INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) LITERACY AMONG LIBRARY PROFESSIONALS OF COLLEGE LIBRARIES AFFILIATED TO UNIVERSITY OF PUNE: A SURVEY

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D E C L A R A T I O N

I hereby declare that the thesis entitled **"Information and Communication Technology (ICT) Literacy among Library Professionals of College Libraries Affiliated to University of Pune: A Survey"** completed and written by me has not previously formed the basis for the award of any degree or other similar title upon me of this or any other university or examining body.

Place: Pune   **Mr. Subhash Bandu Ahire**

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C E R T I F I C A T E

This is to certify that the thesis entitled **"Information and Communication Technology (ICT) Literacy among Library Professionals of College Libraries Affiliated to University of Pune: A Survey"** which is being submitted herewith for the award of Degree Doctor of Philosophy (Ph.D.) in Library and Information Science, under the Faculty of Moral and Social Sciences, Tilak Maharashtra Vidyapeeth, Pune is the result of original research work completed by **Mr. Subhash Bandu Ahire** under my supervision and guidance. To the best of my knowledge and belief the work incorporated in this thesis has not formed the basis for the award of any degree or similar title of this or any other university or examining body upon him.

Place: Pune

Date: 03 August 2018

Dr. Nanaji Shewale

Research Guide

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Executive Summary

Education is the continuous process and it is essential for every human being. Education has become the most important source of transforming the wealth of knowledge and skills from one generation to another. Education always plays a vital role in the process of knowledge, developing skills and increasing the growth and productivity of the nation. Higher education plays a crucial role in the development of the country. It includes teaching, learning, research and social service activities of universities, affiliated colleges and private institutes. In the area of teaching, it includes both the UG and PG levels.

Libraries have always played a vital role to support the teaching and learning process. Earlier libraries were treated as a mere storehouse of information, but due to the information explosion, it is now very difficult for any library to store the whole information and all kind of information resources in any specified subject to solve the information problem. The challenges arising from information explosion are because of the shift in publication trends from print to the digital or electronics format, increase in research activities. There are also few administrative challenges, like, rising costs of publication, every changing user expectations, changing needs of users, etc. Thought the aim of the every modern library is to provide the right information to the right user at the right time and right form for improving user's knowledge, skill and development activities. Once of the solutions to tackle these challenges could be Information and Communication Technology (ICT) Literacy.

The development in ICT has drastically changed the methods of information handling. ICT might be any combination of tools and techniques that facilitate to generate, acquire, store, process, manage, retrieval, searching, upgrade and dissemination of information using electronic means. ICT has changed the libraries from traditional to the modern digital libraries. Today, ICT is a must in library and information centres to overcome the problems faced by traditional libraries like space problem, time spent for searching of documents, etc. After the implementation of ICT in libraries, it resolved many problems faced by tradition libraries. Unlike traditional libraries, to the

user can search books suing OPAC/Web OPAC, and even a single document can be accessed/used by multiple users. Thus, with the implementation of new ICT Technologies, the libraries are in a better position to provide better information services and meet the user expectations. At the end for fruitful results, both the library professionals and the users need to be ICT literate.

ICT literacy means the people are trained to handle various technologies to access the required information. ICT literacy is the skills or ability to use electronic technology, communication tools, and/or network accurately to solve the information problems including the ability to use technology as a tool to create, search, process, manage, evaluate, and disseminate information. It also adds to the knowledge about basic understanding of the ethical/legal issues encompassing the access and utilization of information.

Information is needed by everyone including students, faculties and researchers to enhance their academic performance. Many times users visit the library, but they are not satisfied with library resources and services due to a lack of ICT knowledge and ICT infrastructure facilities. The main reason there could be a lack of ICT infrastructure facility and non-availability of subscribed current information resources. Other reasons could be an absence of proper knowledge of available e-resources in the library and the mismanagement of the library resources both printed and electronic or digital resources. Keeping these in mind, the present study has been undertaken to assess the ICT literacy skills among library professionals to fulfil users' satisfaction in digital information age from college libraries of Nashik District in the state of Maharashtra. The problem selected for the research study is "Information and Communication Technology (ICT) literacy among library professionals of college libraries affiliated to University of Pune: a survey".

This research study is considered to be the first study in the ICT literacy among college library professionals in Nashik District colleges affiliated to University of Pune. College libraries get special consideration by the National Assessment and Accreditation Council (NAAC) and recommends that the ICT literacy programme is conducted continuously by the library professionals for library users.

The objectives for this research study are:

1) Assess the current status of ICT application in college libraries affiliated to University of Pune,

2) Study the availability of e-resources and databases used by library professionals while serving the user community,

3) Assess ICT Literacy among the library professionals of college libraries affiliated to University of Pune,

4) Assess the level of application of ICT tools for library activities,

5) Study the problems faced and impact of ICT literacy programmes on library professionals and

6) Suggest best practices/literacy models to enhance ICT literacy among library professionals.

The study is based on the hypothesis "ICT literacy of college Librarians and Assistant Librarians is satisfactory but need some training programmes to enhance it". For the current research work, the research methodology used is survey research and descriptive in nature. The formal questionnaire is used to collect primary data from a sample population. The scope of the study is restricted to ICT literacy among library professionals of college libraries in Nashik District.

Organization of Research work:

Chapter I: Introduction: This chapter provides a brief introduction of the information and communication technology literacy among the library professionals and the status of ICT infrastructural facilities in the libraries. It also describes the need, significance, objectives and hypothesis of this research. Lastly, it also explains the research methodology, research tools and techniques, sampling techniques, selection of sample, scope and limitations of the research work.

Chapter II: Literature Review: This chapter presents various research studies conducted earlier in the field of ICT literacy among library professionals. Here, the researcher has tried to analyze the research work carried out in the past for implementation of information technology, application of ICT in libraries,

information literacy, ICT literacy overview and ICT literacy among library professionals. During the study, the researcher also explored various print and online books, journals, Ph.D. thesis, online databases, etc.

Chapter III: Role of Academic Libraries in Higher Education: This chapter elaborates the role of academic libraries including college and university libraries. It also includes the type of education, its goals, functions, trends and development of higher education, education status in global and national scenario etc.

Chapter IV: Growth and Development of ICT Literacy: This chapter highlights the growth and development of ICT in libraries, ICT literacy in the global and national scenario. It also gives a brief description of d the development of ICT literacy concepts in library and information science field. At the same time, the researcher has also covered various types of literacies implemented in the library science field and its actual utilization in libraries.

Chapter V: ICT Literacy Models for Library Professionals: Apart from literacy models like hardware literacy, software literacy, resource literacy and search and information retrieval literacy, this chapter also discusses various ICT literacy models at international and national level.

Chapter VI: Data Collection, Analysis and Interpretation: This chapter presents analysis and graphical representation of data obtained through questionnaire from the library professionals. It gives a detailed interpretation of the analysis of the results.

Chapter VII: Findings, Suggestions and Conclusion: This chapter presents findings, suggestions and conclusion from the research work. Suggestions are put forward to improve the library resources and services. It also enlists the best practices and model for ICT literacy to be adopted for the library professionals. Lastly, it includes scope for further research.

Finding of the study:

1.   N-List from INFLIBNET consortia is one of the popular databases among Arts, Commerce, Science and Computer Science Colleges in Nashik District

whereas J-Gate and IEEE are the popular databases among Engineering Colleges.

2. Majority of library operations are automated and get support from proprietary automation software. On the contrary, very few use open source software. 'Vriddhi' is popular library management software among Nashik District college libraries.

3. It is observed that out of 149 library professionals 99 are male whereas only 50 female professionals.

4. Even though UGC has recommended minimum qualifications as Master's Degree with NET / SET, it is observed that only 47 library professionals are qualified whereas 102 library professionals do not have even the minimum qualification.

5. It is observed that all the libraries are having client PCs with LAN connectivity to servers and printers as a minimum requirement. Even though there is frequent load-shading of electricity in Nashik District, it is observed that many libraries do not have UPS/Battery backup facility even though it is a must. There are a few libraries with additional infrastructures like a scanner for digitizing the document, photocopier, barcode scanner, web cameras, barcode printers, etc. Some of the libraries do have LCD projector, fax, CCTV Cameras and Smart LED TV too. Only one college library has installed RFID technology so far.

6. All the library professionals are techno-savvy and possess considerable knowledge and skills about ICT and its application in the library. Library Assistant and Library Clerks have basic skills and knowledge of ICT tools and techniques.

7. With improved internet connectivity, various social networking tools are being used by library professionals for enhancing library services. WhatsApp is one of the popular social networking tools. Google Plus, Facebook, Skype, YouTube, LinkedIn, Twitter etc. are also being used by library professionals.

It is also observed that a few of them have used Instagram, Hike Messenger, WeChat, etc. for providing enhanced library services.

8.   Open Source Software (OSS) is the latest phenomenon and hence its use by library professionals is very low as a few are using OSS like KOHA, e-Granthalaya, CDS/ISIS, NewGenLib and ABCD software, etc.

9.   Due to lack of knowledge and experience of webpage designing professionals very few of had an exposure to web page designing and development.

10. One of the reasons for the lack of ICT skills up-gradation and implementation mentioned is the tight working schedule and lack of budget.

Best Practices suggested:

1.   Apart from ICT Literacy, there are other literacies to be adopted by the college librarian and ICT literacy is not the prominent among them.

2.   Librarians need to have hardware literacy in which all the hardware components required to develop automated, digital and virtual libraries are essential.

3.   In addition, to develop an advanced library, the librarian also required literacies like scanners, barcode scanners, servers, storage devices, etc.

4.   Network literacy is equally important for librarians to develop a network in the library.

5.   Librarians need to understand software literacy which covers all types of software required for automating and advancing library including open source software, operating systems, etc.

6.   Internet literacy is also equally important in which search engines, their types, search strategies and utilities are required.

7. Librarians need to know e-resource literacy and consortium development for the economics of collection development.

8. Librarians also gain literacies on information search and retrieval literacy which is more important while accessing databases online/offline more effectively.

9. In addition, web literacy is essential to access web tools for library development.

In short, librarians need to have different ICT related literacy to manage college library properly to a suite in the ICT environment. Academic libraries in higher education institutions are more responsible for many duties and functions involved in support of teaching, learning and research activities. Routine works in the library are continuously changing because of new technology and updating of such technologies. College librarians are also responsible for development and management of library resources and services. Currently, the librarian's role has been drastically changed in the modern ICT era from the custodian of books to the development and management of electronic resources. This study will be useful for college librarians who are working in academic colleges and institutes and the suggested ICT literacy model is useful for other librarians.

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List of Abbreviations

Abbr.		Full Forms
ABCD	:	Automation of liBraries and Centres of Documentation
ADIS	:	Associateship in Documentation and Information Science
AICTE	:	All India Council of Technical Education
AMSE	:	American Society for Mechanical Engineers
AP	:	Andhra Pradesh
APA	:	American Psychological Association
ASCE	:	American Society for Civil Engineers
ASME	:	American Society of Mechanical Engineers
CDS/ISIS	:	Computerized Documentation Service/Integrated Set of Information System
CUST	:	Cochin University of Science and Technology
DBMS	:	Database Management System
DELNET	:	Developing Library Network
DLMS	:	Digital Library Management Software
DOAJ	:	Directory of Open Access Journals
EDSAC	:	Electronic Delay Storage Automatic Calculator
EDVAC	:	Electronic Discrete Variable Automatic Computer
E-Mail	:	Electronic Mail
ENIAC	:	Electronic Numerical Integrator and Computer
ERP	:	Enterprise Resource Planning
ETD	:	Electronic Thesis and Dissertation
ETS	:	Educational Testing Service
FAQ	:	Frequently Asked Questions
FB	:	Facebook
FE	:	Further Education
GSDL	:	Greenstone Digital Library Software
HTML	:	Hyper Text Markup Language

Abbr.		Full Forms
IBM	:	International Business Machine
ICT	:	Information and Communication Technology
IEEE	:	Institute of Electrical and Electronics Engineering
IEEE	:	Institute of Electrical and Electronics Engineers
ILMS	:	Integrated Library Management Software
INDEST	:	Indian National Digital Library in Engineering Science and Technology
INFLIBNET	:	Information and Library Network
JNTUK	:	Jawaharlal Nehru Technological University, Kakinada
LC	:	Library of Congress
LED	:	Liquid Crystal Display
LICs	:	Libraries and Information Centres
LIS	:	Library and Information Science
MAT	:	Mobile Application Technology
MOOC	:	Massive Open Online Courses
MSOT	:	Ministry of Science and Technology
MTCs	:	Mobile Technology Consultants
NAAC	:	National Assessment and Accreditation Council
NBA	:	National Board of Accreditation
NCERT	:	National Council of Educational Research and Training
NDL	:	National Digital Library
NISCAIR	:	National Institute of Science Communication and Information Resources
N-LIST	:	National Library and Information Services Infrastructure for Scholarly Content
NPE	:	National Policies on Education
NPETL	:	National Programme on Technology Enhanced Leaning
OCLC	:	Online Computer Library Centre
OHP	:	Over Head Projector

Abbr.		Full Forms
OPAC	:	Online Public Access Catalogue
OSS	:	Open Source Software
RFID	:	Radio Frequency Identification
SDITSC	:	Shri Dadaji Institute of Technology and Sciences
SNSs	:	Social Networking Sites
SOUL	:	Software for University Libraries
SPPU	:	Savitribai Phule Pune University
SPSS	:	Statistical Software for Social Science
SSUS	:	Sree Sankaracharya University of Sanskrit
UGC	:	University Grants Commission
UK	:	United Kingdom
UP	:	Uttar Pradesh
UPS	:	Uninterruptible Power Supply / Uninterruptible Power Source
URL	:	Uniform Resource Locator
USA	:	United States of America
VRS	:	Virtual Reference Service
XML	:	Extensible Markup Language

CHAPTER - I   INTRODUCTION

1.1   Introduction:

Education is the continuous process and it is essential for every human being. Education has become the most important source of transforming the wealth of knowledge and skills from one generation to another. Education always plays a vital role in the process of knowledge, developing skills and increasing the growth and productivity of the nation.

Higher education plays a crucial role in the development of the country. It includes teaching, learning, research and social service activities of universities, affiliated colleges and private institutes. In the area of teaching, it includes both the UG and PG levels. The higher education in the global concerns, in many countries, especially in developing countries, higher education is making its own way for the needs of advanced skills to be highly progressive. In Germany, restructuring of degree is the modularization of the graduate degree. Different changes by the United States in higher education like, certificate programmes and short-term courses of studies are being quickly developed (Maitra, 2008).

In India, the education system is run by the Central Government, State Governments, private and autonomous institutions as per Government norms. The higher education is an immense tools to promote the society of the 21st century. It has continuously changed, modified and adopted new technologies for improving quality in the education process.

The earlier education system in India stated that the dark age of Indian higher education followed which continued until the East India Company established three universities at Calcutta, Bombay and Madras under the Wood's dispatch in 1854. But prior to that in 1781 Warren Hastings had set up Calcutta, Madras and Jonathan Duncan started Sanskrit College at Varanasi and a few educational institutions were established in the initiation of some social workers and missionaries. Later on, 1902

Indian University Commission and in 1907 Calcutta University Commission was formed to study the condition of education (Borthakur, 2016).

India has a magnificent legacy of advanced education framework. In India, higher education system had tremendous changes in the last three decades, the higher education is a backbone of research and social development. In 1964-66 the education commission reported that there is cooperative collaboration among the education and national development. The vision of higher education in India is to remember the nation's human resources potential to its fullest with impartiality and consist. The structure of Indian higher education is the biggest in the world, as there were only 20 universities and more than 500 colleges with the 0.1 million students at the time of India attained independence. The expiration of it in 2011, shows that there were more than 600 universities and 30,000 colleges. It works with the rising of utilization of the potentials of human resources (Ayyappan, 2016).

The central Government of India and the state Governments are endeavouring to sustainability by concentrating on the extension of higher education. In the spite of the fact that the number of colleges and institutions related to higher education has expanded, however, there is uniqueness in the development of higher education at the national level of India. In the process of extension of higher education, the issues of uniqueness have emerged. It is a duty of the U.G.C. to make more influential regulation over the higher education system in India. The development of higher education will not serve the essential needs of education approach. It is important to see that the universities and colleges ought to give quality education to the masses and some of the universities and colleges have poor infrastructure, lack of skilled manpower, which are the hurdle in providing quality education to the age group of 18 to 22 years (Gaikwad & Solunke, 2013).

In India, extending quality in education has been the concentration of the considerable number of committees constituted at various stages of the improvement of the higher education system. The National Policies on Education (NPE) and constitutional amendment of 1976 have played a vital role in the different national consultations, discussions and recommendations. The NPE of 1968 denoted a huge step by stressing

on the need for a radical reconstruction of the education system, to enhance its quality at all stages (Stella, 2001).

The education system in India has made some amazing progress assessment from the Vedic-age and e-learning. Through Indian tradition which has always afforded special significance to education. Libraries have always played a crucial role in the support of teaching and learning process. Earlier libraries were treated as a mere storehouse of information, but due to the information explosion, it is now very difficult for any library to store all the information and every type of information resources in any specified subject to solve the information problem. The challenges of this information explosion scenario, the shift of publication trends from printed books and other reading material to the digital or electronics, rising costs of publication, users expectations, user refers e-resources, increase in research activities, changing needs of users and they expect all the facilities as per their requirements from the libraries in terms of services have to be faced by librarians. The library shape has been changed from the traditional library to digital or electronic library, and it has shifted from the storehouse of books to the powerhouse of knowledge (Kurhade, 2016). Education always changes the human mind from negative thinking to positive one. Education is an index of human development activities.

The education is the power of a country. ICT plays a crucial role in transmitting information from one generation to another. The procedure of education system in present-day period has changed because of the utilization of ICT in teaching, learning and research activity. ICT has changed the way and functioning of the education framework and educational administration with the assistance of electronic information, its access, storage, manage, retrieval and dissemination (Akhtar, 2014).

Education at all levels has been remarkably influenced by the application of ICT especially in the field of telecommunications and multimedia applications. A few decades ago, technological gadgets like radio, film strips, TV, OHP, sound and video cassettes were utilised to make effective teaching and enhance learning. In the present days, teaching and learning have been improved by the impact of ICT based

advancement in the form of radio, teleconferencing, video conferencing, online and satellite-based services (Gunjan, 2014).

The use of ICT in the higher education, it makes a tremendous change in the education process. Innovation in technology is integral to the correspondence, storage, process, manage, and retrieval of information. A library is not exceptions to these technologies. The conventional library is being reformed by electronic information systems with the application of such technologies which make a hybrid library, digital and/or e-libraries.

By considering higher education in the State of Maharashtra, Savitribai Phule Pune University (SPPU), Pune (formerly University of Pune) is role model. Present topic of the research, "ICT Literacy among library professionals of college libraries affiliated to Pune University: A Survey" was approved by Tilak Maharashtra Vidyapeeth on 12 Sept 2012. During the study, in the year 2014, name of University of Pune is changed to Savitribai Phule Pune University (SPPU) (Kadu, 2014) and (Deputy Registrar, Planning & Development, 2014) . Hence in the following text the name of the University "University of Pune" will be used as "Savitribai Phule Pune University (SPPU), Pune." After the establishment of Mumbai University in 1854 and Rashtrasant Tukdoji Maharaj Nagpur University in 1923, the third university is SPPU was established on 10 February 1949. At the time of establishment of SPPU, 12 districts of Maharashtra were attached to SPPU. After the establishment of Shivaji University, Kolhapur in November 1962, SPPU restricted to 5 districts namely Pune, Ahmednagar, Nashik, Dhule and Jalgaon. After the establishment of North Maharashtra University, Jalgaon in August 1990, restricted only up to three districts namely Pune, Ahmednagar and Nashik Districts are attached to the SPPU, Pune. Currently 1024 colleges and recognized institutes affiliated to SPPU, Pune up to 2014. Out of the 179 from Nashik jurisdictions ("Savitribai Phule Pune University," 2016). This research work is limited to Nashik District only and covers all the 179 colleges and institutes.

1.2   Information:

Information is a processed data. It means people can share their ideas and messages directly or indirectly with each other. Information is essential for everyone at everywhere and anytime to solve their problems. Information means arranging data in the proper way or in an accurate format.

Information can be in the form of books, computer, individuals, documents and the huge number of different sources. It has to be as simple as raw material which can be utilized to determine uncertainties (Faibiosoff & Ely, n.d.). Information defined as "any potential useful fact, quality of value that can be expressed uniquely with exactness. Information is whatever is capable of causing a human mind to change its opinion about the current state of the real world" (Jena & Das, 2013).

1.3   Communication:

Communication means to share ideas, facts, and information from one person to another or one physical place to another directly or indirectly.

The communication is imperative, because each and every administrative activity including some form direct or indirect communication whether planning and organization or prime and supervising, school authorities communicate with and through other people. This suggests that every person's communication skills both the individual and authoritative influencing and effectively. Communication can be characterized as the procedure of transferring information and common understating from one individual to another (Lunenburg, 2010).

Communication is the regular process everywhere in all fields. It means the transfer of information from one physical location to another by electronic means. "Communication alludes to the exchange or transfer of information from one physical location to another or from person to another. When action creates a reaction, regardless of whether positive or negative, communication has been taken place. Communication as a procedure, an exchange of information, ideas, thoughts and messages. It includes a sender, a recipient, a code and a language that is understood by both the sender and the recipient. A procedure including the passing of messages

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through the use of images. It includes the transfer of thoughts, facts, feelings, opinions, attitudes and beliefs between individuals" (Jena & Das, 2013).

1.4   Information and Communication Technology:

IT is a non-specific term, that covers to acquire, store, process, manage and dissemination of information of all types like textual, numerical, graphical and sound and in all application areas e.g. banking, business, science and technology not just librarianship and information science. Today ICT is used in every fields of all sectors. "Information technology has largely been replaced by information and communication technology 'ICT'. It is a part of the current and emerging fields of information technology including cloud computing, web technologies, bioinformatics, GIS and large-scale knowledge base" (Hussain, 2013).

Information technology defines "scientific, technological and engineering disciplines and the managerial techniques used in information handling and processing; their application; computer and their interaction with man and machine and associated social, economic and cultural matters" (Ramana, 2013).

"Information technology is the aggregate term for the various technologies engaged in the manipulating and dissemination of information. It includes computers, telecommunications and microelectronics, whereas information technology is a development of information resources handled by computers and communicated by electronic channels, databases can thus be accessed by telephone and television links, and computer output can be transmitted in an electronic format directly to a remote receiver" (Devarajan, 1999). Information and communication technology is a combination of devices and procedures that facilitates to generate, acquire, store, manage, process, search, retrieve and transmit information electronically. Today ICT is beneficiary due to improving the quality of work and speed of working process in all fields. In the field of library science, ICT plays a crucial role to acquire, storage, process, organize, access, retrieval and dissemination of information to the end users electronically.

"ICT has basically changed to acquire, store, process, access, use and transformation of information and facilitate worldwide interconnectivity. ICT is a framework intended to create, accumulate, process or disseminate information or it is the science and skills of computing, data storage, and communication" (Mohamed K. Haneefa & Shukkoor, 2010).

ICT has changed the libraries design from traditional to the modern digital libraries. Today, ICT is must in library and information science field due to traditional libraries facing various problems like space problem, ample time for book searching, rising cost of books, access to books by a single user at a time. After the application of ICT in the library, it solves space problem, a quick search of library books through OPAC and Web OPAC, and multi-users' access single book at a time. To overcome these problems, modern libraries are changing their shape with reading materials due to the advancement of ICT. Libraries are adopting new technologies to provide better information services and match the user's expectations.

The aim of every modern library is to provide the right information to the right user at the right time and right form for improving user's knowledge, skill and development activities. The developments of ICT have drastically changed the methods of information handling. "ICT might be any combination of tools and procedures that facilitate to generate, acquire, store, process, manage, retrieval, searching, upgrade and dissemination of information by using electronic means. Over the past two decades, libraries have become increasingly aware of the revolutionary impact of development in information and communication technology on their key functions." (M.K. Haneefa, 2006).

The advancement of ICT has made a tremendous improvement and changed almost in all walks of human life. Due to the emergence of ICT, the geographical boundaries and distances, which used to act as barriers in the way of the free flow of information have been rendered irrelevant. Library administration, organization and other technological processing have been made easier and more quantum of work can be done with the help of ICT (Mehaboobullah & Kabir, 2013).

1.5 Information and Communication Technology (ICT) Literacy:

In the age of information explosion and ICT, people want every information very quickly at their destination or remotely accessible. The main role of college librarian, to provide selected and current information to the library users as per their requirement. Presently library users want information in printed as well as electronic format.

Information and Communication Technology (ICT) literacy defined "used electronic technology, communication tools and/or network appropriately to use, access, organize, integrate, evaluate and create information with specific goals to work in and information society." ICT skills are essential for every library professionals to provide better library services and to well manage library resources.

ICT literacy means the people are trained to handle various technologies for access to required information. ICT literacy is "the skills or ability to use electronic technology, communication tools, and/or network accurately to solve the information problems including the ability to use technology as a tool to create, search, process, manage, evaluate, and disseminate information and the possession of a basic understanding of the ethical/legal issues encompassing the access and utilization of information" (Mohamed K. Haneefa & Shukkoor, 2010). ICT is the greatest achievement in the advancement of mankind. Earlier information published in a printed format like books, journals, newspapers etc. Now the information publication pattern is changed in e-books, e-journals, e-papers, e-databases, CDs/DVDs etc. and users preferred e-sources rather than printed material.

ICT has drastically transformed the traditional methods of library and librarianship in providing of services to their clients. Currently, the libraries provide required information and research journals through online or electronic methods (Ahmad & Fatima, 2009).

The ICT has changed the scene of libraries and information centres. Libraries are drastically shifted from traditional to the digital in the cyber environment. Library resources are being changed from print to the electronic and online resources.

Information has been scattered rapidly around the world because of development and advancement in ICT and telecommunication. The development of ICT driven information services has postured difficulties for LIS professionals (Ansari, 2013).

The advent of ICT today indicates that this age of information and communication is rapidly transforming from information society to knowledge society. The concept of ICT is a generic term that used to create, acquire, store, organize, access, retrieve, present and transfer information by electronic and other computerized implies (Olatunji & Oluwadare, 2011).

Information and Communication Technology (ICT) or Information Technology (IT) skills can be allowed to as the general capabilities (learning, know-how, attitude and state of mind) important to create, store, process, manage, retrieve and distribute digital information (text, pictures, sounds) in a digital library or any type of information (Seena & Pillai, 2014).

Information and communication technology is the systematic design of tools to gather, process or distribute information very quickly. Today's information publication rate is very high and it will be increasing continuously in future. Here, college librarian's role is very crucial due to teaching and learning process, increased research activities, information demand of college and institution authorities and user's expectation on information demand in electronics format preferably. In the college libraries, a user is students and faculty members. Student and faculty members did not literate about e-resources available in the college library. Through the ICT literacy programme, library professionals should aware of electronic information resources available in the college library and they know how it will be accessed.

1.6   Statement of the Problem:

Information is needed by everyone including students, faculties and researchers to enhance academic performance. Many a times users visit the library, but they are not satisfied with library resources and services due to a lack of ICT knowledge and ICT infrastructure facilities. The main reason for unavailable or not providing proper information to the user is lack of ICT infrastructure facility and not subscribed to

current information resources. Some problems such as an absence of proper knowledge about available e-resources in the library and the management of all the library resources like printed as well as electronic or digital. Keeping these considerations in mind present study has been undertaken to assess the ICT literacy among library professionals to fulfil users' satisfaction in digital information age from college libraries of Nashik District in the state of Maharashtra. The present study is an effort made towards an attitude of college librarians to searching electronic information resources, awareness of ICT infrastructure, handling various digital tools applied in the libraries, accessing databases and providing electronic information to the end users. The problem selected for the research study is "Information and Communication Technology (ICT) literacy among library professionals of college libraries affiliated to University of Pune: a survey". The present study focuses attention on ICT literacy among library professionals who are currently working as a librarian in various colleges and institutes in Nashik District in the state of Maharashtra.

1.7   Need of the Study:

In the views of earlier discussions about ICT literacy and ICT application in libraries, the information is considered as crucial role played in an intellectual national resource which is a need of every individual in the society. A college library extends its support for teaching, learning and research activities of the college and also the social, economic, cultural, political and technological development of the country. The ICT application in library has brought revolutionary changes in the activities of college library. From the invention of ICT and its application in the library, it makes tremendous changes in the library resources and services. The application of ICT in the library makes library automation with the standard library software, use of barcode technology and applying Radio Frequency Identification (RFID) technology. The ICT use in the library, there is continuous change and development in libraries. From the different studies conducted so far as elaborated related to the topic in various universities and institutes but fewer studies are reflected in academic colleges to ICT literacy among college library professionals. Since the slot of ICT literacy among library professionals in academic institutions is visualized this has tempted the

researcher to undertake the present study to assess the ICT literacy among library professionals of college libraries. The present research study is not overlapping and hence the title "Information and Communication Technology (ICT) literacy among library professionals of college libraries affiliated to University of Pune: a survey" is fixed.

1.8   Significance of the Study:

This research study is considered to be the first study in the ICT literacy among college library professionals in Nashik District colleges affiliated to the Savitribai Phule Pune University (SPPU), which has analyzed the ICT literacy/skills among college librarians. College libraries get special consideration by the National Assessment and Accreditation Council (NAAC) as important to ICT literacy programme conducted continuously by the library professionals for library users.

The delivery of ICT literacy programme by the library professionals will help to improve the professional status of college librarian and it meets to the user expectation as well. The present study provides the current scenario and explore the current status of ICT literacy among college library professionals.

1.9   Objectives of the Study:

1. To assess the current status of ICT application in college libraries affiliated to Savitribai Phule Pune University (SPPU)
2. To study the availability of e-resources and databases used by library professionals while serving the user community
3. To assess ICT Literacy among the library professionals of college libraries affiliated to Savitribai Phule Pune University (SPPU)
4. To assess the level of application of ICT tools for library activities
5. To study the problems faced and the impact of ICT literacy programmes on library professionals
6. To suggest best practices/literacy models to enhance ICT literacy among library professionals.

1.10   Hypothesis:

1. ICT literacy of college Librarians and Assistant Librarians is satisfactory but need some training programmes to enhance it.

1.11   Research Methodology:

The research method is a systematic plan for conducting research work. "Actually research is simply the process of arriving at dependable solutions to the problem through the planned and systematic collection, analysis, and interpretation of data" (Kumar, 1992).

Research is a "studies enquiry or examination especially; investigation or experimentation aimed at the discovery and interpretation of facts, revision of accepted theories or laws in the light of new facts or practical application such as new or revised theories or laws" (Kumbhar, 2013). The research method is basically selected based on the nature of the study and work. This study is a survey research and descriptive in nature. In this study, the researcher has used a descriptive research method and survey technique to collect primary data from the target group of college librarians from Nashik District.

1.11.1 Research Technique:

In this study, the researcher has used survey technique to conduct the present research work of ICT literacy among library professionals in college libraries in Nashik District affiliated to Savitribai Phule Pune University, Pune.

1.11.2 Data Collection Tools:

The techniques used for data collection are questionnaire and observation as per necessary support and requirement of ICT literacy among library professionals. In additional support, the researcher discussed with college authorities about library facilities, services and ICT infrastructure where the librarian is not appointed. The literature review is also conducted by the researcher to analyze the past and present situation in the area of ICT literacy or ICT skills among the library professionals. The questionnaire is prepared with proper care to cover all the aspects related to ICT

literacy which is covered under this study to fulfill the research objectives. Some places, researcher orally discussed this with library professionals, which are unstructured in nature to get more details or satisfactory information about ICTs.

1.11.3 Design of the Questionnaire:

Research questionnaire has been designed, based on the study of literature. The questionnaire is grouped into seven sections, these sections have been systematically and logically arranged. These seven sections like; information about college/institute, library personnel information, information about the library, library automation, ICT infrastructure status, ICT literacy, etc. The questionnaire is having 80 questions related to the research study.

1.11.4 Selection of Sample:

The college libraries in Nashik District that are affiliated to Savitribai Phule Pune University (SPPU), Pune are the sample of this research work. The researcher has selected this entire population for the data collection through census enquiry. For the sample of this particular research, a total number of 179 college library professionals were selected and a questionnaire was distributed among all these library professionals.

1.11.5 Scope and Limitation of Study:

In SPPU jurisdiction 1024 colleges and institutes are affiliated till 2014. Out of that 684 from Pune district, 157 from Ahmednagar district, 04 from Dadra and Nagar Haveli and remaining 179 from Nashik District. Even though the title approved by the Tilak Maharashtra Vidyapeeth mentions the scope of work as "colleges affiliated to University of Pune", it has been restricted to the colleges of Nashik District, which was recommended by the Subject Expert during the presentation of progress of work. Copy of the letter is included in the revised thesis appendix (Tilak Maharashtra Vidyapeeth, 2015). Efforts are made to focus the attention on ICT literacy among college library professionals and ICT infrastructure facilities available in college libraries. Under these faculties like arts, commerce, science and computer science;

college of education and performing arts, etc. are covered. These colleges offer various degree/courses like; undergraduates, postgraduates and professionals degrees. The libraries selected for research study belong to the colleges either approved by NAAC, AICTE, NBA, and UGC as well as autonomous.
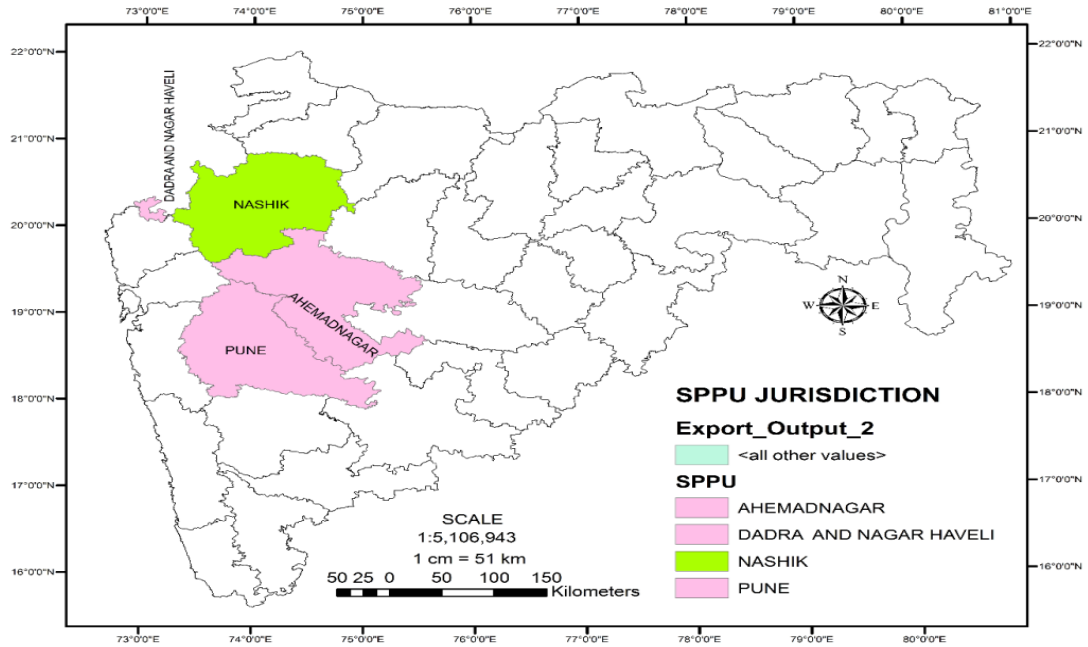
Figure No. 1.1: Map of Maharashtra showing Savitribai Phule Pune University Jurisdiction and highlighted Nashik District
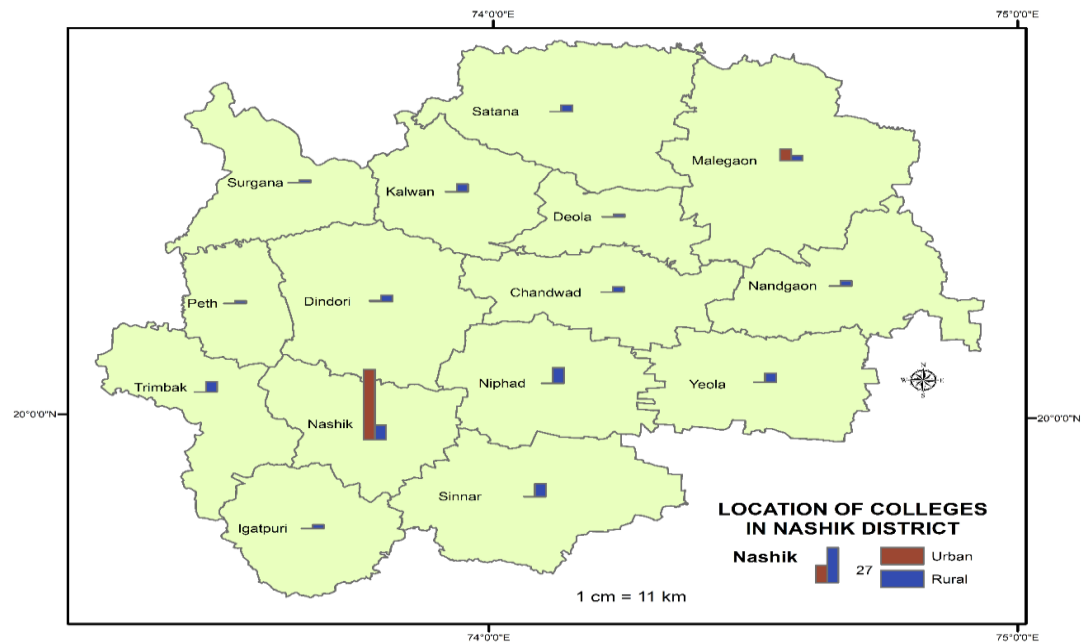
Figure No. 1.2: College location with urban and rural places in Nashik District

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1.11.6 Data Collection Sources:

In order to fulfill the research objectives of this study, the researcher has classified the data into primary as well as secondary data and arranged this scientifically into primary and secondary sources of the data collection.

i. Primary data:

The primary data is collected through various research methods like; structured questionnaire, personal interviews or discussion and observation.

a) **Questionnaire:** In order to elicit data from respondents, the researcher has prepared a structured questionnaire for library professionals for college libraries in Nashik District.

b) **Personal interview (informal) or discussion:** Researcher collected the relevant data by personal interaction and discussion with library professionals and college authorities in case of absence of the head librarian.

c) **Observation:** The necessary data is collected by the researcher through silent observation of library working process and personal working style of library professionals.

ii. Secondary Data:

In the order to acquire the necessary data in this research work, the researcher has used books, journals, periodicals, e-resource databases, e-books, e-journals and e-thesis. The researcher also visited different libraries like: Jaykar library SPPU, Pune, TMV library, YCMOU library, HPT/RYK college library and KTHM college library for data collection purpose.

1.11.7 Data Analysis Plan:

The researcher has analyzed the collected data using systematic and scientific tools like Statistical Package for the Social Sciences (SPSS) and Microsoft excel with

tables and graphs. Data analysis was processed through Microsoft excel for the purpose of maintaining accuracy and manage meaningful and constructive measures.

1.12   Structure of the Research Study:

The present research work is organized into seven chapters covering different aspects of the research are as follows:

Chapter I: Introduction

This chapter provides a brief introduction of the information and communication technology literacy among the library professionals and the status of ICT infrastructural facilities in the libraries. It also describes the need, significance, objectives and hypothesis of this research. Lastly, it also explains the research methodology, research tools and techniques, sampling techniques, selection of sample, scope and limitations of the research work.

Chapter II: Literature Review

This chapter presents various research studies conducted earlier in the field of ICT literacy among library professionals. Here, the researcher has tried to analyze the research work carried out in the past for implementation of information technology, application of ICT in libraries, information literacy, ICT literacy overview and ICT literacy among library professionals. During the study, the researcher also explored various print and online books, journals, Ph.D. thesis, online databases, etc.

Chapter III: Role of Academic Libraries in Higher Education

This chapter elaborates the role of academic libraries including college and university libraries. It also discusses details of the type of education, its goals, functions, trends and development of higher education, education status in global and national scenario etc.

Chapter IV: Growth and Development of ICT Literacy

This chapter highlights the growth and development of ICT in libraries, ICT literacy in the global and national scenario. It gives a brief description of the development of

ICT literacy concepts in library and information science field. At the same time, the researcher has also covered various types of literacies implemented in the library science field and its actual utilization in libraries.

Chapter V: ICT Literacy Models for Library Professionals

This chapter discusses various ICT literacy models at the international and national level. It also covers the literacy models like hardware literacy, software literacy, resource literacy and search and information retrieval literacy.

Chapter VI: Data Collection, Analysis and Interpretation

This chapter presents analysis and graphical representation of data obtained through questionnaire from the library professionals. It gives a detailed interpretation of the analysis of the results.

Chapter VII: Findings, Suggestions and Conclusion

This chapter presents findings, suggestions and conclusion from the research work. Suggestions are put forward to improve the library resources and services. It also enlists the best practices and model for ICT literacy to be adopted for the library professionals. Lastly, it includes the scope for further research.

Bibliography:

All the references and bibliography is arranged using the American Psychological Association (APA) 6th edition style manual. The researcher also used the Zotero software for citing references and arranging bibliography.

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CHAPTER - II   LITERATURE REVIEW

2.1   Introduction:

A literature review is an act to find relevant and related literature on a research topic, it helps to avoid duplication of research and support to improve research activity. Review of literature is a process to find out earlier published or unpublished, printed as well as non-print materials on a concerned research topic. The literature review is a systematic and critical review of the earlier published most important scholarly literature on a particular topic.

