%)

5.5.6 Awareness of Digital library software

Digital library software are used for setting up digital collections of library holdings and diverse types of digital works that deal with subjects associated with the institution. Digital library software common in academic libraries are Greenstone, D-space, E-prints and to lesser extent Fedora. The library professionals were asked to indicate whether they are aware of the digital library software. The results as shown in the Fig 5.5.6 indicate knowledge about Digital library software is less among the respondents. Only D-space is familiar to more than 50% of professionals (51.4%) ,whereas Greenstone is known to 34.1% of professionals . Other not very common digital library software are E-prints known to only 11.4% and a great majority (88.6%) is not aware of it. Similarly Fedora is known to 10.8% professionals and most of the professionals (89.2%) are not aware of it. Only few libraries have initiated Digital library services and this may be the reasons for low level of awareness about these software among the library professionals.

Table 5.5.6 Awareness of Digital library software



5.5.7 Library professionals' attitude towards ICT application

The library professionals in the seven Universities were asked to assess their attitude towards ICT application with the help of ten variables (Mohamed Haneefa, 2004).The results was analysed and summarised in the Table 5.5.7.

The table shows that most of the library professionals agree with the positive aspects of ICT listed in the study. Majority of the library professionals agreed that ICT application facilitate quick access to current data , improve quality of library services, helps to enhance knowledge and skills of library professional , and helps to improve the status of library with more than 90% positive responses . The professionals also agreed that ICT application helps to improve communication (80.5%), increase job satisfaction of library professionals (78.9%), makes integration within the library (68.1%), and helps to reduce workload of library professional (66.5%), all of which shows high positive responses. Of the two negative aspects listed, to the variable ICT disturbs routine work of the library only 10.8% agreed and majority 77.3% was against this concept. Similarly, to the variable ICT affects regular budgeting provision, 18.4% agreed and majority (63.2%) disagreed. It is evident that library professionals have a highly positive attitude towards the application of information communication technology services and its applications. Sagolsem, Purnima Devi and Vikas (2007) , Mohammed Haneefa (2004), Kannappanavar & Vijayakumar (2001), Nair (1997) reported similar results that majority of librarians showed favourable attitude towards information technology . They were prepared to accept modern technology in library activities, which helped to improve the efficiency of library services.

Table 5.5.7 Library professionals' attitude towards ICT application

Sl. no	Attitude	Agree	Disagree	No response	Total
1	ICT application facilitate quick access to current data	180 (97.3%)	0	5 (2.7%)	185 (100%)
2	ICT application improve quality of library services	180 (97.3%)	2 (1.1%)	3 (1.6%)	185 (100%)
3	ICT application help to enhance knowledge and skills of library professional	171 (92.4%)	7 (3.8%)	7 (93.8%)	185 (100%)
4	ICT application increase job satisfaction of library professional	146 (78.9%)	20 (10.8%)	19 (10.3%)	185 (100%)
5	ICT application help to improve communication	149 (80.5%)	16 (8.6%)	20 (10.8%)	185 (100%)
6	ICT application improve the status of library	167 (90.2%0	6 (3.2%)	12 (6.5%)	185 (100%)
7	ICT makes an integration within the library	126 (68.1%)	29 (15.7%)	30 (16.2%)	185 (100%)
8	ICT application reduce workload of library professional	123 (66.5%)	47 (25.4%)	15 (8.1%)	185 (100%)
9	ICT disturbs routine work of the library	20 (10.8%)	143 (77.3%)	22 (11.9%)	185 (100%)
10	ICT affects regular budgeting provision	34 (18.4%)	117 (63.2%)	34 (18.4%)	185 (100%)

5.5.8 Problems faced in the effective utilization of ICT applications

The library professionals' opinion relating to the problems faced in the effective utilization of ICT applications was analyzed and the results are presented in the Table 5.5.8. From the table it is clear that inadequate training is the main problem in the effective utilization cited by majority of library professionals (90.3%).Other major issues indicated by library professionals are lack of infrastructure (72.4%), lack of support from authorities for implementing ICT applications in library (58.9%) and lack of support from administration in training library professionals (54.6%). Some other issues which was indicated by lesser number of professionals include lack of co-ordination among library staff (45.9%) and lack of initiative from professional associations to conduct specialized training programmes (39.5%). Only few professionals had opinion that fear of ICT applications (15.1%) and lack of interest of

users (14.1%) caused problems in effective use of ICT. Lack of scope for library professionals due to ICT applications was cited as an issue by very few professionals (9.2%).It was also observed that some libraries did not provide adequate facilities for staff, which was quoted by some library professionals as an issue that hindered their interest in ICT applications. Few library professionals also cited lack of career advancement opportunities as concern in the proper use of ICT application. Another major threat to the effective use of ICT was the lack of adequate back up facilities for computers and other systems.

Table 5.5.8 Problems faced in the effective utilization of ICT applications

S.No	Problems	Frequency
1	Inadequate training in ICT applications	167 (90.3%)
2	Lack of infrastructure	134 (72.4%)
3	Lack of support from authorities for implementing ICT applications in library	109 (58.9%)
4	No support from administration in training library professionals	101 (54.6%)
5	Lack of co-ordination among library staff	85 (45.9%)
6	Lack of initiative from professional associations to conduct specialized training programmes	73 (39.5%)
7	Fear of ICT applications	29 (15.7%)
8	Lack of interest on the part of users	26 (14.1%)
9	Lack of scope for Library professionals due to ICT applications	17 (9.2%)

5.5.9 Suggestions for updating knowledge/skills of Library Professionals

Library professionals' suggestions for updating their knowledge and skills shows that majority (88.2%) have given utmost priority to In-house training and workshops, and next preference to searching Internet for relevant professional information (71.9%). While third preference is given to regularly reading relevant professional literature (69.7%), regular attendance of relevant conferences/workshops (68.7%) is the next preferred option. Discussion of professional matters with colleagues (62.2%)was one important updating activity preferred by the library professionals. Discussions with colleagues is the largest component of informal updating activities reported in a study of reference librarians by Auster and Chan (2003) in addition to reading professional literature. Learning from web resources accounted to 61.1% of the suggestions, while

other suggestions for updating activities less preferred include attending professional association meetings (43.2%), undertaking individual research work/publication (41.1%), reading general books/literary works (39.5%), and going for higher studies/formal courses (35.1%). The least preferred mode of updating professionals' knowledge or skills is involvement in teaching which only 22.2% respondents suggested. Few library professionals also quoted that for efficiency in ICT no formal training or education is required, it can be acquired by self-study through internet.

Table 5.5.9 Suggestions for updating knowledge/skills of Library Professionals

	Suggestions	Frequency
1.	In-house training programmes for staff development	163 (88.2%)
2.	Searching internet for relevant professional information	133(71.9%)
3.	Regularly reading relevant professional literature	129(69.7%)
4.	Regular attendance of relevant conferences/workshops	127(68.7%)
5.	Discussion of professional matters with colleagues	115(62.2%)
6.	Learning from web resources	113(61.1%)
7.	Attending professional association meetings	80(43.2%)
8.	Undertaking individual research work/publication	76(41.1%)
9.	Reading general books/literary works	73(39.5%)
10.	Going for higher studies/formal courses	65(35.1%)
11.	Involvement in teaching	41(22.2%)

5.6 Conclusion

Infrastructure facilities in University Libraries in Kerala are not enough to provide the library staff suitable experience in the emerging technologies and support professional development, which in turn will help in providing enhanced technology based services to the users. The study revealed that the Library professionals in the Universities of Kerala are highly qualified and majority has a positive attitude towards continuing education and its importance in professional development. Majority of the library professionals preferred to update their technology skills and knowledge by participating in continuing education programmes. The preference for electronic

information sources was more obvious among the younger professionals than the experienced hands. The need for restructuring curriculum was stressed by all groups of professionals. Majority of the professionals were of the opinion that library science education has not helped them in attaining the skills required in the modern electronic environment. The analysis of ICT skills and awareness of various technologies revealed that library professionals are moderately skilled in various technologies and applications, but the awareness level was low in the case of emerging web tools and services. Most of the library professionals had a positive attitude towards the application of ICT based services in libraries. The main problems in ICT utilization was the lack of training in ICT applications as pointed out by majority of library professionals. The importance of staff training and participation in institution's training/ workshops was stressed to update the knowledge and skills of library professionals.

References

1. Adomi, E. E., & Nwalo, K. I. (2003). Prospects for continuing professional education for library and information science professionals in Nigeria: the case of Delta State . *New Library World , 104* (1194/1195), 499-508.

2. Adomi, E., & Anie, S. (2006). An assessment of computer literacy skills of professionals in Nigerian university libraries. *Library Hi Tech News , 23* (2), 10-14.

3. Chan, D. C., & Auster, E. ((2003)). Factors contributing to the professional development of reference librarians. *Library & Information Science Research , 25*, 265–286.

4. *E-resource management*. (2010). Retrieved October 14, 2010, from Information Library and Netwwork centre : http://www.inflibnet.ac.in /functionalgroup/ eresource.html

5. Hubbell, F. (2010, March 13). *Converting AACR2 from RDA.* Retrieved June 5, 2010, from The Free Library: http://www.thefreelibrary.com/Converting+/ AACR2+from+RDA-a01074063561

6. *IGNOU*. (2010). Retrieved February 13, 2010, from About IGNOU: http://www.ignou.ac.in/ignou/aboutignou/profile/6

7. Kannappanavar, B. U., & 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.

8. Mohamed Haneefa, K. (2004). *Application of information and communication technologies in special libraries : PhD Thesis.* Malappuram: Department of Library and Information Science,University of Calicut.

9. Nair, S. K. (1997). *A study of the attitude of the librarians in Kerala towards the use of Information Technology and information activities:PhD Thesis.* Trivandrum: Department of Library and Information Science, University of Kerala.

10. Ramaiah, C. K., & Moorthy, A. L. (2002). The impact of continuing education programmes on library and information science professionals. *Library Review , 51* (1), 24-31.

11. Rehman, S. (1998). Intl. Inform. & Libr. Rev. 1998 , 30,. *International information and llibrary review , 30*, 123-141.

12. Sagolsem, M., Purnima Devi, T., & 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 knowlege management in networked world* (pp. 570-578). Chandigarh: Inflibnet centre.

13. Sarasvady, S., & Khatri, N. K. (2007). *Study of the Use of Electronic Resources for Implementing Library Consortium* . Retrieved June 14, 2010, from http://www.isical.ac.in/~serial/consortia/CBSOR-07

14. Sheeja, N. K. (2010). Application of Information Communication Technologies in University Libraries in Kerala. *International Journal of Liibrary Science , 1* (J 10), 86-92.
15. Sreenivasulu, V. (2000.). The role of a digital librarian in the management of digital information systems (DIS). *The Electronic Library , 18* (1), 12-20.
16. Suku, J., & Pillai, M. G. (2005). Perspectives on automation of university libraries in Kerala: status,problems and prospects. *Journal of Academic Librarianship , 31* (2), 151-159.
17. Tenopir, C. (2003). *Use and Users of Electronic Library Resources: An Overview and Analysis of Recent Research Studies.* Retrieved June 14, 2010, from http://www.clir.org/pubs/reports/pub120/pub120.pdf
18. Varalakshmi, R. S. (2006). Educating 21st Century LIS Professionals- Needs and Expectations: A Survey of Indian LISProfessionals and Alumni. *Journal of Education for Library and Information Science , 47* (3), 181-199.