A literature search is a systematic and thorough search of all types of published literature in order to identify a breadth of good quality references relevant to a specific topic. The success of one's research project depends on a thorough review of the academic literature at the outset. It is, therefore, a fundamental element of the methodology of any research project. An effective literature review is a critical skill in its own right and will prove valuable for any future information gathering activity whether in academia or not. Getting the literature through the right manner will save time through the course of your research project and will inform and improve the quality of the research one goes on to do (Faculty-Librarians, 2016).

The literature search is a well thought and organized search for all of the literature published on the concerned topic. A well-structured literature search is the most effective and efficient way to locate sound evidence on the related subject of research. Evidences of the literature search may be found in books, journals, government documents and internet (Havard, 2007). A methodological review of past literature is a crucial endeavour for any academic research. The need to uncover what is already known in the body of knowledge prior to initiating any research study should not be underestimated (Levy & Ellis, 2006).

In the present search topic primary and secondary resources were used along with internet resources accessed like Library and Information Science Abstracts (LISA), Library, Information Science &Technology Abstracts (LISTA), primary resources

like journals, thesis, conference proceedings, books and reference books like encyclopedias, electronic resources available on the websites like Google books, e-databases like: N-List INFLIBNET, EBSCO, library and information science journals like DESSIDOC Journal of Library and Information Technology, Library Trends, Library Philosophy and Practice, etc. Thesis databases like Shodhganga and Vidyanidhi etc. have been consulted. The information collected from these resources have been organized into following various facets, those are:

- ICT: general aspects
- Application of ICT in libraries
- ICT literacy in general aspects
- ICT literacy among LIS professionals

2.2 ICT: General Aspects

The history of ICT has started from the invention and application of the computer in various sectors. The first time, ever since man thought of counting, he developed the concept of computation. His initial approach to accounting and data computation and their recording with the help of sticks, pebble or lines on the walls of caves. Then moved towards counting, using ten figure of his hands, which probably is the basis of the present decimal figure system. Man gradually developed mathematical ideas and went on inventing better tools for computations and calculations. The computer is made first time as a calculation machine (Sareen, 2010).

According to Ramana, the history of the development of a computer can be classified into different stages. Each stage of major technological innovation resulting into smaller, cheaper and more powerful, more efficient computers with a period of about ten years is known as a generation. The first generation computers available during late 1940's and early 1950's used thousands of vacuum tubes for the central processor, magnetic drums for memory, punched cards for input and output machine language for human machine interface. These computers were huge, bulky, expensive and complicated machines that consumed a lot of electricity, generated more heat, occupied large space and needed specialist operators. The first electronic digital computer, ENIAC developed in 1946 can be treated as an origin for the first

generation computers. The second generation of computers started in the early 1960's used transistors. Transistors were faster, cheaper, much smaller and required less energy and produced less heat than vacuum tubes. These computers used punched cards for input. IBM 700 series computers belong to this generation. In the second generation that the concept of (CPU) central processing unit, memory, programming language and input and output unit was developed. The high-level programming languages such as COBOL, FORTRON were developed during this period. The third generation computers started in 1964 replaced transistors with integrated circuits. The fourth generation computers had a reduction of computer components to microscopic dimensions. These computers are made using Very Large Scale Integrated Circuits (VLSIC). Thousands of integrated circuits placed onto a silicon chip made up a microprocessor. Due to the development of the microprocessor, it is possible to place computers central processing unit (CPU) on a single chip. Computers began to rapidly increase in speed, reliability and power while becoming more compact, cheaper and more user-friendly from the 1980's onwards resulting into the personal computer revolution. The first home personal computer is made by IBM in 1981. The fifth generation computers developed the concept of "Artificial Intelligence". It was introduced to allow the computers to take its own decision. These type of computers developed during the 1990s used ultra large scale integration and logic based languages to handle sophisticated non-numeric applications. The sixth generation computers are very large sized super computers. These computers facilitate various national and international networks in transmitting huge quantities of data across the world. The Centre for Development of Advanced Computing (C-DAC) developed Asia's second largest computer "PARAM-10000" 1998 is an example of sixth generation computers (Ramana, 2013).

The first automatic general purpose of a digital computer, designed by the Harvard University, a wall built in 1944 by the I.B.M. (International Business Machines). Yet technology dated back 1833 when Charles Babbage devised an idea of a computer which was utilized by George R. Stibitz of the Bell telephone laboratories in 1903s for using telephone relays in the construction of a computing machine. However, the first electronic digital computer ENIAC (Electronic Numerical Integrator and

Computer) was built in 1946 at the University of Pennsylvania. Similarly, the first EDVAC (Electronic Discrete Variable Automatic Computer) was built at the University of Pennsylvania under the guidance of John von Neumann in mid-1940s and the first stored programme machine EDSAC (Electronic Delay Storage Automatic Calculator) was designed at the Cambridge University, England in 1949 (P. Kaushik, 2006).

The computer-based online real-time circulation system has been devised during the 1960s besides many other data collection and batch system. In this period the State University of New York at Buffalo's real-time library circulation system introduced. At the same period The Illinois State Library, The Illinois State University, Midwestern University and The Bell Laboratories Library has started online circulation control systems. The immediate impact on library management came with the creation of the computer unit in the library, which began in the early 1960s. The first Indian computer was developed and built in 1956 at the Tata Institute of Fundamental Research, Bombay with some imported components while the second computer was built by the University of Jadavpur, Calcutta in 1963 in collaboration with the Indian Statistical Institute similarly the Bhabha Atomic Research Centre, Bombay has developed a small but high-speed digital computers for real-time applications (Balakrishnan & Paliwal, 2001).

The five aspects of technology which are likely to have a major impact on libraries during the 1980s. The five aspects are a microprocessor, distributed processing, mass storage communication, and "user hospitable" technology. The advent of a microprocessor has introduced library automation at an affordable price for smaller libraries. Resource sharing and networking are greatly facilitated by the use of a microprocessor to interface with larger systems or provide subject access (Panigrahi, 2000).

The new advances and developments in information technology or they have started influencing the libraries and librarians since 1930s. The use of computer-based systems and the information communication technologies have significantly affected library services and profoundly influenced the total information environment-virtually

in every facet of library operation and services. Including the acquisition of library material; technological process, including management of serials, preparation of bibliographic control tools such as catalogue and union lists; services such as reference, circulation and interlibrary loan; and administrative records keeping and data processing; activities such as online searching and CD-ROM databases (Abraham, 2013).

A case study conducted by Ronke, Isiaka and Isaac on "Information and Communication Technologies (ICTs) application in the teaching of agricultural science-based courses." The study reveals that the teachers are able to use ICT and its facilities into their teaching, learning, research and community development activities. It further reveals that there were existed significant differences among the teachers (in terms of their sex, age and job status) in their level of confidence to integrate ICTs into teaching and learning process although, no significant difference existed in terms of their academic qualification (Ronke, Isiaka, & Isaac, 2011).

Information and communication technology convey the nation of the application of microprocessor-based (digital) technologies for information handling on the purpose of effective and speedy decision making. A core component of ICT development changes is the semi-conductor chip which since the early 1980s began to decrease in size and cost, and increased steadily in capacity and complexity. The information age is viewed as the age of electronically wired or enabled society (e-society) within the context of the aspirations for living and managing life activities in a paperless environment (Adeyoyin, Okunlyaya, Alawiye, & Emmanuel, 2013).

The library automation system in India, has started last three decades ago and the initial systems were a stand-alone application for each library activities. Such systems were hosted on main frame computers offered by third generation programming language like COBOL based on life system. The advancement of computer and communication technologies and cost reduction coupled with the affordable relational database management system (RDBMS) for data management have resulted into the development of library management system (LMS) more appropriately, integrated library systems (Tyagi & Senthil, 2015).

A study conducted by Adomi and Kpangban focused on the Nigerian education sector which indicates some level of ICT application in the secondary schools. The Federated Government of Nigeria, in the National Policy on Education, recognized the prominent role of ICTs in the modern world, and has integrated ICTs into education in Nigeria. The study noted that 2004 was not the first attempt the Nigerian government made to introduce computer education in school. In 1988, the Nigerian government enacted a policy on computer education. The Federation Ministry of Education has launched an ICT-driven project known as school net, which was intended to equip all schools in Nigeria with computer and communication technologies. In June 2003, at the African Summit of the World Economy Forum held in Durban, South Africa, the new partnership for African Development (NEPAD) launched the e-school initiative, intended to equip all African high schools with equipment including computers, radio and television sets, phones and fax machine, communication equipment, scanners, digital cameras and copiers, among other things (Adomi & Kpangban, 2010).

The study of information and communication technology use for scholarly communication in Nigerian Universities and it carried out to determine the extent of ICT use by academics, the accessibility and level of ICT skills. The study focused on assessing the influence of rank, years of experience and gender on ICT use for scholarly communication. The gender and year of experience do not significantly influence ICT use for knowledge generation and communication imply of experience to produce knowledge. It also implies that female academics are now closing the gap the existed between male and female in the use of technology for their works (Okore, 2011).

The ICT used for virtual offices and networks, empowers people towards ICT-oriented human resources. When compared to the global telework scenario, it is evident that it could take a few years to implement all the major changes in South Africa, because people often prefer to maintain the safe and familial status. The role of ICT is not to replace or minimize human involvement, but to provide more flexibility, productivity and efficiency (Hoffman, 2002).

The study on interdependency between strategic management and the formulation of ICT strategy. The different perspectives with regard to strategy formulation from a business and ICT point of view, a holistic model was formulated. This model is capable of predicting the future, learning from mistakes and transforming strategic resources into core capabilities. There is increased acceptance of the utility of computer and information technology tools for better organization of information resources and effective rendering of services in libraries (Kruger & Snyman, 2002).

ICT firms in South Africa can be described as entrepreneurial based on an assessment of their entrepreneurial mindset. These firms displayed high levels of EO, regularly implemented new e-business initiatives and created a supportive organizational climate within which their employees could function. In this way, ICT firms should have been able to differentiate themselves and increase their organizational competitiveness (Scheepers, 2008).

2.3   Application of ICT in Libraries:

A study has compared IT basis internet skills among medical librarians in India and Iran. The major finding of the study that Iranian LIS professionals IT skills requirement was higher than that of Indian LIS professionals. Iranian professionals stated that there is a higher requirement for the ability to use software packages in areas such as creating documents and web pages than their Indian counterparts. Self-study is the most popular mode among Indian medical librarians as a medium of learning and updating their knowledge and skills of IT, whereas, attending workshops/seminars is the most popular mode of learning IT skills among Iranian LIS professionals (Farahi & Ramesh Gandhi, 2011).

The library automation is one of the main reasons for the application of information technology in libraries. It implies the change from manual system to the application of computer and other modern techniques to library operations and services. The major factors contributed to the introduction of computerization in Indian libraries includes greater speed, increase in efficiency, capability to handle large volume of data, flexibility to numerous manipulations, improved quality in services, economy in

power, availability of hardware and software facility, responsibility thruster on the organization and to enhance the prestige (Ramana, 2013).

A survey conducted on information technology adoption in libraries in Kerala. This study selected 25 libraries of premier scientific, technical and research both under the central and state government based in Thiruvananthapuram. The study revealed that some libraries stated computer application in 1986 however, the four libraries adopted automation systems in the year 2000 and also four libraries started using e-mail in the same year (Jeevan & Nair, 2004).

The ICT consists of IT as well as telecommunication, broadcast media, all type of audio and video processing and transmission and network based control and monitoring functions. The ICT application in libraries expression was first used in 1997 in a report by Dennis Stevenson to the UK government and promoted by the new national curriculum documents for the UK in 2000. The use of ICT in libraries has been done by various activities and functions like; library automation, accessing e-resources, acquisition and purchasing of new reading materials (Hussain, 2013).

The library automation in India analyzed the various factors that directly or indirectly affect the progress of library automation such as management issues, resources availability within the libraries, level of skills of the staff, availability of suitable software, geographic location area. Many libraries had used CDS/ISIS since the 1980s for library operations and in 1987; Chiang Mai University library was the first to introduce a commercial integrated library management software. The trend for library operations in the early 2000s was for an electronic information resource, e-books and the virtual library (Jena & Das, 2013).

The library automation is one of the fundamental elements for the development of library and information centres of today. Library automation may refer to the computerization of library activities to provide effective services to a client. The library automation began in the late 1970s by a very few specialized libraries in India. By taking meaningful initiatives to organize effective services, most of the universities and renowned institutes have automated their libraries. UGC is taking

commendable steps for the promotion and strengthening of college libraries in various ways (Ngurtinkhuma, 2011).

A survey of the impact of ICT on jab satisfaction of engineering college librarians in Maharashtra. This survey is based on ability to use online resources, library automation process, ICT used for in-house operations of library and skills in a digital environment. The data is collected through structured questionnaire and analyzed data has concluded that the significant number of librarians are highly satisfied with their ability to use online resources, but the majority of the librarians have expressed a low level of job satisfaction due to issues related to ICT. These factors led to not only dissatisfaction among the librarians but also kind of negative look towards the institution and the job that they are performing (Kacherki & Konnur, 2011).

The utilization and perception of ICT in research and development libraries, and the majority of librarians in R & D institutions in Chennai preferred with the rapid growth of ICT and realized that especially the internet has changed conventional methods of research, repository, retrieval and communication of information. The Internet is the most powerful source for deposit and retrieval of information. The rise of ICT has repositioned the frontiers of library resources, process and services as well as expectations of the users (Amirthalingam & Subramanian, 2015).

A study of the assessment of the application of information and communication technology (ICT) and its problems in the private engineering and management colleges of Orissa has revealed that various computers and ICT tools can be effectively used in the library from computer technology to internet, smart card and RFID technology, etc. The study also finds out that the activities of the libraries are not fully automated. But some libraries are automated only in its acquisition, cataloguing and circulation sections. There are only three libraries in engineering and three libraries in management colleges which have fully automated in their activities and more than thirty per cent of libraries are managing their activities manually (Barik, Das, & Ramesh, 2011).

A survey on the impact of information technology (computer) on biomedical information centres and libraries (ICLs) in India. The view of the study is various technologies available in biomedical ICLs in India during 1994-95 and 1997-98. It is clear that the reasonable number of technologies are available and there is also increase in number, further more demand and use of better hardware and software technologies. The study also points out that the biomedical ICLs are trying to share their resource through local, regional, national and international networks. ICT has a long-standing influence in almost all the areas and every sectors of human activities (S. N. Singh & Garg, 2002).

The study of information and communication technology infrastructure in special libraries in Kerala. The majority of state government institutes in Kerala have used CDS/ISIS software for library automation and most of the special libraries in Kerala have basic hardware facilities like servers, computers, printers etc. The libraries of central government autonomous institutions, have better hardware facilities including scanner, barcode printer, barcode scanner, Net, server, CD-ROM, Tower CD-writer etc. The study concludes that most of the special libraries in Kerala need ICT infrastructure including hardware, software and library staff have to be trained properly to make use of resources optimally (M.K Haneefa, 2006).

A study of ICT facilities in university libraries has stated that the information technology (IT) entered into libraries, especially academic and research libraries, during 1960. This study used a structured questionnaire to obtain feedbacks about university libraries ICT facility. The questionnaire is divided into four sections; hardware, software, technology and electronic resource. Majority of the libraries have implemented library automation and digital library software and digitization software and also implemented barcode technology. All the deemed universities have subscribed e-journals, a large number from deemed university consortia. It is also found that no library has implemented digitization software. It is very useful to digitalize rare collections such as older and out of print editions (Sivakumaren, Geetha, & Jeyaprakash, 2011).

IT is a broad-based term comprising the gathering, organization, store and retrieval of information that can be in textual or numerical (books, documents), pictorial and vocal forms (audio, visual) or a combination of computer and telecommunication devices. The data communications system and computer system transmit data over communication lines such as telephone lines since the mid-1960s. The use of the Internet today, has revolutionized access to information for the business, education, libraries and individuals (Issa, Ayodele, Abubakar, & Aliyu, 2011).

The study on ICT facilities and services among engineering college libraries focused on various library services such as traditional document delivery service and electronic service and to provide ICT based resources available in engineering colleges. With the application of ICT in library, the following services can be offered like: Traditional services: circulation, reservation, interlibrary loan, supply of documents/articles and reference service, Document delivery service: abstracting, indexing, bibliographical, current awareness service (CAS), selective dissemination of information (SDI) and reprographic services, Electronic services: CD-ROM searches, internet, online database service, fax and e-resource. The provision of multimedia library facilities, there is a strong impact on institutional outcomes (K. Kumar, 2015).

A survey of students and research scholars of the university to study their satisfaction level about the information technology-based services in the library. The satisfaction level of the library clienteles likes; physical facilities such as the special arrangement of computers, their configuration, allotted time work, library software, OPAC and LAN, Internet services, search engine and e-mail, access to e-journals and CD-ROM databases etc. The study also concludes and evident that the users are largely satisfied with the library services provided by IGM (Indira Gandhi Memorial) library in the IT environment. The benefit of IT in libraries to meet the user's requirements have satisfied library client (Reddy & Ali, 2006).

The application of ICT and related manpower problems in college libraries significantly focuses on librarian and their role in a digital information age. This study stated that the future librarian may be designated as a cyberian or cyber-librarian, as he has to provide information service from a large number of documents in digital

form available through the Internet where a significant number of documents are available free of cost (Mondal & Bandyopadhyay, 2010).

The emerging information and communication technology has modernized college libraries. The study concludes that the information and communication technologies will help to remove barriers of distance and time to acquire information. There will be no limit on the variety of ways in which modern technology is applied in a speedy retrieval of information most consistently (Bansal, 2010).

A study of ICT related library services and library housekeeping activities among the public libraries in south-south zone Nigeria. In this study descriptive research method is used with ex-post facto design and a survey technique is used for data collection. The study finds out that more than half of libraries have better ICT infrastructure but they do not improve library services due to ICT illiterate library staffs (Emojorho, 2010).

The implication of ICTs in libraries of higher education institutes of a Panacea Catapulting Library development in Africa has observed that Nigeria and most of the African countries are aware of ICTs started gathering a momentum of two decades ago. The early exposure came through lectures, research, academics and students who studied abroad and had opportunities for attending conferences on ICTs. Nigeria and other counties in Africa have no specific policy for ICT in education. It was only in February 2007, that the federal minister of education in Nigeria created its ICT department. The study concluded that the lack of funds has been a serious impediment in the course of ICT acquisition, adoption, utilization and management (Kamba, 2011).

Approach to ICT in library training, education and technology have examined that the origin of the Internet in India has started in the late 1980s when Education and Research Network (ERNET) was launched, with funding the Department of Electronic (DOE), the government of India. The project also involved a number of premier institutions: the National Centre for Software Technology (NCST), Mumbai;

the Indian Institute of Science (IISC), Bangalore; the five IIT and the DOE (Sharma, Singh, & Kumar, 2009).

2.4   ICT Literacy in General Aspects:

ICT has transformed library and information services globally. From the invention of ICT, the library has changed traditional practices to the digital information resources and provide it to end users. ICT literacy is started with the computer literacy. Initially, the knowledge and skill of computer literate person were divided into four components like; computer attitude, computer application, computer system handling and computer programming.

Computer literacy defined as "an understanding of computer characteristics, capabilities and applications, as well as an ability to implement this knowledge in the skilful and productive use of computer applications suitable to the individual roles in society". The study also stated that in the 1980s, computer literacy tends to be considered a grab-bag of different skills and attributes (Oliver, Towers, & Oliver, 2000).

The historical development of the ICT concept, computer literacy has been a topic of discussion since the early 1960s, it was considered to be a component of computer science education most often equivocate with programming skill. There was interest in developing 'computer appreciation' among liberal arts undergraduates. By the early 1970s, the term computer literacy had been officially coined and 1980s was a flurry of activities aimed at the development of computer literate societies. In the early 1990s, a wave of computer literacy courses focused on skill development in a small set of applications primarily containing word processing, spreadsheet and presentation software. The World Wide Web (www) became popular in the 1990s, it was not until later in the decade that competencies related to Internet use were incorporated into the computer literacy construct (Pérez & Murray, 2010).

A case study of ICT and internet literacy skills for accessing to e-resources available under the n-list programme of college library users of Barack Valley, South-Assam. In this study, the survey method was used with a questionnaire as a tool for data

collection. The study highlights ICT awareness for accessing e-resources available under n-list services by the college library users in the network and digital environment. From the study, it is clear that very less number of library users are aware of n-list services (Manoj K. Sinha, 2013).

Another case study is based on survey method, it is to obtain data from academician to use electronic information resources for computer literacy. The aims of the study were investigating the relationship between computing skills and their use of electronic information sources such as OPAC and the internet. The study revealed that a majority of faculty members were using computers, although about half of the academician considered their computing skills as "fair" or "poor". It was also observed that faculty members above fifty years of less frequently used electronic information resource (Santhi, Radhakrishnan, & Rani, 2010).

Information literacy is a lifelong learning process. Every person has the competence of information and knowledge. The impact of ICT on the development of information literacy by students in further education has attempted to study approach to understand information literacy among students and teachers. Interview and questionnaire technique is used to collect data from respondents. The study conclude that all the staff and students in FE (further education) have good ICT skills. However, older staff and some younger ones, may have limited ICT skills (Jackson, 2005).

A user survey study conducted on ICT and internet awareness and access to e-resources under UGC-INFONET digital library consortium of Assam University library users. In the data, collection researcher has adopted a survey method which comprises of administration of the questionnaire, observation of the participants and interview of some of the respondents. The survey has sought the opinions in the respect of usage of ICT and Internet on access to the e-resources under UGC-INFONET digital library consortium and for teaching and research activities. The study concluded that there is an urgent need of developing adequate ICT infrastructure in the colleges and universities and also it is necessary for the faculty members, research scholars and students to undergo ICT awareness training which is

being organized by various agencies like; ICSSR, UGC-Academic Staff College, INFLIBNET centre, professional organizations/societies/universities/libraries and computer centres (M K Sinha, 2012).

The usage of ICT products and services for research in social sciences at Aligarh Muslim University has used a descriptive method and survey technique with the questionnaire as a tool to collect data from research scholars. The social science research has used a variety of ICT products and services for their research work as it is helpful in finding information quickly and also helps the researchers to access, manage, integrate, evaluate, create and communicate information more easily. The study identified that researchers are not getting proper training/guidance and assistance from the staff/librarians, which is very necessary for the effective use of ICT products and services. The majority of researchers learned to use ICTs through the guidance from colleagues and staff (Ahmad & Fatima, 2009).

ICT literacy among the higher secondary education teachers of Odisha in relation to their type of management and stream. The study is based on the account of ICT literacy in both the government and private higher secondary teachers to the impact of management on the development of ICT knowledge. The study reveals that the teachers from both streams need to provide computer and internet knowledge to develop a positive awareness by increasing teaching-learning hours, providing modern infrastructure facilities and train staff to the educational institutions (Mohanty & Pandua, 2012).

A study of computer and ICT skills among secondary schools teacher in Ota, Ogun state of Nigeria has used survey method for collecting the data from the target group. The study reveals that majority of the teachers in the secondary school sample were computer and ICT literate. The government of Nigeria, in conjunction with the ministry of education, should ensure that computer and ICT training is included in the curriculum of teacher training schools (Adebayo & Fagbohun, n.d.).

A study an assessment and comparison of ICT literacy between teachers and students in Iran's secondary schools. The survey research method was conducted and the

questionnaire and interview instruments were used to compare and evaluate ICT literacy. The study finds out the meaningful difference between teacher and students ICT literacy in five components like; data retrieval, data application and classification, data interpretation and representation, data quality and utility judgment and data design and creation. It also presented that among students ICT literacy was higher than the teachers' literacy in the given components (Khalkhali, Moradi, & Amuei, 2008).

The study of information and communication technology (ICT) literacy in higher education. This paper described the ICT literacy assessment, developed by the educational testing service (ETS), an internet-based assessment of ICT literacy skills. The study has selected participants as 4048 undergraduate students recruited in January 2005 to take the ETS ICT literacy assessment. These students represented 30 colleges and university campuses in the Western United States. The study proceeds that assessing the effectiveness of an innovative ICT literacy instructional methods and comparing students' performance on the ICT literacy assessment before and after instruction. The result provides a strong support for instructor's claims that frequency-of-contact does not translate to good ICT literacy skills, and points to the need for ICT literacy instruction. Many students believe, they have good ICT literacy skills because of their frequent interaction with the internet (Katz & Macklin, n.d.).

A comparative survey of ICT skills and students across Europe has used a survey method with the instrument's technique applied for data collection in seven languages. This study selected total 13,000 new and established students at seven European universities about their skills with various ICT applications, approaches to training and support, the importance of ICT in their future studies and careers. The European higher education system is diverse in many respects. It has adopted ICT as a vital component of its core activities of teaching and research. Thus the students moving from one university to another will probably find that the ICT applications use in one of the most familiar features are the new institution (Haywood et al., 2004).

ICT skills of an academic community in postgraduate colleges in Kerala have depicted cross-sectional design with stratified random sampling technique selected for

sample population, which comprises teachers and students of 40 arts and science postgraduate colleges affiliated to the University of Kerala. Further, the study finds out the lower level of ICT skills among the majority of the respondents and among them, males scored better than their female counterparts. In use of e-resources, user preference is high towards web-based resources on the internet than CD-ROM databases. Even in IT savvy environment, the academic community depends on printed books and journals for gathering information for fulfillment of their academic pursuit (P. S. Kumar, Nair, & Devarajan, 2015).

A study of library usage and ICT skills among the internees of a rural medical colleges in Tamil Nadu has revealed that the ICT tools, obviously all the students are comfortable in the use of mobile phone and it is a top priority in the list. The knowledge and skills in operating other ICT tools are found at a low level. It also reveals that rural medical internees' basic knowledge of ICT is below an average and access to information through either off-line or on-line is limited. The rural medical students need to take efforts to learn new ICT tool skills for updating their computer skills (Murugan, Sorman, & Manohar, 2012).

A study of developing ICT skills by social scientists to survive in digital information environment has used a pilot survey method and used stratified random sampling technique for selection of sample group. The target area of the study is social scientists working from Manipur state: two universities, seventy-two affiliated and granted colleges of Manipur, independent research organizations professional bodies/associations government departments and some NGOs working on social, economic and political issues. The study concludes that the ICT skills among social scientists are very less number of social scientists have undergone courses in ICT and its related areas but they were more aware of accessing computer handling, internet browsing, online search, and access to websites, e-mailing and use of e-resources (Sarangthem, Devi, & Singh, 2011).

A study of the relation between teachers' pedagogical thinking and their expertise in information and communication technology. The result of this study indicated that only a small percentage of teachers had adequate skills of information technology

although a majority of them had access to computers either in their home or at school. There are massive efforts aimed at their training for improving ICT skills of teachers, which has been carried out in Helsinki during the last few years. The large-scale improvement of teachers' computer skills seems to be a more difficult problem than the anticipated in Finland's national strategies (Hakkarainen et al., 2001).

A learning assistance tool for enhancing ICT literacy of elementary school students is a study of project-based activities were incorporated into a novel assessment platform to meet the pressing needs of primary school students in Taiwan. Students were expected to apply application software suite provided as a platform to solve daily life problems. To verify the effectiveness of the reinforcement learning mechanism in the learning-assistance platform, 58 Grade 5 students from two classes participated in the experiment. The experimental results revealed that students in the high-achievement category in the experimental group performed better after using the learning-assistance system. Most of the students in the low- and medium-achievement categories had difficulty in using the software due to their poor ICT application capability (Huang et al., 2010).

The study of accountability, assessment and the literacies of information and communication technologies. In this study, the researcher has discussed the issues on Ministries of Education confronted in their large-scale assessment policies and practices as literacy curricula expand to include the new literacies of information and communication technologies. The interview technique has been used with Ministry personnel, to describe their current progress on ICT literacies. The study reveals that current accountability measures in Canadian education address the new literacies of ICT, particularly those most relevant for new times. Through a series of pan-Canadian interviews, it is found that Ministry of Education personnel was wrestling with these issues and was at various stages of innovation in their responses (Asselin, Early, & Filipenco, 2005).

A study of Information, Communication and Technology (ICT) skills curriculum based on the big6 skills approach to information problem solving has realized that the technology literacy is among the attributes that appear in nearly every set of '21st-

century skills'. The big6 skills like: (1) task definition- it includes define task, identifying information needed in order to complete the task to solve the information problem; (2) information seeking strategies- it has brainstormed all possible sources and selected the best sources; (3) location and access- to locate sources and find out information within the sources; (4) use of information- engage in the sources (read, hear, view and touch) and extract relevant information; (5) synthesis- organization of information from multiple sources and present the information; (6) evaluation- judge the process (efficiency) and judge the products (effectiveness), etc. (Eisenberg, Johnson, & Berkowitz, 2010).

A study on ICT literacy and internet use pattern among college library user of Barak Valley, South Assam, North East India has concluded that India has bypassed Japan to become the world's third largest Internet user after China and United States, and its users are significantly younger than those other emerging economies. At the same time, mobile Internet users in India will have 130.6 million by March 2014 (Manoj Kumar Sinha, Bhattacharjee, & Bhattacharjee, 2013).

2.5   ICT Literacy among Library Professionals:

ICT is any systematic design to gather, process or distribute information. ICT may be any combination of tools and procedures that facilitate the generation, acquisition, storage, process, reorganized, searching, retrieval and electronically transmission of information. 'ICT literacy' means people are aware of ICT tools, its application in various sectors and use the internet or network to solve their information problems.

A survey conducted on the developing technological skills for academic librarians, of the universities in Kerala. This study is based on a survey of library professionals employed in the central and departmental libraries of seven major universities in Kerala. The study finds out that the 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. It also observed that the younger library professionals should be more interested in emerging technologies and ICT based services and most of the library professionals have a positive attitude towards the application of ICT based services in libraries. But infrastructure facilities in university

libraries in Kerala has not enough expertise to provide the library staff valuable experience in the emerging technologies and support professionals development which is providing enhanced technology-based services to library client (Ms, Susan, & Baby, 2012).

A case study of the universities in Karachi, Pakistan on ICT skills proficiency of library professionals. In this study population is selected as a library professionals working in university libraries in Karachi, which are owned either by the government or by the private sectors. Altogether, there was four government (public) universities and eleven private universities. The study reveals that library professionals are highly proficient in three skills: word processing, presentation software and web-based functions and they are also moderately proficient in seven skills such as hardware using, system maintenance, spreadsheet, software development, web design, system analysis and design and networking. But they are low conversant in digitization and imaging technique (Ansari, 2013).

Information and Communication Technologies (ICTs) in Nigerian University libraries have suggested various responsibilities of librarians in the ICT/digital environment, such as select, acquire, preserve, organize and manage ICT/digital collection; design the technical architecture of ICT/digital library; establish user friendly interface over network; set up relative standards and policies for the ICT/digital library; design, maintain and transmit value-added information products; protect digital intellectual property in network environment and ensure information security (Igun, 2010).

A comparative survey on Information and Communication Technology (ICT) literacy of the state of the libraries of Kenneth Dike and Nimbe Adedipe universities, in Nigeria, has adopted survey method of research with a validated structured questionnaire. The population was selected from both universities library staff like a professional librarian, paraprofessionals and other staff members. The study finds out that the high-level of the usefulness of ICT application in the daily activities of the library staff in both university libraries. It also finds out that the adequate level of ICT training is adopted by the library members in both the libraries (Ajegbomogun & Busayo, 2011).

An analytical study on ICT literacy among library professionals in the engineering college libraries of Tamil Nadu has collected data from fifteen engineering colleges in Salem, Namakkal and Coimbatore district through the structured questionnaire and interview method. The study concludes that the library professionals must possess sufficient knowledge of few ICT skills such as library automation, e-resources management, content management, an organization of information on internet and intranet, developing and maintaining digital libraries/institutional repositories, web-based library services etc. (Thanuskodi, 2011).

ICT Skills among women library professionals in SSUS and CUSAT has selected only women library professionals from major two universities in Kerala viz. Sree Shankaracharya University of Sanskrit (SSUS) and Cochin University of Science and Technology (CUSAT). The study is based on the women library professional's skills like awareness, skills of technologies, library automation, use of ICT based applications, skills on the usage of institutional repository software, managing e-resources and ICT based library services. Findings of the study: the majority of women library professionals have an average level of skills in managing ICT based library services. The study also suggested that university library professionals need in-house training programmes to update their ICT skills. For successful implementation of modern ICT tools and digital library, it is essential that LIS professionals are well trained and possess the requisite knowledge and skills (Vijaykumar & Antony, 2015).

The usage of Information and Communication Technology (ICT) tools by library professionals in the state of Tamil Nadu finds out that all the library professionals use some kind of ICT tools, particularly the Internet and mobile phones. The use of ICT by the female library professionals is higher than the male library professionals. But there is no significant relationship between the use of e-mail and the Internet and the genders between age and the use of ICTs. All the library professionals strongly believe that IT tools play a significant role in supporting and enhancing their professional and research activities (Dhanavandan, Esmail, & Mani, 2008).

A study of ICT training for LIS professionals working in engineering institutions in Chennai. The study investigates, ICT training methods and level of training and

preferred time for the training by LIS professionals. The study finds out that majority of the LIS professionals were interested to attend lectures series, tours to other institutions and web-based tutorials to develop their knowledge and skills in ICTs. The study also finds out that the LIS professionals preferred lectures and conference/seminars methods of training to update their ICT skills and the majority of LIS professionals are interested to attend ICT training programmes after working hours (Sivakumaren, Geetha, Jeyaprakash, & Gopalakrishnan, 2011).

A case study of availability, use and barriers to ICT in the R & D Institutions of libraries and information centres in Noida. This study based on various areas of application of ICT and compared the ICT status among the LICs in Noida. The study found out that the majority of LICs of Noida have basic hardware facilities such as servers, computers, printers, photocopiers, internet connectivity etc. but majority of library professionals are not properly aware of the use and operation of the ICT hardware's (K. P. Singh, Sharma, & Negi, 2009).

Impact of web 2.0 technology application in Kerala university library. The study focused on the application of web 2.0 technological facilities in libraries which is become the subject of interest among the library professionals. Web 2.0 technology is used for developing interpersonal cooperation among librarians and to get new information on any subject. Librarians mainly used these technologies for sending email, chat and social networking. Web 2.0 technology is effectively applied in LIS field such as blogs, wikis, RSS, content management, social bookmarks, podcasts etc., but the library professionals are not effectively using those social medias in libraries (Seena & Sudhier, 2014).

A study of knowledge on ICT skills among LIS professionals of engineering institutions of Andhra Pradesh state. In this study, respondents are selected from three types of engineering institutions such as government, minority and private in the Rayalaseema region of Andhra Pradesh. The study highlights knowledge of ICT among engineering institutional library and information science LIS professionals. This study finds out that most of the LIS professionals in engineering educational institutions are computer literate and have significant basic ICT skills. There is

enough scope to develop their innovative ICT skills and to implement these skills in the library to provide new ICT based library services (K. Kumar, 2013).

A study of ICT skill among librarians in engineering colleges in Salem and Namakkal district. It is based on ICT, computer and other skills among the thirty-nine engineering college librarians in their day-to-day working activities. The study has discussed college librarian's academic and professional qualifications and certain ICT skills in their daily workings processes such as use of operating system, application software package, and knowledge of database programming, acquaintance in webpage design, library automation software, technical skills and managerial skills. The study finds out that librarian possessed skills like; programming languages, application software package, database management system (DBMS), library automation software and webpage design (Sankari & Chinnasamy, 2014).

Information and Communication Technology (ICT) literacy among university library staff members South-West, Nigeria has used survey research method to collect data from the professional librarians, paraprofessional and other library staff members in the libraries such as Kenneth Dike and Nimbe Adedipe universities in South-West, Nigeria. It is found that the level of ICT awareness among the staff members of both the libraries is very high, but they do not know its technicalities and related applications (Olatunji & Oluwadare, 2011).

A case study on Information and Communication Technology (ICT) literacy among the staff of Banaras Hindu University library system and it is ranging from professionals, semi-professionals and non-professionals library staff. It is found that an average number of library professionals are ICT literate, but semi-professional and non-professional library staff are poor and have a low level of ICT knowledge and skills (R. K. Singh, Agrawal, & Lal, 2009).

Another case study on ICT skills and core competencies of LIS professionals of VTU research centres in Karnataka has used a questionnaire-based survey to collect data among the working LIS professionals of seventy-nine VTU (Vishveshwaraya Technological University) research centres in the Karnataka state. The study shows

that the LIS professionals in VTU research centres do not possess a good level of ICT skills as compared to their qualification and rich work experience. The study finds out that majority of private research centres are having better IT infrastructure facilities as compared to government and aided research centres (Arokyamary & Ramasesh, 2012).

ICT skills of LIS professionals in emerging institutions of Orissa have deeply discussed the ICT tools and services being used in libraries to manage, libraries more effectively and to cater users demand properly. In this changing library scenario, the library and information professionals must possess adequate ICT skills to manage the modern libraries, more specifically the academic libraries. The study covers seventy-two engineering institutes of Orissa, from that the two LIS professionals of each institutes are selected for this study. The study reveals that LIS professionals must possess sufficient knowledge of new ICT skill such as library automation, e-resources management, content management, an organization of information on internet and intranet, developing and maintaining digital libraries/institutional repositories, web-based library services etc. The study also finds out that the LIS professionals working in various engineering institutions of Orissa are mostly computer literate and have acquired considerable ICT skills to manage the library system (Satpathy & Maharana, 2011).

Information and communication technology literacy among library professionals in Calicut University Kerala has adopted a quantitative research method with comprehensive literature review were applied and structured questionnaire used to collect data. The study stated that the Calicut University should take initiative to introduce open-source software for the design and development of automated library system, digital libraries and institutional repositories. The study finds out that the young professional assistants are more ICT literate than the junior librarians and assistant librarians. The use of ICT based resources and services, library automation software and general purpose application software are high among the professional assistants than the junior librarians an assistant librarians. But the use of a digital library and institutional repository software is very low among library professionals (Mohamed K. Haneefa & Shukkoor, 2010).

A study on the ICT skills among librarians in engineering educational institutions in Tamil Nadu has examines that the library professionals have possessed knowledge of the skills such as: operating system, packages and programming languages, web awareness, knowledge of online facilities and services, technical and managerial skills. The study also discussed librarians' role, possession and opportunities available outside the traditional settings, it includes cybrarian, website coordinator, webmaster, database consultant, metadata specialist, digital literacy manager, information literacy coach, corporate information officers, knowledge manager etc. (Babu, Vinayagamoorthy, & Gopalakrishnan, 2007).

The impact of ICT on job satisfaction among library professionals working in NMIMS (Narsee Monjee Institute of Management Studies) deemed university, Mumbai has found out that, the majority of library professionals have participated in a training course and seminars/conferences related to ICT to update their skills and they actively participated in such a programmes. It is also found that the majority of the library professionals like to work with ICT in the library field. Some factors suggested by researchers to library professionals for motivation in work and improve ICT skills are: attend seminar/workshop/conference related to ICT at regular interval, update knowledge by reading conference proceeding in the library field, visit well-known library websites such as OCLC, LC, BCL etc. to understand new development in IT field and its usage and communicate with ICT developers regularly (Bellary, Sadlapur, & Naik, 2015).

A comparative study conducted on the impact of ICT on library staff training has selected two universities from India and two similar universities from Iran. Data collection was done by structured questionnaire in personal and through via e-mail to all the library staff in the four selected universities in India and Iran. The study concludes that the ICT training programmes for library staff in Indian and Iranian university libraries are inadequate. Therefore, it is essential for Indian and Iranian university libraries to initiate regular ICT training programmes for library human resources to keep up with rapid development in ICT. On the job training and workshop/seminar are the most preferred modes of training by both the Iranian and Indian library staffs (Talab & Tajiferi, 2012).

An analytical study on ICT literacy among the college librarians in Kerala is based on the means and methods of acquiring ICT skills, knowledge and skills of the operating system (OS), use of general purposes application software, familiarity about world wide web, method of searching online information, knowledge about library automation software and digital library/institutional repository software, ability in various ICT related tools, constraints in ICT related resource and services, etc. This study has used survey method with a structured questionnaire as a tool to collect data from selected college librarian in the colleges affiliated to four state universities in Keara Viz. University of Kerala, Mahatma Gandhi University, University of Calicut and Kannur University. The survey found out that the library professionals must possess sufficient knowledge about new ICT tools and services such as e-resources, content management, digital libraries/institutional repositories, social networking tools, websites designing etc. (Mehaboobullah & Kabir, 2013)

The knowledge acquisition is a process of long-life and which can be significantly improved through the proper use of emerging ICT means. The opinions of (Sarah & Olugbenga, 2015) library professionals who have faced with the difficulties and complicity challenges, as the traditional gatekeeper of knowledge are in danger of being bypassed, as their skills are ignored, their advice unsought due to new trends in information access.

ICT literacy among library professionals working in selected arts and science colleges in Trichy and Tanjore District and affiliated to Bharathidasan University has used survey method to collect data with using questionnaire. The study finds out the majority of the library professionals had confidence in routine ICT skills and internet tasks, but they needed training application of these skills in libraries. All the professionals had expressed a positive attitude towards the application of ICT in libraries (Angeline & Swaroopa Rani, 2015).

A survey conducted on perceptions of library and information science professionals towards Massive Open Online Courses are based on the knowledge about MOOC, librarians participation and interest in MOOC, it helps library professionals, type of MOOC that LIS professionals prefers to use, learning approach of MOOC etc. In this

survey, the researcher has sent an online questionnaire to 300 library professionals through 'kwiksurvey' method. Major findings of the study are that LIS professionals are aware of MOOC through e-resource and search engines but not yet participated in any MOOC course. The study also suggested that the LIS professionals should find out the possible areas in LIS domain in which they can use MOOC at a massive level and able to establish MOOC technology as a reliable learning environment in LIS field (A. Kaushik, 2015).

A study of ICT competencies/literacy to librarians in the 21stcentury is based on challenges of digital competency and its utilization, digital literacy and competencies, librarians possess digital skills and competencies, ICT facilities provided by libraries, librarians access the internet and provide digital information resources services. The study finds out that librarians do not possess sufficient ICT skills and they need to join the training programmes and the majority of librarians stated that the ICT facilities are available in their working environment (Itsekor & Ugwunna, 2014).

A survey conducted on information and communication technology literacy among library professionals in the Universities of Tamil Nadu is based on the computer literacy skills, use of ICT based resources and services, confidence while handling various ICT tools among librarian and identify the training or orientation needs. The study has used a quantitative research method with a structured questionnaire for data collection from library professionals in the university libraries of Tamil Nadu. The study has to find out that the use of ICT-based resources and services was higher among the librarians, deputy librarians and assistant librarians than the technical officer, technical assistant and library assistant. It is also found that the majority of the library professionals are very much confident in handling high-level ICT tasks (Nagarajan, 2012).

Information/ICT literacy level and skills among librarians in Madonna University Library, Okija has undertaken a descriptive survey method. Questionnaire and oral interviews are instruments used to collect the primary data. The study has focused on the various literacies among library professionals such as critical literacy, research literacy, ICT tools literacy, publishing literacy, searching literacy and/or skills like;

listening skills, communication skills, interpersonal skills, public relation skills and writing skills. The study concludes that the Madonna University librarians are very poor in the area of information/ICT literacy/skills. These have affected the type of services they are given to patron/users (Umeji, Ejedafiru, & Oghenetaga, 2013).

Summary:

The various studies have been carried out by the experts, researchers and academicians in the field of ICT, ICT application in libraries and ICT literacy among library professionals. There are many research articles, reference books, as well as thesis submitted for M.Phil. and Ph.D. degree level in the areas of ICT literacy among library professionals. The study reviews the literature like survey research, analytical studies, comparative studies, case studies, developmental studies etc. On the basis of all the above-discussed literature has helped to review the researcher is able to decide the precise subject area. It has helped to understand the importance, background and current status of other research related to the topic selected for research work. So the present investigation is the first attempt and it is an original and important contribution to the literature on the relevant subject. It is revealed that the present study is genuine and no study as on the same topic has been done before it.

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CHAPTER - III   ROLE OF ACADEMIC LIBRARIES IN HIGHER EDUCATION

3.1   Introduction:

Education is the basic need of every human being. It is required for the society as well as the development of personal life. Information plays a vital role in the teaching and learning process. The information is acquired, stored, processed, managed and disseminated to end users by libraries and it is a continuous process from Vedic age to the present modern age. The academic library supports teaching, learning and research activities in the higher education. A library is a collection of books, journals and non-book materials organised for use.

A library is considered an integral component of any educational system. It plays a vital role in the improvement of academic achievement, scientific and technological research and the acceleration of the innovation process. A library is not only a rich source of books and non-book materials for a comfortable place for extra reading but also a treasure house of knowledge and an absorbing centre for inquisitive minds. It preserves the great thoughts, the beautiful imaginings, the wise counsels and the accumulated wisdom of ages (Mondao & Sinha, 2011).

We cannot imagine a college or university without a library. There is always a need of college library to maintain campus tour with core values and activities of academic life. Academic libraries in the present era should improve rich and qualitative reading material in addition to the number of books and journals.

Libraries have been inseparable since the dawn of civilization and their co-existence has been attributed to many landmarks in the knowledge creation and dissemination. In the history of India, it is observed that Nalanda, Takshashila and Vikramashila universities and the Gurukula type of institutions highly depended on libraries which were earlier known by 'Grantha Bhandar' or 'Garanthasala'. The library in an educational institution is now considered as actively participating intermediary between the learners and the vast amount of sources. The libraries have been

perpetuating since people have become information literate and perceived the sense of learning (Babu, Rao, & Baskar, 2015).

3.2 Education in General:

Education and its general sense is a form of learning in which the knowledge, skills and habits of a group of people are transferred from one generation to the next generation through the teaching, training and research process. Education is any experience and knowledge that has a formative effect on the way of one thing, feels or acts may be considered education.

The education is the key enabler for raising the quality of life of an individual as well as at the society level. Good quality education empowers individuals and societies to accelerate human development processes even as individuals enhance their own livelihood earning potential and contribute to the growth of the national economy (Kakodkar, 2011). The education is the only way through which we can eradicate problems as illiteracy, social inequalities, deforestation, unemployment, poverty, disease, hunger and corruption afflicting in many developing countries (Raghavan, 2011). Education is the basic need and it is a continuous process for lifelong learning.

Goals of Education by (Kumari, 2016):

Following are the real goals of education:
1. Lifelong learning
2. Ready to take the risk
3. Able to solve the problem and think critically
4. Able to look at things differently
5. Able to work independently and with others
6. Care and want to give back to their community
7. Have integrity and self-respect
8. Have moral courage
9. Able to use the world around them effectively
10. Speak well, write well, read well, and work well with numbers
11. Truly enjoy life and work
12. To enhance creativity, passion, courage and perseverance.

3.3   Higher Education:

Higher education is provided by the universities, colleges and private institutes for creating life skill, generating knowledge and research activities among students and faculties.

The higher education is the education provided by universities, vocational universities (community colleges, liberal art colleges, and technical colleges etc.) and other educational institutions that award academic degrees, such as career colleges. Higher education, also referred to as tertiary education, is normally taken to include undergraduate and postgraduate education, as well as vocational education and training. Higher education includes teaching, research and social services activities of university and colleges (Maitra, 2008).

Higher education systems (to educate, to train, to undertake research and, in particular, to contribute to the sustainable development and improvement of society as a whole) should be preserved, reinforced and further expanded, namely to educate highly qualified graduates and responsible citizens and to provide opportunities for higher learning and for learning throughout life. Moreover, higher education has acquired an unprecedented role in present-day society, as a vital component of cultural, social, economic and political development and as a pillar of endogenous capacity-building, the consolidation of human rights, sustainable development, democracy and peace, in a context of justice. It is the duty of higher education to ensure that the values and ideals of a culture of peace prevail (UNESCO, 1998).

Definition of Higher Education

Higher education defined as "higher education seeks to promote excellence, an adventure of ideas and research truth." It is to cultivate new knowledge and interpret old knowledge in the light of needs and discoveries. It also aims to provide the right kind of leadership in all walks of life and identify gifted youth and help them to develop their potential to the full by cultivating physical fitness, developing the powers of mind, right interest, attitudes and values (Brinda, 2001).

3.3.1 Goals of Higher Education by (Deka, 2000):

➢ To seek and cultivate new knowledge,

➢ To engage vigorously and fearlessly in the pursuit of truth,

➢ To interpret earlier knowledge and belief in the light of new needs and discoveries,

➢ To provide the right kind of leadership in all walks of life,

➢ To identify gifted youth and help them to develop their potential to the full by cultivating physical fitness, developing the powers of the mind and cultivating right interest, attitudes, and moral and intellectual values,

➢ To provide society with competent men and women trained in agriculture, arts, medicine, science and technology and various other professions, who will also be cultivated individuals, imbued with a sense of social purposes,

➢ To promote equality and social justice and to reduce social and cultural differences through diffusion of education,

➢ To foster in the teachers and students, and through them in society generally, the attitudes and values needed for developing the good life in individuals and society,

➢ Higher education, in fact, develops younger people in such a manner that they not only have a satisfying personal life but also can make a worthy contribution to the progress of the society to which they belong.

The institutions of higher education, therefore, have to provide all-round development of the students – intellectual, physical, moral and spiritual. The higher education, in short, has to bring about that development of individuals' mind, body, heart and personality. It disseminates knowledge promotes skills and develops an outlook among the youth so that they are socially committed and economically self-reliant.

3.3.2 Trends and Developments in Higher Education:

The higher education examined and acknowledged that universities all over the world face an imperative to adapt and adjust to a whole series of profound changes that fall into six major categories: the increased demand for HE in a lifelong learning context, the internationalisation of education and research, the need to develop co-operation

between universities and industry, the proliferation of places where knowledge is produced, the reorganisation of knowledge, and the emergence of new expectations (Virkus & Metsar, 2004).

Old Paradigm for HE	New Paradigm for HE
Take what you can get	Courses on demand
Academic calendar	Year-round operations
University as a city	University as idea
Terminal degree	Lifelong learning
University as an ivory tower	University as a partner in society
Student = 18 to 25 year old	Cradle to grave
Books are the primary medium	Information on demand
Tenure	Market value
Single product	Information reuse/info exhaust
Student as a 'pain'	Student as a customer
Delivery in classroom	Delivery anywhere
Multi-cultural	Global
Bricks and mortar	Bits and bytes
Single discipline	Multi-discipline
Institution-centric	Market-centric
Government funded	Market funded
Technology as an expense	Technology as a differentiator

3.3.3   Higher Education in Global Scenario:

The higher education system in the world is different in every country. The US has arguably the most evolved higher education system and has been the model that has seen multiple modes evolving from models of pre and post-World War era. Its leadership in the science and technology has a direct correlation to its rich and varied HE model. Europe, on the other hand, has been the showcase of state investment and freewheeling access to its citizens in Higher Education. Australia and New Zeeland have largely borrowed from the US model and now, lead the way in providing HE as

a service to the hordes of Asian, ethnic Chinese and Indian consumers of HE. China, Korea, Japan and Far East nations have largely followed models, which comprise public investment led for China, private investment led for Korea, mixed investment modes for Japan and Far East (Kakodkar, 2011).

3.3.4 Higher Education in Indian Scenario:

In India, the higher education system was started as early as 700 B.C. there was existed a giant university Takshashila, which was located in the northwest region of India. In the writings of Chinese travellers like FiHien, Hiuen-Tsang there existed ancient seats of learning at Takshashila, Kanchipurar, Nalanda, Odantapuri, Sri Dharrayakataka, University of Kashmir, Somapuri, Jagaddala, Vallabhi, Kashi, Pushpagiri, and Vikramashila. In these universities, a varied number of subjects were taught. Among the subjects studied there were grammar, metaphysics, logic etc. In both Sanskrit and Arabic higher learning much secular and scientific learning in law, medicine, mathematics, astronomy etc. was cultivated besides literature, philosophy with the help of books, discussion and memorization (Sundararajan & Nanda Gopal, 2016). The Indian higher education system is very far away from the 69 years of its independence.

The 'Higher Education' (HE) system in India has grown in a remarkable way, mainly in the post-independence period, to become one of the largest organisation of its kind in the world. There has been considerable improvement in the 'Higher Education' scenario of India in both quantitative and qualitative terms (Hiremath & Albal, 2016). The higher education system in India that, today India's higher education system is the world's 3rd largest after USA and China. India, currently has 757 universities and 38,056 colleges and 11,922 stand-alone institutions. Gross Enrolment Ration (GER) in higher education in India has reported as 23.6% for the age group of 18-23 years in 2015. Whereas in the USA, it was 83%, Russia 76%, Malaysia 40% and China 26%. It predicts that in India GER in higher education of relative age group is still lower than that of many developed and developing countries. Moreover, most of the educated persons are not employed in our country. Worldwide, the percentage of employers who are experiencing difficulties filling job vacancies continues to rise.

India ranks 7th position, globally, in facing difficulty in filling the jobs (Goswami & Das, 2016).

Indian students are pursuing higher education in abroad. In the United State (US) and United Kingdom (UK) has played and continues to play a major role in expanding and enhancing the pool of qualified Indian. More than about 30 thousand Indian students are pursuing higher education in the UK. In the USA, the number of Indian students are about 2 lakh and in 2004/2005 exceeded 80 thousand and was twice, it was earlier 10 years, has become the largest group of foreign students in the United States (Hiremath & Albal, 2016).

3.3.5   Application of ICT in Higher Education:

Black board and chalks there in practice in early times for teaching and learning purpose. But in modern times because of the invention of ICT, the teaching and learning process of higher education is equipped with LCD projector, smart board teaching, teleconferencing, videoconferencing, and mobile learning.

The use of information and communication technology in the educative process has been divided into two broad categories namely ICT for education and ICT in education. ICT for education refers to the development of information and communication technology specifically for teaching/learning purpose, while the ICT in education involves the adoption of general components of information and communication technology in the teaching, learning process (Dorothy, 2016). With respect to an implication of ICT in the higher education institutions libraries, the process of seeking access to library resources and information services in higher education libraries all over the world is undergoing a tremendous transformation, especially with the advent of information and communication technology. The application of ICT into the higher education libraries has promoted the process of information seeking and made it more meaningful, where users can stay in their homes and classrooms to access and interact with the librarians and receive information without physically visiting the libraries (Kamba, 2011).

3.4   Role of Libraries in Higher Education:

A library is a building or room containing collections of books, periodicals, and sometimes films and recorded music for people to read, borrow, or refer to. Academic libraries are established by every academic institutions like universities, colleges and other institutions for the support of teaching, learning and research activities in academic programmes.

The academic library as a library that is an integral part of a college, university and other institutions of post-secondary education, administered to meet the information and research needs of its students, and faculties (Ali, 2004).

Academic libraries as those libraries that are mainly found in tertiary institutions, they are established to support learning, teaching and research processes. Over the last few years, academic libraries have been affected by changes in information and communication technology. The practice of various information and communication technology (ICT) trends and its use in academic libraries has led to the reorganization, change in work patterns, and demand for new skills, job retraining and reclassification of positions (Krubu & Osawaru, 2011).

Academic libraries play a vital role to support teaching and learning process via integrating their services with the academic curriculum, as well as providing a good space for reading and learning.

3.5   Aims and Objectives of the Academic Libraries:

The main aims and objective of the college libraries are:

1. To create curiosity and eagerness among the students,
2. To assist students and faculty in using reading materials available in the library,
3. To support teaching, learning and research activity in the university and college,
4. To serve the students by functioning as an independent teaching agency for encouraging as well as promoting the use of books and other reading materials apart from those required or suggested by the teachers.

3.6 Functions of the Academic Libraries:

In order to fulfill of aims and objectives the necessary functions of academic libraries are as follows:

1. To make available the books and documents required by faculty members in preparation of their instructional courses,
2. To make available books and allied reading materials relevant to the courses offered in the college by the students,
3. To provide supplementary books and reading materials to help study and teaching at the college,
4. To train the college students in the use of the library materials and to encourage them to enrich their knowledge and outlook in a wider perspective through general and wider reading,
5. To assist the teaching staff in the pursuit of higher studies and research and support them with relevant literature and information about the subject (Mondao & Sinha, 2011).

Academic libraries provide various services that support students to pursue the academic success and faculty to endeavour for the classroom interaction and knowledge creation.

3.7 Academic Libraries in Global Scenario:

With respect to the inventions and implementation of ICT in academic institutions, nowadays every library is trying to bring in an automatic system and try to become as smart library functioning.

Some factors that hinder the growth of ICT services in academic libraries in the Arab world, such as:

Language: the majority of e-journals and databases which are provided by the Arab university libraries are in English and many Arab students are not proficient in the English language.

Funding: many of university libraries in the Arab countries suffer from a lack of government material support and this deficiency could be causing a considerable decline in the growth.

ICT literacy: many users in university libraries in Arab countries are unaware of the utilisation of ICT services. Moreover, most of the librarians in the academic libraries in these countries need more training to deal with ICT-services.

Cultural factors: Cultural factors are one of the most important factors which hamper the development of libraries in general in the view of Arab society (Ghuloum & Ahmed, 2011).

The Kuwaiti University is the first higher education organization in the State of Kuwait, which includes 14 colleges, offering a wide range of programmes in humanities and sciences. Kuwait University Library (KUL) is providing and promoting access to information in all formats in support of academic programs and scholarly research at the university, in addition, to meet the information needs of the local community. LMUL (Leeds Metropolitan University Library) is not only an academic library, but also a high-level learning centre which offers vast amounts of services and facilities in the support of academic staff, distance learning, part-time and full-time students. They have an impressive list of ICT services, and the administration is constantly striving to improve their facilities. The library has a complete online network with a lot of electronic services and facilities. The library offers a wide range of ICT services and all of these services can be utilised from the library webpage effectively (Ghuloum & Ahmed, 2011).

The application of ICT into the higher education libraries has promoted the information seeking and made it more meaningful, where users can stay in their homes and classrooms to access and interact with the librarians and receive information without physically visiting the libraries. One of the key areas of African higher education libraries made giant stride of library automation and computerization with a view to reorganise, restructure and reorient the library facilities. Various efforts were made in the acquisition, organization and circulation units of the libraries to

manage, acquire and organise the library materials by electronic means (Kamba, 2011).

3.8   Academic Libraries in Indian Scenario:

Academic libraries can support teaching, learning and research activities in college, university and recognized institutes. Those libraries have a collection of text and reference books and research journals. The text and reference books are purchased as per curriculum designed by the University for Courses offered to university departments and colleges.

Modern academic library in India started emerging notionally from 1931, the year of the publication of Dr. S. R. Ranganathan's revolutionary book, "Five Laws of Library Science". Quite a few changes were effected since then. The old concept of the book centred librarianship was changed to the reader's centred librarianship. New ideas like open access, reference service, library co-operation, documentation and information services emerged and settled, paving the way for future developments. The old concept of library service limited to a single library has undergone a phenomenal change extending it beyond the four walls of a library and modern libraries have tremendously changed in the collection of resources facilities and functioning (Tikekar, 2009).

The government of India has appointed various education commissions for provision and grants realization for the higher education. These, the commission have recommended grants and facilities for higher educational libraries. The education commissions and the provisions made for academic libraries. Following are the recommendations for libraries by education commission (Bhatt, 2009).

3.8.1   University Education Commission (1948-49):

The University Education Commission presided over by Dr. S. Radhakrishnan (1948-49) with its recommendations, such as, annual grants, open access system, working hours, an organization of the library, staff, steps to make students book conscious and the need to give grants to teachers to buy books. Therefore, the Commission recommended that at least six per cent of the total budget of each academic institution

should be reserved for the library. It added that if institutions were not willing to allocate six per cent of their budget to libraries, they should spend Rs.40 per student enrolled. The Commission also suggested that greater attention should be paid to improve the reference services in the university libraries.

3.8.2 Ranganathan Committee (1957):

The most comprehensive and significant document on the university and college libraries is the report of the UGC library committee, chaired by Dr.S.R. Ranganathan. The Report was published by the University Grants Commission in 1959 entitled 'University and College Libraries.' It was perhaps the first attempt by any Library Committee in India to systematically survey the academic libraries on a national basis, and it was also the first time that the government of India had decided to seek advice from a professional librarian regarding academic libraries. The committee was formed to advise to UGC on the standards of libraries, building, pay scales, and training.

3.8.3 Kothari Commission (1964-66):

The Education Commission under the chairmanship of Dr. D. S. Kothari (1964-66) marked another important stage in the history of university libraries in India. The Commission devoted considerable attention to the development of the university libraries and made suitable recommendations on the following points: (i) norms for financial support; (ii) long-term planning for library development; (iii) the need for the establishment of a well-equipped library before the starting of any university, college, or department; (iv) suitable phasing over of the library grants; (v) encouraging the students in the use of books; (vi) interdisciplinary communication; and (vii) documentation service in libraries etc. Monetary guidelines were also suggested by the Commission. As a norm, a university should spend each year about Rs.25 per student registered and Rs.300 per teacher [of the total budget] depending on the stage of development of each university library.

3.8.4 The Wheat Loan Programme:

During the 1950's and early 1960's the Indian academic libraries received huge grants from the UGC amounting up to Rs. 100,000 for books, buildings, equipment and even for additional staff. At the same time, many libraries got additional grants from a special US fund called the 'Wheat Loan Programme.' The American Congress passed a special Act, in 1951 known as the 'Public Law 480' to provide a loan to India $19,000,000 to buy much-needed wheat (two million tons) from the US. Under the agreement of the loan, India had to buy American books, periodicals and scientific equipment worth $ 50,000 to be used for research purposes in the Indian libraries. India had to pay the money interest on the loan. Part of the money was to be spent on the exchange of scholars, including librarians between the two countries. The United States authorities bought some educational material and equipment from India for research purposes in the American Universities.

3.8.5 National Knowledge Commission:

The National Knowledge Commission was set up by the Government of India on 13th June 2005 with a time-frame of three years, from 2nd October 2005 to 2nd October 2008. As a high-level advisory body to the Prime Minister of India, the National Knowledge Commission was given the mandate to guide policy and direct reforms, focusing on certain key areas such as education, science and technology, agriculture, industry, e-governance etc. The Commission envisaged the future road map for the growth and development of academic libraries by imbibing core issues such as: to set up a national commission on libraries, prepare a national census of all libraries, revamp LIS education, training and research facilities, re-assess staffing of libraries, set up a central library fund, modernize library management,encourage greater community participation in library management, promote information communication technology applications in all libraries, facilitate donation and maintenance of private collections, and encourage public-private partnerships in LIS development etc.

Summary:

The academic libraries play an important role in providing necessary reading materials, forum and e-resources to the academic community (students, faculties and research scholars). The nature and functions of the academic libraries in the present scenario have been drastically changing from the warehouse of published books to the emergence of electronic/digital resources. The future libraries will be a hybrid library with the functioning of user-centered and expert-assisted set up. The present changes are fast and libraries find it difficult to keep pace with the need for financial and administrative support from different agencies to meet the new requirement.

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CHAPTER - IV GROWTH AND DEVELOPMENT OF ICT LITERACY

4.1   Introduction:

A library is a collection of books and non-book materials stored and organised for use. A library plays a vital role in every educational institutions from primary to higher education. The modern education libraries not only store hard copies of books and periodicals but also subscribe to e-books, e-journals, CDs/DVDs and purchase databases. The main reason of e-collection in modern libraries is to equip with information and communication technology. A library, whether public, national, academic, research or special library has its main objective and function to collect, organise and disseminate information to its end users efficiently and effectively.

The libraries of the 21st century have to conceive not merely as a store house of knowledge, but also be an effective mechanism to facilitate dissemination of knowledge, promoting information and knowledge sharing. The libraries of the 21st century should transmit today's literate society to a knowledge-based society of tomorrow. A library is a fulcrum or support for the entire range of academic activities on an education institution (Mandao & Singh, 2011).

Information Technology (IT) has been used for many years, particularly in the United States, and refers to the electronic display, processing, and storage of information, but not necessarily the transmission of the information. However, Information and Communication Technology (ICT) represents the set of activities and technologies that fall into the union of IT and communication technologies. Global industry, international media, and academics increasingly now use ICT to describe this union. The real benefit of adding "communication" doesn't derive from including specific technologies, such as routers or servers, but from the dynamism implicit in interconnected social, economic, and information networks (Educational Testing Service, 2002).

The advancement ICT has changed the entire process of libraries and moved towards digital and electronic resources, which are generally found to be less expensive and more helpful for easy access. The globalization ways of life and electronic resources have made the information as the backbone for each and every library and information centres (Maharwar, 2011).

ICT skill of LIS professionals in engineering institutions of Orissa has found that ICT has considerably changed the library environment over last few decades in terms of collection, organisation and services. The e-resources (both online and offline) have occupied a considerable space in the library collection, the transaction of library materials are fully automated, new web-based services are offered by libraries to attract user's participation in redesigning the library system and services. These changes are mainly due to the development and impact of information communication technology (ICT) in libraries which have also made grave changes in all walks of life (Satpathy & Maharana, 2011).

4.2   ICT in General:

ICT is any combination of computer, telecommunication and other related technologies used to acquire, store, process, access/use, transfer and dissemination of information when required.

Information technology is a generic term that covers the acquisition, processing, store and dissemination of information of all types like textual, numerical, graphical and sound and in all application areas e.g. banking, business, science and technology not just librarianship and information science. The term is restricted to system's dependent on a microelectronic based combination of computing and telecommunications technology. Now it has largely been replaced by Information communication technology. In the ICT environment, every library grows in terms of reading material, equipment, space, staff, readers etc. The library and information scenario is changing at a dynamic pace. There is a paradigm shift from print media to web media; from ownership of documents to access to information, intermediary to

the end-user model of services and from the location of specific libraries to digital/virtual/hybrid libraries (Hussain, 2013).

ICT has used with computer based technology and the internet to make information and communication services available to a wide range of users. ICT is used broadly to address a range of technologies, including telephones and emerging technology devices (Sharma, Singh, & Kumar, 2009). The libraries in the age of information technology have shifted their roles from the custodian of books to the provider of service-oriented digital information resources.

The role of ICT in libraries and realised that the emergence of ICT is one of the wonderful gifts of modern science and technology which has brought tremendous changes in library and information science. The application of ICT in library and information work has revolutionised the traditional concept of libraries from a storehouse of the book to an intellectual information centre (Barik, Das, & Ramesh, 2011).

Definition of ICT:

"ICT as a tool used for collection, processing, store, transformation and dissemination of information. With advances in ICT, electronic information resources such as electronic books, electronic journals, CD ROM database, OPAC, online databases and internet have launched the world into an information age" (Quadri, 2012).

The advent of ICT today has indicated that this age of information and communication is rapidly transforming from information society to knowledge-driven society. The concept of ICT is a generic term that is used to access, retrieve, store, organise, manipulate, produce, present and exchange information by electronic and other automated means (Olatunji & Oluwadare, 2011).

ICT as "the acquisition, processing, storage and dissemination of information by means of computer and other telecommunication equipment" (Adeyoyin, 2013).

4.3   Application of ICT Tools in Libraries:

The modern libraries have shifted their collection and services from books and journals to e-books and e-journals, and from traditional service oriented to modern online resource and service providers.

ICT has provided libraries with new opportunities to improve their resources and services. The main tool to be implemented in libraries are as follows (Khan, Dominic, Banga, & Garg, 2011):

   i.   **Computer:** The computers are now commonly used to write letters, preparing reports, printing books, newspapers and magazines, drawing pictures and diagrams doing statistics, mathematics, handling financial records and sending messages anywhere through internet.

   ii. **Internet:** The Internet is the world's largest computer network that enables computers of all kinds to share services and communicate directly with each other. In the library, the Internet is a useful tool to share information, online resources, e-documents and interlibrary loan facility.

   iii. **E-mail:** Electronic mail (e-mail) is the exchange of text messages and computer files transmitted via communications networks such as the Internet. The email system as the equivalent of postal mailing services, with the biggest difference being the time and cost involved, and not only written data, but all sorts of information in the form of video, audio, or photographs, can be sent via e-mail. E-mail is described as an increasingly popular method of communication, especially in the workplace.

   iv. **Mobile Phones:** Mobile phones are defined as a telephone system that can be moved easily and quickly from place to place. Mobile phones are now the ICT tools that are reshaping and revolutionizing the communication globally. The availability of this new technology has been reshaping the material basis of the society as well as bringing about a profound restructuring of economic, political, and cultural relations in society. Through the use of mobile phone in

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the library, users can access all the electronic resources without visiting the libraries physically. Library users can also download required information on a mobile phone when needed.

v. **Fax machine:** Fax machine can give permission to the transaction of images (photos, printed images, maps, drawing) and their reproduction on paper at a remote receiver. The fax machine is a long distance copying device that might be an appropriate nickname for the telecommunication process. Any document whether it is handwritten, picture, diagram, graph, chart or typed text can be transmitted at a great speed for relatively low cost.

vi. **Scanner:** An image scanner is an important ICT device that translates the paper document into an electronic format that can be stored in a computer. The input document may be a typed text, picture, graphics or even handwritten material. The image scanner has been found to be very useful in preserving paper document into electronic form. In the library, a scanner is very useful for scanning the important document related to the library.

vii. **Printer:** The processed data into the form of tables, graphics, spreadsheets, diagrams, pie charts, scheduled reports, images etc. may be printed on a piece of paper by using the printer.

viii. **Barcode Reader:** Barcode reader is a device that can be used for reading barcoded data. It may be hand-held or embedded in a stationary scanner. Bar code scanner scans a barcode image and converts it into an alphanumeric value that is then fed to a computer connected to the barcode reader. A barcode reader is used in the library for circulation of library books and stack verification preferably.

The following ICT tools described by (Islam & Islam, 2006):

i. **CD-ROM Technology:** CD-ROM is an optical disc of 120mm diameter and a hole of 15mm at the centre with thickness 1.2mm. Data is recorded in digital form using laser bean. CD-ROM is used to hold prerecorded text graphics and

sound. It is micro storage device e.g. 18 volumes Marathi vishvakosh has stored in only 3 CD-ROMs.

ii. **Communication Technology:** Communication or telecommunication technologies are used to transmit information in term of signals between remote lactation using electronic or electromagnetic medias carriers of signals some examples of communication technology are audio technology, audio-visual technology, motion picture, television (TV).

iii. **Telephone:** The telephone is one of the longest established methods of electronic information communication especially transfer the voice, which can be a strong means of disseminating information and keeping what is being happened to a concerned organization and outside institution.

iv. **Teleconferencing:** Teleconference is a meeting among people away from each other remotely from one place to another who are linked by a communication device such as telephone, television or computer. Some examples of the teleconference are an audio teleconference, video teleconference, computer teleconference, document teleconference or personal video conference.

v. **Networking Technology:** The important functions of the network is to interconnect computers and other communication devices so that data can be transferred from one location to another instantly. Generally, the computer network is of two types of WAN (wide area network and LAN (local area network).

vi. **Reprography:** The science and practice with regards to replicating and duplicating records and realistic material. Reprographics is a blanket term enveloping numerous techniques for imitating content, such as scanning, photography, xerography and digital printing. The term applies to both physical (printed version) and computerized (electronic version) reproductions of archives and pictures. Today, reprography assumes a critical part in the

transmission of information inside library resources and services. It helps to preserve libraries rare and special material and collections.

4.4   Impact of ICT on Society:
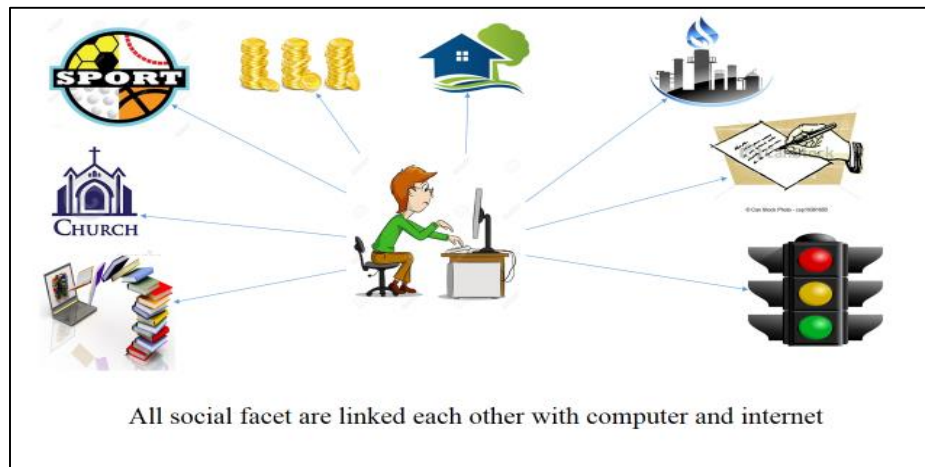
Figure No. 4.1 Computer Links to All Facet of Society through Internet
(Jena & Das, 2013a)

4.5   Impact of ICT on the Library:

1)   ICT has transferred information in the digital format,

2)   ICT has made online information and transfer files, images, videos in short time,

3)   ICT has made networking and sharing of information resources among library or group of libraries,

4)   Digital information may be free or cheaper than the printed reading materials.
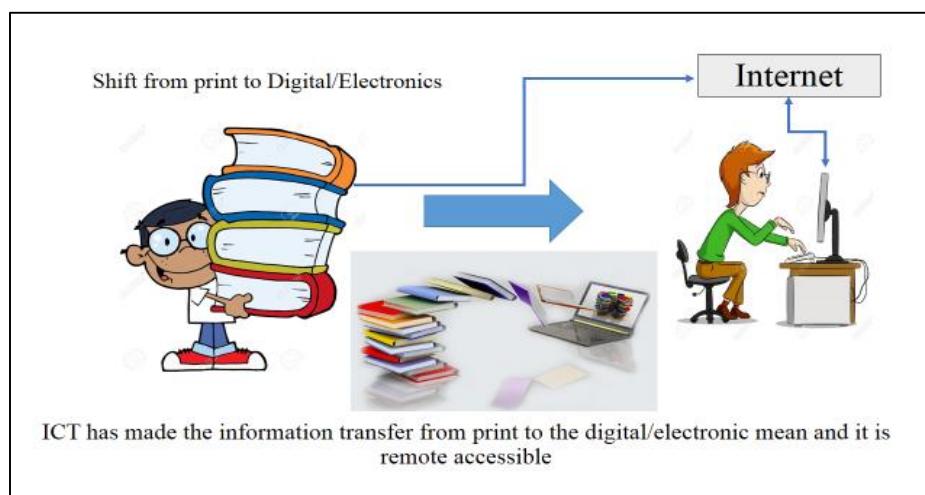
Figure No. 4.2: ICT has made the Transfer of Digital Information from Remote Places (Jena & Das, 2013a)

ICT has made the printed information resources into a digital resources and available to remote accessible.

4.6   Advantages of ICT in Libraries:

There are various issues involved in ICT application in the library it is essential to understand the advantages of ICT in a library situation. The advantages explained by (Sharma et al., 2009) are as follows:

> ➢ ICT provides opportunities to deploy innovative methodologies and to deploy more interesting materials that create an interest in the librarians,
> ➢ It enables better management of the library, thereby improving the productivity,
> ➢ It enables the librarian to concentrate on other tasks such as research and consultancy,
> ➢ It enables optimum utilization and sharing of resources among institutions thereby reducing the costs of implementing ICT solutions.

4.7   ICT Literacy:

In the present age of ICT, it has played a vital role to store, process, acquire, use and dissemination of information. The application of ICT in modern libraries has changed the role of the library from traditional paper to the modern electronic/digital/virtual libraries. The 21st-century library professionals have all the skills and literacies of handling various ICT tools to require, store, process, use, retrieve, and dissemination of information. Without ICT skills and using its tools, librarians of the present days will have to struggle to exist. Because of the convergence of technology in the libraries, it has brought changes in the user's attitude and approach.

ICT skills or IT skills can be referred to the overall competencies (knowledge, know-how skills and attitudes, necessary to create, store, analyze, retrieve and disseminate digital information (text, image and sound) in digital libraries or any type of information (Angeline & Swaroopa Rani, 2015).

ICT literacy is using digital technology, communication tool and/or networks to access, manage, integrate, evaluate and create information in order to function in a knowledge society. This should be regarded as a continuum that allows the measurement of various aspects of literacy from the skills used in everyday life such as using a bank ATM or filling an online form to the transformative benefits of ICT proficiency. ICT literacy is made up of three important components such as cognitive proficiency, technically proficient and ICT proficiency. ICT proficiency incorporates several elements in a continuum of increasing complexity that are explored with the following examples;

Access   : collecting and/or retrieving information

Manage   : identify relevant information within necessary

Integrate   : summarize information elicited

Evaluate   : make a decision based on information gained

Create   : write up a recommendation using an application such as an electronic presentation (Jena & Das, 2013b).

Definitions of ICT Literacy:

The Strategic Framework for Promoting ICT Literacy in the Asia-Pacific Region defined the ICT literacy is specified as the ability to use "digital technology, communications tools, and/or networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society" (Pernia, 2008).

ICT literacy is "the ability to use digital technology, communication tools and/or network appropriately to solve information problem including the ability to use technology as a tool to research, organize, evaluate and communicate information and the possession of a fundamental understanding of the ethical/legal issues surrounding the access and use of information" (Mohamed K. Haneefa & Shukkoor, 2010).

ICT literacy is "the skill and abilities that will enable the use of computers and related information technologies to meet personal, educational, and labour market goals''

(Quadri, 2012). An ICT skill is very important for its pre-requisite of networking of e-library services and resource sharing among a group of libraries.

ICT literacy is an attitude or skill to handle digital technology, access e-resources and to know the functioning of these ICT tools. In today's changing scenario, the library and information professional possess adequate ICT skills to manage the modern libraries.

4.8   Need for ICT Literacy:

Information is the basic requirement for every activity of human life and it is important as an air, food and water. The need for ICT literacy is essential due to the following reasons:

1)   The rapid increase of information due to information explosion or information revolution.

2)   Changing the shape of libraries from a traditional library to the modern digital library,

3)   Advancement of information and communication technology,

4)   A vast variety of information resources,

5)   Increase in number of users,

6)   Wide dispersal of information,

7)   Research on complex and interdisciplinary topics,

8)   Increased users demand of information.

Library Professionals Need to Know ICT and Acquire Its Skills:

The experienced and suggestions for LIS professionals do not only improve the performance of their work but also prepare them to take up a new assignment in the world of advanced technologies.

The library professionals need to require following ICT skills:

1)   Subscription and access to online journals,

2)   Access and retrieval of information through web resources,

3)   CD-ROM browsing and search services,

4)   Access to digital libraries and online databases,

5) Web designing, creation and maintenance of the library website and library blogs,

6) Creation and maintenance of database using RDBMS software,

7) Skills pertaining to hardware networking,

8) Knowledge and skills pertaining to operating system, programming language and application software (Arokyamary & Ramasesh, 2012).

The library professionals are have a preliminary idea of ICT and they are aware of the main component of ICT, the internet which can be used to facilitate the library and its profession in the following ways:

1) Access other sites and sources of experience relating to one's query or search,

2) Sharing resources with other libraries,

3) Collaboration with different library projects or development issues,

4) Establishing communication through electronic mode such as, email, video conferencing etc.,

5) Collaborating library database for introducing an improved system of acquisition, cataloguing and reference services in parent library and

6) To develop professional activities (Jena & Das, 2013b).

4.9 ICT Literacy: Global Scenario

4.9.1 U.S.A.

The USA library and information science (LIS) professionals have fully understood education and independent life-long learning processes and shifted in technology based learning and teaching strategy. New library professionals must now completely understand the variety of the resources used in the learning process. LIS professionals in the USA have acquired sufficient knowledge and skills to handle information technology to provide library resources and service to their users (Miller, 2007).

The effectiveness of an innovative ICT literacy assessment before and after the instructional method by comparing students' performance on the ICT literacy. Many students believe that they have good ICT literacy skills because of their frequent

interactions with the Internet. Indeed, there is a strong correlation between the frequency and confidence scales (Katz & Macklin, n.d.).

ICT literacy skills among master's students of finance in the USA. Most of the students considered and identified evaluation of information as an important skill for their future professional success out of seven skills (Holler Phillips, 2011).

The skills and knowledge needed to serve as mobile technology consultants for IT organizations, librarians and IT professionals engaged in implementing mobile application technology (MAT) in libraries. Four core and six supplementary competencies are needed to help libraries to provide for better service to patrons using MAT. The USA, LIS graduate programs could equip students with skills and knowledge needed to build 10 competencies that they could serve as mobile technology consultants (MTCs) for libraries (Potnis, Regenstreif-Harms, Deosthali, Cortez, & Allard, 2016).

4.9.2 United Kingdom (UK)

The students in the UK are familiar with ICT and work experience in their daily activities. They use ICT mainly for word processing and feel that it is quick and easy to edit in order to amend their work and improve the presentation of assignment using ICT. A computer used at home and the provision of ICT facilities in college means that students can learn from family members, friends and other students as well as teaching faculties and LIS staff (Jackson, 2005).

4.9.3 Iran

A study on the impact of ICT on library staff training between India and Iran. Iranian medical university library staffs have stated that attending 'seminar/workshop' and 'on-the-job training' are most popular methods for acquiring IT skills and Indian university library staff indicate 'self-study' and 'vendors/suppliers training' which is most preferable for acquiring IT skills (Talab & Tajiferi, 2012).

ICT literacy between teacher and student in Iranian secondary schools considerably found that students' ICT literacy is higher than the teachers. The situation is that the

students quickly acquire the latest ICT literacy skills. According to this study, teachers have a lower level of skill in ICT and it is a weakness of the educational system in Iran. The knowledge of five components such as data retrieval, data application and classification, data representation and interpretation, data evolution, data designing and creation and their correct application in the educational system are effective in developing teacher and students teaching-learning process and promote ICT in schools (Khalkhali, Moradi, & Amuei, 2008).

The majority of librarians at the University of Isfahan, Iran do not possess a good level of computer skills. Even their long duration experience of the computer has not improved their level of computer literacy skills. Most of the librarians have acquired their computer skills from informal channels such as self-teaching, friend/colleagues' guidance, by computer/IT books, and from trial and error basis. It is a need of librarians of University of Isfahan to be adequately equipped with the computer literacy competencies to take advantage of all computerized library facilities and enhance their work productivity (Safahieh & Asemi, 2008).

4.9.4 Pakistan

The perceptions of LIS professionals regarding use of Pakistan national digital library (NDL) databases. The NDL program provides free access to electronic resources including 30 full-text databases 24,000 peer-reviewed online journals of different disciplines and 45,000 e-books through a consortium models. The young library professionals of Pakistan have more interest in the use of e-database and the majority of them have accessed these databases through the higher education commission (HEC) web site. Apart from that LIS professionals are more satisfied with electronic journals. There is lack of awareness of digital literacy and poor marketing of such type of resources, which has not reached up to end users (Warraich & Ameen, 2010).

ICT literacy and its related library activities are available in Pakistan to have explained the ICT application in medical libraries in Lahore and have found a low level of ICT application availability. The study also found that the lack of hardware, partial automation, an absence of LISs for automation, an absence of websites,

inadequate fund and very few training opportunities are available for medical librarians. The requirement of LIS professionals is that the library school and professional association in Pakistan should organize refresher courses, workshops, seminars and continuing education programs for medical librarians. Librarians in Pakistan should join together to provide more application of ICTs in libraries to serve library users (Mairaj & El-Hadi, 2012).