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Chapter 6

SUMMARY OF THE FINDINGS AND SUGGESTIONS

6.0 Introduction

This chapter gives the summary of the major findings of the study with suggestions and recommendation for further areas of research. The survey was carried out to assess the infrastructure in the seven University Libraries especially Information communication technology infrastructure and to study whether ICT has any influence on library professionals with regard to their professional activities, educational needs, and also to assess the awareness of library professionals about developments in ICT. Major findings of the study are as follows:

6.1 Infrastructure of University libraries

Library Budget

1. University libraries in Kerala have allotted major share of the budget to staff salary and books, journals etc. Budget allocation to ICT infrastructure is negligible in the period covered for the study. For computer hardware maximum amount (seven lakhs) allocated is in CUSAT Library (CUSTL)that accounts to only 4.3% of the total budget allocation. All other libraries have allocated five or less than five lakhs for ICT infrastructure. During this period MG University library (MGUL) has given separate budget provision for subscribing online databases and in the case of CUSTL online databases were purchased from the budget for journals

Document Collection

2. Kerala University Library (KUL) being the oldest library in the state has the most number of book collection, more than 3 lakhs followed by Calicut University Library (CHMKL)with more than 80,000 books and CUSTL with around 74,000 books. All other libraries have less than 60,000 books with Agricultural University Library (KAUL) having comparatively less (25,000) number of book collection. The less number of books points to the fact that Kerala Agricultural University, Cochin University and Sree Sankaracharya University are basically non-affiliating universities. Other universities being mainly affiliating in nature, Government and

private colleges, both aided and unaided, are affiliated to these universities and hence the book collection is more in accordance to the needs of the users of these libraries. In addition to books all University Libraries have different types of collections like bound volumes of journals, thesis, journals, patents, reports, microforms ,CD-ROMs, CD-ROM databases etc.

3. KAUL has more than 150 foreign journal subscriptions. MGUL and CUSTL has 120-130 foreign journals and all other University Libraries subscribe to 40-70 foreign journals. All University Libraries subscribe around 140-230 Indian journals, except in CUSTL which has 47 Indian journals, whereas MGUL has the highest number (234) of Indian journal subscriptions. Most of the University Libraries have access to online journals through UGC Infonet . KAUL subscribes to science direct journals and other journals available in electronic medium are subscribed in that medium only. All University Libraries have good collection of back volumes of journals with CUSTL and KAUL having 7000-9000 volumes.

4. The thesis collection includes 6200 in KUL followed by 5781 in CHMKL and 3020 in KAUL. MGUL has subscription to ten CD-ROM databases .All the Universities have good collection of CDROM, 3200 in in KUL , 1000 in Kannur University Library(KANUL) and 800 in KAUL. CUSTL and KANUL subscribe to six online databases. Only CHMK library has a microform collection.

Library Membership

5. Kerala University Library being the oldest University Library in the state has the most number of members above 16000 including public, non teaching staff, teaching staff , research students, graduate and post graduate students .CHMKL has more than 8000 members and all other University libraries has membership between 2000 and 4000. KUL and CHMKL has more public membership than other libraries as they have more affiliated colleges and graduate membership is open to the students of affiliated colleges

Professional staff strength

6. KUL has the highest number of professional staff being the oldest library system with more number of teaching departments and the lowest number in KAUL. Only

MGUL has a University Librarian, all other University Libraries are managed by Deputy Librarian or senior most Assistant Librarian.

ICT Infrastructure

7. Most of the University Libraries have basic hardware facilities like enough number of computer workstations, server machines, laser printer, bar code printer, scanner, CD tower, LCD projector and sufficient number of UPS .But some of the facilities are not used suitably nor had no proper maintenance.

8. Microsoft windows are the most common operating system used in University libraries. Few libraries like CHMKL, CUSTL used Linux for network management. For library automation all the libraries have library management softwares like Soul (MGUL,KANUL,KAUL), Libsys (CHMKL,KUL), Koha open source software (CUSTL) and Alice for windows (SSUL). Some University Libraries use Digital Library softwares like Dspace (CUSTL, MGUL), Greenstone (KAUL) and Techfocuz. (CHMKL, KUL).The most common database management software used in University Libraries is Microsoft SQL and MySQL. The common Antivirus softwares used are Kaspersky , Symantec and some University Libraries use Avira and C.A for virus issues(SSUL).

9. Automation of all University libraries commenced between 1994 and 1999 .Though all University Libraries have adopted automation , some of the functions like acquisition, serials control and technical processing are only partially automated in most of the University Libraries. In almost all libraries library catalog and circulation is computerised, but the features like online reservation of books, overdue receipts are some features that are yet not completely functional in majority of the libraries. Important features like barcode generation and Opac is supported by all automation packages used in the seven University Libraries. There are issues of maintenance cost, updating problems etc which are yet to be solved. All the modules in the automation software are not fully utilized in the University libraries and require further customization for the needs of individual libraries.

10. Though databases of books have been created in all University libraries lack of periodic updation and correction has resulted in lot of inconsistency in the databases. Database of serials and thesis is still incomplete in almost all the University Libraries.

Similar is the case with non-book materials like audio visual materials, CD-Roms, DVD's etc.

Networking

11. Most of the University Libraries have LAN facilities, connected to the campus network. KANUL has LAN facility but does not have a campus network. Almost all libraries have membership in INFLIBNET and few libraries have membership in DELNET. None of the University Libraries have links with other international networks.

12. The major internet service provider in Universities is BSNL followed by ASIANET and in MGUL internet is also accessed through ERNET. All the libraries have leased line connectivity except in KANUL which has broadband connection. All the libraries have 1-2Mbps connectivity except in CUSATL and CHMKL where they have upgraded to 10Mbps.

Library services using ICT

13. All libraries provide internet and e-journal services to its users through dedicated terminals. Document delivery service is provided by all libraries mainly through INFLIBNET document delivery centres and in some libraries through DELNET. Other services like Current awareness services in the form of new book alerts, SDI services through bibliographic databases available in CD-ROM , Reprographic services ,Library OPAC are some of the services common to all University libraries. Access to consortia based online journals and databases are provided in all University Libraries. KAUL, MGUL and CUSTL also provide access to online and CD databases subscribed by the respective Libraries in subjects like Agriculture, Biology, Legal studies, Management and Electronics. Though all libraries provide internet services to its users, proper utilization of the available resources was lacking in all University Libraries. Only CHMKL provide separate internet and other IT facilities for handicapped users .It is found that access to E books are provided by CHMKL and KAUL only. In some University libraries the sections were provided with one or two computers, but the staff had no access to internet or other e-journal services. As IT

facilities are provided as a separate section, the professionals were reluctant to use these facilities.

Training for Library professionals in ICT based services

14. Except SANKUL all Libraries have conducted workshops or training programmes for the professionals in ICT based services, E-journal awareness programmes etc. Sponsored workshops by INFLIBNET or other agencies for library professionals were conducted only in MGUL, CUSTL and KAUL.

Problems in ICT based applications in University Libraries

15. All Librarians in charge of the University Libraries have similar opinion that inadequate staff trained in ICT application is the main problem faced in ICT application. Maintenance of ICT infrastructure in most of the University Libraries is done with the help of computer professionals .Though all library professionals are well qualified, training in ICT applications is essential to provide services in the present day environment. Lack of sufficient funds, Lack of support from authorities, Lack of initiative on the part of library staff, Lack of ICT knowledge on the part of users and lack of a standard library management software are also pointed out by Librarians as barriers in ICT application

6. 2 Professional Development, Educational needs and ICT skills

General Information about Library Professionals

16. Among the total library professionals who participated in the study 31.4% are from Kerala University, CUSAT (25.4%), University of Calicut (20.5%), M.G University(9.2%), Sanskrit University (6.5%), Kerala Agricultural University (3.8%) and 3.2% from Kannur University. Majority of the respondents (59.5%) are female and 40.5% are male. Most of the library professionals are above 36 years (37.8%).Only 30.3% of the professionals are below 35 years of age. The remaining 31.9% are above 46 years of age.

17. Library professionals having only BLISc degree is 9.2%, while 50.3% of professionals have MLISc , 30.3% have MPhil degrees, and 10.2% have attained PhD. Majority of MLISc holders are in CUSAT (66.0%) and MPhil degree holders in

MGU (52.9%).44.3% of the professionals have a Post Graduate degree in their basic subject and 48.1% has basic degree. A few of the professionals have additional degrees like MBA (3.8%), PGDCA (7.6%), LLB (2.7%), and MCJ(.5%).

18. Among the library professionals while 41.6% belong to Professional Assistant/ Library Assistant /Technical Assistant category, 37.3% to Assistant Librarian (UGC and Non-UGC) category, 17.8% to Junior Librarian / Reference Assistant and 3.2% to Deputy Librarian category. Majority of the Library professionals (49.2%) have 5-15 years experience, only 11.4% of the professionals have below 5 years experience, 31.3% have 16-25 years of experience and a few (8.1%) above 26 years of experience.

Enrolment in higher degree in library science

19. Analysis of higher education in Library science found that 64.3% of professionals have pursued higher degrees after entering the profession, for MLIS (32.9%), MPhil (18.4%) ,PhD (10.3%) and a few for other degrees .

20. 66.7% of professionals have enrolled in higher degrees in Library science in Kannur University, 100% in Agricultural University, 75% in Sanskrit University, 47.1% in MG University, 57.9% in Calicut University, 59.6% in CUSAT, and a good majority 70.7% in Kerala University.

21. The rate of enrolment in higher degrees was similar among male (62.7%) and female professionals (65.5%).

22. 78.0% of professionals in the age group above 46 years have pursued higher education in library science after joining the profession, whereas in the age group 36-45 it is 62.9% and the lowest among the younger age group (51.8%).

23. 84.2% of the professionals having the highest degree, i.e., PhD have pursued higher education and 75% of MPhil holders have joined higher courses, while MLISc and BLISc have comparatively lesser rate of enrolment, i.e., 59.1% and 35.3% respectively.

24. Most of the library professionals (66.7%) in the category of Deputy Librarian, and 79.7% of Assistant Librarians have enrolled for higher education at some stage in

their career, whereas a lesser majority have joined higher education in the case of Junior Librarian/ Reference Assistant(57.6%) and Professional Assistant/ Technical Assistant category (53.2%).

25. The professionals with 16-25 years of experience (82.8%) and above 26 years of experience (80.0%) have pursued higher education to a greater extent than professionals having below 5 years experience (52.4%) and between 6 to 15 years of experience (52.7%).

26. Chi-square tests are significant for age, qualification, designation and experience proving that personal factors influence the professionals' interest in higher education.

Reasons for not pursuing higher degree

27. 35.7% of the professionals indicated that they have not pursued higher education for reasons like not interested (48.5%), not allowed by the university (6.1%) and there is no need for a higher degree in the present post (45.5%). A few also quoted financial problems.

Enrolment in IT /Computer related courses

28. Analysis of enrolment in higher education shows that Library professionals have enrolled in Computer related degrees in addition to courses in Library and information science. 23.8% professionals have computer related degree or diploma , 6.5% have PGDCA and DCA, 4.3% PGDLAN and .5% PGDIT, 5.9% have certificates from short term computer courses This shows that ICT has influenced the professionals in pursuing education in Computer related courses when compared to other subjects. Only a few (3.8%) have pursued degree in Management studies

Publication trends of library professionals

29. Majority of the library professionals (79.5%) have no publications, which shows the poor trend in publishing papers. Only 17.3% of the library professionals have journal articles/ articles in books/conference papers, etc., a very few (1.6%) have publications 5 to 10 and more than 10 publications each.