ICT skill proficiency of library professional in Karachi, Pakistan shows that library professionals in the University of Karachi are not equally proficient in all area of ICT skills and the majority of them are moderately proficient. The working process of most libraries are pre-automation and their training and skills are not utilized due to the unavailability of computers. There are only two universities in Karachi that are fully automated, twelve are partially automated and two are not automated at all. It is also the responsibility of library schools and library professional associations to conduct a regular training program to meet their needs in the changing scenario of libraries functions and activities (Ansari, 2013).

Library professionals of public sector universities of Sindh province in Pakistan, must possess sufficient knowledge of new skills, information and communication technology such as library automation, management of electronic resources, content management, organizing information on the Internet and Intranet, development and maintenance of digital/institutional repositories and library services on the Internet etc. (Rahoo, Mangrio, & Bhutto, 2016). Facebook is used by library professionals in the University of Lahore for various library services. The Facebook (FB) is a well famous and reputed Social Networking Site (SNS) in Pakistan. Most of the librarians are using this tools for personal and professional purposes but still many features are yet not explored by them. Facebook is being used in libraries for communication, reference service, acquisition, marketing, promotion, integrated database and publishing of news and feed etc. (Yousaf, Ahmed, & Sabzwari, 2016).

4.9.5 Nigeria

The challenges before modern libraries of Nigeria are an implementation of ICT and train or expertise of all the library staff as an ICT literate. The current situation of library personnel on computer literacy. The study has stated that the majority of library personnel in university libraries in Nigeria are skilled in computer literacy. There should be intensive training and re-training of library personnel on regular basis to improve the level of computer skills (Obaje, 2014).

The application and use of a computer are presently widespread in Nigerian libraries especially in academic, research and special libraries. Most of the libraries in Nigeria do not yet possess the high level of computer skills and their use of computers and technology is not grown-up. The majority of librarians have acquired their computer skill from computer/IT training programmes and there is frequent use of library software than other computer software packages. They use the computer for the personal purpose than library work. Apart from that, the study expected the librarians in the new digital age will be more knowledge, forward-looking, creative, productive, more focused and more competitive. The librarians with adequate ICT skills/competencies mostly possess these traits (Adomi & Anie, 2006). Computer and ICT skills among secondary school teachers in Ota Ogun State. The ministry of education in Nigeria should ensure that computer and ICT trainings should be inculcated the curriculum of teacher training schools in Ota, Ogun State. A viable school library with computer and ICT gadgets in working conditions should be established in each school for training ICT and computer skills (Adebayo & Fagbohun, n.d.).

A great improvement in the level of computerization of academic libraries in Nigeria. Majority of libraries are fully computerized and they are using different software for library automation. The ICT skills among library professionals show that they are computer literate, but this outcome does not mean that they are expert in the use of necessary ICT skills and their means of acquiring these skills is incompetent (Sarah & Olugbenga, 2015). ICT literacy among the staff of the libraries of Keneth Dike and Nimbe Adedipe University in Nigeria. From this study, it is clearly stated that the

level of ICT awareness of staff in both the libraries is high. It also clear that the level of ICT training is adequate for both the libraries staff (Ajegbomogun & Busayo, 2011).

The impact of new technologies is felt by libraries in every aspect. The computer technology, communication technology and mass storage technology are some of the areas of continuous development that reshapes the way that libraries access, retrieve, store, manipulate and dissemination information to the end users. The ICT resources are mostly used by library users such as CD-ROM, online databases, World Wide Web and the Internet technology. The ICT has enormously influenced the effectiveness of the Nigerian university libraries (Krubu & Osawaru, 2011).

4.9.6 Africa

ICT literacy status among library staff in African countries shows an analytical study on the ICT literacy among the staff of West African university libraries. In this study, the university libraries are selected from Anglophone and Francophone countries. The finding shows that Senegal University professional librarians are best ranked among other West African university librarians. Ghanian university library professionals are next in ranking. Nigerian university librarian's ICT literacy level is considered as poor and low among other Anglophone countries. The level of ICT literacy of Guinea university librarians are equally poorest among all other Francophone countries (Olu Adeyoyin, 2006).

4.9.7 Kuwait

The lack of ICT related services in Kuwaiti academic libraries and it is found that the main reason of lack of ICT services are the low budget that does not meet the ICT requirement. There is also a shortage of qualified staff in academic libraries in Kuwaiti (Ghuloum & Ahmed, 2011).

4.9.8 Bangladesh

The technological changes in library and information science field in Bangladesh has states that, the present age is the most exciting period in the history of the human race

when the world's most population is shifted from 'techno-illiterate' to 'techno-literate'. A well-equipped library with the facilities of modern information infrastructure and technologies could satisfy the needs and requirements of present technology conscious users (Islam & Islam, 2006).

4.9.9 Turkey

The attitudes of physical education and sports students towards information and communication technologies in Turkey. The physical education and sports students have a positive attitude towards the use of computers. The age factor does not affect physical education and sports students while using a computer. Female students have a more positive attitude towards computers than their male counterparts and male students believe more strongly that computers have changed their way of learning (Goktas, 2012).

4.9.10 Nepal

The Ministry of Science and Technology (MSOT) which was established in 1996 and it is realised that took a lead role in promoting and facilitating the effective use of ICT in Nepal. As per the MSOT rules, in every one thousand persons in Nepal, there are fourteen telephone lines, one mobile phone, four internet users and nine personal computers. To create a gender sensitive and women-friendly ICT, the government of Nepal and civil society organizations need to collaborate to develop ICT policies, training, capacity building projects and develop structures that promote women's access of new technologies (Shresta, 2007).

4.10 ICT Literacy: An Indian Scenario

The invention of ICT and its application in libraries and information centres have drastically shifted the library from the traditional store house of books to the modern knowledge resource centres.

Librarian's role as custodians of information audit has gone through a dramatic change and from providing documents to their clienteles. The internet is used in the library in nearly all aspects of the library activities. The librarian can now use internet

for exploiting the catalogue of the other institutions, ordering online books and journals, participate in ILL, use e-mail and discuss through list-serves, support reference service through remote databases and most important is to establish library/homepages to project their collection and services on the site. The role of the librarian as an information organizer and a navigator has gained importance in the internet era (N. Singh, 2001).

The use of e-resources in the parliament library of India used by Member of Parliament and staff of the parliament. The e-resources are extensively accessed as a part of the daily work by MPs and staff. They use e-resources like e-directories, e-reports, e-databases, documentations, e-books, e-journals and e-audio books which are subscribed by parliament library of India (Joshi, Singh, &Jagriti, 2015). Virtual reference service (VRS) is the next step of ICT literacy. VRS is a provision of real-time personal assistance to the patron via web-based interactive software.

The virtual reference service provided by IIT libraries in their study. It gives a greater opportunity to users who can access services at home, in office, at school, or in a library. Most of the IIT library users have agreed that computer literacy is very important whenever we use e-resources, institutional library website, as well as VRS service offering by the library (Khobragade & Lihitkar, 2016).

4.10.1 Orissa

The private engineering and management college of Odisha are trying their best to pace with the changing scenario of ICT application in the libraries. In this ICT era, the library services of Orissa have shifted from traditional documents to e-library facilities (Barik et al., 2011).

The LIS professional's working in various engineering institutions of Orissa and found that they are computer literates and have acquired considerable basic ICT skills to manage the library. LIS professionals must possess sufficient knowledge of new ICT skills such as library automation, e-resources management, content management, an organization of information on internet or intranet, developing and maintaining digital libraries/institutional repositories and web-based library services. They are also

actively participating in professional forums, mailing list, socials networking, blogging etc. (Satpathy & Maharana, 2011). The significant variation of ICT literacy among the higher secondary teachers of Odisha in the private and government Arts and Science streams (Mohanty & Pandua, 2012).

4.10.2 Kerala

The college librarians in Kerala are aware of most of the ICT based resources and services, but they have not gained proper skills and expertise to use these tools and techniques in an effective manner. There is a need for systematic training programmes for college librarians in Kerala to make use of ICT based resources optimally and effectively (Mehaboobullah & Kabir, 2013). The use of ICT based resources and services in special libraries in Kerala. The study indicates that formal training and user orientation program are the crucial steps that can facilitate the effective use of ICT based resources and services (M K Haneefa, 2007).

The college library professionals are moderately skilled in various modern technologies and its applications but the awareness level was very low in the case of emerging web tools and services. It is also observed that the younger library professionals are more interested in emerging technologies and ICT based services (Ms, Susan, & Baby, 2012). The web 2.0 technologies that can be used for developing interpersonal cooperation among librarian and to get new information on any subject. Web 2.0 technologies can be effectively applied in library and information science field such as blogs, wikis, RSS feeds, content management, social bookmarking, podcast etc. but it is not effectively used by library professionals (Seena & Sudhier, 2014b). ICT technologies are not yet introduced in the Kerala University library system. The library professionals are also not in a position to use these technologies in their work. This is a low level of technological skill development among the college library professionals in Kerala (Seena & Sudhier, 2014a).

The women library professionals of both Sree Sankaracharya University of Sanskrit (SSUS) and Cochin University of Science and Technology (CUSAT) Kerala are aware and literate about all the ICT tools like OPAC, bibliographical and full text

databases, e-books, e-journals, ETS (Electronic Thesis and Dissertations), e-mail, search engine, library networks, library websites and digital libraries (Vijaykumar & Antony, 2015).

The use of web-based resources and services by research scholars of Calicut University. Most of the research scholars are not aware of the web-based library services provided by the library. There is a requirement of research scholars, and the library should provide training and orientation courses from time to time on newly added library resources and services (Deepa & Azeez, 2016).

4.10.3 Assam

have realised that every user of college libraries of Barak Valley, South Assam is aware of N-List services (e-resources) provided by the INFLIBNET for the college library users (Manoj K. Sinha, 2013). Another study by indicates that most of the library users of Assam University are ICT and internet literate and they are also experts in using ICT and internet in their day to day academic and other related activities (M K Sinha, 2012).

The status of ICT literacy among the library professionals in Assam, (Mahanta, 2016) explained that LIS professionals of Assam are not fully skilful in ICT based resources and services. The level of the awareness of ICT based applications, skills for managing electronic resources and ICT based library services are at a satisfactory level. There is a lack of awareness of library automation software, digital library software and cloud libraries. Inadequate training in ICT applications is the main constraint in the LIS professionals of Assam.

4.10.4 Andhra Pradesh

ICT literacy status of Andhra Pradesh has been discussed and studied, the knowledge on ICT skills among the LIS professionals. Most of the LIS professionals of the Rayalaseema region of Andhra Pradesh are computer literate and have significant basic ICT skills to handle the library. There is enough scope to develop their innovative ICT skills and to implement these skills in the library to provide new ICT-

based library services (K. Kumar, 2013). The status of library automation in National Board of Accreditation (NBA) accredited engineering college libraries affiliated to JNTUK, Kakinada. All the NBA-accredited engineering college libraries are fully automated because automation is the basic quality indicator for college libraries as emphasised by the AICTE-NBA and UGC-NAAC (M. A. Kumar & Rao, 2016).

4.10.5 West Bengal

The Burdwan Sadar (North and South) degree colleges in Bengal has found that insufficient manpower, lack of IT skills among library professionals and lack of right attitude of the authorities towards library development were the main problems for ICT development. There is a need to make provision of adequate funds for ICT application in academic libraries (Mondal & Bandyopadhyay, 2010).

4.10.6 Madhya Pradesh

The ICT literacy of library professionals and library users in SDITS (Shri Dadaji Institute of Technology and Sciences) library, Khandwa. They found that the internet literacy among faculties of SDITS are well aware with the internet facilities and they have good knowledge of e-resources such as e-books, e-journals, technical reports, conference proceedings, databases etc. (Boria & Soni, 2012).

4.10.7 Uttar Pradesh

The researchers of Aligarh Muslim University in social science stream regularly use computer and they are getting proper training/guidance and assistance from the staff/librarians, which is very essential for the effective use of ICT products and services (Ahmad & Fatima, 2009). The infrastructure and administrative support are limited in university libraries of U.P. and there is need to build a good ICT infrastructure. There are many challenges in the university library professionals such as the right skill and attitudes (Shukla, 2015).

The application of ICT in the LICs of Noida has become inevitable on account of information explosion and wide spread use of digital information. The majority of LICs in Noida have good hardware and software facilities to some extent but ICT-

based services and products are not reaching to the library users due to the inadequate finance, infrastructure and trained library professionals (K. P. Singh, Sharma, & Negi, 2009).

4.10.8 Haryana

The e-resources usage pattern among the UG and PG medical students at Maharshi Markandeshwar University, Ambala, Haryana. It is found that medical students frequently use search engines as well as e-research report by title and subject for required information for updating medical knowledge. There are significant differences among UG and PG students in relation to the use of various types of e-resources, search strategy, reason for using e-resources, and access frequencies. PG students feel that using e-resources are time-consuming and slow downloading whereas UG students face problems of the virus, slow downloading and feel that using e-resources are more expensive (R. Kumar, 2016). The SCL (State Central Library) Haryana and TSCSL (Trilok Singh Central State Library), Chandigarh. It is found that the ICT-based library full-fledged services are provided by TSCSL, Chandigarh as compared to SCL, Haryana. It provides very few ICT-based services to meet the information needs of the library users (P. Kumar, 2012).

4.10.9 Punjab

The use of electronic information resource by students and teachers of engineering, management and biotechnology colleges in Faridabad, Punjab. Majority of the library users are aware of electronic information resources and they are using e-resources for their academic purposes and near about half of user's claim that the library staff helps in accessing electronic information resources (Maan, 2012).

4.10.10 Tamil Nadu

ICT infrastructural development is varied from state to state. In Tamil Nadu state, most of the special libraries have automatic functioning available with ICT infrastructure such as hardware, software. The network connection is encouraging in the government sector as well as the non-government organization. Majority of the

user especially research scholars are highly satisfied with ICT infrastructure availability in the institutes (Latha, Nagarajan, & Nithyanandam, 2010).

The faculty members of self-financing engineering colleges in Annamalai University have a very positive attitude towards e-resources accessing for their study and research purpose. The role of the library is a gateway to provide assistance in accessing library resource and services. Faculty members are heavily dependent on e-resources for their required information and to keep themselves up-to-date in their subject area (Thanuskodi, 2011). The users of Arts and Engineering college libraries of Tamil Nadu have preferably ranked mobile phone as an ICT tool to easily access and acquire current information at anytime and anywhere (Saleem, SZ, & Batcha, 2013). The academic staff of engineering colleges under the Coimbatore Anna University at Karur district, (Tamil Nadu) have excellent computing skills by frequently using electronic information sources and services (Santhi, Radhakrishnan, & Rani, 2010).

4.10.11 Karnataka

LIS professionals of Medical, Dental and Pharmacy colleges of Karnataka affiliated to Rajiv Gandhi University of Health Science (RGUHS) and Iranian college libraries. They found that Indian LIS professionals do not have more IT skills like e-mail, internet, e-publishing, e-databases and presentation as compared to Iranian library professionals (Farahi& Ramesh Gandhi, 2011).

The telecasts media libraries in Karnataka and it is found that they have remarkably preserved their digital collection and achieved future long-term preservation. The libraries have adopted proper planning in establishing new policies, the discovery of new tools, an advanced technique for preservation, training, monitoring, regular and routine feedback from library users are helpful to enhance library services (Sarojadevi, Padmamma, &Walmiki, 2016).

The ICT skills level of the LIS professionals in VTU (Visveshwaraya Technological University) research centres of Karnataka does not possess a good level of ICT skills when compared to their academic qualification and rich work experience

(Arokyamary & Ramasesh, 2012). The awareness of internet and online resources among software engineers, administrative staff and supportive staff of Honey Well Library (software industry) Bangalore. The library users have knowledge of various quality parameters such as client site, personal website, web-links, standards and library web-OPAC are excellent (Kattimani & Kamble, 2010).

The library automation that stated in India late 1970 in a few special libraries. The status of library automation in engineering college libraries in Karnataka show the very high level in the current situation and most of the Engineering college libraries used 'Libsoft' library software for automation. Library automation is an important step for giving better service to the library users (Mulla, Chandrashekara, & Talawar, 2010).

4.10.12 Delhi

The use of e-resources by undergraduate students and teachers in college libraries of Delhi. Most of the users are aware of the e-resources, but they prefer to use them either at home or any other places but not in the library. Students use e-resources for the purpose of preparing assignment and make notes and teachers use e-resources for the preparation of lectures. Users claim that the college libraries of Delhi do not subscribe sufficient e-resources in the library due to lack of funds for subscribing e-resources (G. Singh & Arora, 2010).

The use of mobile device for improving the research work by research scholars of the University of Delhi and the University of Hyderabad. Research scholar under the age group of 26-30 years is using a variety of mobile features from their smartphone to fulfil their academic needs. They also use a mobile device for m-learning to improve their social interactions and mobile apps are most frequently used for checking social networking sites, accessing e-newspapers and web-OPAC (Madhusudhan, 2015).

The use of e-resources by students of Jawaharlal Nehru University, Delhi. Most of the students are aware of the online resources being subscribed to by the library and the students also claim that, these resources are user-friendly. The central library of JNU has frequently organised the orientation programmes for fresher's and old students to

create awareness among them about e-resources and facilities (Awasthi, Devendrappa, & Rigzin, 2016).

4.10.13 Maharashtra

The study ICT literacy status in Maharashtra, found that majority of library professionals are working in NMIMS deemed university, Mumbai has satisfied with ICT related activities available in the library. The LIS professionals are satisfied with their job and they update their ICT skills through attending a training course, seminars and workshops. Library professionals regularly visit well-known library websites like OCLC, LC and BCL etc. to understand new developments in the IT field (Bellary, Sadlapur, & Naik, 2015).

All the engineering college libraries of North Maharashtra University, Jalgaon having necessary ICT infrastructure facilities to provide e-resources for their users. Majority of the engineering college libraries are having two network services namely DELNET and INFLIBNET and majority have subscribed IEEE, ASME, ACM, ELSEVIER, J-GATE ENGG., J-GATE MANAGEMENT etc. popular bibliographic database to access e-resources (Mohd & Esmail, 2013).

ICT can be a useful tool to address problems in medical education, but the lack of technology and resources have a serious limitation. The noteworthy point is that even after three decades, the inadequacy of qualified and technical staff has stood in the way of users' satisfaction. Further, there is ample evidence that most of users are deprived of access to the vast medical literature available in electronic format. The Medical college library is not capable of using the services available at a national and international level. It is also observed that there is an absence of co-operation among the medical libraries in Maharashtra at the national level, including interlibrary loan. Attention to these broad areas of weakness will go a long way towards improving the use of ICT in the library (Angaitkar, Nair, & Deshmukh, 2016).

Summary:

ICT is the basic requirement for management of the college libraries to organize and offer continuous training programmes to train or retrain librarians with the latest advancement of information technology. Every library in the modern era has basic hardware and software to manage library resources. Librarians and library staffs have acquired the proper training of ICT tools applicable in the library. Library authorities can take initiative to depute library staff for attending a various training program, seminar, conference and workshops related to ICT application in libraries.

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CHAPTER – V   ICT LITERACY MODELS FOR LIBRARY PROFESSIONALS

5.1   Introduction:

The invention of information and communication technology and its use in libraries has drastically changed the process and functions of a modern library system. The adaptation of ICT literacy skills is essential for every library professionals.

ICT skills or IT skills can be referred to as the overall competencies (knowledge, know-how skills and attitudes), necessary to create, store, analyze, organize, retrieval, and dissemination digital information (text, image and sound) in the digital libraries or any type of information (Angeline & Swaroopa Rani, 2015).

5.2   ICT Literacy Models:

ICT literacy refers to the mastery and skilled to handle digital technology, use various communication tools and access network appropriately.

As per the survey of adult literacy and life skills on information and communication technology literacy assessment framework, "the ICT is important to the daily lives of individuals: logic and critical evaluation, use, skills, applications, social content, motivation, adaptability, and knowledge." This survey suggested that the scope of ICT is broader than ICT skills, and literacy. ICT is more than just a tool that individuals can make use to improve their social and economic condition. The following draft of the content cover seven key dimensions of ICT literacy:

1. General use of information and communication technology,
2. Use of computer and Internet,
3. Use of computer and skills in work contents,
4. Use of computer in non-work content,
5. Development of computer skills,
6. Use of computer for personal benefits, and

7. Receptivity to computer use among current non-users (Lowe & McAuley, 2000).

5.2.1 Ahmad, Badusah and others 21ˢᵗ Century ICT Literacy Model:

This model determined the level of ICT competency based on the learner's ability in seven different domains- defining, accessing, evaluating, managing, integrating, creating and communicating. This model is significantly crucial and appears as a key to become successful in the society. The use of effective ICT, at the moment, require several important skills namely cognitive and technical skills. Following are seven cognitive skills;

- **Defining:** Understanding and explaining the concern which needs to be solved using ICT.

- **Accessing:** Identifying information sources in the digital environment.

- **Evaluating:** Evaluating type of information which matches the problem by determining the power, unfairness, relations and other aspects of materials.

- **Managing:**

  ➢ Standardizing the information, so that it could be easily retrieved in future.

  ➢ Arranging the source of information such as files, email, pictures and music according to a certain classification.

  ➢ Using the file name, email or database which is relevant to the content and easy to be understood.

- **Integrating:** Synthesizing the information from various sources in order to invent something new and also in decision making

- **Creating:** Designing and adapting information in the digital environment.

- **Communicating:** Spreading the information in digital form efficiently. Determining the method of digital communication relevant to the requirement of a task.
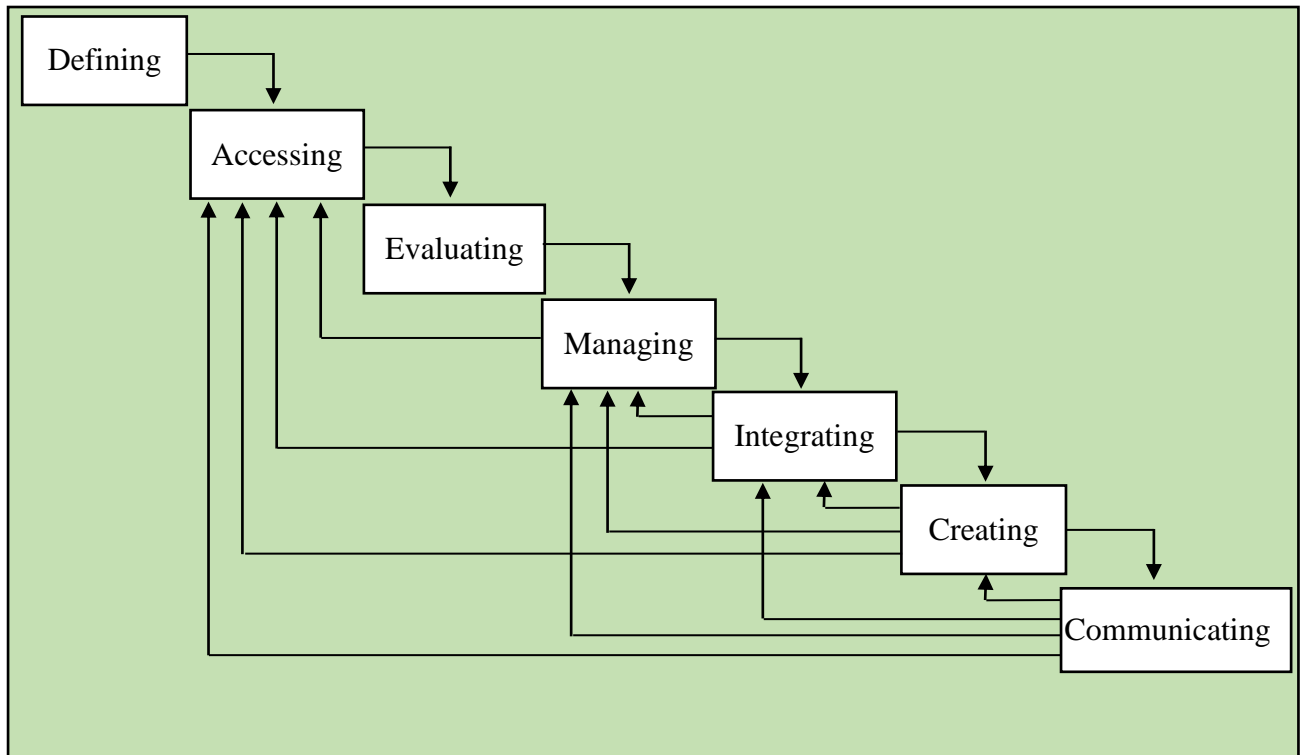
Figure 5.1: Ahmad, Badusah and others 21ˢᵗ Century ICT Literacy Model

The model comprises of different stages. It is not a liner but makes use of the step-by-step process. This is a flexible process in which one can move back and forth in the process but to be able to do what is essential in each stage. 21st-century literacy model determines the level of ICT literacy based on seven different domains but it measures the aspect of technical skills based solely on five domains of ICT competency like accessing, managing, integrating, creating and communicating. With the integrating of ICT components such as applying the word processing, electronic presentation, electronic sheet, e-database, Internet, e-mail and search engine etc. tasks forms a major part of developing ICT competency assessment (Ahmad et al., 2016).

The ICT literacy assessment, developed by Educational Testing Service (ETS), an Internet-based assessment of ICT literacy. The assessment measures ICT literacy through seven performance areas, which represent important problem-solving and critical thinking aspects of ICT literacy skill including define, access, manage, integrate, evaluate, create and communicate. The assessment was designed to support instructional efforts in ICT literacy by providing data on students' skills that can helps

to decisions for instituting and evaluating information literacy programs. Educators who accept the challenge of teaching ICT literacy skills must be prepared to:

i. Find a strategy to reach the user who believes he/she is already proficient,
ii. Make the learning relevant to the user's needs, including the use of the technologies that student already knows, to anchor the learning in something familiar,
iii. Create active learning opportunities to keep the students on task, and
iv. Assess the impact of instruction on student learning outcomes (Katz & Macklin, n.d.).

5.2.2 Kambas ICT Literacy Model:

The ideas for the development of an ICT competency framework in only one significantly national and local initiatives related to developing and supporting effective ICT use in LIS schools and managing library and information resource and services. In this regards, there is a need to exploit a competent practitioner who will manage the information resources effectively.

The ICT competency framework is intended to provide guidance for future usage of ICT in library and information services.
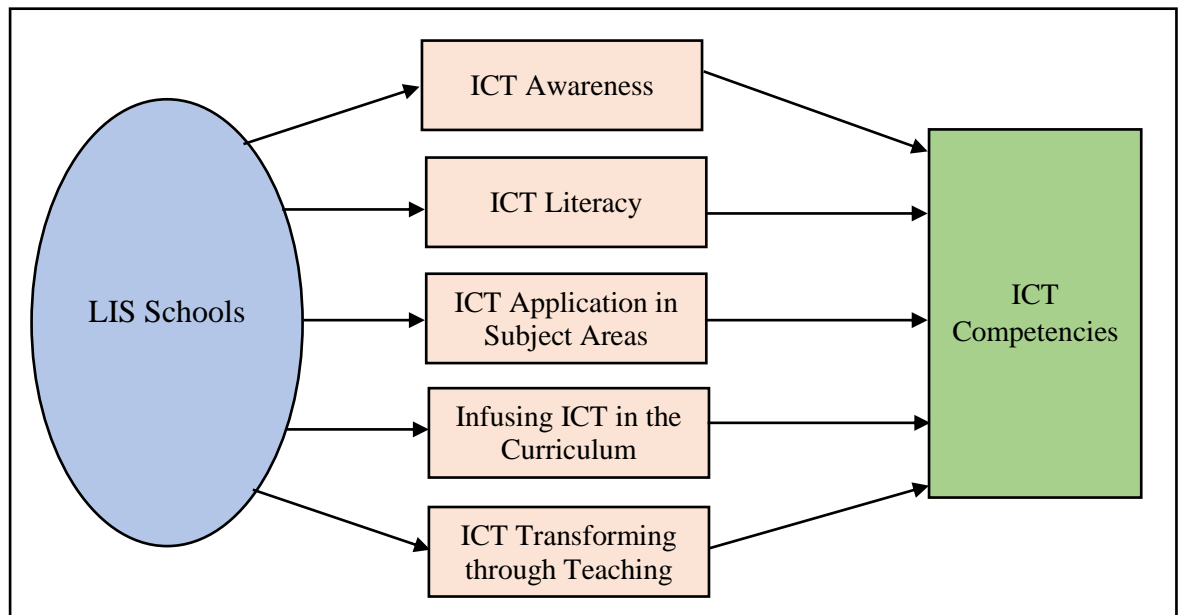
Figure 5.2: Kambas ICT Literacy Model

The above figure shows that the framework proves useful in developing ICT literacy skills for LIS schools, the framework is similarly useful in planning for the professional development among library professional, library technical and supporting staff which is essential in their professional life when they begin to use ICT. The framework depicted in figure 5.2 identifies approaches to ICT development which helps to provide a model for library professionals, semiprofessionals, assistant librarian, library assistant and library users.

The explanation of the framework in details is as follows;

5.2.2.1 ICT Awareness:

Library and information science schools are held responsible to raise the library professionals, practitioners and student's awareness of the need to become ICT literate, describing good or emergent practices, organizing discussion groups, conferences, seminars, workshops, developing informative websites etc. In the awareness approach, the focus is on the importance and use of ICT, and on the need for some knowledge of the impact of ICT as a whole. This approach often involves library professional's own awareness and that on the use of ICT such as familiarity with word processing to prepare worksheets, locating learning resources on CD-ROMs or on the Internet and communicating with friends and family through email.

5.2.2.2 ICT Literacy:

ICT literacy means having the required knowledge to use the ICT in the professional life of librarians, faculties, practitioners, students and library users. This approach in the framework covers the use of ICT as encountered in the daily activities of their professional life. Specific areas to become literate include realization of basic concepts of ICT, using computers and managing files, word processing, spreadsheets, databases, creating presentations, finding information and communicating with computers, social and ethical issues and jobs using ICT.

5.2.2.3 ICT Application in Subject Areas:

This approach in the framework covers the application of ICT tools for working within specific subject areas such as circulation, reference services, acquisition, resources sharing/interlibrary loan, special section, information retrieval and organisation etc. Specific units include measurement, modelling and simulation, robots and feedback devices, statistics, creating graphics, spreadsheet design, internet applications, browsing and database design.

5.2.2.4 Infusing ICT in the Curriculum:

In the infusing approach to ICT development, ICT implantations in all aspects of teachers' professional including library and information science, lives in such way as to improve student's learning and the management of learning processes. This approach supports active and creative faculty staff and practitioners who are able to stimulate and manage the learning of students, integrating a range of preferred learning styles and uses of ICT in achieving their goals.

5.2.2.5 ICT Transforming through Teaching:

This is a better method to understand or adopt ICT literacy easily. In this approach the ICT development, faculties and library staff should consider ICT as a naturally mean and integral part of everyday life of in LIS schools. Basically, this process has a shift from teacher-centred to the learner-centred approach (Kamba, 2011).

ICT literacy models suggested by Perez & Murray. The model explains the main domain of ICT literacy are knowledge, skills and attitudes. Knowledge represents understanding, comprehension, and purposeful intent, skills equate to an ability to perform task/functions, and attitudes reflect perceptions of value, appreciation and confidence.

5.2.3   Perez and Murrays Model of ICT Literacy:
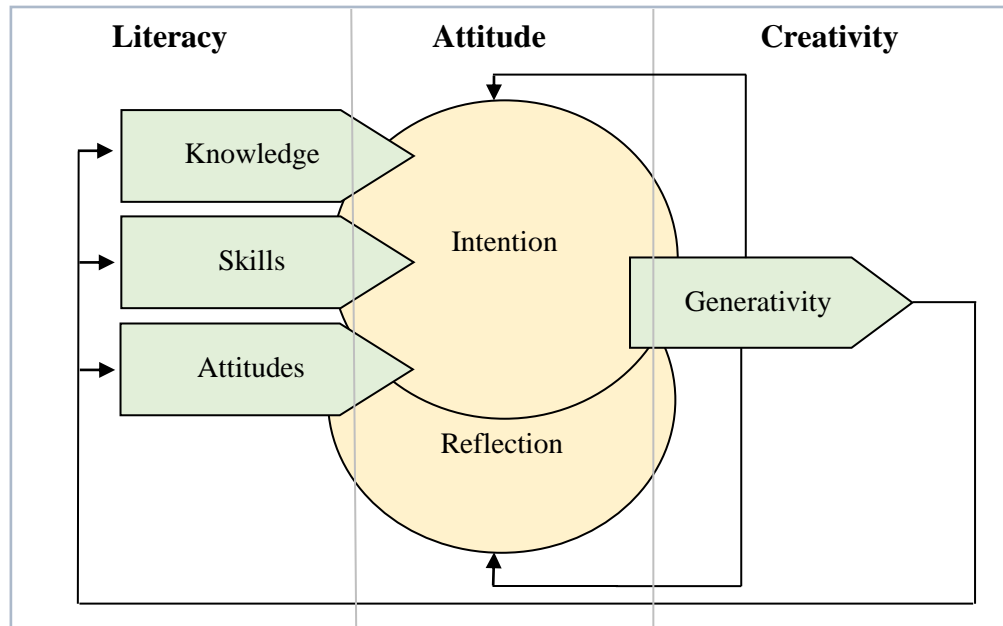
Figure 5.3: Perez and Murrays Model of ICT Literacy

The context of reflective self-awareness and purposeful intent to allow one to achieve generativity, the ability to generate new skills and knowledge that is the basis for innovation and creativity. Generativity technologies have been described as characterized by adaptability, ease of mastery, accessibility, transferability and leverage. Literacy encompasses knowledge, skills and attitudes; attitude captures reflection and intention, which turns to create the potential for generativity (Pérez & Murray, 2010).

People affect the safety, effectiveness, comfort and satisfaction with the high-quality level which the goals of an individual or an organization are formulated and attained (Hunt, 2003).

Technological literacy means computer skills and the ability to use of computers and other technology to improve learning. Productivity and performance-have become fundamental to a person's ability to navigate through society as traditional skills like reading, writing and arithmetic (Breuch, 2002).

The digital literacy, as the ability to use ICT and the addition of the Internet becomes a new form of literacy – "digital literacy". Digital literacy is fast becoming a

prerequisite for creativity, innovation and entrepreneurship and without it, citizens can neither participate fully in society nor acquire the skills and knowledge necessary to live in the 21st-century (Martin, 2005).

5.2.4   Khvilon and Patrus Stages of Teaching and Learning through ICT:

Teaching and learning in schools identify four broad stages in the way that teachers and students learn about and gain confidence in the use of ICT. These four stages give rise to the model depicted in figure 5.4 that shows the stages in terms of discovering, learning how, understanding how and when, and specialization in the use of ICT tools.

5.2.4.1 Discovering ICT Tools:

The first stage, which teachers and learners go through in ICT development is of discovering ICT tools and their general functions and usage. In this discovery stage, there is usually an emphasis on ICT literacy and basic skills. This stage of discovering ICT tools is linked with the emerging approach in ICT development.

5.2.4.2 Learning How to Use ICT Tools:

Following the discovery of ICT tools, the next stage is learning how to use ICT tools. Starting to use it into different disciplines. This stage involves the use of general or particular applications of ICT and it is linked with the applying approach in ICT development.

5.2.4.3 Understanding How and When To Use ICT Tools:

The next stage is understanding how and when to use ICT tools to achieve a particular purpose, such as in completion of a given project or target. This stage implies the ability to recognize situations where ICT will be helpful, choosing the most appropriate tools for a particular task and using these tools in combination to solve real problems. This stage is linked with the infusing and transforming approaches in ICT development.

5.2.4.4 Specialization in the Use of ICT Tools:

The fourth and last stage involves specialization in the use of ICT tools and it occurs when one enters more deeply into the science that creates and supports ICT. In this stage students undertake to study ICT as a subject to become specialists. Such study concerns vocational or professional education rather than general education and it is quite different from previous stages involving the use of ICT tools (Khvilon & Patru, 2002).

Discovering	A	ICT tools
Learning how	B	To use ICT tools
Understanding how and when	C	To use ICT tools to achieve particular purposes
Specializing in	D	The use of ICT tools

Figure 5.4: Khvilon and Patrus Stages of Teaching and Learning through ICT

5.3   ICT Literacy Models for Library Professionals:

Library professionals should acquire the following four main ICT literacies:

5.3.1   Hardware Literacy:

The level of expertise and familiarity with computers result in hardware literacy. Computer literacy generally refers to the ability to use applications rather than to program. Individuals who are familiar with computer and those also computer literate are sometimes called power users. The level of familiarity with the basic hardware and software (and now Internet) concepts that allows one to use personal computers

for data entry, word processing, spreadsheets and electronic communications, are prerequisites of hardware literacy.
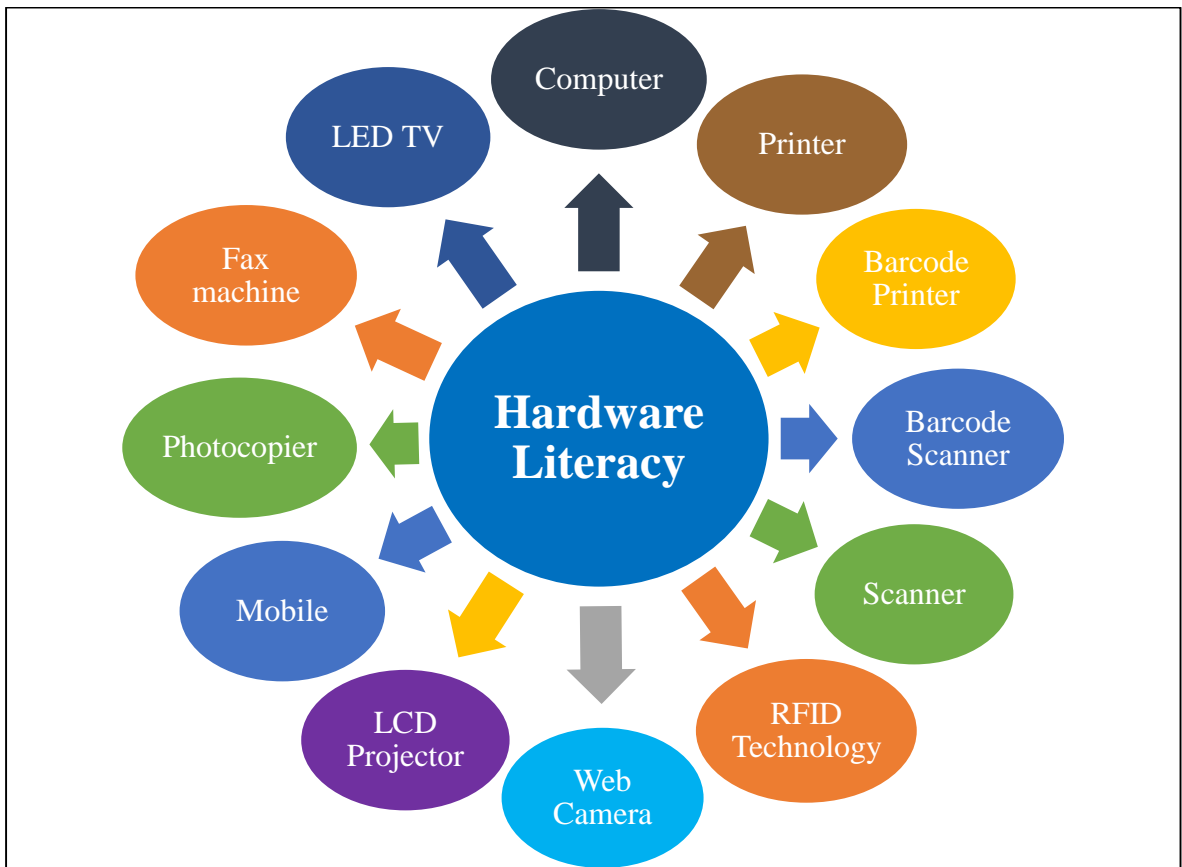
Figure 5.5: Hardware Literacy

   i.   **Computer:** A computer is a hardware. It includes the parts of the computer system that we actually can touch and required to its operating systems like keyboard, mouse, monitor or CPU.

  ii.   **Printer:** Printer is used in the library to print reports, user records, books lists, barcode labels, circulation slips etc. It always works as attached to a computer or group of computers.

 iii.   **Scanner:** Scanner is an important equipment in the modernization of the library. It is useful for scanning text, image and content pages of books for display in the OPAC (Online Public Access Catalogue). Scanned documents may be circulated and accessed easily. The scanner provides great help for establishing a digital and virtual library.

iv. **Barcode Printer:** Barcode printer is required to generate and to print barcode labels. In the library, barcode printer is used to print the books-barcode and users' I-Cards labels. Barcode label can help in easy circulation of library books and it makes accuracy in that process.

v. **Barcode Scanner:** Bar-coding is a compulsory activity in a modern library. Almost all the library automation software packages are compatible with a barcode reader and are capable of generating barcodes for library materials. Using barcode equipment for circulation and stock verification is becoming more common, efficient and time saver.

vi. **RFID Technology:** RFID (Radio Frequency Identification) is the latest technology being used in modern libraries as a theft detection system.

vii. **Fax Machine:** Fax system permits the transaction of images (photos, printed images, maps, drawings) and their reproduction on paper at a remote receiver. "Long distance copying" might be an appropriate nickname for this telecommunication process. Any document, whether it is handwritten, pictures, diagrams, graphs, charts or typed text can be transmitted at a great speed for the relatively low cost (Khan, Dominic, Banga, & Garg, 2011).

viii. **Web Camera:** A webcam is a video camera that feeds or streams its image in real time to or through a computer to computer network. When "captured" by the computer, the video stream may be saved, viewed or sent on to other networks via systems such as the internet and email as an attachment. A webcam is generally connected by a USB cable or similar cable or built into computer hardware, such as laptops ("Wikipedia," 2016).

ix. **Mobile:** Mobile learning has includes the use of portable electronic devices to access and share information is a trend in higher education and it is redefining the manner in which learning takes place and how instruction is delivered. Mobile learning brings in students and professionals the unique opportunity to access information instantaneously regardless of location (Foti, 2014).

x. **LCD Projector:** The LCD projector is a projector for displaying video, images or computer data on a screen or other flat surface. The combination of open and closed pixels can produce a wide range of colours and shades in the projected image. LCD projector is always used with the computer unit. In the library, LCD projector can be used for presentation of library department, accessing e-resource, library activities and facilities, resource and search literacy programme.

xi. **Photocopier:** Photocopier is used in the library to provide duplicating copies from reference books, journal articles and previous exam question papers etc.

xii. **LED TV:** Modern digital libraries are using such type of ICT infrastructure for displaying library regular practices, library collection, available facilities, functions, new arrivals, best books availability etc.

5.3.2 Software Literacy:

The main reason for software literacy is an automation of library systems. To create an automatic library system, the requirement of library management automation software is essential. The modern library management system depends on library automation software. The selection procedure of software is a difficult task, because of various types of library software are available in the market like proprietary, open source and some in-house developed software for library functioning. In the selection process of software, criteria should be cost, popularity and easy accessibilities.

ICT is the main reason for the application of automation software in the modern library system. The application of Information and Communication Technology (ICT) in the operation of the different processes and functions of the library to attain efficiency, accurate reporting and improved services. Core services of the library like circulation, cataloguing, acquisition, serial management, reference services and special collection readily benefit from automation ("Wikipedia," 2016).
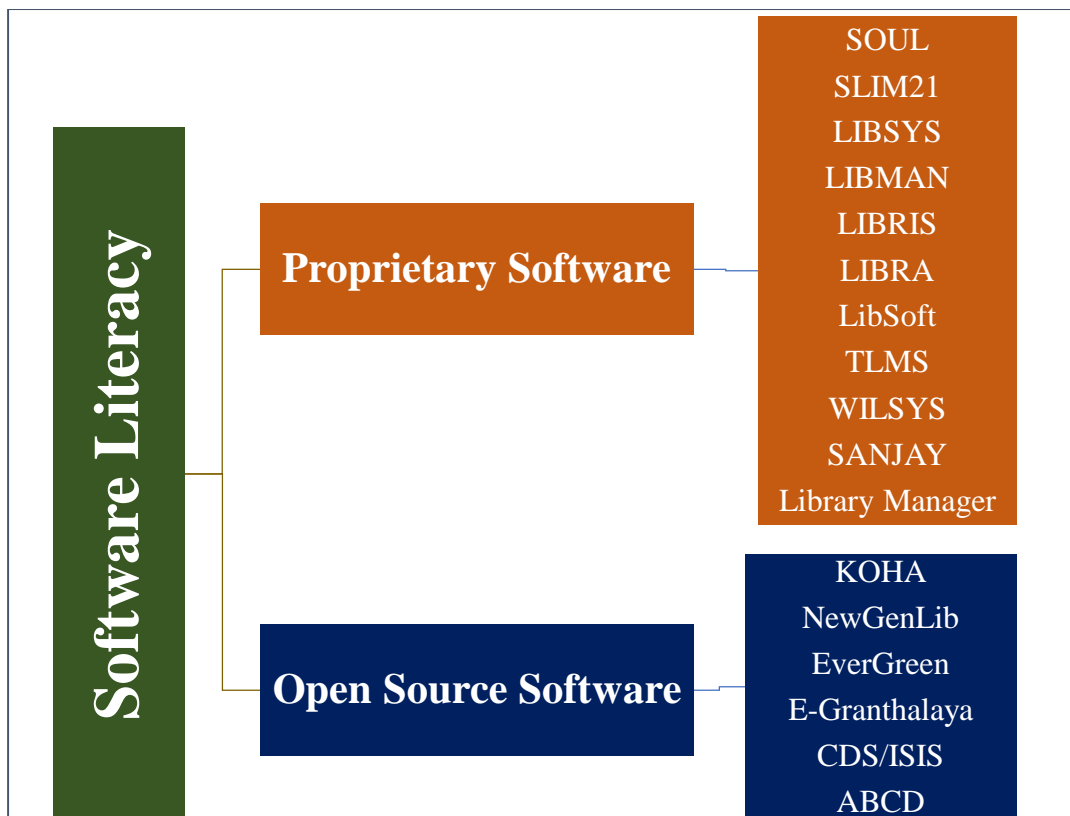
Figure 5.6: Software Literacy

5.3.2.1 Proprietary Software:

Proprietary software is software that is owned by an individual or a company (usually the one that develop it). There are major restrictions on its use and its source code is always kept secret. This software has earned royalty to the developer and it is always purchased.

While selecting the automation software, it is important that it should have all the model (acquisition, cataloguing, circulation, serials control, OPAC and administration) required to carry out all routine work of the library. It should also have Unicode model for handling all the Indian and foreign languages and user-friendly applications. Some prominent software successfully installed in libraries are LIBSYS, SOUL, LIBMAN, TLMS, ALICE, BASIC-PLUS & TECHLIB, and DEL-WINDOWS etc. (Sharma, Singh, & Kumar, 2009).

5.3.2.2 Open Source Software:

The digital library refers to a collection that constitutes electronic resources, accessible through the World Wide Web. It often contains electronic versions of books, photographs, videos that are owned by a "physical" library. The open source digital library software presents a system for the construction and presentation of information collections. It helps in building collections with searching and metadata-based browsing facilities. Moreover, they are easily maintained and can be augmented and rebuilt automatically. With many Open Source Software (OSS) applications available for library and information management, many organizations have novel options for acquiring and implementing systems (Tramboo, Shafi, Gul, & others, 2012). The Digital Library Management Software (DLMS) present an easy to use, customizable architecture to create online digital libraries. With these, institutions/organizations can disseminate their research work, manuscripts or any other digital media for preservations and world over the dissemination of digital items.

The OSS/FS programs are programs whose licenses give users the freedom to run the program for any purpose, to study and modify the program, and to redistribute copies of either the original or modified program (without having to pay royalties to previous developers) (Wong, 2004).

The open source software (OSS) are computer software that is produced by Programmers and made available to the general public with their source codes and relaxed copyright restriction. It also allows modification by users in line with their needs, requirements, and purpose of usage. This software, in addition to being effective, are most often acquired free of charge. This implies that those factors such as the exorbitant cost of proprietary software and library budgetary constraint which in the past, had restricted library automation to exclusively well-funded libraries, is being eradicated by the advent of OSS (Ukachi, Nwachukwu, & Onuoha, 2014).

5.3.3 Resource Literacy:

The ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers. The users can access, locate, download, manage and use information in the appropriate formats when they need.

The information explosion via Internet connectivity has greatly increased the number of electronic information resources available on the web. E-information resources have enhanced accessibility, increased usability, effectiveness and established new ways for information users in using information for more productivity in their endeavours. The value and use of information resources, particularly e-resources, have greatly increased in the 21st-century libraries (Okiki, 2012).

The electronic e-resources are one of the emerging environment in libraries and Information communication in the competitive service. E-resources usually consist of e-books, e-journals, e-articles, e-paper, e-thesis, e-dissertation, e-databases and CD-ROMs, which are likely to be the alternative to the print media. Emerald, EBSCO, N-List, Scopus are some of the examples of online databases. All updated information is published in these e-resources. The familiarity and use of electronic information resources in the libraries for rapid development are necessary and important in the present scenario (Sundareswari, 2013).
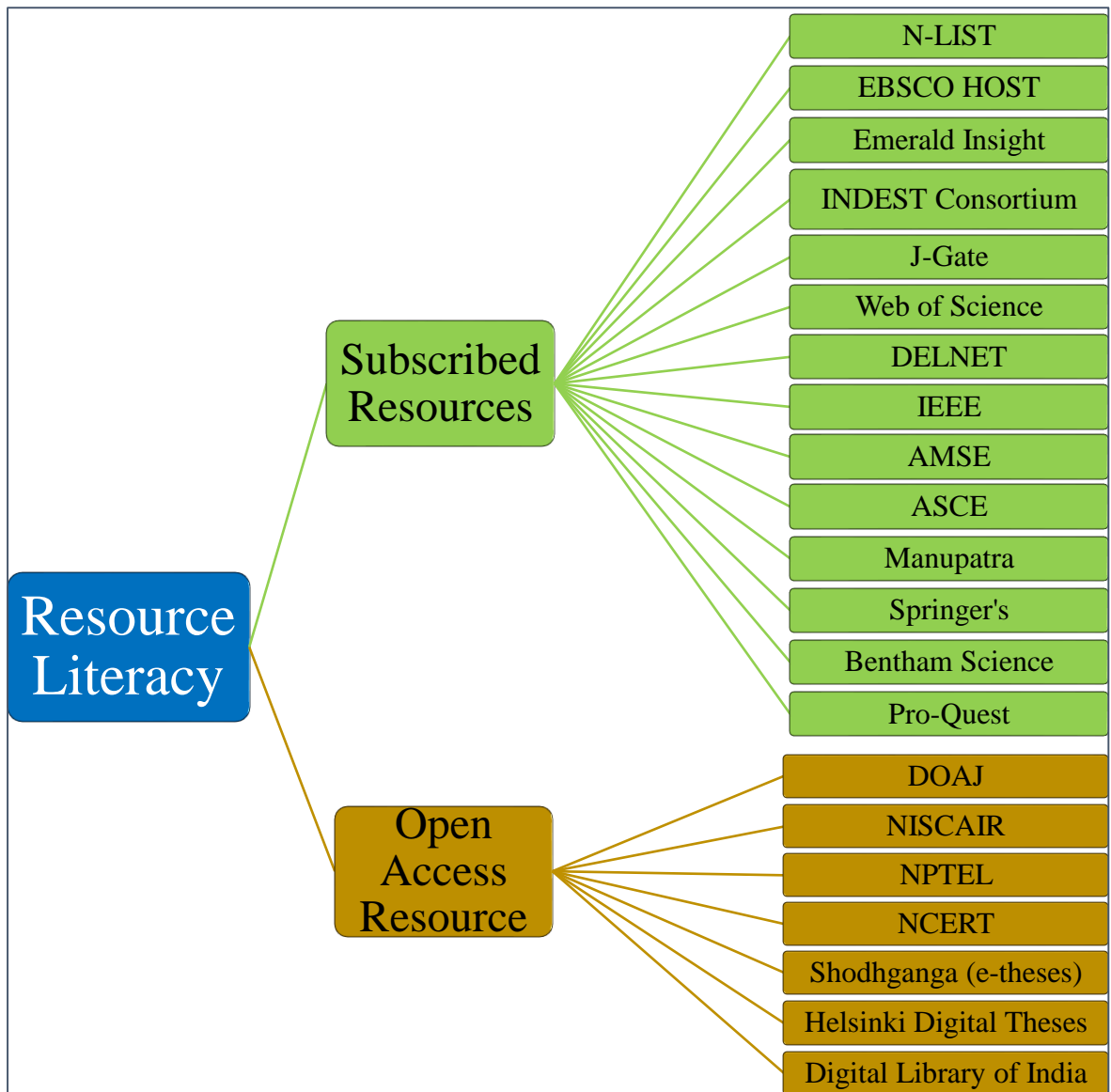
Figure 5.7: Resource Literacy

The e-resources are basically of two type's viz. subscribed and open access. Here is a list of some prominent e-resources and their websites which are available in college libraries in Nashik district.

5.3.3.1 Subscribed Resources:

The organization or publishers want payment of e-resources subscription in advanced and they prepare user account with user name and password. From them, some of the databases provide users personal user ID and password and others provides institutional user ID and password.

Subscribed E-Resources Websites

N-list	http://nlist.inflibnet.ac.in (3135000+e-books & 6000+e-journals)
EBSCO	https://www.ebscohost.com/
Emerald	http://www.emeraldinsight.com/
INDEST Consortium	http://paniit.iitd.ac.in/indest/index.php/about-us
J-Gate	https://jgateplus.com/
Web of Science	https://login.webofknowledge.com/
DELNET	http://www.delnet.nic.in/
IEEE	http://ieeexplore.ieee.org/Xplore/home.jsp
AMSE	http://www.amse-modeling.com/
ASCE	http://www.asce.org/
Manupatra	http://www.manupatrafast.com/Defaults/CompanyInfo.aspx
Springer's	http://link.springer.com/
Bentham Science	http://benthamscience.com/
Pro-Quest	http://www.proquest.com/

5.3.3.2 Open Access Resources:

Opens access e-resources are freely available for access, use and download from everywhere and any time. There are no terms and conditions for access and use of e-resources. Following are websites of free e-resources.

DOAJ	http://doaj.org
NISCAIR	http://www.niscair.res.in/ (20 e-journals available)
NPTEL	http://nptel.ac.in/
NCERT	http://www.ncert.nic.in/
Shodhganga	http://shodhganga.inflibnet.ac.in/

Helsinki Digital Theses   http://ethesis.helsinki.fi/en/tietoa-palvelusta

National Digital
Library of India   https://ndl.iitkgp.ac.in/

5.3.4   Search and Information Retrieval Literacy:

Search literacy includes the expertise and techniques used for searching required information on the web. If the same title or keywords are entered into the search engine, the number of information is available in one click, but this all searched information is not required for our needs. Since, all the search results did not match our needs. Searching tools and technique helps us to search for proper information in minimum time spent. For proper search tools and techniques and we must have an accurate name of the website. We can directly reach, at the place where the information is available. Following are the information searching techniques and strategies;

5.3.4.1 Boolean Operators:

The Internet search strategies employed by library and information science students of the University of Nigeria, in their research. Boolean Operators include simple words (AND, OR, NOT) used as a conjunction to combine or exclude key words in a search, resulting in more focused and productive results. This should save time and effort by eliminating inappropriate hints that must be scanned before discarding. Using these techniques the operators can greatly reduce or expand the number of records returned. Boolean operator saves time by focusing searches for more 'on target' results that are more appropriate one's needs, eliminating unsuitable or inappropriate attempts.

AND: - AND requires both terms to be in each item written. If one term contains in the document doesn't, then the item is not included in the resulting list. (Narrows the search)Example: a search on **ICT literacy and library professional's** show result as: ICT literacy for library professionals; library professionals ICT literacy.

OR: - Either term (or both) will be in the written document. Example: A search on **ecology OR pollution** includes results as: documents containing the world ecology (but not pollution) and other documents containing the word pollution (but not ecology) as well as documents with ecology and pollution in either order or number of uses.

5.3.4.2 Proximity search:

One can use a proximity search to search for two or more words that occur within a specified number of words (or fewer) of each other in the databases. Proximity searching is used with a keyword or Boolean search. The number of * represents any intervening words in between. Library* science
Google* search

5.3.4.3 Phrase search:

Surrounding a group of words with double quotes tells the search engine to only retrieve documents in which those words appear side-by-side. Phrase searching is a powerful search technique for narrowing your search results significantly.

Example: "Library science"

"Information retrieval"

"ICT Literacy"

5.3.4.4 Fuzzy Search:

This is a type of search is possible by fuzzy matching. The search engine gives results that it predicts will be relevant, even when the terms used in the query does not appear anywhere in the matched documents.

Example: ~Subramanian will find Subramanian as well as Subramanian ~food will retrieve nutrition, recipes, cooking etc.

5.3.4.5 Stemming:

This means that the engine will search not only for your search terms, but also for words that are similar to some or all of those terms. It will search for all variations of the word. Example: 'read plan' will find pages with read, reading, reads, and plans, planning etc.

5.3.4.6 Truncation search:

Truncation places a symbol at the end of the word so you search for variant endings of that word. Example: lib $ would look for a library, librarian, liberalization, liberty.

5.3.4.7 Wildcard searches:

Wildcards also place a symbol within a word to find variations on it.

Example: analy*e would find analyse or analyse.

Different symbols including **$ * ~ #! :** are used by different search tools

Operators use different Search Strategies include the following:

'+'   To specify a must include the term

'-'   To specify a must exclude the term

' '   To specify a must include the phrase

( )   To specify a set of terms

:   To separate the reserved word from the search terms

*   To specify term search (truncation) (Eke, Omekwu, & Agbo, 2014)

AND

OR

NOT
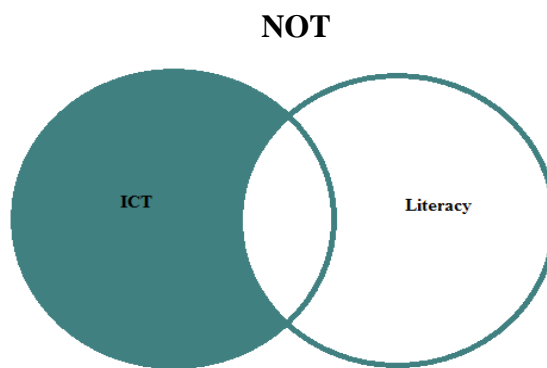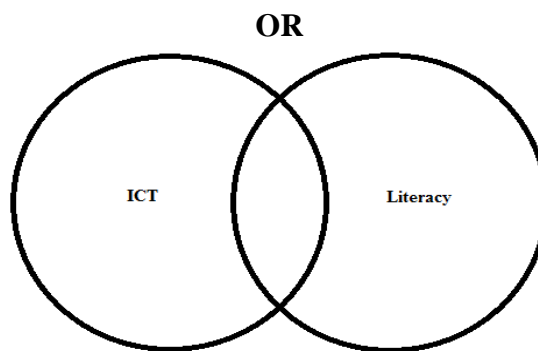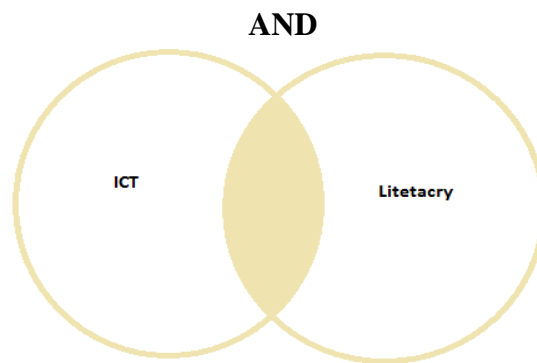
Figure No. 5.8 Boolean Operators (Eke et al., 2014)
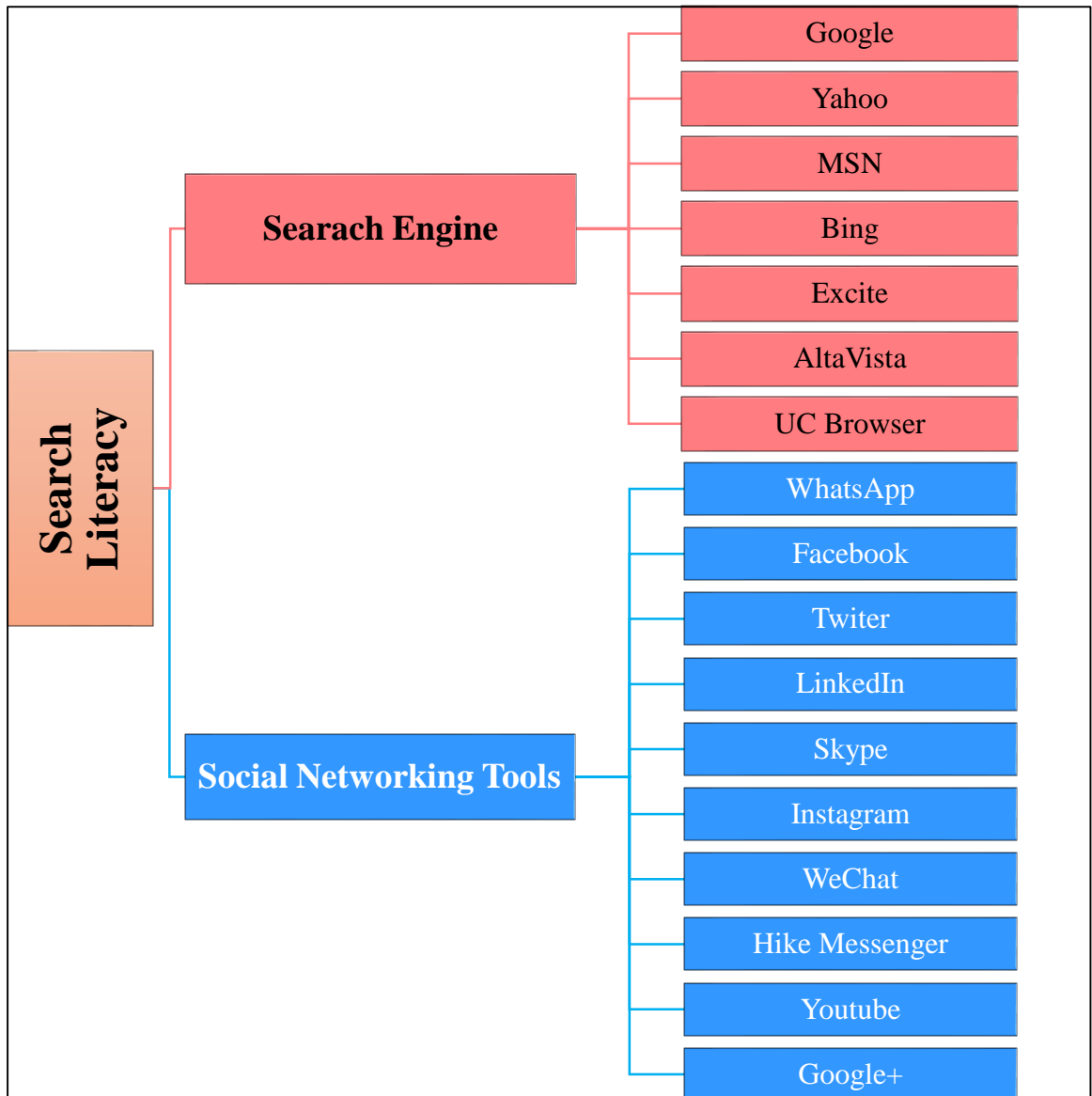
Figure No. 5.9: Search Literacy

5.3.4.8 Search Engines:

The search engine is a program that searches for and identifies items in a database that corresponds to keywords for characters specified by users, used especially for finding particular sites on the World Wide Web. Basically, Google, Yahoo, MSN, Bing, Excite, AltaVista and UC browser search engine are mostly used for accessing and browsing online information. The details of search engines are as follow:

i.   **Google:** Google is a brand name of the leading Internet search engine, it is founded in 1998. It is most popular to search for information about (somebody

or something) on the Internet using the search engine Google. Today, Google is one of the top search engines. Google has about 40 options for searching. Apart from normal features it includes nearly 22 special features like patents, language translation, package tracking etc. (Shridhar, Renuka Devi, Nirmala, & Swarna, 2014).

ii. **Yahoo:** Yahoo is also a popular search engine with a full-featured Web portal, including a chat groups, instant messaging (IM), and e-mail etc.

iii. **Bing:** Bing is a web internet searcher created and developed by Microsoft.

iv. **Excite:** Excite is the main personalization Web searcher, highlighting world-class search, substance and usefulness

v. **UC Browser:** (Universal Control Browser), UC Browser is a smartphone internet searching browser created by the Chinese mobile Internet Company UCWeb and is owned by Alibaba Group of China.

vi. **MSN:** MSN is a web-based interface and related collection of Internet administrations and applications for Windows and cell phones (Dutta & Bansal, 2016).

vii. **AltaVista:** In 2002, AltaVista was the 7th most popular search engine in terms of unique visitors and had a content collection of nearly approximately a billion Web pages. AltaVista supported several query operators including AND, OR, NOT, NEAR, MUST APPEAR, MUST NOT APPEAR, and PHRASE operators (Jansen, Spink, & Pedersen, 2003).

5.3.4.9 Social Networking Tools:

In the present ICT era, social networking tools are most useful for sharing and easy transferring information to each other. These ICT tools always required internet connectivity to share and receive information, pictures, audios and videos to each other. The details of various social networking tools are as follow:

i. **WhatsApp:** WhatsApp is a FREE messaging app available for iPhone and other smartphones. WhatsApp uses your phone's Internet connection

(4G/3G/2G/EDGE or Wi-Fi, as available) to let you message and calls to friends and family. WhatsApp uses to send and receive messages, calls, photos, videos, and Voice Messages.

ii. **Facebook:** Facebook is a well-known free social networking site that allows registered users to make profiles, upload and share photographs and video, it also allows to friends, families and colleagues to keep in touch each other's.

iii. **Twitter:** Twitter is an online news and interpersonal interaction benefit where users post and collaborate with messages, "tweets", and it is restricted to 140 characters. Users used Twitter by its website interface, SMS or a cell phone application.

iv. **LinkedIn:** LinkedIn is a social networking site composed particularly for the business groups. The fundamental objective of the site is to enable enlisted clients to build up and archive systems of individuals they know and trust each other's professionally.

v. **YouTube:** YouTube is a free video sharing site that makes it simple to watch online videos. The user can even create and transfer their own particular videos to share with others. YouTube is currently the most popular site for sharing and watching videos on the Web (Ezeani & Igwesi, 2012).

vi. **Instagram:** Instagram is a free accessible social networking app made for sharing photographs and videos for smartphone users. It is the same as Facebook or Twitter, everybody who makes an Instagram account has a profile and a news feed. When users post their photographs or videos on Instagram, it will be shown on their profile.

vii. **WeChat:** This is an all-in-one communications app for messaging and calling (similar to WhatsApp) that enables the user to connect with the people of their choice. It is a cell phone app for text and voice messaging correspondence benefit developed by Tencent in China.

viii. **Skype:** Skype is an Android application and it allows registered users to convey through both text and voice chat. Voice talk permits phone calls between a group of users and conference calling.

ix. **Hike Messenger:** Hike Messenger is a cross- platform text messaging service for cell phones that uses the web for correspondence. It is mainstream for text messaging and furthermore enables users to send graphical stickers, emoticons, pictures, video recordings, sounds, documents, voice messages, contacts and user location each other's.

x. **Google+:** Google+ is a social networking service from Google. If the user has a Google Account, they can activate their Google+ account easily. Google+ the same as Facebook or Twitter, importing contacts and assigning them to circles (Omeluzor, Oyovwe-Tinuoye, & Abayomi, 2016).

Summary:

The ICT literacy models are helpful in to generate awareness about of ICT tools, selection of library automation software, a quick search of e-databases or e-resources and searching online information. The main reason for ICT literacy among library professionals in the modern information age that, most of the required information is available in electronic format. Library professionals should be aware of all the ICT tools and search techniques applied in the libraries for information searching, organization and disseminations.

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CHAPTER – VI   DATA COLLECTION, ANALYSIS AND INTERPRETATION

6.1   Introduction:

Data analysis is a key phase in research work and it helps to present research result. Analysis of data is the ultimate step in the research process. It is the link between raw data and significant results leading to a conclusion. This process of analysis has to be result oriented (Thanuskodi, 2011a)

This chapter includes the analysis, presentation and interpretation of data with the help of dividing a raw data, its codification, classification and tabulation, percentage calculation and drawing of tables and graphs.

6.2   Measurement/Evaluation Criteria to judge the ICT Literacy:

International ICT literacy panel (Educational Testing Service, 2002a) defines "ICT literacy is using digital technology, communications tools, and/or networks to access, manage, integrate, evaluate, and create information in order to function in a knowledge society. The panel's definition reflects the notion of ICT literacy as a continuum, which allows the measurement of various aspects of literacy, from daily life skills to the transformative benefits of ICT proficiency. This definition is also important in that it lists five critical components of ICT literacy. The five components represent a set of skills and knowledge presented in a sequence that suggests increasing cognitive complexity. Those five critical components are as following:

Access   :   Knowing about and knowing how to collect and/or retrieve information

Manage   :   Applying an existing organizational or classification scheme

Integrate :   Interpreting and representing information. It involves summarizing, comparing and contrasting

Evaluate :   Making judgments about the quality, relevance, usefulness, or efficiency of information

Create   :   Generating information by adapting, applying, designing, inventing, or authoring information

While the definition of ICT proficiency is an important starting point, it lacks the specificity needed to serve as a roadmap for developing assessment tasks (Educational Testing Service, 2002b). Accordingly, the next step in developing the proficiency model is to identify precisely which aspects of proficiency are to be measured. Seven processes were identified by the charter institutions as critical components of ICT literacy in higher education: the ability to define, access, manage, integrate, evaluate, create, and communicate information. These processes reflect the wide range of uses for information and communication technologies.

Define	:	Using ICT tools to identify and appropriately represent and identify an information need
Access	:	Knowing about and knowing how to collect and/or retrieve information in digital environments, also the ability to develop a search strategy to locate information within a database
Manage	:	Organizing information into existing classification schemes
Evaluate	:	Reflecting to make judgments about the quality, relevance, usefulness, efficiency, authority, bias, and timeliness of the information.
Integrate	:	Interpreting, summarizing, drawing conclusions, comparing and contrasting information from multiple digital sources
Create	:	Generating new information and knowledge by adapting, applying, designing, inventing, or representing information in ICT environments
Communicate	:	Conveying information and knowledge to various individuals and/or groups

Presently, the researcher has completed the data analysis using some of the criteria mentioned above. Above processes were followed to analyze the ICT Literacy of the users from various levels. During the study, the users were assigned some tasks to analyse their ICT Literacy. In the present study, all the libraries belong to well-established institutions and the librarian are serving these organization for quite some time. Hence, it is assumed that the Librarians in the present study are providing the

information services using some of the above processes. Thus, the data about the information services provided by these libraries was not collected.

6.3   Population and Sampling:

There were 179 colleges in Nashik District till 2014. Every college has a library facility and most of the libraries are managed by the trained library professionals. For research purpose, all the college libraries are selected for the survey in order to study the information about the ICT literacy among the library professionals. Out of 179 libraries, a questionnaire was circulated to all the library professionals of colleges in Nashik District and affiliated to Savitribai Phule Pune University, Pune.

The efforts are made to collect data from the remaining 30 college libraries, but due to various administrative and technical problems, the researcher could not get a response from these library professionals. Finally, data from 149 questionnaires are received from college libraries in Nashik District and these questionnaires have been sent to analysis and they are presented in this chapter. The response received from library professionals to this survey is 83%. The chapter is further divided into the following seven section; the details of each section are as follows.

6.4   Data Presentation, Analysis and Interpretation:

Section 1:   In this section **general information** about colleges or institutions are included, with various basic facilities like; date of establishment, the name of the library (if the name is given), college location, communication details, the status of college i.e. granted or non-granted and students strength etc.

Section 2:   The second section covers information about **library personnel** i.e. the name of library personnel, age group, designation, educational qualification, contact details, use of the mobile internet for various social networking applications etc.

Section 3:   In this section information is collected about **library facilities** such as library annual budget, the supplementary budget for ICT infrastructure, library website or web link on the college website, library staff and their ICT literacy, library collection and subscribed e-resources.

Section 4:   This section consists of **library automation**, the library automation status, software used in the library for automation, OPAC facility, barcode technology and its use in the library, internet used for library operations and services.

Section 5:   It covers the **status of ICT infrastructure** in the college libraries. This section includes internet connection and its speed, internet browsing cell, antivirus software used, ICT hardware, ICT tools used for various purposes, frequencies of internet accessed by library professionals, social networking tools to help in providing enhanced library services and search engines preferred by library professionals etc.

Section 6:   In this section detail information is covered about **ICT literacy** among library professionals. It includes the list of ICT related training programmes attended, use of the operating system and programming languages, application software packages used, open source software, and provision of the digital library. It also covers experience of web page designing, use of online ICT tools, online utilities and services used in the library, various internet tools, electronic resources, ICT skills adoption process and conducting ICT training programme in the library.

Section 7:   This section consists of the statement of five scale measurements like; SA-Strongly Agree, A- Agree, NO- No Opinion, D- Disagree and SD- Strongly Disagree. The opinions acquired by LIS professionals on the effectiveness and relevance of ICT literacy. It helps in foot fall in libraries, ICT training programme for LIS professionals for effective utilization of library resources, ICT literacy helps in increasing research output of the users and organizations, helps in the understanding of economic, legal and social issues related to the use of information etc.

Table No. 6.1: Data Received from Library Professionals

Questionnaire Circulated	No of Libraries	%
Received	149	83
Non-Received	30	17
Total	**179**	**100**

Graph. No. 6.1: Data Received from Library Professionals
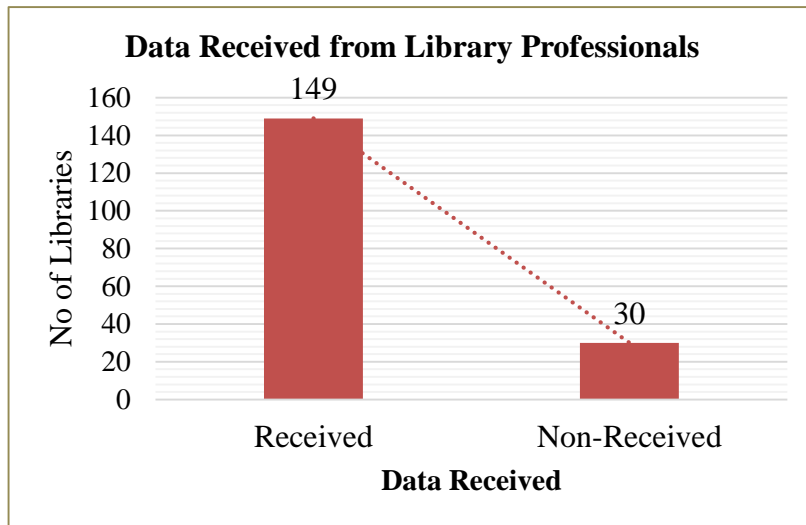
In this research study, the researcher has circulated a total 179 questionnaires to the library professionals of colleges in Nashik District and affiliated to Savitribai Phule Pune University, Pune.

The above table and graph show that 149 (83%) respondents replied to the questionnaire and the remaining 30 (17%) respondents did not reply and returned the questionnaire to the researcher.

6.4.1 Information about College/Institution

Table No. 6.2: Information about College/Institution (Summary Table)

S/N		Total	Urban	Rural	Phone	No Phone	Fax	No Fax	Email	No Email	Web site	No web site
1	Nashik	65	54	11	61	4	31	34	57	8	51	14
2	Sinnar	10	0	10	9	1	4	6	9	1	6	4
3	Tryambakeshwar	8	0	8	8	0	3	5	8	0	6	2
4	Malegaon	13	9	4	12	1	8	5	13	0	11	2
5	Niphad	12	0	12	10	2	4	8	12	0	12	0
6	Kalwan	6	0	6	6	0	4	2	5	1	2	4
7	Chandwad	4	0	4	4	0	1	3	2	2	1	3
8	Yeola	7	0	7	7	0	4	3	7	0	3	4
9	Igatpuri	3	0	3	2	1	1	2	3	0	2	1
10	Dindori	6	1	5	6	0	2	4	6	0	4	2
11	Peth	2	0	2	2	0	1	1	1	1	0	2
12	Nandgaon	4	0	4	4	0	3	1	3	1	2	2
13	Deola	2	0	2	2	0	1	1	2	0	1	1
14	Baglan	5	0	5	5	0	4	1	5	0	3	2
15	Surgana	2	0	2	2	0	1	1	1	1	0	2
	Total	149	64	85	140	9	72	77	134	15	104	45
			149		149		149		149		149	

Table No. 6.3: College Location

College Location	No. of Colleges	%
Urban	64	**43**
Rural	85	**57**
Total	149	**100**

Graph. No. 6.2: College Location
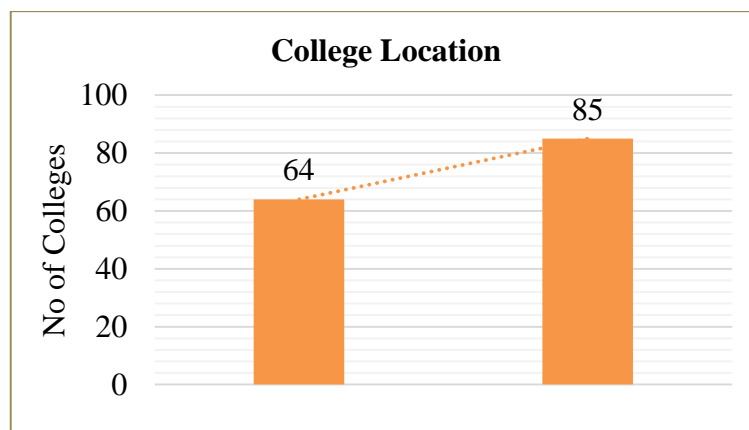
The above table and graph show that 85 (57%) colleges are located at rural place whereas 64 (43%) colleges are located in an urban place.

Table No. 6.4: Communication Details of the Colleges

Phone Connection	No. of Colleges	%
Yes	140	**94**
No	09	**06**
Total	**149**	**100**

Graph. No. 6.3: Communication Details of the Colleges
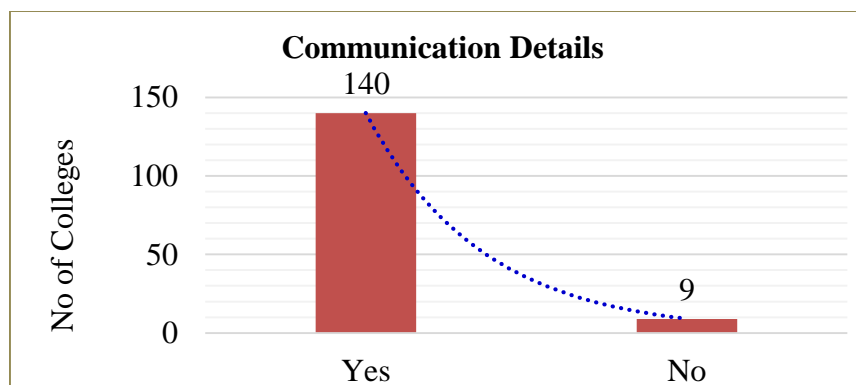
The above table and graph show that telephone facility available in the colleges. Out of 149 colleges, 140 (94%) library professionals have stated that telephone facility is available in the college, whereas 09 (06%) library professionals have stated that telephone facility is not available in the college.

Table No. 6.5: Fax Facilities in the College

Fax available in the college	No. of Colleges	%
Yes	72	48
No	77	52
Total	**149**	**100**

Graph. No. 6.4: Fax Facilities in the College
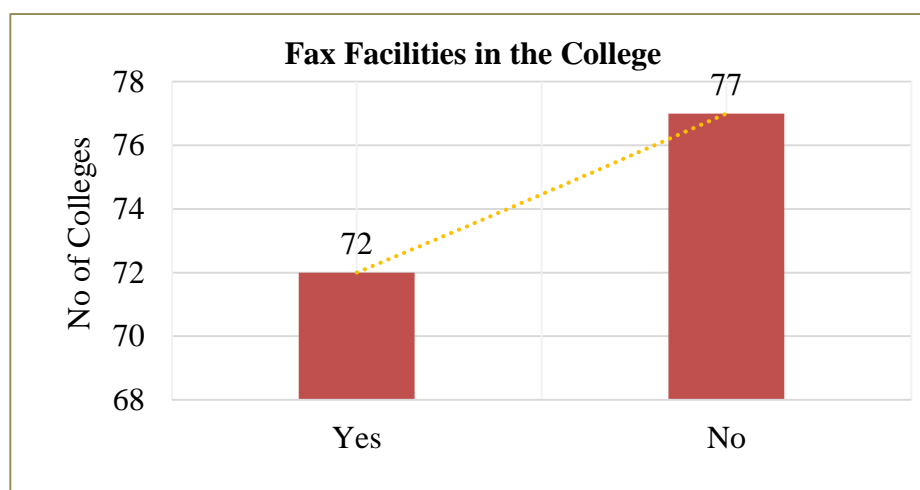
Above table and graph show that majority of 77 (52%) library professionals have stated that the fax facility is not available in the colleges while 72 (48%) library professionals stated that the fax facility is available in the college.

Fax is currently not an effective source of communication and it is mostly outdated in service for transferring documents due to the invention of ICT, Internet, e-mail, WhatsApp, Facebook etc.