30. 18.9% of the library professionals in University of Kerala have less than 5 publications, 23.4% in CUSAT, University of Calicut (13.2%), MG University (17.6%), Kannur University (16.7%) and in Sanskrit University very few have publications. In Agricultural University 14.3%, have more than 5 publications, and none less than 5.

31. Only 25.3% male professionals and 17.3% female professionals have published papers in journals or conference proceedings. Publication trends are almost similar among the three age groups. In the younger age group of 25-45 years, the total publication rate is 19.6%, while in the age group above 36 years it is 20.4% and above 46 years it is 20.6%.

32. 52.7% of professionals with doctorate degree, 14.3% with MPhil degree, 16.1% with MLISc degree and 5.9% BLISc degree holders have publications among the professionals. Chi square tests are significant for qualification proving that there is an obvious relation between qualification and publication pattern of library professionals

33. 33.3% in the category of Deputy Librarian, 20.3% Assistant Librarians, 15.2% Junior Librarians and 14.3% Professional Assistant category have less than 5 publications. 4.3% professionals in the category of Assistant Librarian has more than 5 and more than 10 publications

34. 19.1% of the junior most library professionals, 16.5% of professionals between 5 and 15 years of experience , 17.2% of professionals with 16- 25 years of experience and 20% of the professionals with more than 26 years of experience have less than 5 publications. 8.6% of professionals with 16- 25 years of experience have more than 5 publications.

Membership in Professional Associations

35. 69.2% of the library professionals have membership in one or two national and state llibrary associations. None has membership in Library associations at the International level. National associations like IASLIC (3.1%), ILA (7.3%) and SALIS (1.7%) have very few members. Majority of the library professionals have membership in the state library Associations of KLA (92.2%) and KELPRO (28.1%).

Attendance in Continuing Education Programmes (CEP)

36. Library professionals have participated more in training programmes conducted by each Universities (52.4%),followed by Workshops sponsored (41.6%) and not sponsored (34.6%) , Conferences not sponsored (33.5%) and least attendance in sponsored Conferences (29.7%) and Refresher courses (23.8%).

37. Library professionals in the Universities of CUSAT and Kerala Agricultural University (KAU) have a better average of participation in Continuing Education Programmes than the library professionals other universities. Chi-square tests are significant for University in the case of sponsored conferences, sponsored workshops and in-house training programmes proving that participation in continuing education programmes varies according to University.

38. 40% male library professionals and 33.2% female professionals have attended the continuing education programmes. Chi-square values are significant for gender in the case of sponsored conferences indicating that attendance in such programs varies according to gender.

39. Attendance in Continuing Education Programmes is comparatively more in the age group 36- 45 and above 46 years. Participation in in-house training is almost similar for all age groups. In the case of refresher courses attendance is higher in the age group above 46 years and minimum in the age group 25-35. Chi-square values were significant in the case of refresher courses, which show that there is a distinct relation between age group and participation in refresher courses which is mandatory.

40. Library professionals with highest qualification PhD and MLISc have better average of participation in Conferences, Workshops and training programmes than other qualified professionals.

41. Professional Assistant/ Technical Assistant category have the least participation in CEP especially in refresher courses in which their participation is only 2.6%, reasonable participation in-house training programmes (44.2%), whereas the Assistant Librarian category has a comparatively better attendance in all programmes. Library professionals in the category of Deputy Librarian have high participation in refresher courses (83.3%) and fair average of attendance in conferences (33.3%), and sponsored

workshops (50%). Junior Librarian category has reasonable attendance in all programmes except refresher courses (12.1%).Computed values of Chi-square for studying the association between designation and participation in continuing education programmes. are found to be significant for refresher courses indicating dependency of designation on participation in refresher courses.

42. Library professionals having experience between 16 to 25 years have participated in more professional development programmes than the other experienced professionals. Chi-square values are significant in the case of refresher courses, which prove that experience has an obvious relation to participation in refresher courses.

43. The analysis of professional activities proves that some of the personal characteristics influence library professionals in their professional development.

Attitude towards Continuing Education Programmes(CEP)

44. 72% of the library professionals attend CEP to get trained in the latest technologies and 60.5% to acquire new skills, 53.5% attend CEP to update basic education, while 53% to improve library services, 8.6% to train junior staff , 27% to improve relation with fellow professionals and 9.2% for promotion. Reasons for not attending CEP are that CEP are for a particular grade only(6%), for .5% CEP do not influence their professional work and financial constraints was another reason. 4.9% were not at all interested to attend any CEP.

Opinion about effect of Continuing Education Programmes on updating skills

45. Majority of the professionals have the opinion that CEP has helped to update skills to some extent (55.1%) , while 33% were of opinion that CEP has helped to update their skills to a great extent , very few noted that CEP has not helped to update their skills.

46. Majority of Library professionals in all Universities except CUSAT have opinion that CEP has helped to some extent to update the skills, while majority in CUSAT (55.3%) has opinion that CEP has helped to a great extent to update the skills. Significant Chi-square value implies that there is an association between opinion about updating skills and University.

47. The opinion about continuing education programmes is similar among the male and female professionals.52% of the male professionals and 57.3% of female professionals have the opinion that CEP has helped to update skills to some extent, while 37.3% males and 30% females believe it has helped to a great extent. Similarly all the age groups have almost similar opinion about CEP contribution to update skills of library professionals, and the younger age group have almost equal choice of opinion about effect of CEP to update skills to a great extent (44.6%) and to some extent(41.1%).

48. Library professionals with different qualifying degrees had similar opinion about CEP effect on updating skills. Majority of library professionals with different degrees in LIS had opinion that CEP helped to update skills to some extent. Similarly all categories of professionals had similar opinion that CEP has helped to update skills. Majority of the experienced and less experienced also indicated positive attitude towards the effect of continuing education programmes on updating skills.

49. Analysis of the attitudes towards Continuing Education Programmes(CEP) proves that Library professionals have a positive attitude towards CEP and that their attitudes are dependent on some of the personal characteristics. The analysis also shows that ICT has influenced the participation in CEP as majority of the professionals attend CEP to get trained in the latest technologies and to acquire new skills.

Use of Information Sources

50. Internet resources was preferred mode of information source by 38.9% of Library professionals, while print resources including Journals/Periodicals preferred by 20.0%, Books (24.3%),Conference papers (5.4%),and few preferred other types of sources for their information needs.

51.The professionals in University of Calicut prefer journals/ periodicals (36.8%) and books (26.3%) more than internet sources (21.1%).Whereas in Kerala University books are more preferred (34.5%) than internet sources (27.6%) and journals and other sources .In all other Universities internet sources are more preferred than books and journals. The preference to internet sources is more in CUSAT (57.4%), Kerala

Agricultural University (57.1%), M.G University (52.9%) , Kannur University (50.0%) and Sanskrit University (41.7%).

52. While 41.3 % of males use internet sources more than books and journals, the preference to internet sources is comparatively less among the female library professionals (37.3%).The professionals in the younger age group access internet sources (51.8%) more than books and journals. While in the age group 36-45 the use of internet sources is (37.1%), books and journals are equally preferred (25.7%).The older group of professionals prefer to use books (32.2%) to internet sources (28.8%), journals/periodicals and other sources of information.

53. Library professionals with higher qualifications like PhD prefer journals / periodicals and internet sources (31.6%) to books and conference papers (15.8%). Those with MPhil degree access internet resources (44.6%) more than books and journals and MLIS holders also have preference to internet sources when compared to books and journals Books are main sources of information to graduates in library science (47.1%) than internet (17.3%) and Journals.

54. Deputy Librarians depend more on books (50.0%) than internet sources, journals/periodicals and conference papers (16.7%). Library professionals in the category of Assistant Librarian prefer internet sources (34.8%) to journals/periodicals (29.0%), books and conference papers whereas among Junior Librarians and Professional Assistants preference to internet resources is higher (42.4% and 42.9%) than journals / periodicals and books.

55. Library professionals having less experience access Internet sources (44.0%)more than other professionals. 32.8% of professionals with 16-25 years experience prefer to use internet sources , more than journals/periodicals (25.9%), books (22.4%) , and conference papers .The senior most professionals' use of books and internet sources is 26.7% and that of journals /periodicals is 13.3%.

Use of Electronic Information Sources

56.In the case of electronic information sources search engines (60.6%) are the most preferred form of information source for the library professionals in all the Universities.The use of other information sources is comparatively low as in the case

of online journals (15.0%) , Library websites (10.6%),Online databases (6.1%), Library Networks (3.9%),Web Opacs (2.2%),Email List Serves (1.1%),and Institutional repositories (0.6%).

Use of Online Educational Sources

57.In the case of educational broadcasts on television network, only 48.1 % saw such programmes of educational interests, while 51.9% of professionals have not viewed any educational programmes on T.V. Library professionals of Sanskrit University (58.3%), CUSAT (53.2%) and University of Kerala (50.0%) have made use of educational programmes than the professionals in Calicut University (47.4%), MG University (35.3%) ,Kannur University (33.3%) and the least interest by those in Agricultural University (28.6%). 37.1% of library professionals utilized UGC programmes, 21.3% preferred to watch IGNOU programmes, and 21.3% other educational programmes (eg Victer, Discovery Channel), 20.2 % liked to see both UGC and IGNOU programmes.

58. In the case of E-learning programmes only 23.2% have accessed online modules or e-learning modules , while a great majority (76.8 %)have not made use of any of the e-learning course modules available. The library professionals in Kerala Agricultural University (42.9%) and CUSAT (40.4%) have accessed e-learning programmes more than that of Sanskrit University (25.0%), MG University (17.6%), Calicut University (18.4%), University of Kerala (13.8%) and Kannur University where none has used e-learning programmes. The most preferred module is that of IGNOU (76.7%), followed by few who used NPTEL modules (9.3%), MIT course modules and other E-learning programmes available (7.0%).

59. Though there is a preference for internet based sources to satisfy information and educational needs especially among the younger library professionals, the overall dependence on e-resources for educational and information needs is limited among the library professionals.

Opinion about restructuring curriculum

60. Opinion about restructuring the present curricula of library and information science found that a good majority (83.2%) was positive about restructuring curriculum and only .5% pointed out that it was not necessary. All the professionals both young and experienced hands suggested revising curriculum of library and information science courses.

61. In the case of topics to be added to the curriculum, Digital library software was pointed out by 65.9% of professionals, computer hardware and networking was the next important topic preferred by 61.1% of library professionals.. Library software (60.0%), IT oriented project work and apprentice training (57.8%), Library Web page designing (54.1%), Cataloging of E-resources (51.8%), Institutional repositories/Digital archives, Electronic databases and Web2.0 tools (50.8%), Public relations and personal management (47.6%), Multimedia applications (44.9%), Metadata extraction (43.2%), content development (42.2%), Soft skills and Information marketing (40.5%), web search strategies (40.0%), Information Literacy (38.4%), Intellectual property rights (30.8%), and Information audit (18.4%).

62. Library professionals have the opinion that their education in LIS has not in helped in getting skills in topics like evaluating information resources in electronic format(43.3%),handling MultiMedia Systems and LCD projection aids (55.7%). They had better opinion about current methods of cataloguing for print & E-resources (57.3%), familiarity with automated acquisition and serial control (44.4%), and evaluating library automated systems (44.3%). Majority of library professionals agreed that library education has helped to get knowledge of research methodologies (76.7%) and in Conducting User education programme (66.5%). Professionals did not have a positive opinion about Understanding different marketing techniques (43.2%), Knowledge of network management (48.1%), Webpage designing (56.2%), Installation of software, antivirus tools and hardware troubleshooting (55.7%). 47% of the professionals agreed that effective search of online/ electronic resources and knowledge of Presentation skills (38.9%) improved to some extent with the help of formal library education.