Table No. 6.6: College E-mail Account

College E-mail Account	No. of Colleges	%
Yes	134	90
No	15	10
Total	149	100

Graph. No. 6.5: College E-mail Account
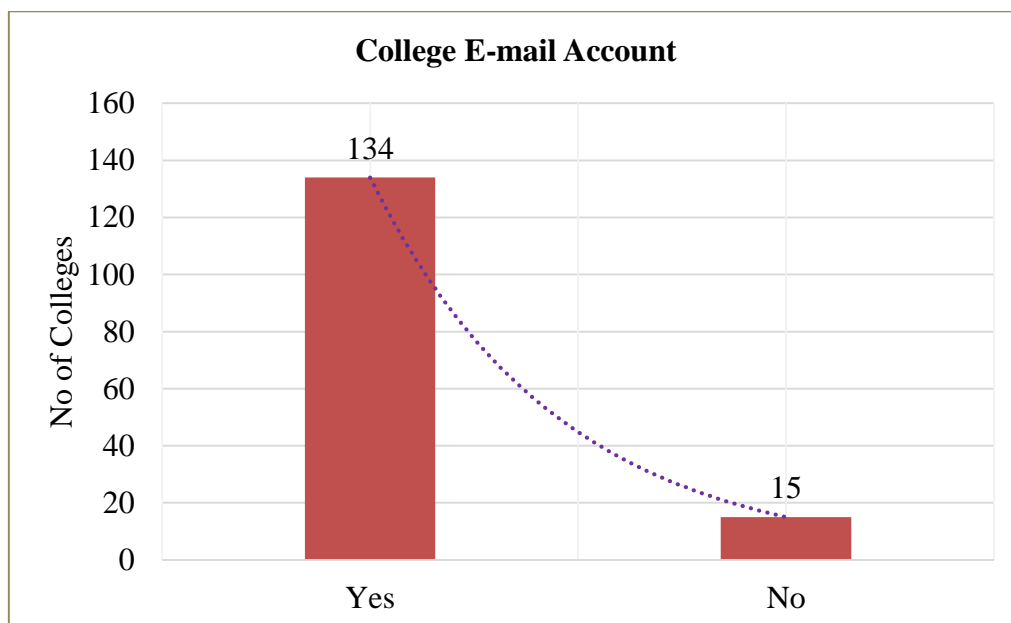
The above table and graph show the number of e-mail accounts is available for the colleges. 134 (90%) colleges have email accounts, whereas 15 (10%) colleges did not have their e-mail accounts.

An e-mail account is necessary for every college due to university, UGC, central government, state government and other institutions are sending required information by e-mail.

Table No. 6.7: College Website

College Website	No. of Colleges	%
Yes	104	**70**
No	45	**30**
Total	**149**	**100**

Graph. No. 6.6: College Website
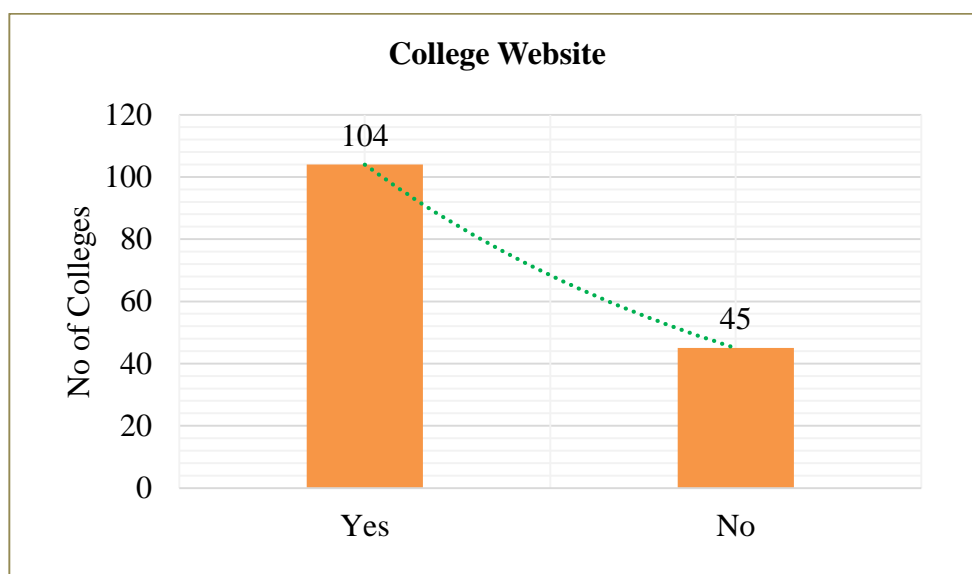
The above table and graph show that the colleges have created their own website. 104 (70%) library professionals have stated that the college website is available, whereas 45 (30%) library professionals have stated that the colleges do not have their websites. The website is a basic need of every college. NAAC (National Assessment and Accreditation Council) has received college self-study report (SSR) through uploaded on the college website. All colleges have uploaded their SSR on the website and informed NAAC about report.

Due to non-availability of Internet 45 (30%) colleges did not create their own website or library professionals not provide college website details when data was collected.

6.4.2 Information about Librarians

Table No. 6.8: Library Professionals Designation

Library Personnel	No of Libraries	%
Librarian/Asst. Librarian	141	95
Library In-charge	08	05
Total	**149**	**100**

Graph. No. 6.7: Library Professionals Designation
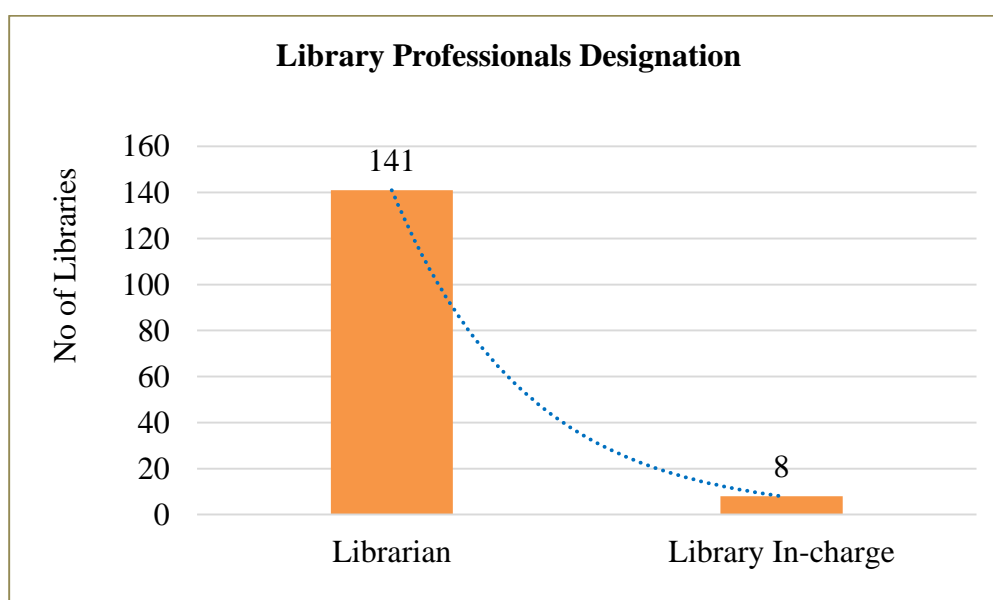
Out of 149 colleges, 141 (95%) colleges have appointed a Librarian or Asst. Librarian in the college library, whereas 08 (05%) colleges in Nashik District have not appointed a Librarian. The library operating system carried out by library-in-charge personnel where the Librarian is not appointed.

Table No. 6.9: Gender

Gender	No. of Librarians	%
Male	99	66
Female	50	34
Total	**149**	**100**

Graph. No. 6.8: Gender
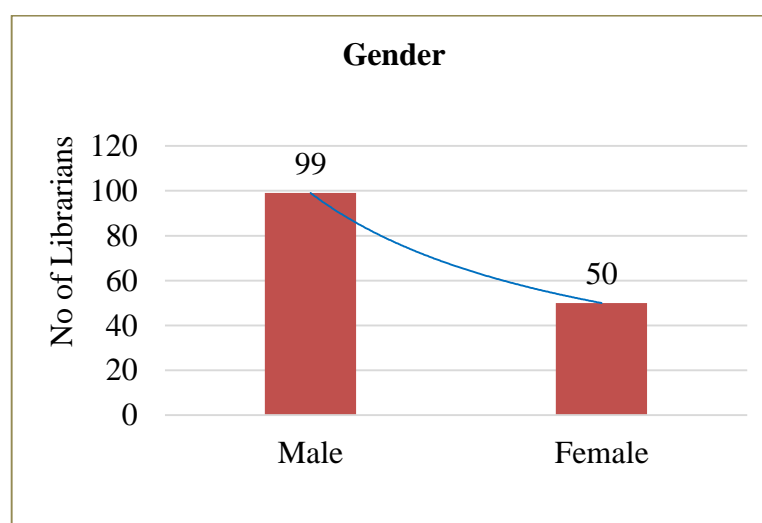
The above table and graph show that 99 (66%) male library professionals are working in college libraries in Nashik District as compared to the 50 (34%) female library professionals.

The census result of India in 2011 shows that 940 females per 1000 males and as per the census report in 2011 it was revealed that the population ratio of Maharashtra is 929 females per 1000 males (Director of Census Operations, Maharashtra, 2013). The earlier study by (Thanuskodi, 2011b) of ICT literacy among library professionals in Tamil Nadu shows that the engineering colleges have 63% males and 37% females, librarians. It is clear that the female ratio of library professionals in Nashik District is near about same as on Tamil Nadu state engineering college libraries.

Table No. 6.10: Age Group of Library Professionals

Age Group	No. of Librarians	%
Below 25	07	**05**
26–35	73	**49**
36–45	49	**33**
46–55	15	**10**
Above 55	05	**03**
Total	**149**	**100**

Graph. No. 6.9: Age Group
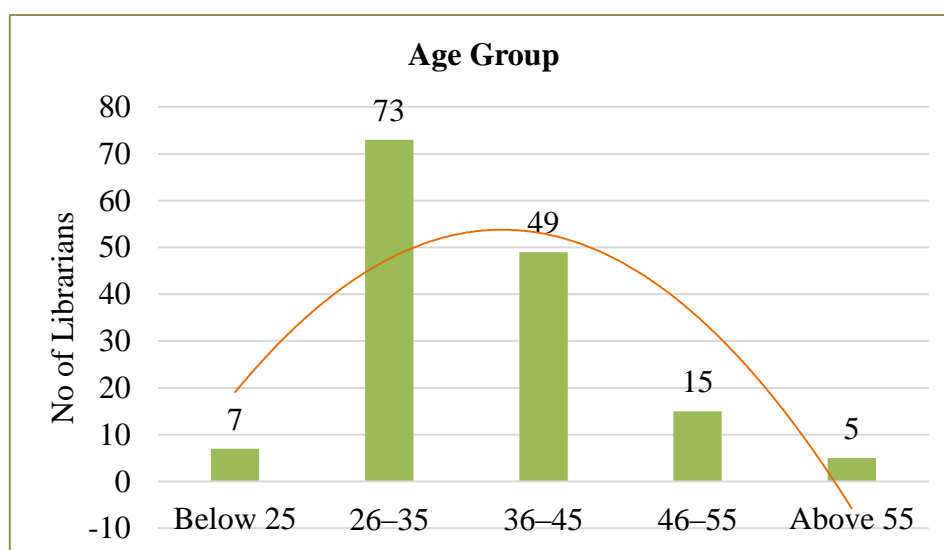
Out of 149 college library professionals in Nashik District 73 (49%), library professionals from Nashik District colleges are between 26-35 age group and they are experienced and technically qualified. 49 (33%) library professionals are of average age group i.e. 36-45 years. 15 (10%) library professionals are belonging to the 46-55 age group. 07 (05%) library professionals are above 55 years age group, remaining 05 (03%) library professionals are below 25 years age and they are young and newly recruited but dynamic personality having knowledge of ICT.

Table No. 6.11: Educational Qualification (Graduation) of Library Professionals

Graduation	No. of Librarians	%
B.A.	98	66
B.Com.	18	12
B.Sc.	29	19
B. Pharm.	01	01
B.Sc. (Agri.)	01	01
BCS	02	01
Total	149	100

Graph. No. 6.10: Educational Qualification (Graduation)
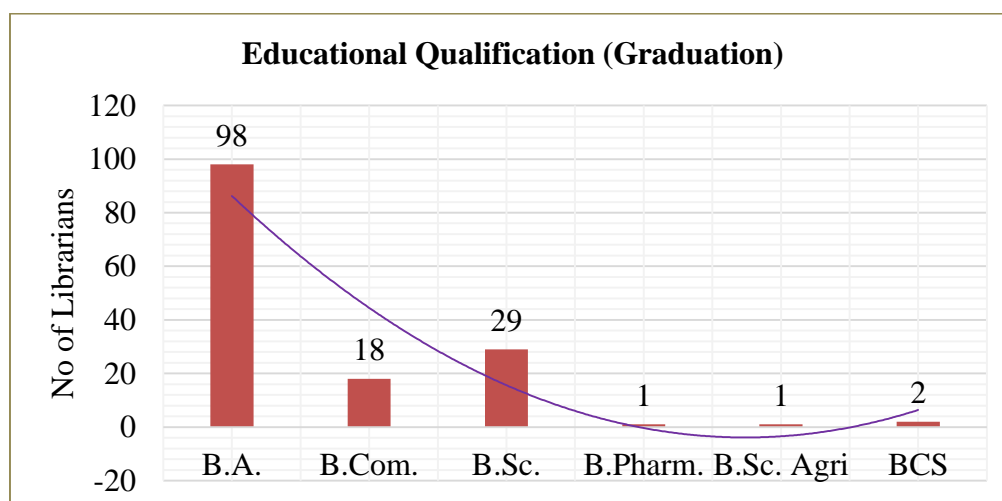
From the above table and graph, 98 (66%) library professionals have passed Bachelor of Arts (B.A.), followed by 29 (19%) library professionals have passed Bachelor of Science (B.Sc.) degree, 18 (12%) library professionals have passed Bachelor of Commerce, 02 (01%) library professionals have passed Bachelor Of Computer Science (BCS) and remaining 01 (01%) library professional has passed Bachelor of Pharmacy (B. Pharm.) and 01 (01%) has passed Bachelor of Science in Agriculture (B.Sc. Agri.). As per the above discussion, most of the library professionals are from the arts faculty. There is a single library professional having degree in B. Pharm. and B.Sc. Agriculture and two library professionals BCS graduates.

Table No. 6.12: Educational Qualification (Post-Graduation)

Post-Graduation	No. of Librarians	%
M.A.	61	83
M.Com.	11	15
M.Sc.	01	01
M.C.S.	01	01
Total	**74**	**100**

Graph. No. 6.11: Educational Qualification (Post-Graduation)
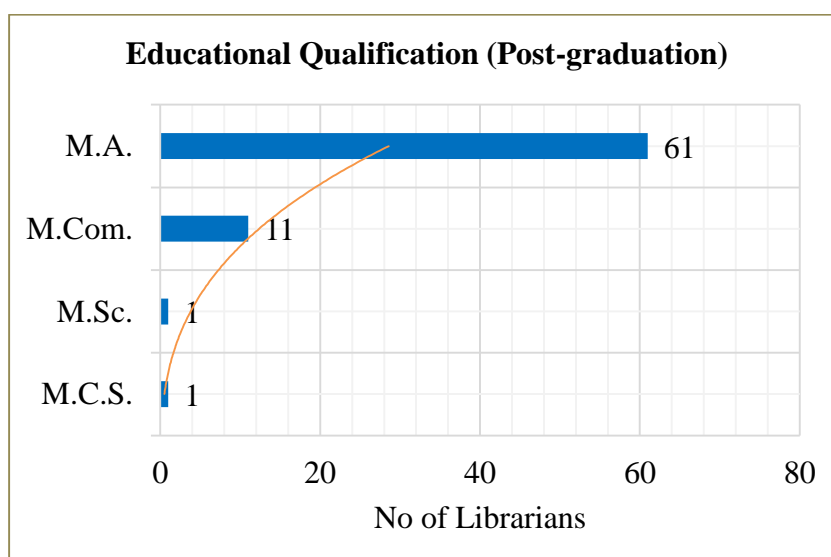
Above table and graph show that 61(83%) library professionals have passed Master of Arts (M.A.), whereas 11 (15%) library professionals have passed Master of Commerce (M.Com.). Remaining 01 (01%) library professional has passed Master of Science (M.Sc.) and 01 (01%) library professional has passed Master of Computer Science (MCS).

Table No. 6.13: Professional Qualification

Professional Qualification	No. of Librarians	%
B. Lib.	13	**09**
M. Lib.	124	**90**
ADIS	01	**01**
Total	**138**	**100**

Graph. No. 6.12: Professional Qualification
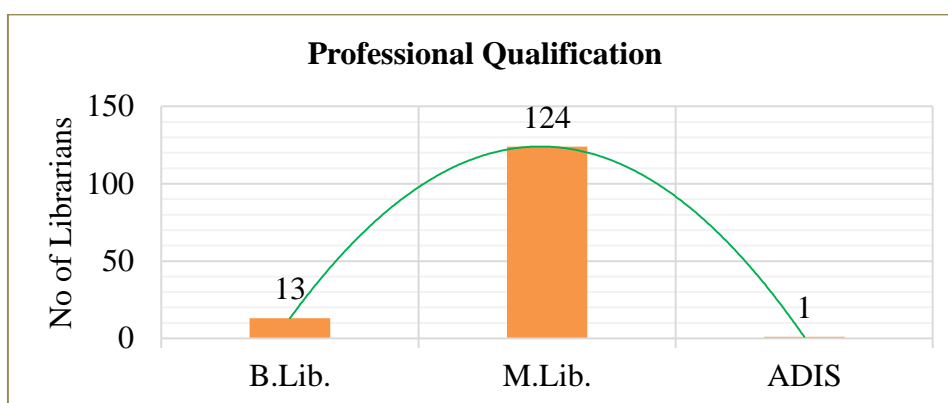
The above table and graph show that the library professionals have completed their professional degrees in library and information science field. Among 138 library professionals, 124 (90%) have passed Masters of Library and Information Science (M.Lib.I.Sc.), whereas 13 (09%) library professionals have passed only Bachelor of Library and Information Science (B.Lib.I.Sc.). remaining 01 (01%) library professional have passed ADIS (Associateship in Documentation and Information Science) degree and who is currently working as a librarian in Bhonsala Military College, Nashik.

It is also observed that the 13 library professionals who are passed B.Lib.I.Sc. Among them, 04 is working in granted colleges but their age group is above 55 years. 03 library professionals working in non-granted Arts, Commerce and Science Colleges and their age group are between 20 to 45 years. 04 library professionals working in non-granted B.Ed. Colleges and their age group are also 20 to 45 years. Remaining 02

library professionals working in technical colleges like Hotel Management and Pharmacy College and their age group is 36 to 55.

Table No. 6.14: Eligibility Test Qualified

Eligibility Tests	No. of Qualified Librarians	%
SET	25	17
NET	09	06
Both NET/SET	13	09
Non NET/SET	102	68
Total	**149**	**100**

Graph. No. 6.13: Eligibility Test Qualified
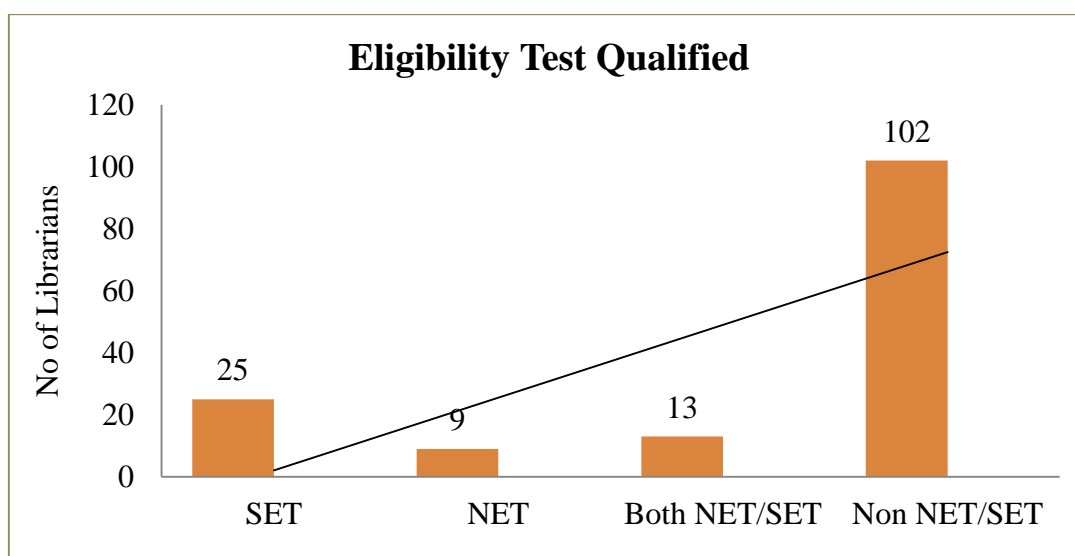
Above table and graph show that out of 149 library professionals 102 (68%) did not qualify any eligibility test, whereas 25 (17%) library professionals have qualified SET examination in library and information science subject. 13 (09%) library professionals have qualified both the NET and SET examinations, remaining very few i.e. 09 (06%) library professionals have qualified NET examination.

NET or SET qualifying is a compulsory degree for every college librarian working in any aided or non-aided college library as per the requirement of UGC and universities.

Table No. 6.15: Research Degree

Research Degree	No of Librarians	%
M.Phil.	20	14
Ph.D.	05	03
No Research Degree	124	83
Total	**149**	**100**

Graph. No. 6.14: Research Degree
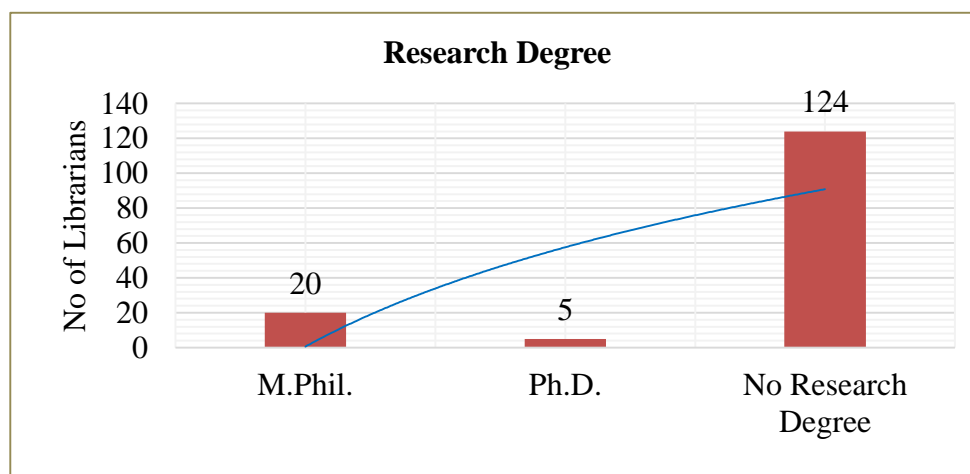
Above table and graph show that the awareness of research in library and information science in Nashik District is a very poor condition as in current status. Most of the library professionals i.e. 124 (83%) do not have any research degree in library and information science field. 20 (14%) library professionals have acquired M.Phil. degree in LIS field. Very few i.e. 05 (03%) library professionals have Ph.D. degree in library and information science and those are working in BYK College of Commerce, Nashik, JD Bytco Arts, Commerce And Science College Nashik Road, KKW

Engineering College, Nashik, MET Engineering College, Nashik and Sapkal College of Management Studies Trimbakeshwar Road, Anjaneri Dist. Nashik.

Table No. 6.16: Cell Phone Users

Cell Phone Used	No of Librarians	%
Yes	140	94
No	09	06
Total	**149**	**100**

Graph. No. 6.15: Cell Phone Users
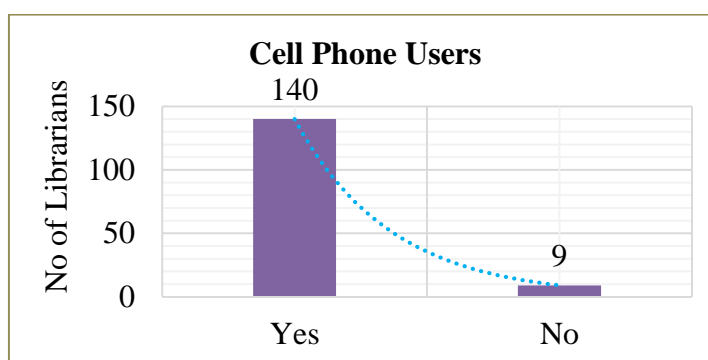
Out of 149 college libraries, 140 (94%) library professionals stated that they use mobile cell phones, while 09 (06%) library professionals do not use mobile cell phones. In this ICT era, every person has a mobile cell phone. Librarians cannot be excluded from that, but some personal issues or not interested to share information, nine library professionals do not provide their cell phone details.

Table No. 6.17: E-mail Users

E-mail Users	No. of Librarians	%
Yes	119	80
No	30	20
Total	**149**	**100**

Graph. No. 6.16: E-mail Users

E-mail Users
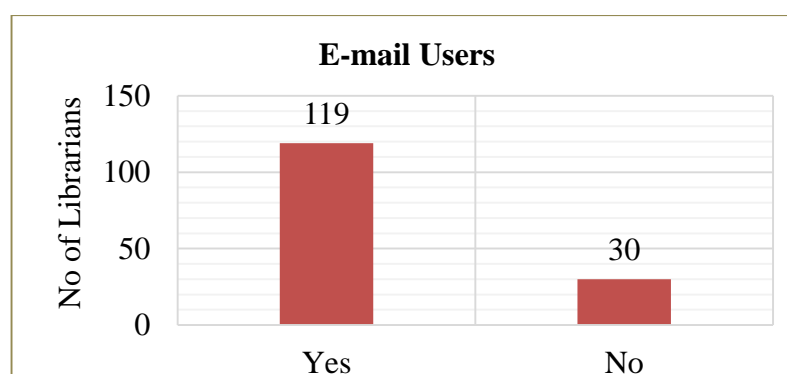
From the above table and graph, it is found that 119 (80%) library professionals have an e-mail account, whereas 30 (20%) library professionals do not use e-mail due to non-availability of ICT infrastructure or illiteracy of modern technology and no internet access. Out 119 library professionals, only 03 library professionals make their e-mail account on institution/library name and they are working at BYK College of Commerce, Nashik, Sir Visvesvaraya College of Engineering, Chincholi and NBT Law College, Nashik.

Table No. 6.18: Internet Access on Mobile Cell Phone

Internet Access on Mobile Cell Phone	No. of Librarians	%
Yes	121	81
No	28	19
Total	**149**	**100**

Graph. No. 6.17: Internet Access on Mobile Cell Phone

Internet Access on Mobile Cell Phone
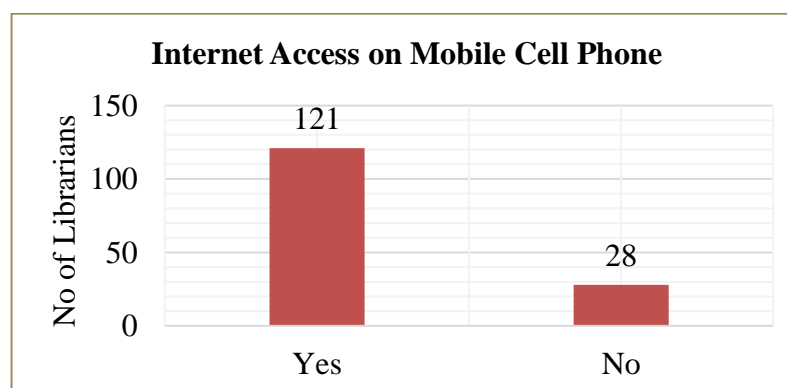
Out of 149 college libraries, 121 (81%) library professionals use internet on a mobile cell phone, while 28 (19%) library professionals do not use internet on a mobile cell phone due to the slow speed of internet and network problems in the rural areas.

Table No. 6.19: Mobile Internet Access for Various Purposes (Summary Table)

College	Email	%	Browsing	%	WhatsApp	%	E-Resources	%	Twitter	%	Facebook	%
ACSC	49	50	34	48	46	48	34	51	06	27	37	48
EPE	11	11	07	10	16	17	08	12	01	05	11	14
Engg.	16	16	12	17	13	13	10	15	01	05	10	13
Arch	00	00	01	01	01	01	00	00	01	05	00	00
Law	04	04	03	04	03	03	02	03	00	00	03	04
Mngt.	10	10	07	10	08	08	07	10	07	31	07	09
Pharm.	09	09	06	09	09	09	06	09	06	27	08	11
FA	00	00	01	01	01	01	00	00	00	00	01	01
Total	99	100	71	100	97	100	67	100	22	100	77	100

Observation:

Above study is undertaken to realize the use of the internet is used by library professionals on a mobile cell phone for the following services and purposes;

E-Mail:

There are about 49 (50%) library professionals of Arts, Commerce, Science and Computer Science colleges use e-mail on mobile internet followed by 16 (16%) Engineering College library professionals using e-mail on mobile internet, 11 (11%) library professionals of Education and Physical Education Colleges use e-mail on mobile internet. 10 (10%) library professionals of Management Institutes use e-mail on mobile internet, 09 (09%) library professionals of Pharmacy Colleges use e-mails on mobile internet, remaining 04 (04%) library professional of Law Colleges use e-mail on mobile internet.

Browsing:

When, the study was undertaken to realize the browsing of general information of mobile internet by the library professionals, it is found that 34 (48%) library professionals of Arts, Commerce, Science and Computer Science Colleges browse general information of mobile internet, followed by 12 (17%) library professionals of Engineering Colleges browse general information of mobile internet, 07 (10%) library professionals of Education and Physical Education, Management Institutes browse general information on mobile internet, 06 (09%) library professionals of Pharmacy Colleges browse general information on mobile internet, 03 (04%) library professionals of Law Colleges browse general information on mobile internet, remaining 01 (01%) library professional of Architecture and Fine Arts College browse general information on mobile internet.

WhatsApp:

It is found that 46 (48%) library professionals of Arts, Commerce, Science and Computer Science Colleges use mobile internet for WhatsApp facility, 16 (17%) library professionals of Education and Physical Education Colleges use mobile internet for WhatsApp, 13 (13%) library professionals of Engineering Colleges use mobile internet for WhatsApp, 09 (09%) library professionals of Pharmacy Colleges use mobile internet for WhatsApp, 08 (08%) library professionals of Management Colleges use mobile internet for WhatsApp, 03 (03%) library professionals of Law Colleges use mobile internet for WhatsApp, remaining 01 (01%) library professional of Fine Arts Collegesuse mobile internet for WhatsApp facility.

E-resources:

It is found that 34 (51%) library professionals of Arts, Commerce, Science and Computer Science Colleges use mobile internet for accessing e-resources, 10 (15%) library professionals of Engineering Colleges use mobile internet for accessing e-resources, 08 (12%) library professionals of Education and Physical Education Colleges use mobile internet for accessing e-resources, 07 (10%) library professionals of Management Colleges have used mobile internet for accessing e-resources, 06

(09%) library professionals of Pharmacy Colleges use mobile internet for accessing e-resources, remaining 02 (03%) library professionals of Law Colleges use internet on mobile for accessing e-resources.

Twitter:

There are about 07 (31%) library professionals of Management Colleges use mobile internet for using Twitter, 06 (27%) library professionals of Arts, Commerce, Science and Computer Science and Pharmacy Colleges use mobile internet for Twitter, 01 (5%) library professionals of Education and Physical Education, Engineering and Architecture colleges use mobile internet for Twitter.

Facebook:

There are about 37 (48%) library professionals of Arts, Commerce, Science and Computer Science Colleges use mobile internet for Facebook, 11 (14%) library professionals of Education and Physical Education Colleges use mobile internet for Facebook, 10 (13%) library professionals of Engineering Colleges use mobile internet for Facebook, 08 (11%) library professionals of Pharmacy Colleges use mobile internet for Facebook, 07 (09%) library professionals of Management Colleges has used mobile internet for Facebook, 03 (04%) library professionals of Law Colleges used mobile internet for Facebook, remaining 01 (01%) library professional of Fine Arts College use mobile internet for Facebook.

6.4.3 Information about Libraries

Table No. 6.20: Annual Budget of College Libraries (in Rs.)

Library Annual Budget (Rs.)	No of Libraries	%
Below 50,000	27	18
50,000 to 1,00,000	24	16
1,00,001 to 2,00,000	30	20
2,00,001 to 3,00,000	15	10
3,00,001 to 4,00,000	05	03
4,00,001 to 5,00,000	17	12
Above 5,00,000	31	21
Total	**149**	**100**

Graph. No. 6.18: Annual Budget of College Libraries (in Rs.)
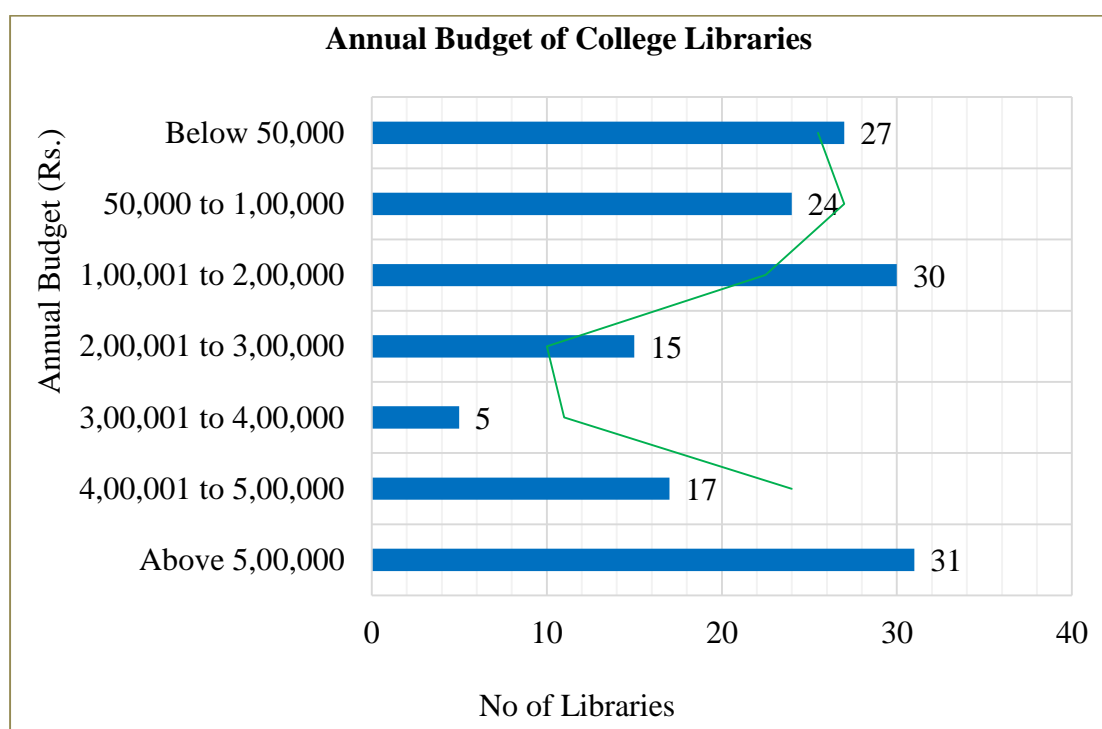
Above table and graph represent annual budget of college libraries for the purchase of books, other reading materials and provide library services.

Above table and graph shows that 31 (21%) college libraries have highest annual budget i.e. above 5 lakh, followed by 17 (12%) college libraries have 4 lakh to 5 lakh annual budget, 05 (03%) college libraries have 3 to 4 lakh annual budget. 15 (10%) college libraries have 2 to 3 lakh annual budget, 30 (20%) college libraries have 1 to 2 lakh annual budget, 24 (16%) college libraries have 50 thousand to 1 lakh annual budget, remaining 27 (18%) college libraries have below 50 thousand annual budget.

Table No. 6.21: Supplementary Budget for ICT Infrastructure

Budget for ICT Infrastructure	No of Libraries	%
Yes	25	17
No	124	83
Total	**149**	**100**

Graph. No. 6.19: Supplementary Budget for ICT Infrastructure
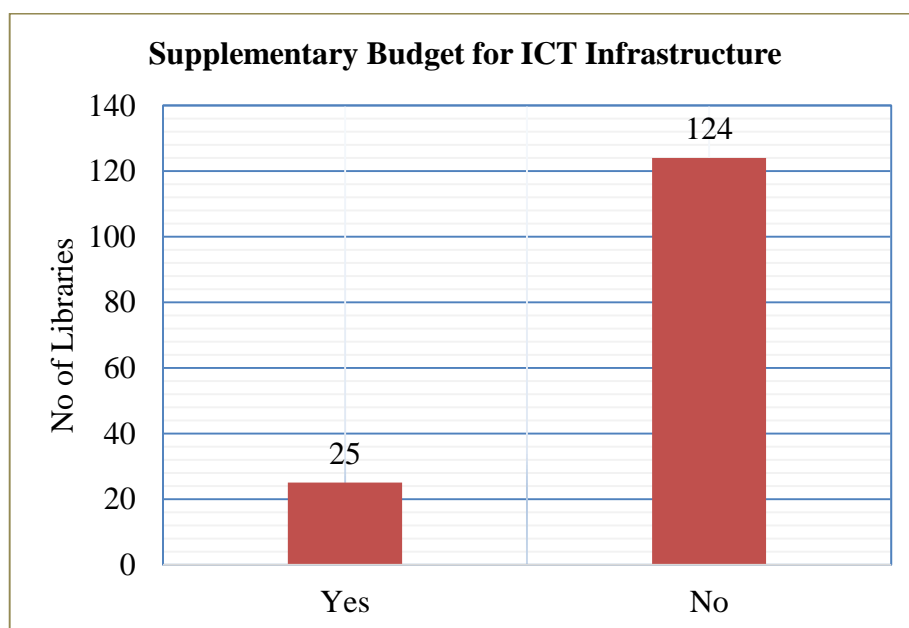
Apart from library annual budget, very few libraries i.e. 25 (17%) have the supplementary annual budget for implementing ICT infrastructure in college libraries, remaining 124 (83%) libraries do not have the provision of ICT infrastructure budget independently.

Table No. 6.22: Amount Spent on ICT Infrastructure (in Rs.)

Amount Rupees (Rs.)	No of Libraries	%
Below 1,00,000	13	52
1,00,001 to 2,00,000	01	04
2,00,001 to 3,00,000	02	08
3,00,001 to 4,00,000	02	08
4,00,001 to 5,00,000	02	08
Above 5,00,000	05	20
Total	**25**	**100**

Graph. 6.20: Amount Spent on ICT Infrastructure (in Rs.)
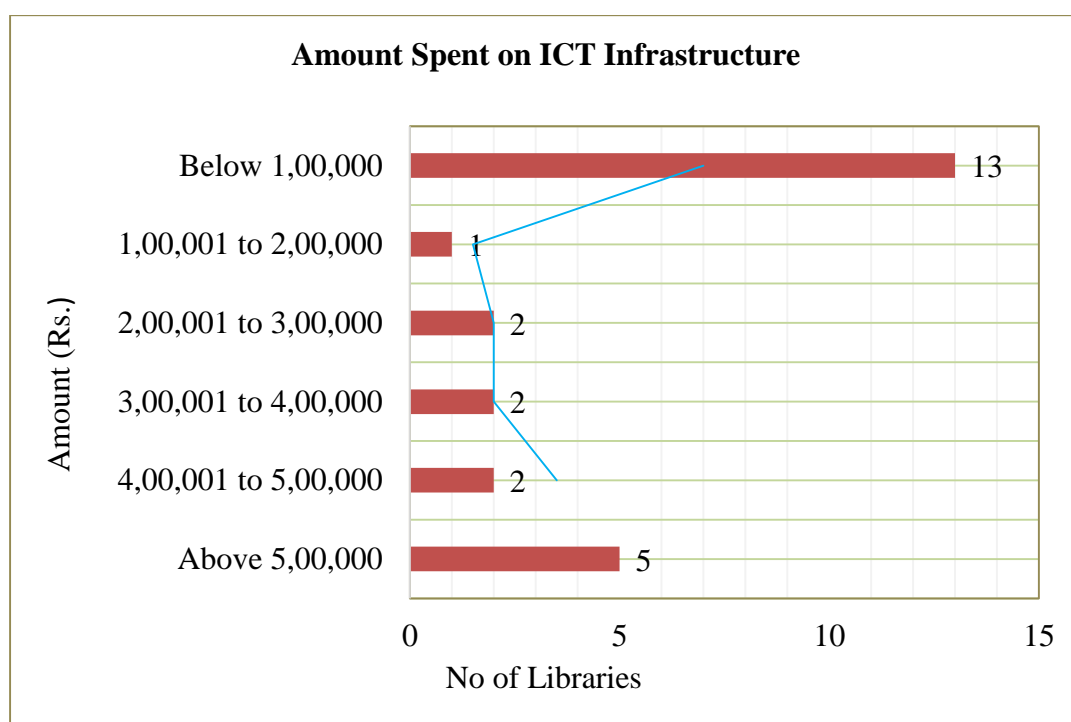
From the observation of above table and graph, it is found that 05 (20%) college libraries spent above 5 lakh amount on ICT infrastructure followed by 02 (08%) college libraries spent 2 lakh to 5 lakh amount annually on ICT infrastructure. Only

01 (04%) college library spent 1 to 2 lakh amount on ICT infrastructure remaining 13 (52%) college libraries spent 1 lakh or below amount on ICT infrastructure.