63. Among the different age groups majority agreed that formal education has assisted in acquiring various skills required for the profession. The opinion was similar in the different age groups among the respondents. Similarly, majority of the professionals in all categories Deputy Librarian, Assistant Librarian etc agreed or were uncertain about library science education. Only a few had opinion that LIS education has not assisted in acquiring necessary skills.

64. Majority of the professionals (66.7%) above 26 years of experience was not sure about LIS education and only a few agreed that LIS education has helped them in their career. All other group of professionals was equally uncertain or agreed that LIS education has assisted them in acquiring skills.

65. ANOVA test shows that experience of library professionals is a factor that influences the opinion regarding library science education. It is evident that library science education has helped to acquire skills in the profession only to a certain extent.

Information Communication Technology (ICT) Skills and Awareness

66. Most of the library professionals have conventional duties in their respective libraries except in some cases. 49.2% are involved in document delivery both conventional and electronic. 46% of the professionals perform data entry operations, around 40-44% in conventional services like acquisition, reference service, circulation and 30.3% in serials control. Technical processing jobs are managed by 26% of library professionals while other ICT based services like online services (22.6%), current awareness services (16.8%), database development (21.6%) and institutional repositories have less number of library professionals. It is evident that most of the professionals are not directly linked with ICT based services.

Awareness/skill and use of different technologies

67. Mobile phone (91.4%) and internet (86%) is the most used and familiar of all the technologies. CD/DVD related technology is known to 72.4% of professionals. Other familiar technological devices are Laser printer (69.2%), Barcode Scanner (67%), Digital Camera (66.5%), Memory Stick like flash drive or USB (54%). Technologies familiar to less than 50% of professionals are computer networking(48%), Image

Scanner(46.5%), MP4 Player(45.4%), LCD/Multimedia Projector (41.1%), Webcam (40.5%), Wireless Internet (34.6%), E-book Reader (21.6%), and the least familiar and least used among library professionals is RFID Technology (10.3%). It is seen that 39.5% of the professionals have not used RFID technologies and 24.9% are unaware of it.

68. Library professionals in all Universities are moderately skilled (above 50%) in the use of various technologies except in the case of Sanskrit University (41.7%) and University of Calicut (47.4%).The level of awareness and skill is comparatively better among the male professionals (58.7%) than female professionals (49.1%).

69. The awareness and use of technologies is high among the younger age group of 25-35 years (64.3%) while the usage and awareness is comparatively less among the age group of 36-45years (52.9%) and 46 -55years (42.4%). Similarly professionals with higher qualification have better awareness (more than 50%) and better familiarity with the use of technologies when compared to other professionals.

70. ANOVA test shows that the use and awareness of various technologies varies according to the gender and qualification of library professionals.

Awareness /skill for ICT based applications and services

71. Majority (88.6%) of the library professionals are skilled in Windows based services,51.9% in management of electronic resources, Linux operating system (41.1%),and institutional repository based activities (22.7%).Only 22.2% of the professionals have good skills in system administration and 16.7% professionals have skills in creating an HTML / XML document. While skills in Software installation and Web page designing found 16.7% and 14.6% of professionals, for Creating Metadata only 14% of professionals are skilled. Least number of professionals are skilled in Programming languages (13.5%), and the remaining are either not skilled or never use programming languages

72. In the case of ICT based applications and services only 31.4% of the professionals have good skills. 33.3% of library professionals in Kannur University are skilled and 33.3% are unaware of the applications, almost similar pattern was shown in Agricultural University and Calicut University (28.6%). In Sanskrit University the

professionals who don't use the applications are much higher (50%) than the those who have good skills (16.7%).In MG university 23.5% have good skills and 35.3% showed poor awareness and 29.4% don't use the services. In CUSAT the rate of awareness was comparatively better (38.3%) and in University of Kerala the 32.8% have good skills and remaining have low level of skills.

73. Male professionals have better skills in ICT based applications. It was found that 37.3% of the male professionals have good skills in ICT based services, while 28% have low level of awareness, and the rest 18.7% and 16% do not use or are unaware of the same. In the case of female professionals, only 27.3% have good skills and the rest have low level of awareness or skills in ICT based services.

74. The professionals with less experience are more skilled in ICT based applications than the more experienced hands. 38.1% of the professionals having less than 5 years of experience and 36.3% of professionals with 6 to 15 years of experience have good skills .Whereas only 24.1% and 20% of professionals with experience of 16-25 years have good ICT skills. The senior professionals (46.7%). have comparatively less awareness about ICT applications.

75. The category of Professional Assistants (35.1%) have comparatively better skills than other category of professionals. 33.3% of Deputy librarians showed good and 33.3% poor skills , whereas in the case of Assistant Librarian and Junior Librarian 29% and 27.3% have good skills respectively.

76. ANOVA test shows significant values for gender, designation and experience, which proves that awareness / skills for ICT based applications, are dependent on respondents' characteristics**.**

Use of Web Tools and Services

77. Email/Instant messaging or Chat was frequently used by 85.9% of professionals, and a few 2.3% has never used it. Wikis was frequently used by 69.1 % and never used by 13.0%, Discussion groups was frequently used by 42.8% and never used by 21.7% of professionals. Social Networking sites was used regularly by 41.6% professionals less frequently by 29.5%, and never used by 28.9%, Listservs used by (33.3%), but more number of professionals (40.4%) never used such services.

Audio/video sharing/webcasting tools like YouTube, Flickr was often used by 28.8%, but never used by 31.9%. Weblogs was often used by 25.2% and never used by 36.5% professionals. Other less frequently used Web tools are Social book marking/aggregating (16.6%), RSS feeds (11.9%), and the least used web application was Content management systems used by very few (3.8%).

78. 33.3% of library professionals in Kannur University used the web tools frequently, less frequently or never. In Kerala Agricultural University 42.9% used these services frequently and in CUSAT 43.2% used web tools frequently, 31.8% less frequently. In Sanskrit University 25%, professionals used the services frequently and not frequently whereas 50% of the professionals who responded never used web tools. In MG University 21.4% used web tools frequently,42.9% less frequently and in University of Calicut 37.5% frequently used web tools and in Kerala university the rate of frequent users was 37 %, 23.9% less frequently and never used 39.1%.

79. The usage of web tools and services is comparatively more among the young professionals. 46.3% of the younger age group used web tools frequently, 29.6% less frequently and 24.1% never used web tools. Whereas 36.7% of the professionals among the age group 36-45 years used web tools frequently, 2.5 % not frequently and 38.3% never used web tools. Still lesser number (25.5%) of senior professionals above 46 years used web tools frequently, 29.8% not frequently, and more number 44.7% never used web tools. Professionals with less experience in library profession use web tools more frequently than other professionals. Majority of professionals above 26 years experience never use web tools.

80. Chi-square test found significant values for University, age and experience of respondents proving that usage of web tools is dependent on University, age and experience of library professionals.

Awareness of Library automation software

81. CDS/ISIS is the most common software known to majority of (71.4%) library professionals. LIBSYS is known to 70.8% of the library staff. Soul is known to 61.6% professionals, and familiarity of other software are KOHA (53.5%), WINISIS (44.9%), LIBSOFT (37.3%), ALICE for windows (20.5%).Other lesser known

software are NEWGENLIB (7%), LIBRARY MANAGER (4.3%), ABCD and OPENBIBLIO (3.2%), EVERGREEN (2.2%) , PHP MY LIBRARY and MANDARIN 1.6% and 1.1% respectively. Other software not listed but reported as known to library professionals are ADLIB ,VIRTUA and TECHLIB plus.

Awareness of Digital library software

82. Knowledge about Digital library software is low among library professionals. Only D-space is familiar to more than 50% of professionals and Greenstone is known to 34.1% of professionals. Other not very commonly known digital library software are E-prints (11.4%) and Fedora (10.8%).

83. The analysis of ICT awareness and skill shows that library professionals have moderate skills in the use of different technologies; fewer skills in ICT based applications and services and reasonable knowledge of various library softwares. The developments in web tools and services are not fully exploited by library professionals. It is also proved that ICT skills are influenced by respondent's characteristics.

Library professionals' attitude towards ICT application

84. Majority of the library professionals have opinion that ICT application facilitate quick access to current data , improve quality of library services, helps to enhance knowledge and skills of library professional , and helps to improve the status of library with more than 90% positive responses. The professionals also have positive response that ICT application helps to improve communication (80.5%), increase job satisfaction of library professionals (78.9%), makes an integration within the library (68.1%), and helps to reduce workload of library professional(66.5%).This proves the highly positive attitude of library professionals towards ICT applications and services.

Problems faced in the effective utilization of ICT applications

85. Lack of training is the main problem in the effective utilization according to majority of library professionals (90.3%). Other problems are lack of infrastructure (72.4%), lack of support from authorities for implementing ICT applications (58.9%), lack of support from administration in training library professionals (54.6%), lack of

co-ordination among library staff(45.9%),and lack of initiative from professional associations to conduct specialized training programmes(39.5%). Only few professionals have opinion that fear of ICT applications (15.1%) and lack of interest of users (14.1%) is problems in the effective utilization of ICT.

Suggestions for updating knowledge/skills of Library Professionals

86. For updating knowledge and skills of Library professionals majority (88.2%) have suggested In-house training and workshops, searching Internet for relevant professional information (71.9%),regularly reading of relevant professional literature(69.7%),attendance of relevant conferences/workshops(68.7%),discussion of professional matters with colleagues(62.2%) and learning from web resources (61.1%). Other suggestions include attending professional association meetings (43.2%), undertaking research work (41.1%), reading general books/literary works (39.5%), pursuing higher studies (35.1%) and teaching which was suggested by only 22.2% of professionals.

6.3 Suggestions and Recommendations of the study

Based on the findings and views of the library professionals the following suggestions are put forward to improve the ICT based facilities of University Libraries and to enable the library professionals to utilize the ICT facilities more effectively, by improving their knowledge and skills in ICT applications and services in the library.

University Libraries in Kerala have to utilize effectively, the available resources to improve the ICT infrastructure. Efficient utilization of budget is important to meet the ever-increasing cost of equipments and electronic resources. All the University Libraries have been functioning with the same conventional budget without any modification for the past several years. There has not been any steady or continuous provision in the budget for the development of ICT infrastructure in the libraries to keep pace with developments in technology. Libraries require generous funds under specific budget heads for the procurement of hardware and its maintenance, software, collection development of electronic resources like e-books, online journals etc. Apart from funds allocated under several projects or non-recurring funds for procurement of hardware, no University library has till date set apart a detailed budget of sustaining

nature for the development of ICT infrastructure. In most University Libraries, a negligible amount is allocated for purchase of equipments and maintenance and it is barely enough for the purchase and repairs of all the existing hardware. Every year Librarians have to convince the authorities to allocate more funds towards development of modern ICT based infrastructure and to maintain the existing infrastructure. Unless and until the university authorities develop a strategy for the continuous development of university libraries' infrastructure and resources, the academic community of these higher educational institutions will be deprived of improved services.

University Libraries on their part can also put forward development projects to various funding agencies like UGC, DST, ICSSR etc and improve the library facilities with the help of such minor projects. They can also formulate means to raise funds through marketing of library services and consultancy services. Libraries must make a policy to conduct periodic user studies to evaluate the services provided and the extent to which facilities are of benefit to the user community. The feasibility of a consortium of Universities in Kerala is to be studied for the successful sharing of resources especially the electronic resources and print journals which in turn will help in providing enhanced services to the users.

At present, there is some inconsistency in pay structure among the professionals in the same designation in different universities and between the UGC qualified and non-UGC professionals. The pay is being revised by the latest state pay commission but with many irregularities. A standardized designation for Library professionals in all Universities is to be implemented with uniform pay scales. The necessity of appointing University Librarian in the Universities in Kerala has been pointed out in different studies and by library associations in particular. Lack of stable leadership is one major hurdle in all phases of progress faced by University Libraries. At present, Librarians on the verge of retirement are also given charge of the University Library purely based on seniority without following any definite norms, whereby the development of the library is seriously affected. At the junior level, in most of the Universities, due to the administrative delay in recruiting regular professionals or due to the expiry of rank lists, the routine library jobs are being done by temporary staff which also affects the quality of library services. There are several departments in

some universities where the library is still managed by a teacher or a provisionally appointed library staff. The university authorities and various library organizations must take immediate action to end such precedence and appoint regular library professionals in all libraries attached to teaching departments.

At the entry level, a basic degree with degree in library science is the required qualification for a library professional in the state universities. In the changing electronic environment, additional qualification or training in information technology related areas is also to be considered while recruiting library professionals, in order to serve the IT perceptive academic community.

The state government must take urgent steps to fill all the vacancies of library professionals, by relaxing the existing UGC requirements in the case of University Librarian and assign the leadership of University Libraries to competent, qualified professionals.

Incentives provided to teachers for career development must be extended to library professionals also, to encourage them to acquire higher qualifications. As refresher courses and career advancement is mandatory for professionals in the UGC cadre only, the professionals in the junior and middle level are mostly not sponsored by the Universities to attend such programmes. Professionals for whom the attendance is mandatory for attaining senior grades mostly attend the conferences and workshops. The number of professionals who have attended such training programmes purely for attaining knowledge may be very few. A continuous programme of professional development should be made mandatory for all library professionals. The training programmes and orientation programmes to develop skills of library professionals are to be organized by the institution in a regular manner and equal opportunities are to be provided to all library professionals irrespective of experience/designation to participate in workshops/seminars etc conducted by various other institutions and library associations. Professional development activities ought to be encouraged from the junior most level to develop the competencies of all professionals in providing various technology based services.

The library and information science curriculum must be restructured in such a way giving more importance to practical skills in library professionals not only in

technology, but also in traditional library topics, organizational and personnel management of libraries, public relations, soft skills, marketing of library services etc. In spite of UGC's model curriculum report in 2001, efforts are not made for research based curriculum development and teaching in Library and information science. LIS education programs will require constant improvement based on new advances in technological innovations.

6.4 Conclusion

The results of the study based on opinions from the library professionals listed here are applicable to library profession in general. Most of the library professionals have an optimistic approach towards the application of ICT based services in libraries. The professionals do not seem content with the opportunities in their work environment as suggested by the study. It may be mainly because of lack of adequate ICT infrastructure in University Libraries in Kerala. Majority of the professionals irrespective of their age, experience or qualifications have suggested the need for more IT oriented topics in the curriculum. To develop competitive personnel in a technologically advanced world, the University administrators and Library associations must provide opportunities to develop skills in ICT applications, library management and soft skills. Library science schools and teaching departments across the country have to take significant steps to revise library science curriculum, and incorporate significant changes to achieve the demands and challenges of library science profession.

6.5 Areas for further research

Evaluation of ICT based applications, services in University Libraries in Kerala can be studied from a user's point of view, and it would be helpful to improve the services in University libraries. A networking model of University Libraries in Kerala to share the resources including ICT based resources can be a subject for research. Impact of Information technology on Library science curriculum in the Universities of Kerala and other South Indian states can be taken as a topic of study to evaluate the changes in library science curriculum over the years.

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BIBLIOGRAPHY

Abels, E. (2003). *Competencies for Information Professionals of the 21st Century*. Retrieved August 12, 2009, from Special Libraries Association: www.sla.org/content/learn/comp2003/index.cfm

Adanu, T. S. (2007). Continuing professional development (CPD) in state-owned university libraries in Ghana. *Library Management , 28* (6/7), 292-305.

Ademodi, D. T., & Adepoju, E. O. (2009). *Computer Skill among Librarians in Academic Libraries in Ondo and Ekiti States, Nigeria (June)(online)*. Retrieved March 25, 2010, from http://www.webpages.uidaho.edu/~mbolin/ademodi-adepoju.htm

Adeyinka, T. (2009). *Attitudinal Correlates of Some Selected Nigerian Librarians towards the Use of ICT*. Retrieved June 14, 2010, from International Journal of Information Science and Management, Vol. 7, No. 1: http://www.srlst.com/ijist/ijism-Vol7No1/ijism71-15-30.pdf

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.

Adeyoyin, S. O. (2005). Information and communication technology (ICT) literacy among the staff of Nigerian university libraries. *Library Review , 54* (4), 257-266.

Adomi, E. E., & Nwalo, K. I. (2003). Prospects for continuing professional education for library and information science professionals in Nigeria: the case of Delta State . *New Library World , 104* (1194/1195), 499-508.

Adomi, E., & Anie, S. (2006). An assessment of computer literacy skills of professionals in Nigerian university libraries. *Library Hi Tech News , 23* (2), 10-14.

Agar, R. (1998). *Information and Communication Technology in Primary Schools : Children or Computer in Control?* London: David Fultor Publishers.

Aina, L. O. (1993). The challenges of the emerging market and the education and training of information professionals in Africa . *Journal of librarianship and information science , 25* (4), 197-201.

ALA. (1980). In-service training. In *ALA World Encyclopedia of Library and Information Services* (p. 601). Chicago: American Library Association.

Alemna A, A. (1998). Education and training of the future librarian in Ghana. *Librarian Career Development , 6* (1), 3-6.

Al-Qallaf, C., & Al-Azmi, H. M. (2002). InformationTechnology in Public Libraries in Kuwait: A First Study. *International Information and Library Review* , 289-308.

Anwar, M. A. (1998). Continuing professional development of Malaysian academic librarians. *Libri , 48* (1), 26-34.

Anwar, M. A., & 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.

Baby, M. D., & Sreekala, S. (2007). Library and Information Science Education in Kerala : Quantity vs Quality: A Case Study of Rajagiri School of Library and InformationScience. *NACLIN 2007* (pp. 506-513). New Delhi: DELNET.

Balakrishnan, N. (1996). Impact of information Technology on Library Science. In N. M. Malwad (Ed.), *Digital Libraries: Dynamic Storehouse of Digitized Information* (pp. 115-118). NewDelhi: New Age International Ltd.

Barden, P. (1997). Training and development for library and information workers for the future: A Manifesto. *Librarian Career Development , 5* (1), 30-33.

Baruchson-Arbib, S., & 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.

Battin, P. (1984). The Electronic Library:A Vision for the future. *Educom Bulletin , 9*, 12-17.

Bavakutty, M., & Verghese, R. R. (2007). *Information search pattern in electronic environment.* New Delhi: Ess Ess Publishers.

Bavakutty, M., Muhammed Salih, T., & Mohamed, H. K. (2006). *Research on Library Computerisation.* New Delhi: Ess Ess Publishers.

Bawden, D., Vilar, P., & Zabukovec, V. (2005). Education and training for digital librarians: A Slovenia/UK comparison.A*slib Proceedings: new information perspectives , 57* (1), 85 -98.

Bhattacharya, G. (1988). A Stable Theory in terms of Five Normative Principles. In T. S. Rajagopalan(Ed), *Relevance of Ranganathan's Contributions to Library Science* (p. 11). New Delhi: Vikas Publishing.

Bhattacharya, G. (1994). Structural Planning for the Development of Manpower for Secondary Information Work and Service. In A. Tejomurthy(Ed), *Restructuring of Library and Information Science Curriculum* (p. 25). New Delhi: Concept Publishing Company.

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.

Bii, H. K., & 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.

Bradley, F. (2006). Writing for the profession: The experience of new professionals. *Library Management , 29* (8/9), 729-745.

Braun, L. W. (2002). New roles: a Librarian by any name. *Library Journal , 127* (2), 46-49.

Breen, C., & et.al. (2002). New information management opportunities in a changing world. *Library Review , 51* (3/4), 127-138.

Broadbent, M., & Grosser, K. (1987). Continuing professional development of special library and information centre managers. *Journal of Education for Library and Information Science. , 28* (2), 99-115.

Broady-Preston, J., & Bell, S. (2001). Motivating mid-carrier LIS professionals : the Aberystwyth experience. *New Library World* (1169), 372-381pp.

Bryant, S. L. (1997). Pursuing professional development: the core competencies. *One-Person Library 14* (5), 1-4.

Cardina, C., & Wicks, D. (2004). The Changing Roles of Academic Reference Librarians Over a Ten-Year Period. *Reference & User Services Quarterly , 44* (2), 133–42.

Cassner, M., & Adams, K. E. (2006). Assessing the Professional Development Needs of Distance Librarians In Academic Libraries. *Journal of Library Administration , 45* (1), 81-99.

Chan, D. C., & Auster, E. (2003). Factors contributing to the professional development of reference librarians. *Library & Information Science Research , 25*, 265–286.

Chaudhary, M. Y. (2001). Continuing Professional Education of Librarians Working in the University Libraries of Pakistan and Azad Jammu. *Inspel , 35* (1), 67-73.

Chisenga, J. (1999). A study of use of the Internet among library professionals in Sub-Saharan Africa. *Internet Reference Services Quarterly , 4* (1), 37-50.

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.

Choudhury, B. K., & Sethi, B. B. (2009). Computer Literacy of Library Professionals in the University Libraries of Orissa: an Analytical Study. *IASLIC Bulletin , 54* (1), 15-30.

Clyde, L. A. (2005). Librarians and breaking barriers to information literacy: Implications for continuing professional development and workplace learning. *Library Review , 54* (7), 425-434 .

Dalton, P., Mynott, G., & Shoolbred, M. (2000). Barriers to career development within the LIS profession . *Library Review , 49* (6), 271-276.

David, T. L. (2001). *ICT for Library and Information Professionals: A Training Package for Developing Countries(ICTLIP).* Retrieved June 26, 2009, from eLibrary Download Page: http://www2.unescobkk.org/elib/publications/ictlip/index.htm

Deegan, M., & Tanner, S. (2002). *Digital Futures:Strategies for the Information Age.* London: Library Association Publishing.

Desai, C. M. (2001). *Continuing Education Needs of Science and Technology Librarians: Results of the 2001 STS Continuing Education Committee Survey.* Retrieved July 13, 2007, from http://www.ala.org/acrl/sts/conted/survey.htm

Edem, S. U. (1999). Issues in career advancement prospects among librarians in Nigerian universities. *Library Management , 20* (2), 76-83.

Edwards, C. V. (2004, April). *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.*Retrieved June15, 2009, from http://etd.ils.unc.edu/dspace/bitstream/1901/25/1/ carlaedwards.pdf

Eells, L. L., & Jaguszewski, J. M. (2008). IT Competence for All: Propel Your Staff to New Heights. *Technical Services Quarterly , 25* (4), 17-35.