Table No. 6.23: Library Website or Library Link on College Website

Library Website Or Library Link	No of Libraries	%
Yes	65	44
No	84	56
Total	149	100

Graph. No. 6.21: Library Website or Library Link on College Website
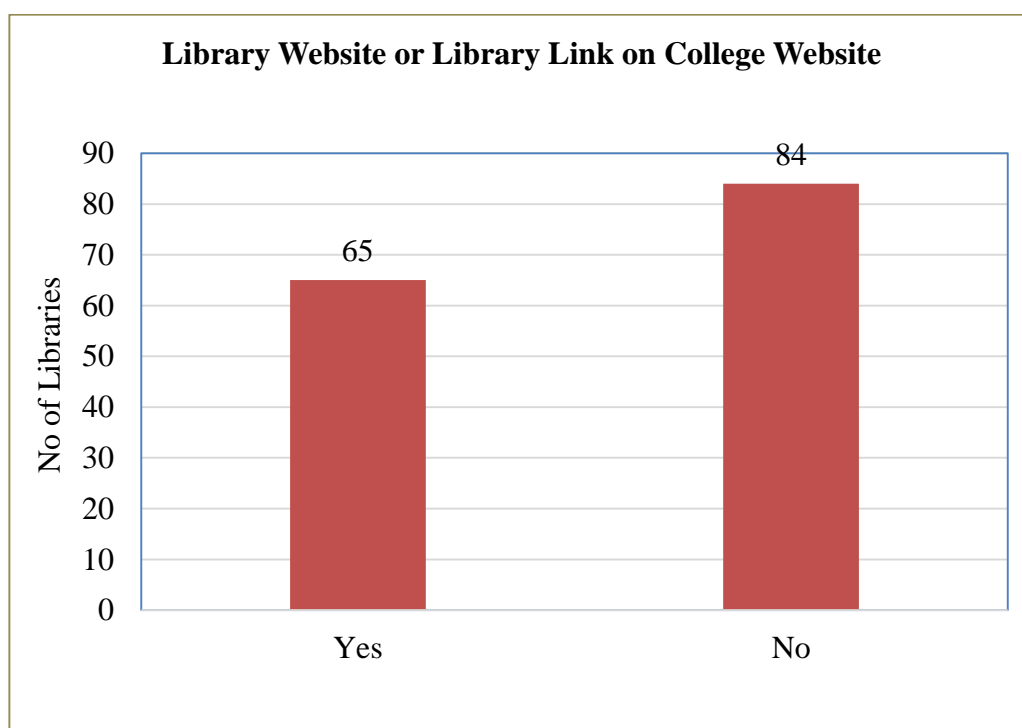
Above table and graph shows that 65 (44%) library professionals have responded that their libraries have developed own website or library link of college website, remaining 84 (56%) library professionals have responded that their libraries do not have own website or library link on the college website.

Table No. 6.24: Information Available on Website about the Library

Information Available on Website	No of Libraries	%
General Information	56	**38**
Library Facilities & Services	57	**38**
Rules & Regulation	42	**28**
Link to Online Resource	20	**13**

Graph. No. 6.22: Information Available on Website about the Library
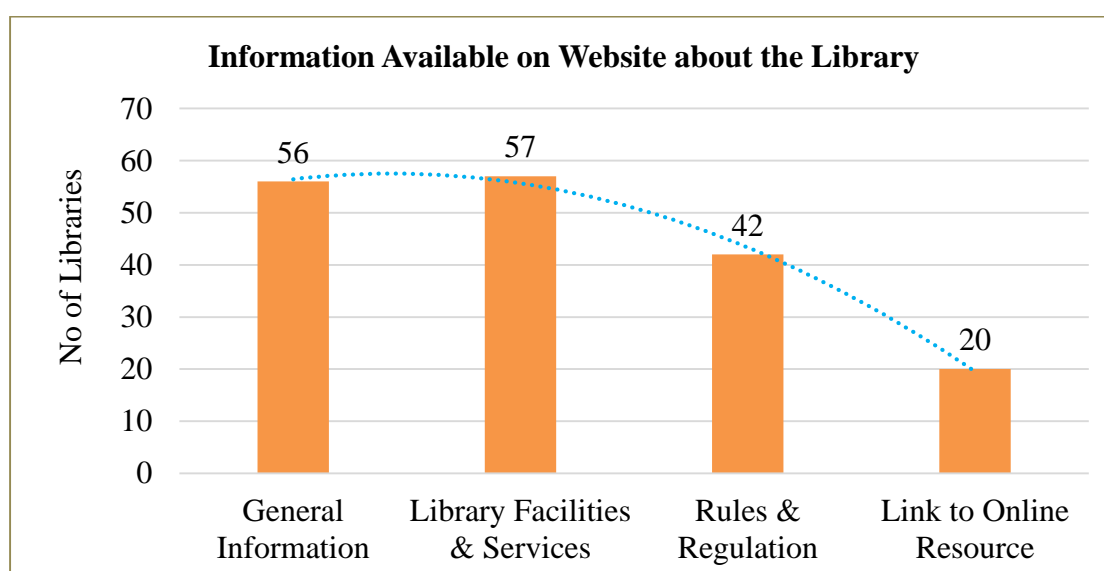
It can be stated after the observation of above table and graph that 57 (38%) library professionals have responded that the information is available on website particularly about library facilities and services followed by 56 (38%) library professionals have responded that the library general information has been kept on the website. 42 (28%) library professionals have responded that the library rules and regulations etc. details are available on the website, remaining 20 (13%) library professionals have responded that the online resource link details are available on the website. This is a very good opportunity of sharing information and online resources among college libraries.

Table No. 6.25: ICT Literacy among Library Staff

Designation	No of Library Staff	ICT Literacy	%
Librarian	135	135	**100**
Asst. Librarian	37	37	**100**
Library Assistant	25	24	**96**
Library Clerk	48	45	**94**
Library Attendant	160	88	**55**
Peon	82	50	**61**
Any others (Professor In-charge, Jr. Clerk)	07	07	**100**

Graph. No. 6.23: ICT Literacy among Library Staff
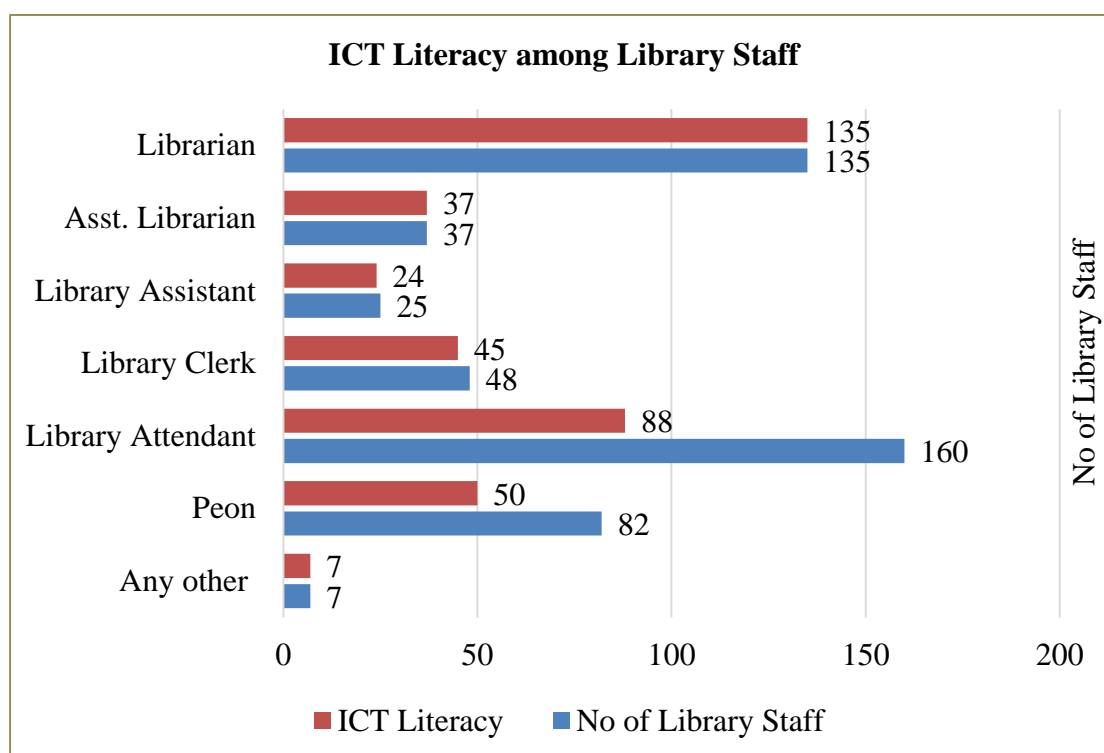
Above table and graph show that all the 135 (100%) Librarians and 37 (100%) assistant librarians are fully literate about ICT tools used in libraries, 24 (96%) Library Assistants are literate about ICT used in libraries, 45 (94%) library clerks are literate about ICT used in libraries. 88 (55%) Library Attendants are ICT literate, 50

(61%) peon are ICT literate and they use ICT tools in libraries, remaining out of 07 (100%) professor-in-charge and junior clerk are ICT literate.

Table No. 6.26: E-databases Subscribed in College Libraries

E-Database	No of Libraries	%
N-LIST	42	**32**
EBSCO HOST	08	**06**
Emerald	02	**01**
INDEST	06	**04**
DELNET	15	**11**
IEEE	13	**10**
J-Gate	17	**13**
Web of Science	01	**01**
Any Others (Like: ASCE, ASME, Science Direct, Bentham Sci., Manupatra, Springer's and Pro-Quest)	29	**22**
Total	**133**	**100**

Graph. No. 6.24: E-databases Subscribed in College Libraries
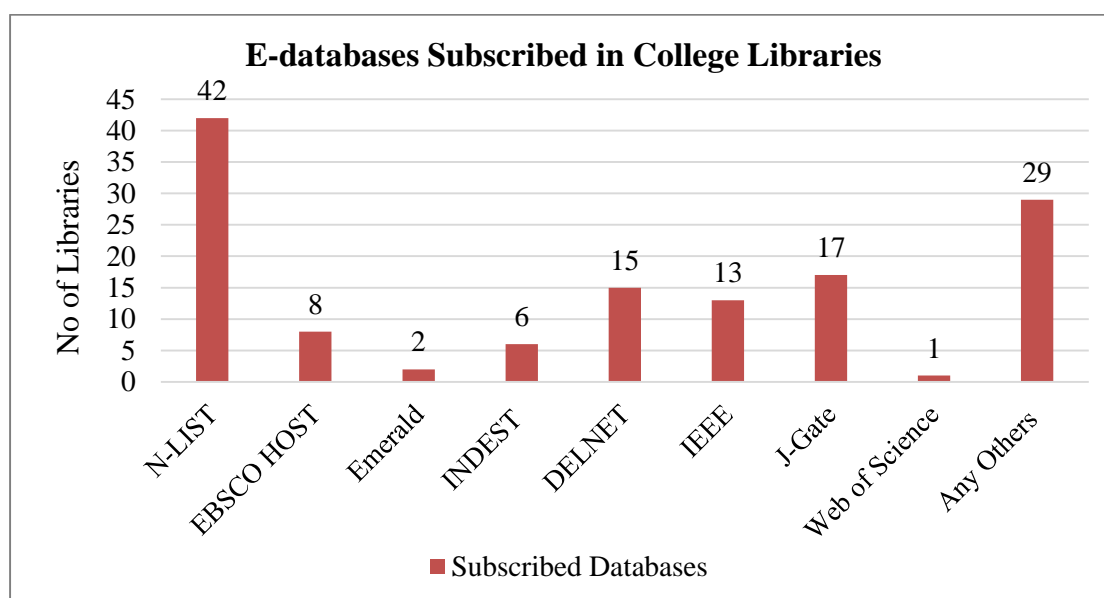
It is observed that the electronic information resources are more effective and favourable among college library users. Above table and graph indicates that 42 (32%) libraries have subscribed N-LIST database followed by 17 (13%) libraries have

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subscribed J-Gate database. 15 (11%) libraries have subscribed DELNET, 13 (10%) libraries have subscribed IEEE database for accessing e-resources, 08 (06%) libraries have subscribed EBSCO Host database, 06 (05%) libraries have subscribed INDEST database. 02 (02%) libraries have subscribed Emerald database, 01 (01%) library has subscribed Web of Science database and remaining 29 (22%) libraries have subscribed e-databases like; ASCE, ASME, Science Direct, Bentham Science, Manupatra, Springer's and Pro-Quest databases for accessing e-resources.

6.4.4   Library Automation

Table No. 6.27: Library Operating System

Library Automation	No of Libraries	%
Yes	102	68
No	47	32
Total	149	**100**

Graph. No. 6.25: Library Operating System
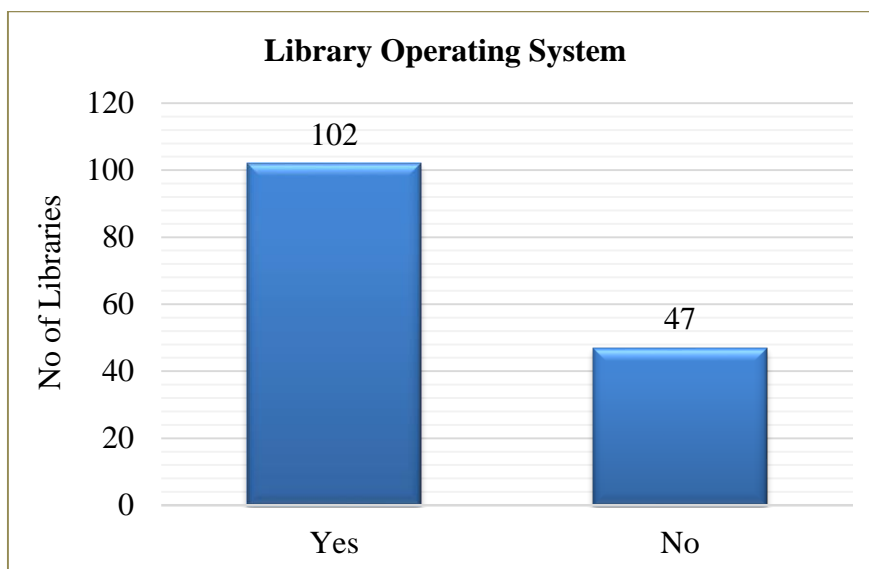
From the responses of library professionals, it is observed that 102 (68%) of library working process is automated, whereas 47 (32%) library professionals have stated that

the library working process is not automated, it means the library working process is done manually.

Table No. 6.28: Status of Library Automation

Automation Status	No of Libraries	%
Fully automated	19	13
Partially automated	63	42
Beginning stage	20	13
Not started	01	01
No Response	46	31
Total	**149**	**100**

Graph. No. 6.26: Status of Library Automation
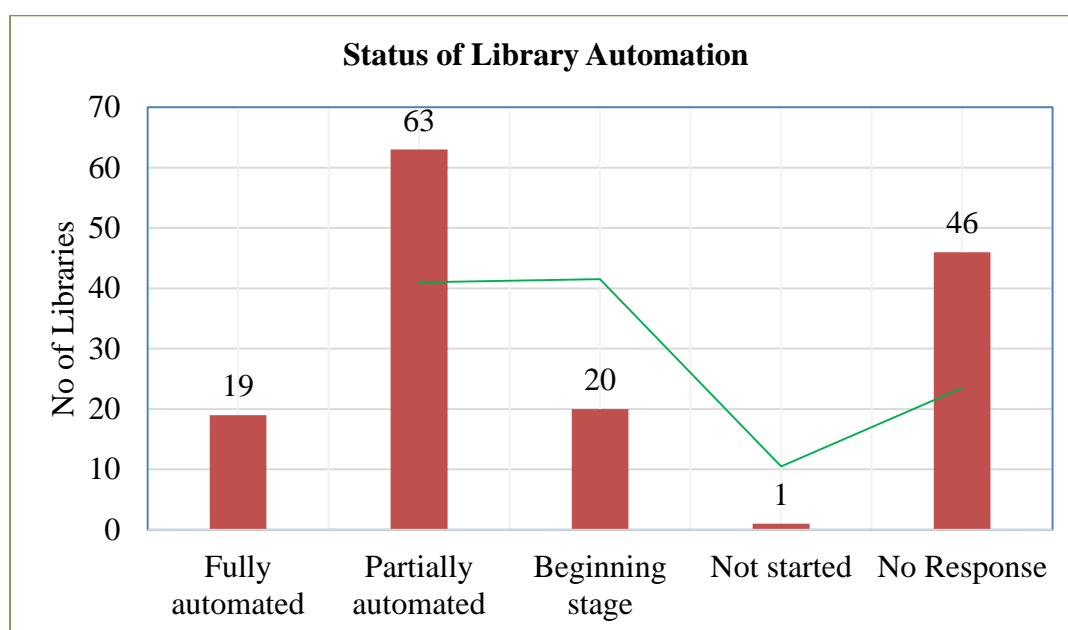
Above data was collected for the present study to know the automation status of college libraries. Above table and graph show that the maximum number of 63 (42%) libraries are partially automated, whereas 20 (13%) libraries are having automation status at the beginning stage and 19 (13%) are fully automated. 01 (01%) library

automation is yet not been started, remaining 46 (31%) library professionals have not taken efforts for automation.

Table No. 6.29: Software Used for Library Automation

Library Software Used	No of Libraries	%
Yes	98	66
No	51	34
Total	**149**	**100**

Graph. No. 6.27: Software Used for Library Automation
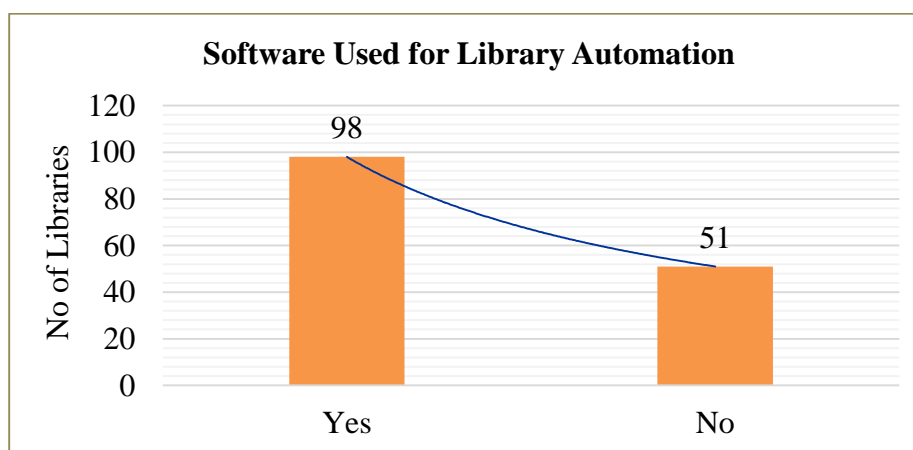
The above table and graph show that the software used for library automation in the college libraries. It is found that 98 (66%) libraries use automation software, whereas 51 (34%) libraries do not use library automation software due to illiteracy and economic issues.

Table No. 6.30: Types of Software Used for Library Automation

Library Software	No of Libraries	%
Commercial Software	92	**94**
Open Source Software	04	**04**
In-House Developed	02	**02**
Total	**98**	**100**

Graph. No. 6.28: Types of Software Used for Library Automation
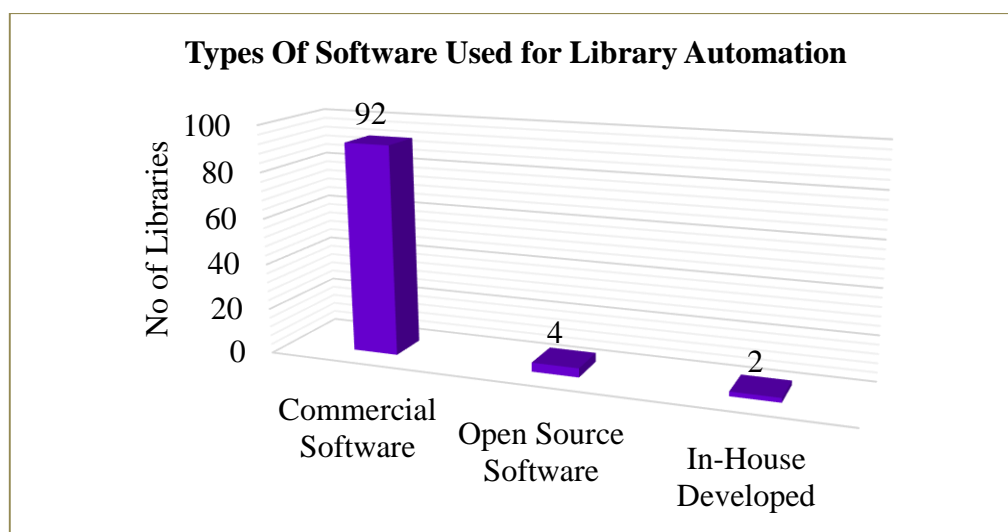
Above table and graph show types of library management software used in college libraries in Nashik District. Out of 98 libraries, 92 (94%) libraries use commercial software for library automation, followed by 04 (04%) libraries use open source software for library automation, remaining 02 (02%) libraries use in-house developed software for library automation.

Table No. 6.31: Types of Commercial Software Used for Library Automation

Library Software	No of Libraries	%
Vriddhi	25	27
Library Manager	24	26
iTSoft	18	20
Book Smith	10	11
SOUL	05	06
ERP	04	04
Libman	02	02
AutpLib	02	02
LibSuite	01	01
LIBSYS	01	01
Total	**92**	**100**

Graph. No. 6.29: Types of Commercial Softwares Used for Library Automation

Types of Commercial Softwares Used for Library Automation
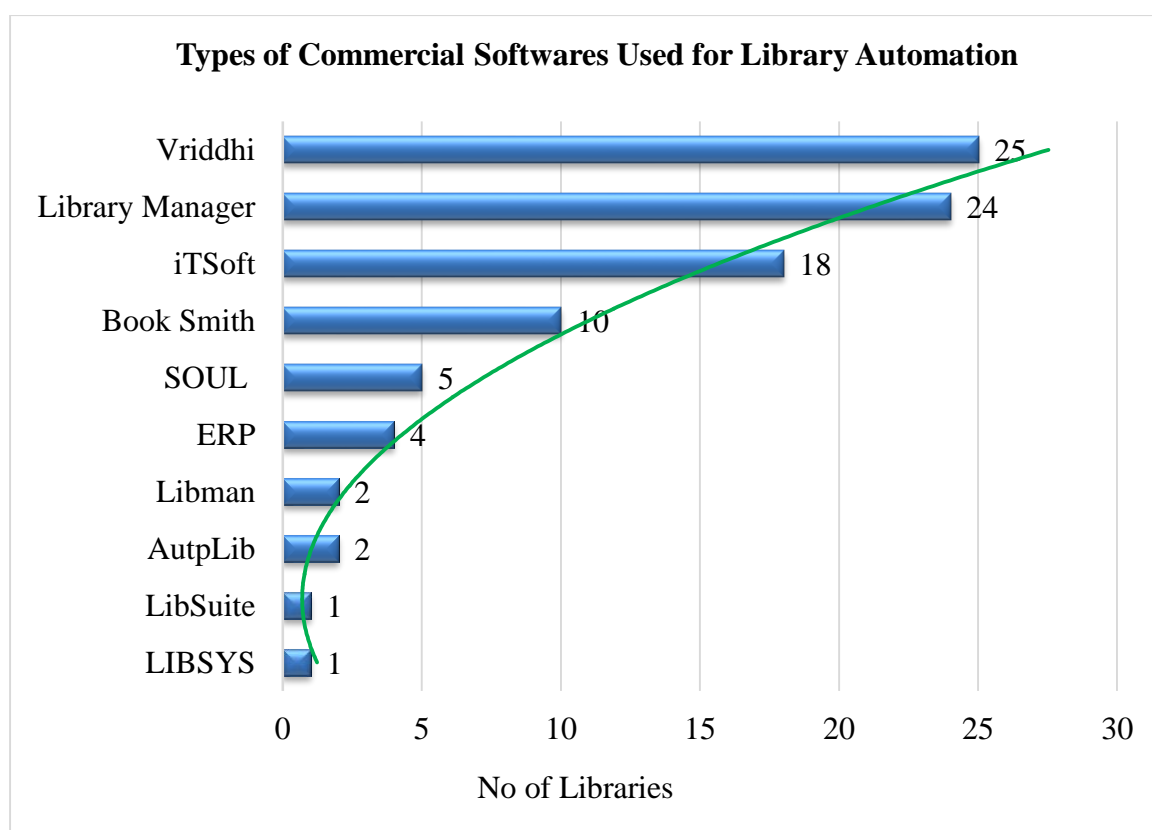
It is found that out of 92 libraries 25 (27%) libraries use 'Vriddhi' ("Vriddhi-College Management ERP Software system to Automate Campus," n.d.) software for library automation, followed by 24 (26%) libraries use 'Library Manager' software for library automation, 18 (20%) libraries use 'iTSoft' library automation software, 10 (11%) libraries use 'Book Smith' software for library automation. 05 (06%) libraries use 'SOUL' software for library automation, 04 (04%) libraries use 'ERP' software for library automation, 02 (02%) libraries use 'Libman' as well as 'AtoLib' software for library automation, remaining 01 (01%) library use 'LibSuite' and 01 (01%) library use 'LIBSYS' software for library automation.

Table No. 6.32: Library OPAC is on the Internet or on Intranet

OPAC or Web OPAC	No of Libraries	%
Yes	58	39
No	91	61
Total	**149**	**100**

Graph. No. 6.30: Library OPAC is on the Internet or on Intranet
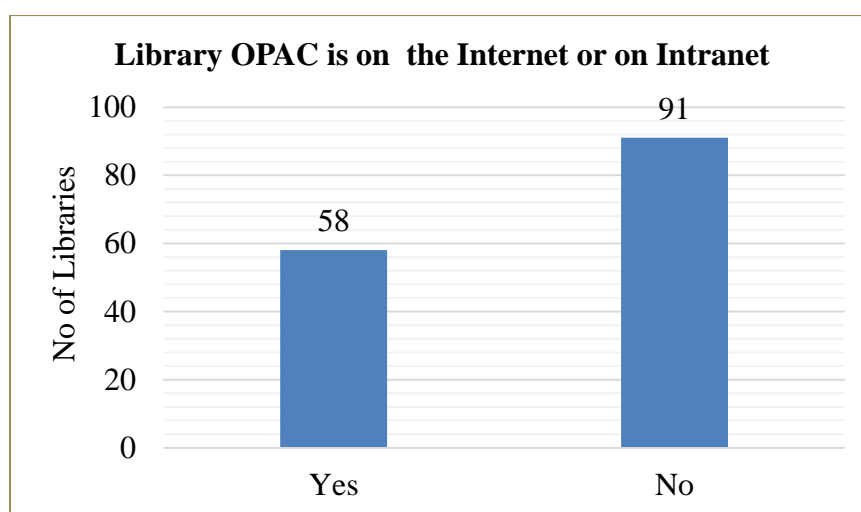
The OPAC is a main tool for searching the books available in any particular library or a group of libraries. Out of 149 libraries, 58 (39%) libraries have OPAC facilities on the Internet or intranet, whereas 91 (61%) libraries do not have OPAC facility on the Internet or on the Intranet.

Table No. 6.33: Barcode Technology Used in Library

Used Barcode Technology	No of Libraries	%
Yes	62	42
No	87	58
Total	**149**	**100**

Above table shows that 62 (42%) libraries have implemented barcode technology in the library, whereas 87 (58%) libraries do not have barcode technology.

Table No. 6.34: Barcode Technology Used in Library for Various Purposes

Used Barcode Technology	No of Libraries	%
Circulation of Library Books	60	54
Stock Verification	49	44
Any other (Location of Library Books, Attendance of Library Visitors)	02	02
Total	**111**	**100**

Graph. No. 6.31: Barcode Technology Used in Library for Various Purposes

Barcode Technology Used in Library for Various Purposes
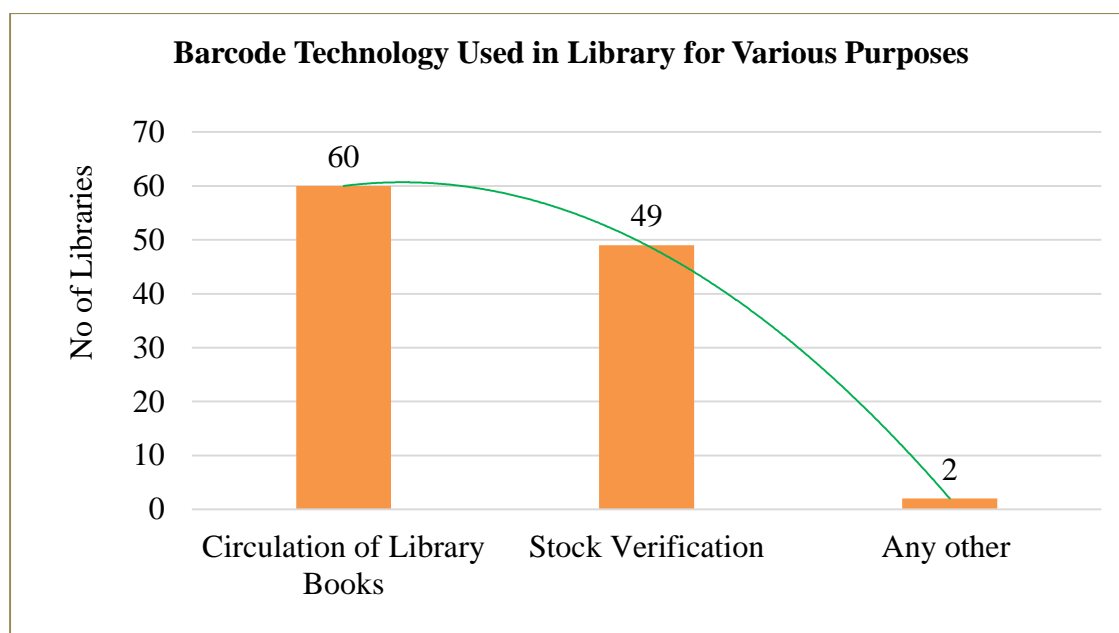
Above table and graph indicate that the barcode technology is used in libraries for various working process and purposes. 60 (54%) professionals have stated that barcode technology is used in library for circulation of library books, followed by 49 (44%) library professionals have stated that the barcode technology is used in library for stock verification, remaining 02 (02%) library professionals have stated that the barcode technology is used in library to find location of library books and attendance of library visitors as well.

Table No. 6.35: Internet Used in Library for Various Operations/Services

Libraries Operations/Services	No of Libraries	%
Acquisition	90	60
Cataloguing	38	26
Classification	88	59
Bibliographic databases	24	16
SDI	34	23
CAS	52	35
Any other (Free database Search, Information Search)	02	01

Graph. No. 6.32: Internet Used in Library for Various Operations/Services
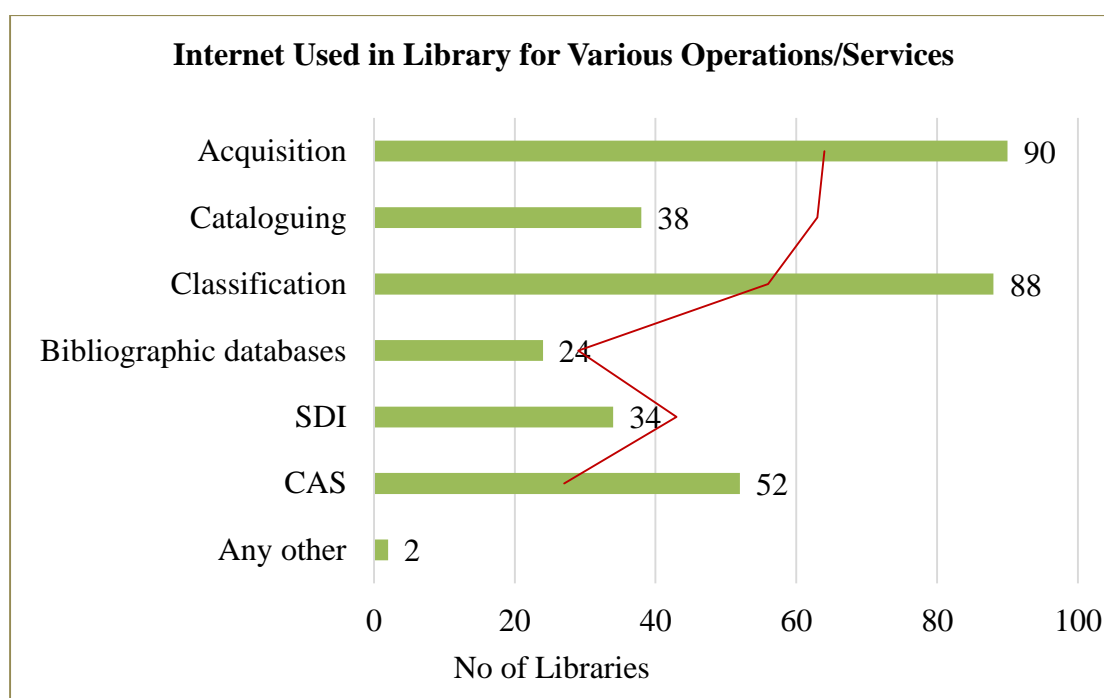
The above table and graph show that 90 (60%) library professionals use the Internet in the library for acquisition, while 88 (59%) library professionals use the Internet for classification of library books. 52 (35%) library professionals use internet in library for current awareness services (CAS), 38 (26%) library professionals use internet in library for cataloguing of library books, 34 (23%) library professionals use internet in library for SDI (Selective Dissemination of Information), 24 (16%) library professionals use internet in library for accessing bibliographical databases, remaining 02 (01%) library professionals use internet in library for using free databases and general information searching purpose.

6.4.5 Status of ICT Infrastructures

Table No. 6.36: Internet Connectivity in Library

Internet Connection in Library	No of Libraries	%
Yes	129	**87**
No	20	**13**
Total	**149**	**100**

Graph. No. 6.33: Internet Connectivity in Library
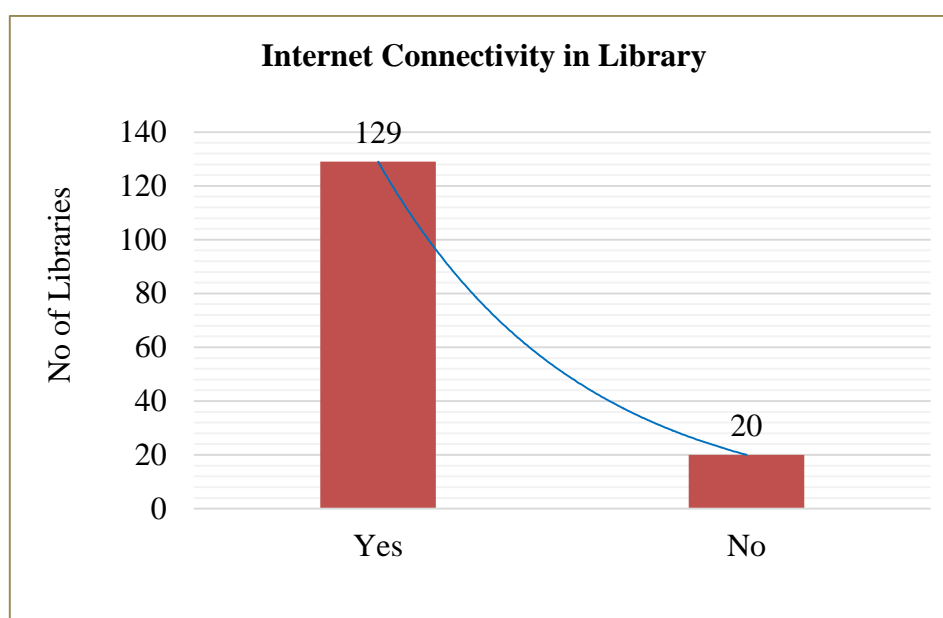
Out of 149 libraries, 129 (87%) libraries have internet connectivity whereas 20 (13%) libraries do not have the Internet connection.

Table No. 6.37: Speed of Internet Connection

Speed of Internet Bandwidth	No of Libraries	%
1 MBPS	01	01
2 MBPS	12	09
3 MBPS	01	01
4 MBPS	04	03
5 MBPS	02	02
10 MBPS	50	38
20 MBPS	04	03
24 MBPS	01	01
100 MBPS	51	39
200 MBPS	01	01
1 GBPS	01	01
2 GBPS	01	01
Total	**129**	**100**

Graph. No.6.34: Speed of Internet Connection
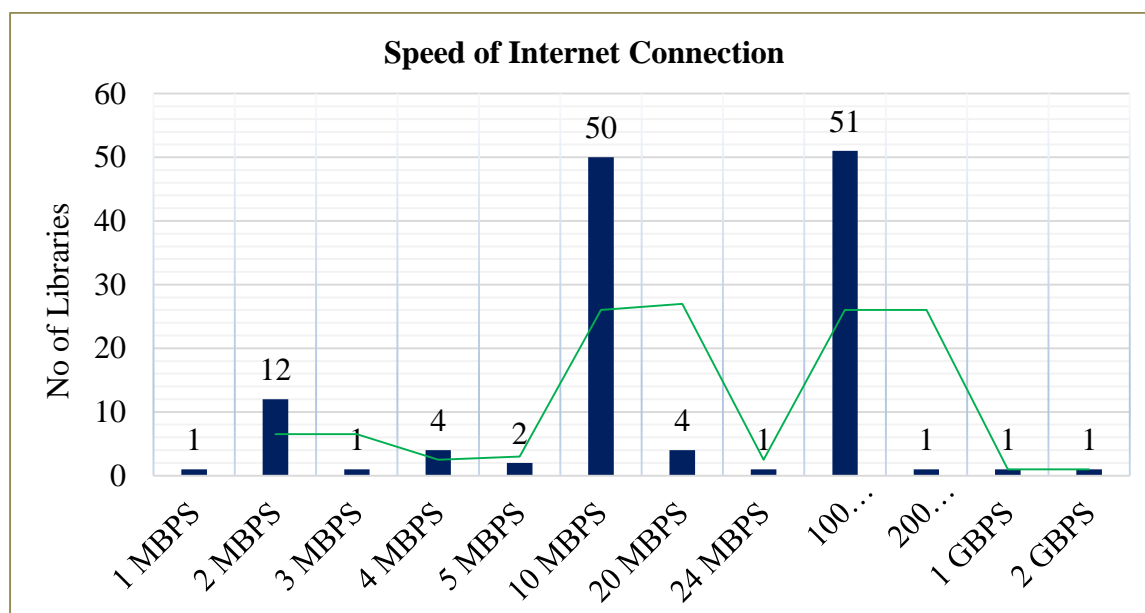
The above table and graph show the libraries having the Internet connection with its speed. Out of 129 libraries 51 (39%) libraries have 100 Mbps speed of Internet

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connection, while, 50 (38%) libraries have 10 Mbps Internet connection speed, 12 (09%) libraries have 2 mbps Internet connection speed, 04 (03%) libraries have 4 mbps and 20 Mbps Internet connection speed, 02 (02%) libraries have 5 Mbps Internet connection speed, remaining 01 (01%) libraries have 1 Mbps, 3 Mbps, 24 Mbps, 200 Mbps, 1 GB and 2 GB Internet connection speed.

Table No. 6.38: Internet Browsing Cell in Libraries

Internet Browsing Cell	No of Libraries	%
Yes	69	**46**
No	80	**54**
Total	**149**	**100**

Graph. No. 6.35: Internet Browsing Cell in Libraries
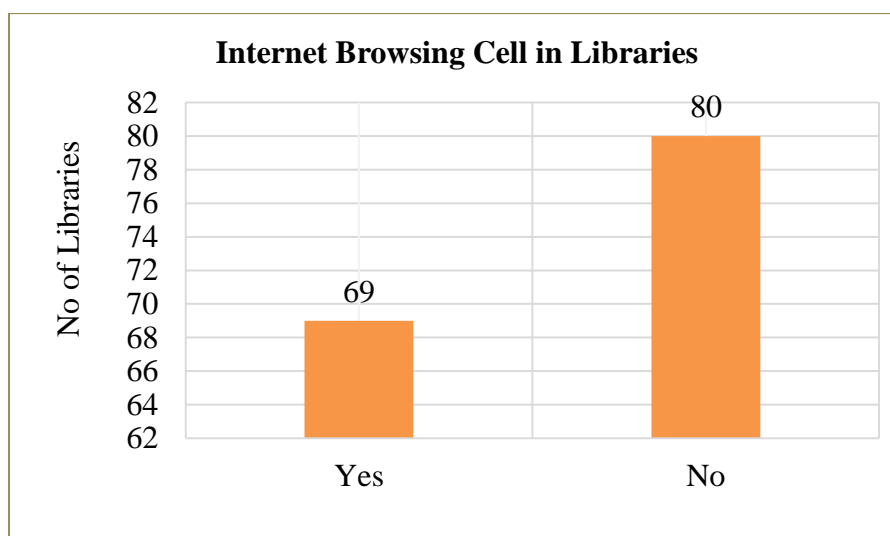
Above table and graph show availability of internet browsing cell in college libraries in Nashik District. Out of 149 libraries, 69 (46%) libraries have internet browsing cell, whereas 80 (54%) libraries do not have internet browsing cell.

Table No. 6.39: Antivirus Software Used in College Libraries

Antivirus Software Used	No of Libraries	%
Quick Heal	122	**93**
Kaspersky	02	**02**
McAfee	02	**02**
Norton	02	**02**
Any other (Net protector)	01	**01**
Total	**129**	**100**

Graph. No. 6.36: Antivirus Software Used in College Libraries
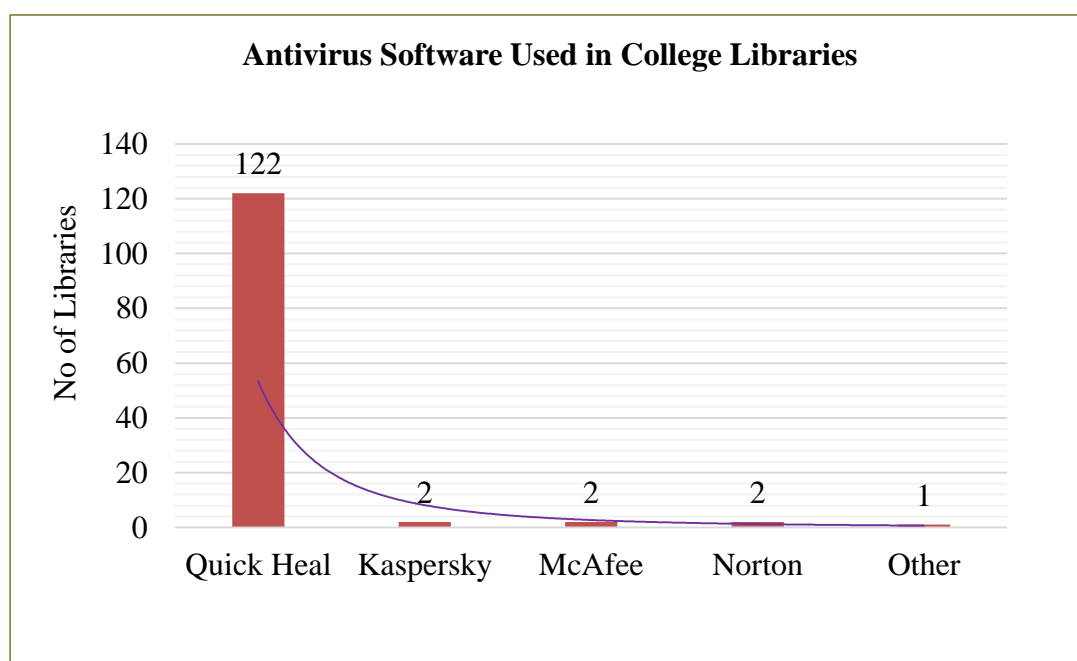
Out of 129 libraries, majority i.e. 122 (95%) library professionals use Quick Heal antivirus software, followed by 02 (02%) library professionals use Kaspersky, McAfee and Norton Antivirus Software, remaining 01 (01%) library professional use Net-Protector antivirus software.