Elgohary, A. (2003). *Educational Preparation of Entry-Level Professional LibrariansEmployed by Florida Research Libraries.* Retrieved July 14, 2007, from http://etd.lib.fsu.edu/theses/available/etd-08312003-231256/unresrticted/ Dissertation.pdf

Elkin, J. (1994). The Role of LIS Schools and Departments in Continuing Professional Development. *Librarian Career Development , 2* (4), 19-23.

Feret, B., & 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

Feret, B., & Marcinek, M. (1999). The future of the academic library and the academic librarian: a Delphi study. *Librarian Career Development , 7* (10), 91-107.

Flatley, R. K., & Weber, M. A. (2004). Perspectives on Professional Development Opportunities for New Academic Librarians. *The Journal of Academic Librarianship , 30* (6), 488–492.

Freeman, M. (1995). The doctorate: a possible continuing professional development route for library and information service practitioners. *Librarian Career Development, 3* (1), 26–27.

Gerolimos, M., & Konsta, R. (2008). Librarians' skills and qualifications in a modern informational environment. *Library Management , 29* (8/9), 691-699.

Gosine-Boodoo, M. (2006). Profiling the Caribbean Special Librarian: demography, skills and professional progress. *Information Development , 22* (4), 292-299.

Gosine-Boodoo, M., & McNish, M. (2005). Comparing polarized perspectives: librarians' professional skills and development. *New Library World , 106* (7/8), 363-377.

Goswami, P. R. (2009). *Academic Librarianship in India: Exploring Strategic Intent and Core Competencies in the Present Era.* Retrieved June 7, 2010, from International Conference on Academic Libraries ICADL 2009: http://crl.du.ac.in/ ical09 / papers/index_files/ical-57_148_324_2_RV.pdf

Griffiths, J. M. (1995). The Changing Role of Librarians: Managing New Technologies in Libraries. *Vistas in Astronomy , 39*, 127-135.

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

Gulati, A. (2004). Use of information and communication technology in libraries and information centres:an Indian scenario. *The Electronic Library , 22* (4), 335-350.

Hamelink, C. J. (1997). *New Information and Communication Technoologies ,Social Development and Cultural Change.* Geneva: UNRISD.

Henry, D. B., & Neville, T. M. (2004). The Research, Publication, and Service Patterns of Florida Academic Librarians. *Journal of Academic Librarianship , 30* (6), 435-451.

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.

Hoskins, R. (2005). Information and communication technology (ICT) knowledge and skills of subject librarians at the university libraries of KwaZulu-Natal. *South African Journal of Libraries and Information Science , 71* (2), 151-163.

Hubbell, F. (2010, March 13). *Converting AACR2 from RDA.* Retrieved June 5, 2010, from The Free Library: http://www.thefreelibrary.com/Converting+/ AACR2 +from + RDA- a01074063561

Ilyas, M. (1998). Librarianship in Pakistan into the 21st Century. *Information Development , 14* (3), 127-132.

Inservice training. In A. Kent, & H. Lancour (Eds.), *Encyclopedia of library and information science* (Vol. 12). Rouledge Publications.

International ICT Literacy Panel. (2002). Retrieved November 21, 2010, from Digital transformation: A framework for ICT literacy (A report of the International ICT Literacy Panel): http://www.ets.org/Media/Research/pdf/ictreport.pdf

Islam, A., & Rahman, A. (2006). Growth and development of information and communication technologies in Bangladesh. *The Electronic Library , 24* (2), 135-146.

Jain, P. K., Kaur, H., & Babbar, P. (2007). *LIS education in India : challenges for students and professionals in the Digital Age.* Retrieved March 20, 2010, from http://dspace.fsktm.um.edu.my/bitstream/1812/231/1/45ind_Jain_Harvin_Babbar.pdf

Jain, P. (1999). On-the-job training: a key to human resource development. *Library Management , 20* (5), 283-294.

Jange, S., & Sami, L. K. (2006). Influence of Internet on library and information centres of National Institutes of Technology in India. *Annals of Library and Information Studies , 53*, 184-197.

Jani, N., Parekh, H., & Sen, B. (1991). Individual perceptions of professional advancement. *Libri , 41* (3), 183-193.

Jeevan, V. K., & 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.

Jestin, J., & Parameswari, B. (2002). Challenges for Library Professionals in India in the New Millennium. *Library Philosophy and Practice , 4* (2), 20-24.

Kajberg, L. (1997). Emerging public librarian roles and skills : A literature review. *Librarian Career Development , 5* (1), 12-22.

Kannappanavar, B. U., & 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.

Kannappanavar, B. U., & 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.

Katz, I. R., & Macklin, A. S. (2007). Information and Communication Technology (ICT) Literacy: Integration and Assessment in Higher Education. *Systemics, Cybernetics and Informatics , 5* (4), 50-55.

Kavulya, J. M. (2007). Training of library and information science (LIS) professionals in Kenya : A needs assessment. *Library Review , 56* (3), 208-223.

Kawatra, P. S. (2000). *2000 Plus : Library and Information Systems in the 21st Century.* New Delhi: Crest PublishingHouse.

Khurshid, Z. (2003). The Impact of Information Technology on Job Requirements and Qualifications for Catalogers. *Information technology and libraries , 22* (1), 18-21.

Kothari, C. R. (2004). Research Methodology : Methods and Techniques. New Delhi: New Age International (P) Ltd, Publishers.

Kumar, P. S. (2003). Information Technology : Basics. New Delhi: B R Publishing Corporation.

Kumar, P. S. (2008). *Library Movement and Library Development in Kerala and Lakshadweep.* New Delhi: B R Publishing.

Kwasik, H. (2002). Qualifications for a Serials Librarian in an Electronic Environment. *Serials Review , 28* (1), 33-37.

Lancaster, F. W., & Sandore, B. (1997). *Technology and management in library and information services.* London: Library Association.

Leach, K., Arundale, J., & Bull, G. (1996). *The use of information networking for continuing professional development.* Yorkshire: British Library. Research and Development Department.

Leong, J. (2008). Academic reference librarians prepare for change: an Australian case study. *Library Management , 29* (1/2), 77-86.

Li, L. L. (2009). *Emerging Technologies for Academic Librarians in the Digital Age.* London: Chandos Publishing.

Maesaroh, I., & Genoni, P. (2009). Education and continuing professional development for Indonesian academic librarians: A Survey. *Library Management , 30* (8/9), 524-538.

Mahapatra, G. (2006). *LIS education in India: Emerging paradigms, challenges and propositions in the digital era*. Retrieved March 14, 2010, from http://arizona.Open repository.com/arizona/bitstream/10150/106109/1/89. Gayatri_Mahapatra. long. pdf

Majumdhar, R. P., & Roy, S. (2008). Application of Blog in Library and Information Services. *IASLIC Bulletin , 53* (4), 241-246.

Maness, J. M. (2006, June). *Library 2.0 Theory: Web 2.0 and Its Implications for Libraries.* Retrieved January 14, 2010, from Webology: http://webology.ir /2006/ v3n2/ a25.html

Marjariitta, V. (1999). Educational needs of Finnish polytechnic librarians . *Librarian Career development , 7* (11), 113-119.

Mayer, J., & Terrill, L. J. (2005). Academic librarians' attitudes about advanced-subject degrees. *College and research libraries , 66* (1), 59-73.

Minishi-Majanjaa, M. K., & Ocholla, D. N. (2003). Information and communication technologies in library and information science education in Kenya. *Education for Information , 21*, 243–262.

Mohamed Haneefa, K. (2004). *Application of information and communication technologies in special librarie:PhD Thesis.* Department of Library and Information Science,University of Calicut.

Mohamed Haneefa, K., & Abdul Shukkoor, C. K. (2010). Information and Communication Technology Literacy among Library Professionals in Calicut University, Kerala. *DESIDOC Journal of Library & Information Technology , 30* (6), 55-63.

Mohana Kumar, T. (2007). *Professional Library Manpower Development for College Librarians in Kerala in the IT Environment : PhD Thesis.* Trivandrum: Department of Library and Information Science, University Of Kerala.

Mohandas, M. K., & Shet, K. C. (1999). Multimedia Based Information Retrieval System. In H. S. Chopra, *Library Information Technology in Modern Era: Libraries and Librarians in the New Millenium* (pp. 173-178). New Delhi: Commonwealth Publishers.

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

Morgan, S. (1996). Developing academic library skills for the future. *Library Review , 45* (5), 41-53.

Mugwisi, T., & Ocholla, D. N. (2003). Internet use among academic librarians in the Universities of Zimbabwe and Zululand. *Libri , 53* (3), 194-201.

Muhammed Salih, T. K. (2004). *Computerisation of University Libraries :PhD Thesis.* Department of Library and information science,University of Calicut.

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.

Murthy, S. (1999). Role of librarians in the new millennium of information. *DESIDOC Bulletin of information technology , 19* (4&5), 3-10.

Mutula, S. M., & Wamukoya, J. M. (2007). *Web Information Management : A Cross Disciplinary Approach.* London: Chandos Publishing.

Nath, A., Gautam, B., & Parveen, K. (2007). Information and communication technology knowledge and skills of librarians in the Chandigarh city libraries. *International Caliber-2007 : Information and knowledge management in a networked world.* (pp. 713-726). Chandigarh: Inflibnet Centre.

Naushad Ali, P. M., & Bakhshi, S. I. (2006). *Problems and prospects of LIS education in India with special reference to distance mode*. Retrieved March 14, 2010, from http://www.bibliotheksportal.de/fileadmin/0bibliotheken/Bibliotheken_International /dokumente/indien_1.pdf

Nyamboga, C. M. (2004). Information skills and information literacy in Indian university libraries. *Program , 38* (4), 232-239.

O'Neill, A. L. (1998). What's for dinner ? Continuing education after the MLIS. *Library Acquisitions : Practice and Theory , 22* (1), 35-40.

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.

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.

Omekwu, C. O. (2006). Managing information and technology: critical roles for librarians in developing countries. *The Electronic Library , 24* (6), 847-863.

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.

Orick, J. T. (2000). The Virtual Library: Changing Roles and Ethical Challenges for Librarians. *International Information and Library Review , 32*, 313-324.

Panda, K. C. (1994). CD-ROM:The Modern Papyrus. In *Some Meins of Modern Librarianship* (pp. 1-11). New Delhi: Ajanta Publishers.

Panda, K. C., & Gautam, J. N. (1999). In'fo Technology (IT) on the Cross'road :From Ab'acus to Internet. Agra: Y.K Publishers.

Patel, D. (2006). *E-learning and its Impact on LIS Profession.* Retrieved January 16, 2010, from https://drtc.isibang.ac.in/bitstream/handle/1849/231/paperX_Dimple.pdf

Powell, R. R., Baker, L. M., & Mika, J. J. (2002). Library and information science practitioners and research. *Library & Information Science Research , 24*, 49–72.

Rajyalakshmi, D. (2007). Information professionals –knowledge and skills ,for information management. *ILA Bulletin , 43* (4), 8-15.

Ramaiah, C. K., & Moorthy, A. L. (2002). The impact of continuing education programmes on library and information science professionals. *Library Review , 51* (1), 24-31.

Ramesh Babu, B. P., Vinayagamoorthy, & Gopalakrishnan, S. (2007). ICT Skills among Librarians in Engineering Educational Institutions in Tamil Nadu . *DESIDOC Bulletin of Information Technology , 27* (6), 55-64.

Ramesh Babu, B., & Parameswaran, R. (1999). Automation of Public Library and Information Services iin the Context of Electronic Information Era:Public Library Staff Opinion Survey. *ILA Bulletin , 35* (1-2), 1-4.

Ramesha, & Ramesh Babu, B. (2007). Trends, Challenges and Future of Library and Information Science Education in India. *DESIDOC Bulletin of Information Technology , 27* (5), 17-26.

Ramzan, M. (2004). Effects of IT utilization and knowledge on librarians' IT attitudes. *The Electronic Library , 22* (5), 440-447.

Ranganathan, S. R. (1931). *Five Laws of Library Science.* Madras: Madras Library Association.

Rehman, S., Abu Baker, A. B., & Majid, S. (1998). Needed Capabilities and Development Strategies for Future Information Professionals: A Malaysian Perspective. *International information and llibrary review , 30*, 123-141.

Reitz, J. M. (2010). *Online Dictionary of Library and Information Science*. Retrieved March 20, 2010, from ODLIS-Online Dictionary of Library and Information Science: http://lu.com/odlis/

Rhine, L. (2006). The Impact of Information Technology on Health Information Access in Sub-Saharan Africa: the divide within the divide. *Information Development, 22*, 242.

Rice-Lively, M. L., & Racine, D. J. (1997). The Role of Academic Librarians in the Era of Information Technology. *The Journal of Academic Librarianship* , 31-41.

Roberts, N., & Konn, T. (1989). Continuing education and training for academic library staff. *Journal of Librarianship and Information Science , 21*, 109-128.

Rowley, J. E. (1988). *The Basics of Information Technology*. London: Bingley.

Safahieh, H., & Asemi, A. (2008). Computer literacy skill of librarians: A case study of Isfahan university libraries, Iran. In A. Abdullah (Ed.), *ICOLIS* (pp. 51-58). University of Malaya, Kuala Lumpur: LISU,FCSIT.

Sagolsem, M., Purnima Devi, T., & 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 knowlege management in networked world* (pp. 570-578). Chandigarh: Inflibnet centre.

Sampath Kumar, B. T., & Biradar, B. S. (2010). Use of ICT in College Libraries in Karnataka, India: a Survey. *Program: Electronic Library and Information Systems , 44* (3), 271 - 282.

Sarasvady, S., & Khatri, N. K. (2007). *Study of the Use of Electronic Resources for Implementing Library Consortium* . Retrieved June 14, 2010, from http://www. isical. ac.in/~serial/consortia/ CBSOR-07

Satyanarayana, N. (1997). LIS education: Change or status quo? In L. S. Ramaiah (Ed.), *In Information and society (Prof. P. Gangadhara Rao Memorial Volume)* (pp. 112-20). Ess Ess Publications, New Delhi.

Savio, R. (1990). Communication for development. *Development Journal , 2*, 7-8.

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.

Shaping the future:ASERL's competencies for research librarians. Retrieved August 12, 2009, from ASERL: http://www.aserl.org/statements/ competencies/ competencies.htm

Sheeja, N. K. (2010). Application of Information Communication Technologies in University Libraries in Kerala. *International Journal of Liibrary Science , 1* (J 10), 86-92.

Shibu Ray, S. (2009). *A study of the information seeking behaviour of Science and Technology teachers and researchers in Cochin University of Science and Technology and University of Kerala in the changed library environment:PhD Thesis.* Cochin: Cochin University of Science and Technology.

Shiholo, B. M., & 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

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.

Singh, D. K., & Nazim, M. (2008). *Impact of Information Technology and Role of Libraries in the Age of Information and Knowledge Societies.* Retrieved January 16, 2010,from http://ir.inflibnet.ac.in/dxml/bitstream/handle/1944/1229/3.pdf?sequence=1

Singh, D. R. (1988). A study of career advancement of academic library professionals in Delhi. *Library herald , 26* (1-4), 143-148.

Singh, J. (2010, May). *Changing Needs of Library and Information Science Curricula in India.* Retrieved June 13, 2010, from Library Philosophy and Practice: http://www. webpages.uidaho.edu/~mbolin/ lpp.htm

Singh, K. P., Sharma, N., & 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.

Singh, N. (2001). Internet: Importance and Usage for Library and Information professionals. *DESIDOC Bulletin of Information Technology , 21* (3), 17-28.

Singh, S. (2000). Library and Information Science Education in India : Growth and Trends. *University News , 38* (6), 45-48.

Singh, S. N., & 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.

Smith, I. (2005). Continuing professional development and workplace learning : resistance to change. *Library Management , 26* (8/9), 519-522.

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

Smith, M. Q. (2005). *The impact of information and communications technology change on the management and operations of academic libraries.* Retrieved January 16,2010,from http :// www.openthesis.org/documents/impact-information-communications- technology-change-502063.html

Somanathan Nair, K. P. (1997). *A study of the attitude of the librarians in Kerala towards the use of Information Technology and information activities:PhD Thesis.* Trivandrum: Department of Library and Information Science, University of Kerala.

Song, Y. (2005). Continuing education in Chinese University libraries: Issues and approaches. *Libri , 55* (1), 21-30.

Spackman, E., & et.al. (2006). *The 2005 Continuing Education Survey: What Science Librarians Want to Know.* Retrieved July 14, 2007, from Issues in Science and Technology Librarianship: http://www.istl.org/06-fall/sts.html

Sreenivasulu, V. (2000). The role of a digital librarian in the management of digital information systems (DIS). *The Electronic Library , 18* (1), 12-20.

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.

Srivastava, A., & Srivastava, A. (2004). Opportunities for professional development of librarians: a study of the level of satisfaction among librarians of institutions of higher education in Jaipur. *ILA Bulletin , 40* (4), 31-34.

Stephens, M. (2007). Libraries and the Read/Write Web. In R. S. Gordon, *Information Tomorrow: Reflections on Technology and Future of Public and Academic Libraries* (pp. 97-111). New Jersey: Information Today Inc.

Su, S.-F. (1993). Attitudes of academic library professionals towards computer-based systems in Taiwan. *Journal of Librarianship and Information Science , 25* (3), 143-152.

Suku, J., & Pillai, M. G. (2005). Perspectives on automation of university libraries in Kerala: status,problems and prospects. *Journal of Academic Librarianship , 31* (2), 151-159.

Temjen, T., & Saraf, V. (2003). Attitudes towards IT adoption : A study of library professionals in North East India. In T. A. Murthy (Ed.), *Proceddings of PLANNER 2003* (pp. 81-94). Shillong: INFLIBNET Centre, Ahmedabad.

Tenopir, C. (2003). *Use and Users of Electronic Library Resources: An Overview and Analysis of Recent Research Studies.* Retrieved June 14, 2010, from http://www. clir. org / pubs/reports /pub120/ pub120.pdf

Terry, A. A. (2001). Continuing education in the scholarly continuum : back to school with publishers and vendors . *Serials review , 27* (3/4), 62-78.

Tran, L. A., & Gorman, G. E. (1999). The implementation of information technology in vietnamese libraries:results of a survey . *Asian Libraries , 8* (10), 380-395.

University Grants Commission. (2001). *UGC Model curriculum: Library and Information Science.* New Delhi: UGC.

Varalakshmi, R. S. (2006). Educating 21st Century LIS Professionals- Needs and Expectations: A Survey of Indian LISProfessionals and Alumni. *Journal of Education for Library and Information Science , 47* (3), 181-199.

Varalakshmi, R. S. (2007). Need for National Consensus on Library and Information Science Education in India. *DESIDOC Bulletin of Information Technology , 27* (2), 13-20.

Vaughan, L. (2009). Statistical Methods for the Information Professional. New Delhi: Ess Ess Publications.

Vespry, H. A., & Kitiyadisai, K. (1992). Information technology in Thai academic libraries : report on a survey. *Information Development , 8* (3), 164-171.

Vijayakumar, J. K., & Vijayakumar, M. (2003). Knowledge, Connections, and Communities:A Special Reference to Indian University Libraries. *International Information and Library Review , 35*, 375-382.

Vijayakumar, K. P. (2007). *Manpower Utilization in the University Libraries of Kerala: PhD Thesis.* Trivandrum: Department of Library and Information Science, University of Kerala.

Walmiki, R. H., & Ramakrishnegowda, C. K. (2009). ICT infrastructure in university libraries in Karnataka. *Annals of Library and information studies , 56*, 236-241.

Watane, A., Vinchurkar, A. W., & Choukande, V. (2005). Library professional's computer literacy and use of information technology application in college libraries of Amaravati city. *IASLIC Bulletin , 50* (3), 131-141.

Webster, J., & Middleton, C. (2009). Impact of IT. *Desidoc Bulletin of Information Technology* , 25-35..

Wilson, K. M., & Halpin, E. (2006). Convergence and professional identity in the academic library. *Journal of Librarianship and Information Science , 38* (2), 79-91.

Yang, Z. Y. (2001). An assessment of education and training needs for government documents librarians in the United States. *Journal of Government Information , 28 ,* 425–439.

Zhang, S. L. (2004). *Effectiveness of Support Staff Training and Development in Selected Academic Libraries in Kansas and Oklahoma.* Retrieved July 14, 2007, from http://www.amigos.org/fellowship/2004_effectiveness.pdf

APPENDIX - I

Questionnaire to Librarian

I. General

a. Name of the University :
b. Name of the Library :
c. Year of establishment of the Library :
d. URL of the Library , If any :
e. Name of the Librarian/Person in charge of the University Library:
f. Designation :

II Details of Library Budget for the last three years

Purpose	2007-2008	2008-2009	2009-2010
Total amount allotted for library Staff salary Books and Journals Online journals/databases Computer Hardware Internet subscription AMC Charges			

III. Library Collection

Document	Number
Books Bound volumes of journals Foreign Journals Indian Journals Online/Electronic Journals Theses Dissertations/Project Reports Reports Standards Patents Technical Reports Online Databases CD-ROM Databases Audio Cassettes Video Cassettes Microforms CD-ROMs DVDs Any Other (please specify)	

IV. Membership

Category	Total Number
Under Graduates Post Graduates Researchers Teachers Non Teaching staff Public Others (please specify)	

V. Staff Strength

Details of professional staff

Designation	No.of Persons	Designation	No of persons
Deputy Librarian		Junior Librarian	
Assistant Librarian (Sr scale)		Reference Assistant	
Assistant Librarian (Sel.Gr)		Prof.Assistant GrI	
Assistant Librarian		Prof.Assistant GrII	
Assistant Librarian Gr I		Technical Assistant	
Assistant Librarian Gr II		Library Assistant	

VI. Infrastructure

1. Details of Hardware available:

Item	No:
Server machines Client workstations Laptop computers Dot Matrix Printer Ink Jet Printer Laser Printer Network Printer Barcode Printer Flat bed scanner Barcode scanner CD-ROM tower CD server LCD projector UPS Others (pl.specify)	

2. Details of software used :

Software	Product name
Network operating system Library management software Digital library software Database management system Antivirus software	

VII Details of Library Automation

Details	Please√ mark
Library automation started in (year) Database creation Circulation Acquisition Cataloguing Serials Control OPAC Barcode generation Digitization of documents Reference services Z39.50 compatibility Financial Management Office file works Stock verification Security check gate	

Details of Databases created

Name	No. of records	Data conversion method
Books Serials Theses Audio/Video materials Standards Reports Patents Other(pl.specify)		

VIII Networking facilities

Library Networking

1. Do you have a Local area network in your library? Yes/No
2. Do you have a campus LAN in your University? Yes/No
3. Do you have link with any regional, national or international networks?
   a)Yes/No
   b)If yes, please specify the names of the network you participate?
   INFLIBNET ( ) DELNET ( ) OTHER (please specify):

4. Internet facility
   a)How many terminals are provided for the users? Specify the number:…….
   b)Please √ mark the type of Internet connectivity you have and specify the bandwidth:

ISP	Leased line	Ordinary Dial up	ISDN Dial up	VSAT	Others (pl.specify)	Bandwidth
ERNET VSNL NICNET ASIANET BSNL OTHERS (pl.specify)						

IX ICT based Library services

Please (√)mark the type of services provided by your library using information and communication technologies?

Types of services	Please √ mark
Current awareness services SDI services Circulation of new additions list Electronic document delivery Multimedia service CD/DVD based service Online databases WebOpac E journals E books Library website Internet services Library website	

X Staff training in ICT

a. Do you conduct any training for library professionals? Yes/No
b. If yes, Please select the training provided :

Training method	Please√ mark
Short training programmes Individual training by supervisor /colleague In house workshops Sponsored workshops outside institution	

XI. Please indicate the problems faced by you in applying ICT in your library:

Problems	Please√ mark
Insufficient funds Library staff are not interested in ICT adoption Inadequate trained staff in ICT application Lack of initiative on the part of library staff Lack of ICT knowledge on the part of users Increasing operating cost of ICT applications Lack of standard Library management software Lack of support from authorities Others(please specify)	

APPENDIX - II

Questionnaire to Library Professional

I. General Information

1. Name :

2. Gender : Male ☐ Female ☐

3. Age group : 25- 35 yrs ☐ 36-45 yrs ☐ 46-55yrs ☐

4. Basic qualifications: BA/BSc/BCom ☐ MA ☐ MSc ☐ MCom ☐
   Any other …….

5. Professional qualifications: Ph.D ☐ MPhil ☐ MLISc ☐ BLISc ☐
   CLISc ☐ Any other .....

6. Technical qualifications: MCA ☐ MBA ☐ PGDCA ☐ LLB ☐
   MCJ ☐ Any other ……

7. Designation : Deputy Librarian ☐ Assistant Librarian ☐ Junior Librarian ☐
   Professional Assistant ☐ Library Assistant ☐

8. Experience : Below 5yrs ☐ 6-15yrs ☐ 16-25yrs ☐ Above 26 yrs☐

II. Professional Development

9. a) Have you enrolled for any higher degree in library science after entering the library profession ?
   Yes ☐ No ☐

   b) If Yes, Please tick the additional degree /diploma you have acquired :
   MLIS ☐ MPhil ☐ PhD ☐ Other……..

   c) If No, please indicate the reason:
   Not interested ☐ Not allowed by University ☐
   No need for an additional degree in the present post ☐
   Any other :

   d) Have you enrolled for any degree in IT /computer applications after entering the library profession?
   Yes ☐ No ☐

   e) If Yes, Please tick the additional degree /diploma /certificate you have acquired:
   MCA ☐ PGDCA ☐ DCA ☐ PGDIT ☐ PGDLAN ☐

10. Have you published articles in?
    Journals /Magazines/Books Yes ☐ No ☐
    a)If yes,
    Total number of articles : Less than 5 ☐ 5-10☐ More than 10 ☐

11. Please select the professional associations in which you have membership :

a) KLA ☐
b) KELPRO ☐
c) IASLIC ☐
d) ILA ☐
e) IATLIS ☐
f) SALIS ☐
g) IFLA ☐
h) Any Other (Please specify)

12. In your service period have you attended any continuing education programmes (CEP) ? Please check the appropriate category below:

	0	1-5	6-10	Over10
Conference attendance : institution sponsored				
Conference attendance : not sponsored				
Workshop participation: institution sponsored				
Workshop participation : not sponsored				
Refresher courses				
In-house training programmes/workshops				
Other (Please Specify)				

a) Please list the reasons for attending the CEP :

to acquire new skills		to train junior staff	
to update knowledge or basic education		to improve relations with fellow professionals	
to get trained in the latest technologies		it is mandatory for promotion	
to improve library services		Any other (please specify)	

b). If you have not attended , the reasons for not attending the CEPs :

a. Restricted to a particular grade ☐
b. Do not influence professional work ☐
c. Lack of awareness ☐
d. Financial constraints ☐
e. Not interested ☐
f. Any other (please specify) ☐

c). How far has the continuing education programmes contributed to update your skills?

a. To some extent ☐
b. To a great extent ☐
c. Not at all ☐
d. Not Applicable ☐

III. <u>Educational and Information Needs</u>

13. Please indicate the source you prefer to support your educational and information needs?

a) Journals ☐
b) Text Books ☐
c) Conference Papers ☐
d) Internet sources ☐
e) Other sources ☐

14. What are the important electronic information resources you usually use to get information? Please indicate your preference as 1,2,3…

SNo	E -Resource	Preference	Not aware
1.	Search Engines		
2.	Library websites		
3.	Web Opacs		
4.	E-Books		
5.	Online Journals		
6.	Online databases		
7.	Email List serves		
8.	Institutional Repositories		
9.	Library Networks		
10.	Any Other Please specify		

15. Do you watch any educational programmes on TV? Yes ☐ No ☐

i) If yes, what are the programmes you usually see?
a) UGC Programmes ☐
b) IGNOU Programmes ☐
c) Other educational programmes ☐
(please specify)

16. Have you accessed any E- learning /course repositories? Yes ☐ No ☐

i) If yes , tick mark the E –learning modules you have accessed?
a) MIT Course modules ☐
b) NPTEL Course modules ☐
c) IGNOU ☐
d) Any other ☐
(please specify)

17. Do you think there is a need to restructure the present curricula of library and information science?
Yes ☐ No ☐ No comments ☐

18. If yes, what all topics do you think need to be included in the curriculum? (Please tick mark the relevant ones)

S.no.	Topics	
1.	Public Relations and Personnel management	
2.	Computer hardware & Networking	
3.	Soft skills	
4.	Information Audit	
5.	Information Marketing	
6.	Information Literacy	
7.	Intellectual property rights	
8.	Library Softwares	
9.	Institutional Repositories/Digital Archives	
10.	Digital Library softwares	
11.	Electronic databases	

12.	Multimedia applications	
13.	Library webpage designing	
14.	Web Resources , Web 2.0 tools	
15.	Web Search Strategies	
16.	Metadata & Metadata extraction	
17.	Content development	
18.	Cataloguing of E- resources	
19.	IT oriented project work & apprentice training	

Any other topics you consider relevant:

19. To what extent do you agree or disagree that your formal library education has assisted you in obtaining the following skills:

S.no	Skills	Disagree	Neutral	Agree
1	Using current methods of cataloguing for print &E-resources			
2	Evaluating information resources in electronic format			
3	Familiarity with automated acquisition and serial control			
4	Handling Multi Media Systems and LCD Projection Aids			
5	Conducting User education programme			
6	Evaluating library automated systems			
7	Knowledge of Research methodologies			
8	Preparing budget and fiscal management & Personnel management			
9	Understanding different marketing techniques			
10	Knowledge of network management			
11	Webpage designing			
12	Effective search of online/ electronic resources			
13	Installation of software, antivirus tools and hardware troubleshooting			
14	Presentation skills			

IV. <u>ICT skills/awareness</u>

20. Please indicate the nature of work in your present post:(Please select whichever applicable)

Serials control		Online services	
Acquisition		Current Awareness services	
Technical processing		Document delivery	
Reference Service		Data entry	
Maintenance		Database development	
Circulation management		Institutional repository	
Any other (Please specify)			

21 How would you rate your level of awareness/skill for the use of following technologies?

S.no	Items	Good	Poor	Don't use	Don't know
1	Computer networking				
2	CD/DVD writing				
3	Memory stick (flash drive,USB)				
4	Mobile phone				
5	Digital camera				
6	Webcam				
7	MP4 Player (eg iPod)				
8	Laser printer				
9	LCD /Multimedia Projector				
10	RFID Technology				
11	Barcode scanner				
12	Image scanner				
13	E- book reader				
14	Internet (leased line , Dial up,Broadband)				
15	Wireless Internet				

22.How would you rate your level of awareness/skill for the following applications/services?

S.no	Applications/Services	Good	Poor	Don't use	Don't know
1	Operating system Windows				
2	Operating system Linux				
3	Manage electronic resources				
4	Web page design				
5	Create metadata /tag				
6	Create HTML/XML document				
7	Installation and customization of software				
8	System Administration &Maintenance				
9	Programming Languages				
10	Development of institutional repository				

23. How often do you use the following web tools/services :

S.no	Web tools/services	Frequently	Not frequently	Never
1.	Blogging (e.g., Twitter, weblogs)			
2.	Audio/video sharing/webcasting (e.g., Flickr, Skype, YouTube)			
3.	Email/instant messaging/Chat			
4.	Discussion groups (e.g, Google/Yahoo! Groups)			
5.	Listservs (e.g., Lisforum, Nmlis)			
6.	RSS feeds			
7.	Wikis (eg. Wikipedia , LISWiki)			
8.	Social book marking/aggregating e.g., Delicious, FriendFeed)			
9.	Social networking (e.g., Orkut, Face book)			
10.	Content management systems eg. (Drupal, Joomla)			

24 . Please tick mark the Library software packages known to you:

LIBSYS		NEWGENLIB	
SOUL		KOHA	
LIBSOFT		EVERGREEN	
ALICE for windows		PHP MY LIBRARY	
CDS/ISIS		MANDARIN	
WINISIS		OPENBIBLIO	

Any other (please specify)……..

25. Please tick mark the Digital library softwares you are familiar with:

a) Greenstone ☐
b) Dspace ☐
c) E-prints ☐
d) Fedora ☐

Any other (please specify)……..

26. Please indicate your opinion regarding the application of ICT in your library:

S.no	Attitude	Agree	Disagree
1.	ICT application facilitate quick access to current data.		
2.	ICT application improve quality of library services		
3.	ICT application help to enhance knowledge and skills of library professional		
4.	ICT application increased job satisfaction of Library professional		
5.	ICT application help to improve communication		
6.	ICT application improve the status of library		
7.	ICT makes an integration within the library		
8.	ICT application reduce workload of library professional		
9.	ICT disturbs routine work of the library		
10.	ICT affects regular budgeting provision		

27. Please select the problems faced by library professionals in the effective use of ICT applications :

S.No	Problems	Please tick
1	Inadequate training in ICT applications	
2	Lack of infrastructure	
3	No support from administration in training library professionals	
4	Lack of support from authorities for implementing ICT applications in library	
5	Lack of co-ordination among library staff	
6	No initiative from professional associations to conduct specialized training programmes	
7	Lack of scope for Library professionals due to ICT applications	
8	Lack of interest on the part of users	
9	Fear of ICT applications	
10	Other problems (please specify)	

28. What are your suggestions for updating the knowledge/skills of Library professionals? Please tick mark the relevant ones :

S .no	Suggestions	Please tick
1	Regular attendance of relevant conferences/workshops	
2	In-house training programmes for staff development	
3	Going for higher studies/formal courses	
4	Undertaking individual research work/publication	
5	Discussion of professional matters with colleagues	
6	Attending professional association meetings	
7	Involvement in teaching	
8	Reading general books/literary works	
9	Regularly reading relevant professional literature	
10	Searching Internet for relevant professional information	
11	Learning from web resources	
	Any other (please specify)	

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