Table No. 6.40: ICT Hardware Available in the Library

ICT Infrastructure	No of Libraries	%
Server	134	90
Client PCs	139	93
Printer	124	83
Barcode Scanner	55	37
Barcode Printer	37	25
Scanner for Digital Library	58	39
Fax Machine	27	18
Photocopier	56	38
UPS/Battery back up	71	48
Web Camera	41	28
LCD Projector	30	20
RFID Technology	01	01
Other (CCTV Camera, Digital Signature Pad & Pen, Smart LED TV, Lamination Machine)	08	05

Graph. No. 6.37: ICT Hardware Available in the Library
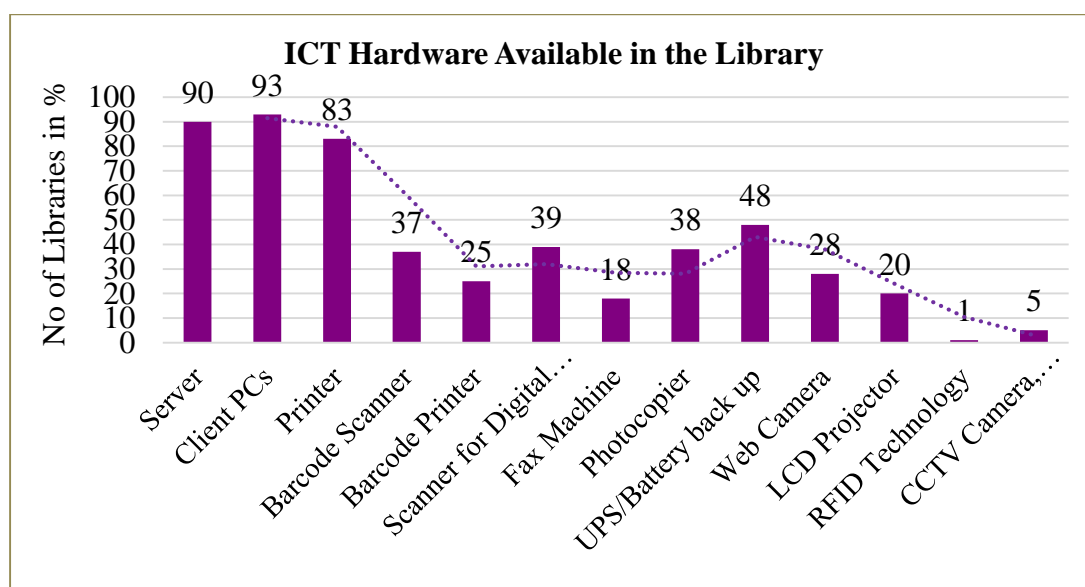
The above table and graph show that the hardware infrastructure facilities in the library. Out of 149 libraries, 139 (93%) libraries have client PCs with LAN

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facility, 134 (90%) libraries have servers. 124 (83%) libraries have printers, 71 (48%) libraries have UPS/Battery backup facility, 58 (39%) libraries have scanner for digitizing document, 56 (38%) libraries have a photocopier (Xerox) facility, 55 (37%) libraries have barcode scanner, 41 (28%) libraries have web cameras, 37 (25%) libraries have barcode printers and 30 (20%) libraries have a LCD projector, 27 (18%) libraries have fax facility, 08 (05%) libraries have other facilities such as CCTV Cameras, Digital Signature Pad & Pen, Smart LED TV, Lamination Machine etc. and remaining 01 (01%) libraries have installed RFID technology.

Table No. 6.41: Various ICT Tools Used for Basic Purpose

Purpose of Using ICT Tools	No of Librarians	%
Faster Communication	113	**76**
Study & research	100	**67**
Providing information services	92	**62**
Entertainment	15	**10**
Professional development	86	**58**
Interact with friends & experts	40	**27**
Updates of Products & publications	47	**32**
Any other (NPTEL Videos)	02	**01**

Graph. No. 6.38: Various ICT Tools Used for Basic Purpose

Various ICT Tools Used for Basic Purpose
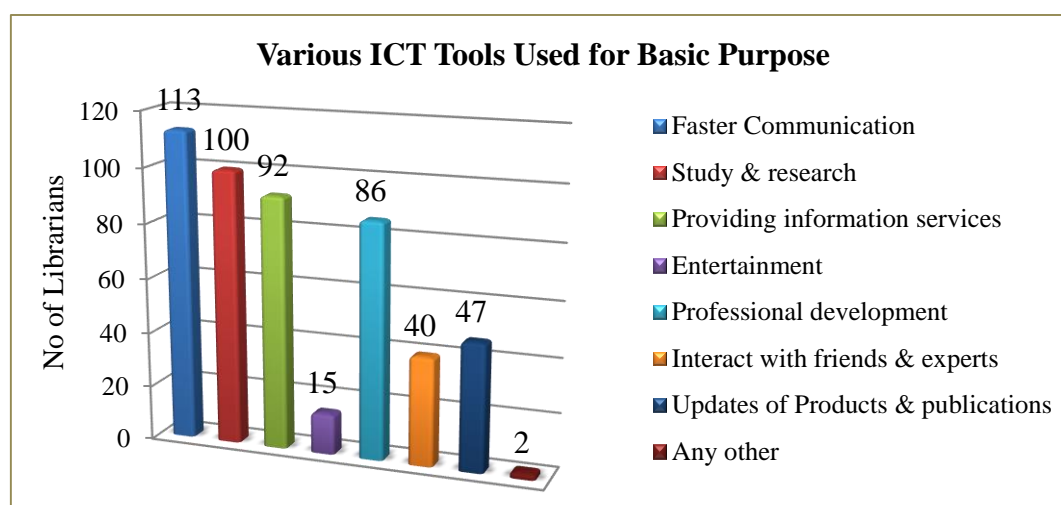
Above table and graph show library professionals using various ICT tools for basic purposes. 113 (76%) library professionals use ICT tools for faster communication, followed by 100 (67%) library professionals use ICT tools for study and research purpose, 92 (62%) library professionals use ICT tools for providing information services, 86 (58%) library professionals use ICT tools for professional development, 47 (32%) library professionals have stated ICT tools are helpful for updating of products and publications, 40 (27%) library professionals use ICT tools to assist and interact with friends and experts, 15 (10%) library professionals use ICT tools for entertaining purpose, remaining 02 (01%) library professionals have stated that the ICT tools are helpful for accessing and using current information.

Table No. 6.42: Advantages of Using Various ICT Tools in Library

Advantages of Using ICT Tools	No of Librarians	%
Quick access to current data	111	74
Improved quality of library services	99	66
Reduce the workload of library staff	107	72
Increased job satisfaction	84	56
Updating of subject knowledge	78	52
Enhance knowledge & skills	60	40

Graph. No. 6.39: Advantages of Using Various ICT Tools in Library
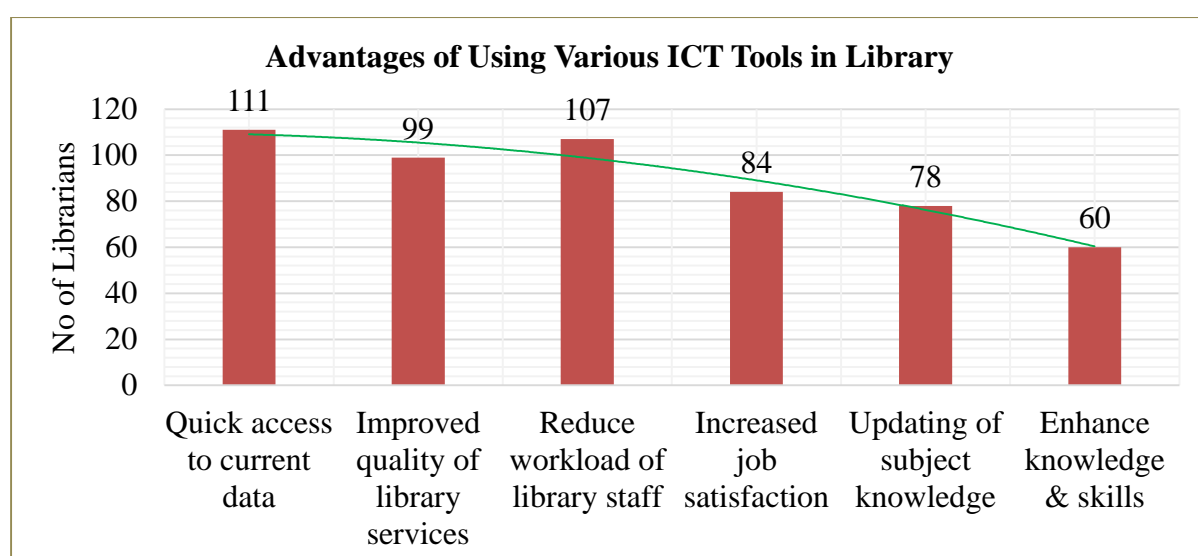
The above table and graph show that the advantages mentioned by library professionals in using ICT tools in the library. 111 (74%) library professionals have stated the main advantage is quick access of current data while using ICT tools, followed by 107 (72%) library professionals have stated that it has reduced workload of library staff by using ICT tools, 99 (66%) library professionals have stated that ICT tools have improved library works and service qualities, 84 (56%) library professionals shave stated that ICT tools have increased job satisfaction, 78 (52%) library professionals have stated that ICT tools are helpful in updating subject knowledge, remaining 60 (40%) library professionals using ICT tools to enhance knowledge and skill.

Table No. 6.43: Internet Accessed Frequencies of LIS Professionals

Frequencies of Internet Access	No of Librarians	%
More than 8 Hours/day	27	18
Less than 04 Hours	73	49
Less than 02 Hours	40	27
Less than one Hour	2	1
Rarely	7	5
Total	**149**	**100**

Graph. No. 6.40: Internet Accessed Frequencies of LIS Professionals
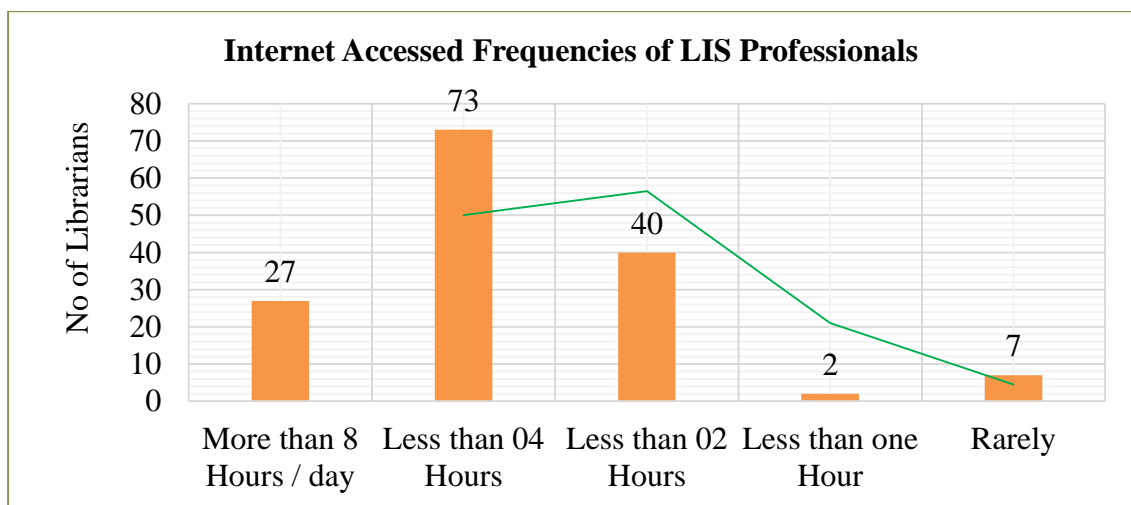
Out of 149 libraries, 73 (49%) library professionals internet accessed frequency is less than four hours in a day, followed by 40 (27%) library professionals have stated that internet access frequency is four hours. 27 (18%) library professionals have stated that their internet access frequency is more than eight hours and 07 (05%) library professionals have rarely accessed the Internet, remaining 02 (01%) library professionals have stated that their internet access frequency is less than one hour.

Table No. 6.44: Methods Based Tools and Technic Used to Enhance Library Services

Use of Social Networking Tools	No of Librarians	%
WhatsApp	119	80
Facebook	86	58
Twitter	28	19
LinkedIn	41	28
Skype	53	36
Instagram	18	12
WeChat	01	01
Hike Messenger	15	10
YouTube	45	30
Google+	87	58
Any other (Online study centre)	01	01

Graph. No. 6.41: Methods Based Tools and Technic Used to Enhance Library Services

Methods Based Tools and Technic Used

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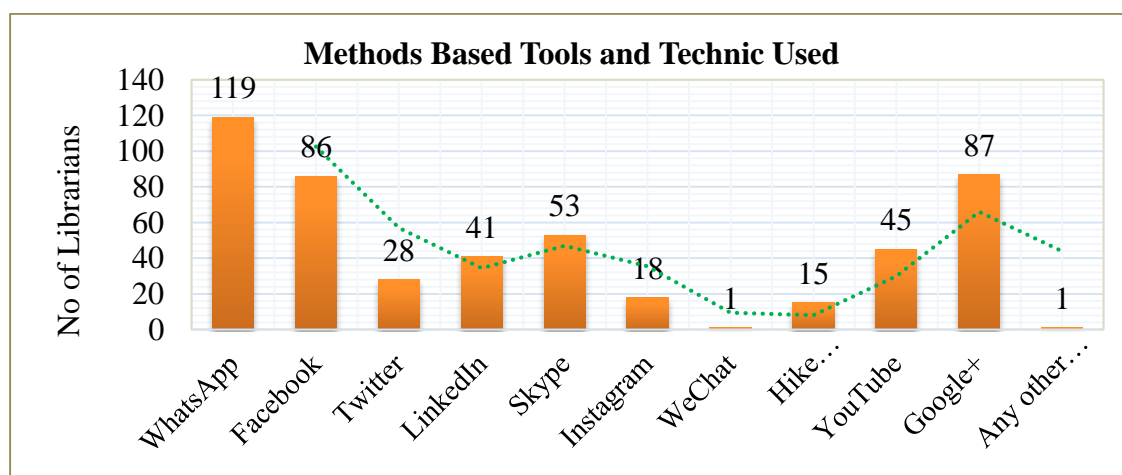
The above table and graph show the social networking tools used by LIS professionals in enhancing library services. WhatsApp is the most popular social networking tool used by 119 (80%) library professionals, followed by 87 (58%) library professionals prefer to use Google+ and 86 (58%) library professionals use Facebook. 53 (36%) library professionals use Skype, 45 (30%) library professionals use YouTube, 41 (28%) library professionals use LinkedIn, 28 (19%) library professionals use Twitter. 18 (12%) library professionals use Instagram, 15 (10%) library professionals use Hike Messenger and remaining 01 (01%) library professional use WeChat as well as online study centres for providing enhanced library services.

Table No. 6.45: Preferred Browsing Search Engines

Preference of search engine	1	2	3	4	5	6	7	Total
Google	143	4	0	0	1	1	0	**149**
MSN	0	38	90	12	5	4	0	**149**
Yahoo	5	101	35	5	1	2	0	**149**
AltaVista	0	2	17	84	38	8	0	**149**
Excite	0	0	1	26	91	31	0	**149**
Bing	1	4	6	22	13	103	0	**149**
UC Browser	0	0	0	0	0	0	149	**149**
Total	**149**	**149**	**149**	**149**	**149**	**149**	**149**	

Graph. No.6.42: Preferred Browsing Search Engines
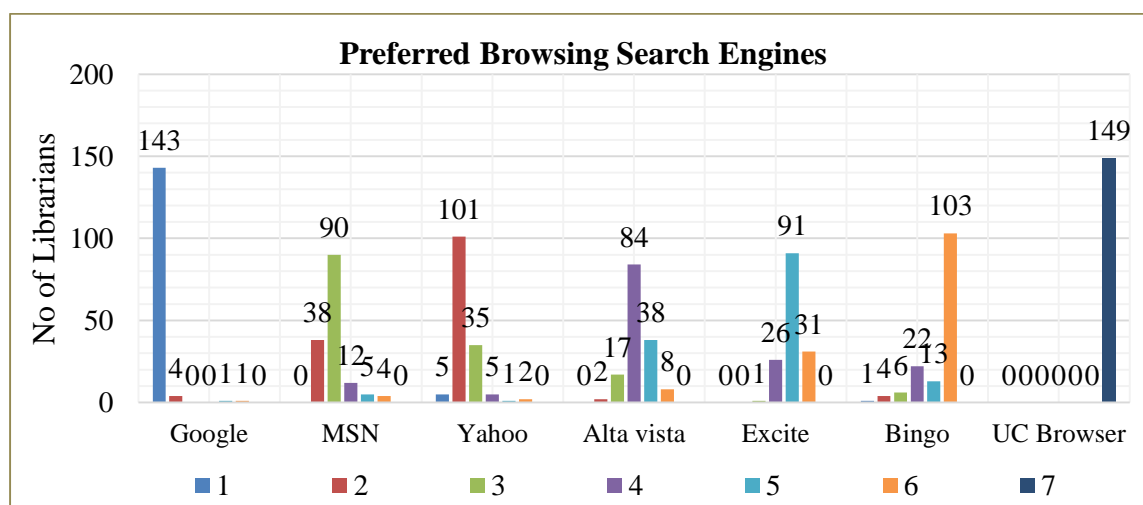
The use of search engines by LIS professionals of college libraries in Nashik District.

Google

The above table and graph show that Google is the most popular and reputed search engine among library professionals. Out of 149 libraries, 143 library professionals have given first preference to Google search engine, followed by 04 library professionals have given second preference to Google search engine, remaining 01 library professionals have given fifth and sixth preferences to Google search engine.

MSN

Out of 149 libraries, 90 library professionals have given third preference to MSN search engine, followed by 38 library professionals have given second preference to MSN, 12 library professionals have given fourth preference to MSN, 05 library professionals have given fifth preference to MSN, remaining 04 library professionals have given sixth preference to MSN search engine and it is in the third position on popularity for the access.

Yahoo

It is observed that the Yahoo is the second popular search engine after google among library professionals. Out of 149 libraries 101 library professionals have given second preference to Yahoo search engine, followed by 35 library professionals have given third preference to Yahoo, 05 library professionals given first and fourth preference to Yahoo, 02 library professionals have given sixth preference to yahoo, remaining 01 library professional have given fifth preference to Yahoo search engine.

AltaVista

Out of 149 libraries 84 library professionals have given fourth preference to AltaVista search engine, followed by 38 library professionals have given fifth preference to AltaVista, 17 library professional have given third preference to AltaVista, 08 library professionals have given sixth preference to AltaVista, remaining 02 library professionals have given second preference to AltaVista search engine.

Excite

Out of 149 libraries, 91 library professionals have given fifth preference to excite search engine, followed by 31 library professionals have given sixth preference to excite. 26 library professionals have given fourth preference to excite search engine, remaining 01 library professionals have given third preference to excite search engine.

Bing

Out of 149 libraries 103 library professionals have given sixth preference to Bing search engine, followed by 22 library professionals have given fourth preference to Bing. 13 library professionals have given fifth preference to Bing, 06 library professionals have given third preference to Bing, and 04 library professionals given second preference to Bing, and remaining 01 library professional has given first preference to Bing search engine.

UC Browser

Out of 149 libraries, all 149 library professionals have given seventh and last preference to UC browser search engine.

6.4.6 Information and Communication Technology (ICT) Literacy

Table No. 6.46: ICT Training Programme Attended

ICT Training Programme Attended	No of Librarians	%
Yes	86	**58**
No	63	**42**
Total	**149**	**100**

Graph. No.6.43: ICT Training Programme Attended
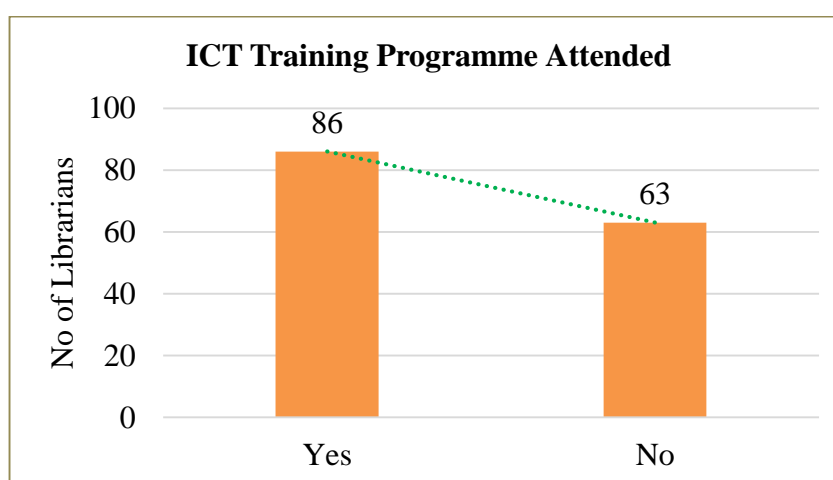
The analysis of above table and graph show that out of 149 libraries majority of the library professionals i.e. 86 (58%) have attended ICT training programme, whereas 63 (42%) library professionals have not attended any training programme related to ICT.

Table No. 6.47: Various ICT Training Programs Attended by LIS Professionals

ICT Training Program Attended	No of Librarians	%
ICT training course	21	**17**
ICT Conference / Seminar	65	**53**
ICT Workshop	24	**19**
ICT related Paper presentation	11	**09**
Others like; Orientation Course on ICT, SOUL & Sanjay Software Training,	03	**02**
Total	**124**	**100**

Graph. No. 6.44: Various ICT Training Programs Attended by LIS Professionals
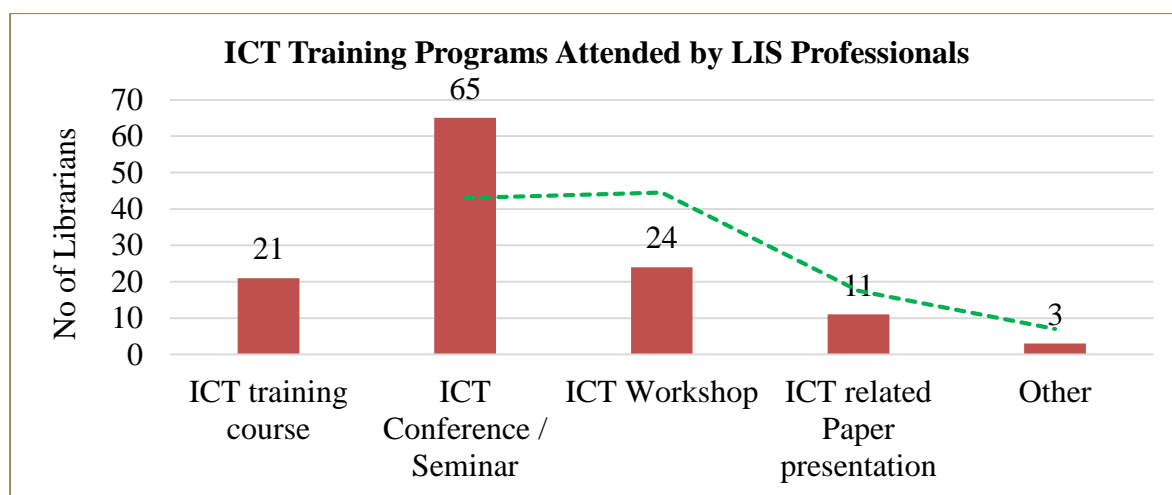
Above table and graph show that, about half of 65 (53%) library professionals have participated in ICT conference and seminars, 24 (19%) library professionals have attended workshops, 21 (17%) library professionals have participated in ICT training courses, 11 (09%) library professionals have presented research papers in ICT related seminar/conference, remaining 03 (02%) library professionals have participated in orientation courses on ICT, SOUL and Sanjay software training.

Table No. 6.48: Knowledge of Operating System

Knowledge of Operating System	No of Respondents	%
Windows Operating System	137	89
Unix / Linux Operating System	14	09
Sun Solaris	02	01
Mac Operating System	01	01
Total	**154**	**100**

Knowledge of operating system is essentially requisite to handle computer systems and which is the basic ICT available in libraries. Majority of i.e. 137 (89%) library professionals have good knowledge about windows operating system, followed by 14 (09%) library professionals are having Unix/Linux operating systems and remaining 02 (01%) library professionals use Sun Solaris and 01 (01%) library professional use Mac Operating System.

Table No. 6.49: Use of Programming Languages

Programming Languages Used	No of Librarians	%
Yes	77	**52**
No	72	**48**
Total	**149**	**100**

Graph. No. 6.45: Use of Programming Languages
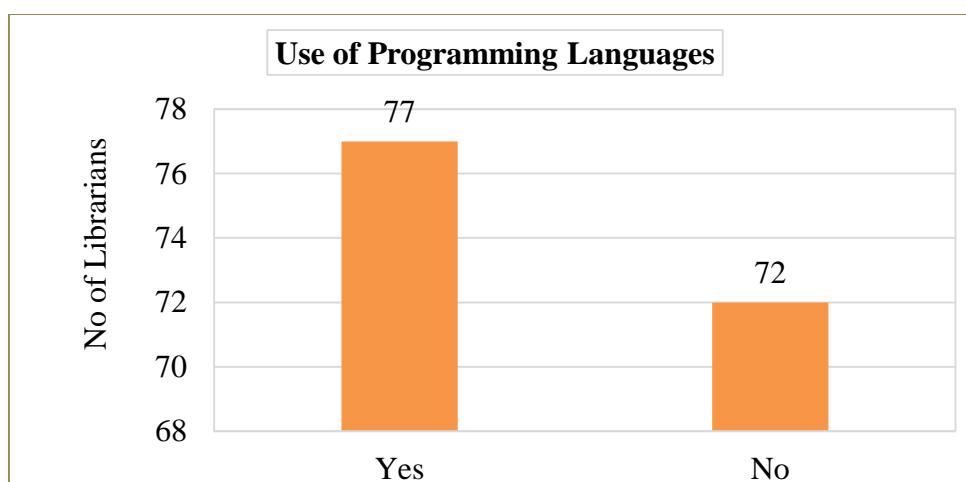
Above table and graph indicate that 77 (52%) library professionals use programming language, whereas 72 (48%) library professionals do not have knowledge about the programming language.

Table No. 6.50: Various Programming Languages Used

Programming Languages Used	No of Librarians	%
C++	20	**16**
HTML	73	**58**
XML	08	**06**
JAVA	12	**09**
VB.NET	11	**09**
Pascal	03	**02**
Total	**127**	**100**

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This is an evidence from the above table that 72 (58%) library professionals use HTML programming language, followed by 20 (16%) library professionals use C++, 12 (09%) library professionals use Java and 11 (09%) library professionals useVB.NET programming languages, 08 (06%) library professionals use XML, remaining 03 (02%) library professionals use Pascal programming language.

Table No. 6.51: Purpose of ICT Use for Various Functions

ICT based applications Used	No of Librarians	%
Web page design	31	**21**
Metadata	16	**11**
Installation & customization of software	29	**19**
Database Management System	24	**16**
MS office package	119	**80**
RFID Technology	01	**01**
Barcode Technology	41	**28**

Above table shows that 119 (80%) library professionals have knowledge and experience of MS office, followed by 41 (28%) library professionals have knowledge and experience of barcode technology, 31 (21%) library professionals have experience of webpage designing, 29 (19%) library professionals have knowledge of software installation, 24 (16%) library professionals have knowledge of database management system, 16 (11%) library professionals have knowledge of metadata, remaining 01 (01%) library professionals have knowledge of RFID technology.

Table No. 6.52: Use Application Software Packages

Application Software Used	No of Librarians	%
MS-Word	145	**97**
MS-Excel	143	**96**
MS-Access	55	**37**
MS-Power Point	100	**67**
Photoshop	41	**28**
CorelDRAW	19	**13**
PageMaker	15	**10**
Notepad	47	**32**

Graph. No. 6.46: Use of Application Software Packages
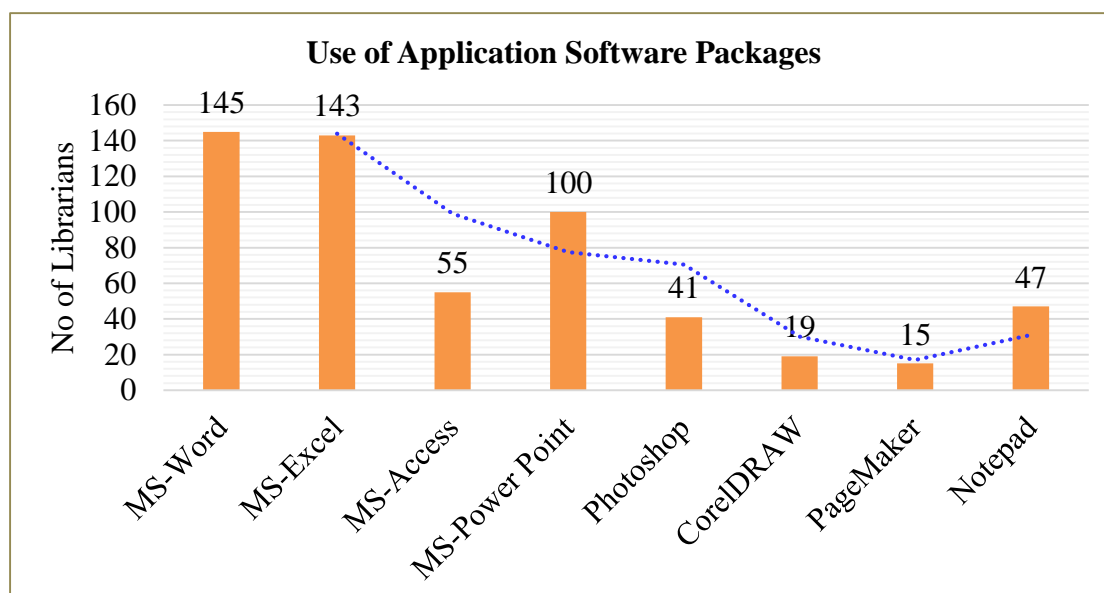
The above table and graph show that the library professionals having skill and knowledge of using various application software. Out of 149 libraries, the majority of library professionals i.e. 145 (97%) library professionals use MS-word, followed by 143 (96%) library professionals use MS-excel. 100 (67%) library professional have used MS-power point, 55 (37%) library professionals have skills and knowledge of MS-access, 47 (32%) library professionals use Notepad and 41 (28%) library professionals use Photoshop, 19 (13%) library professionals use CorelDRAW and remaining 15 (10%) library professionals use PageMaker.

Table No. 6.53: Open Source Software for Library Automation

Use of Open Source Software	No of Librarians	%
Koha	24	**61**
CDS/ISIS	04	**10**
NewGenLib	03	**08**
E-Granthalaya	07	**18**
ABCD	01	**03**
Total	**39**	**100**

The above table and graph show the awareness and literacy among college library professionals in Nashik District in the use of Open Source Software (OSS). Very few library professionals are aware of OSS and 24 (61%) of them use Koha, 07 (18%) library professionals use e-Granthalaya. 04 (10%) library professionals use CDS/ISIS software, 03 (08%) library professionals use NewGenLib library management software and 01 (03%) library professionals use ABCD open source software.

Table No. 6.54: Open Source Software Used for Institutional Repositories

OSS Used for Institutional Repositories	No of Librarians	%
DSpace	14	**56**
Greenstone (GSDL)	06	**24**
E-Prints	05	**20**
Total	**25**	**100**

Graph. No. 6.47: Open Source Software Used for Institutional Repositories

188
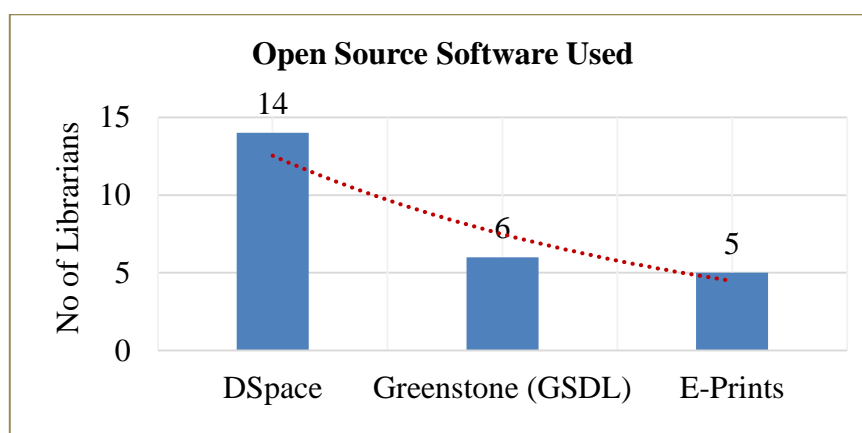
Above table and graph show the open source software used in college libraries for developing institutional repositories. 14 (56%) library professionals have used DSpace software, 06 (24%) library professionals have used Greenstone software and remaining 05 (20%) library professionals have used E-Print open source software.

Table No. 6.55: Digital Libraries Available in College

Availability of Digital Library	No of Librarians	%
Yes	15	10
No	134	90
Total	149	100

Above table shows the information regarding digital library developed in college libraries in Nashik District. Out of 149 college libraries, very few libraries i.e. 15 (10%) colleges have developed a digital library, whereas 134 (90%) libraries do not have a digital library.

Table No. 6.56: Experience of Web page Designing

Experience of Web page Designing	No of Librarians	%
Yes	21	14
No	128	86
Total	149	100

Graph. No. 6.48: Experience of Web page Designing

189
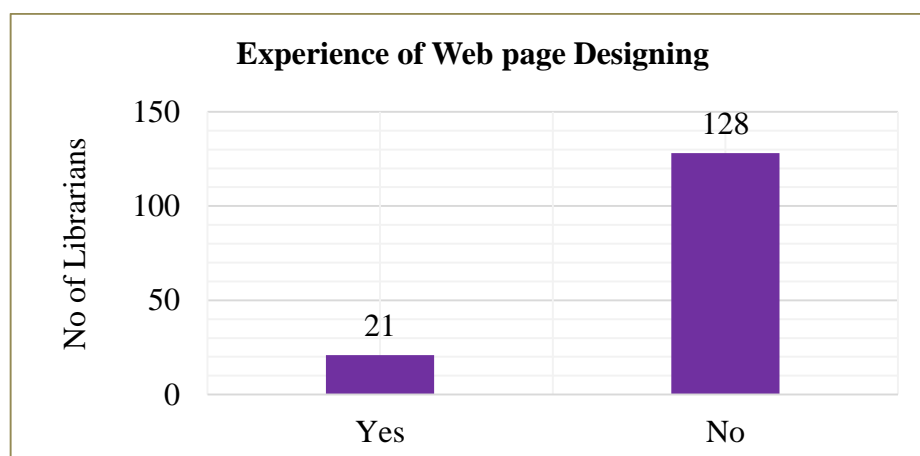
Above table and graph show that only 21 (14%) library professionals have experience and knowledge of web page design, whereas 128 (86%) library professionals are not able to adapt knowledge and experience of webpage design.

Table No. 6.57: Awareness about Massive Online Open Courses (MOOC)

Awareness About (MOOC)	No of Librarians	%
Yes	32	**21**
No	117	**79**
Total	**149**	**100**

Above table indicates the awareness about Massive Open Online Courses (MOOC) among college library professionals. Out of 149 college libraries, only 32 (21%) library professionals are aware of MOOC, while the majority of i.e. 117 (79%) library professionals are not aware of MOOC.

Table No. 6.58: MOOC Recommended by LIS Professionals

MOOC Recommended by LIS Professionals	No of Librarians	%
Teaching staff	24	**32**
Non-teaching staff	07	**10**
Researchers	19	**26**
College students	24	**32**
Total	**74**	**100**

Graph. No. 6.49: MOOC Recommended by LIS Professionals

MOOC Recommended by LIS Professionals
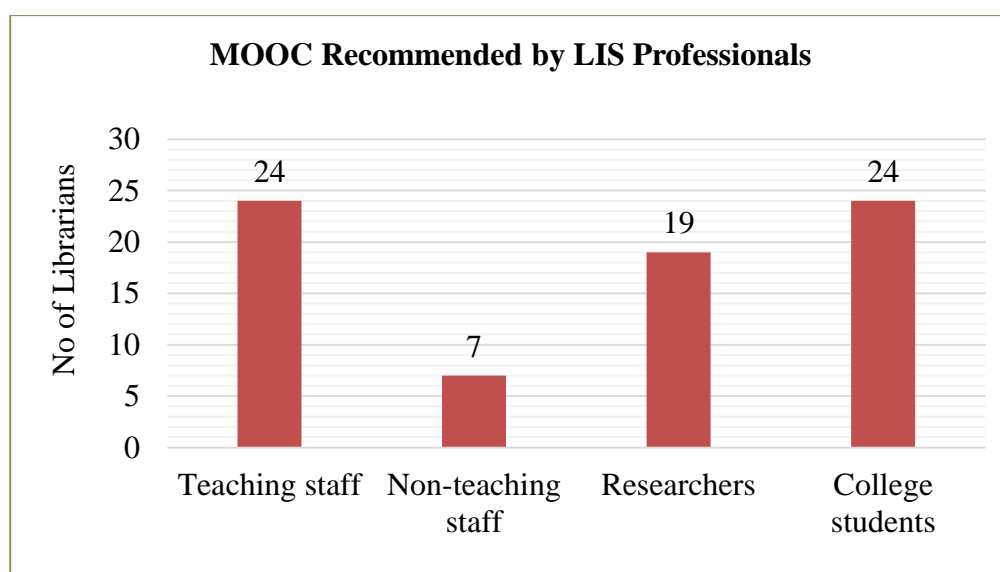
The above table and graph show the MOOC recommended by library professionals for the library users. 24 (32%) library professionals have recommended MOOC for teaching staff as well as college students, whereas 19 (26%) library professionals have recommended MOOC for research scholars, remaining 07 (10%) library professionals have recommended MOOC for non-teaching staff.

Table No. 6.59: Online ICT Tools Used by LIS Professionals

Online ICT Tools Used	E (%)	G (%)	A (%)	BA (%)	EP (%)	Weighted Arithmetic Means	Rank
Social Networking (Facebook, WhatsApp)	69 (46)	44 (30)	24 (16)	9 (6)	3 (2)	**40.93**	1
Web based professional forums	35 (23)	62 (42)	32 (21)	16 (11)	4 (3)	**37**	3
Mailing list	41 (28)	63 (42)	30 (20)	10 (7)	5 (3)	**38.13**	2
Instant messaging	35 (23)	51 (34)	38(26)	19(13)	6 (4)	**35.8**	4
Blogging (Weblogs, Twitter)	29 (19)	29 (19)	47 (32)	28 (19)	16 (11)	**31.6**	6
Content management system (Drupal, Joomla)	15 (10)	21 (14)	31 (21)	49 (33)	33 (22)	**25.53**	5

E- Excellent,   **G**-Good,   **A**-Average,   **BA**-Below Average,   **EP**-Extremely Poor

Development of ICT and its application in libraries, it builds a close relationship with users and redesigns library services according to the need of users. Through this library professionals keep up-to-date with the new developments in libraries. Above table show that most of the library professionals have actively participated in social networking tools like Facebook and WhatsApp, followed by mailing list, web-based professional forums, instant messaging, content management system (Drupal, Joomla) and blogging (Weblogs, Twitter) etc.

Table No. 6.60: Use of Online Utilities and Services in the Library

Use of online utilities and services	No of Librarians	%
Yes	144	97
No	05	03
Total	**149**	**100**

Above table show that the majority of i.e. 144 (97%) library professionals are experienced and expert in the use of online utilities and services, whereas 05 (03%) library professionals are not aware of online utility tools and services available in the library.

Table No. 6.61: Use of Various Online Utilities and Services

Extent of Use Online Utilities and Services	E (%)	G (%)	A (%)	BA (%)	EP (%)	Weighted Arithmetic Means	Rank
Search Engine	103 (76)	25 (18)	8 (6)	0 (0)	0 (0)	**42.6**	1
E-Mail	92 (68)	34 (25)	7 (5)	1 (1)	2 (1)	**41.4**	2
Online LIS Group	65 (48)	44 (32)	21 (15)	2 (1)	4 (3)	**38.13**	3
Online LIS Networks	37 (27)	56 (41)	30 (22)	9 (7)	4 (3)	**34.73**	5
Online LIS Forums	35 (26)	60 (44)	24 (18)	11 (8)	6 (4)	**34.33**	6
Online LIS Blogs	19 (14)	60 (44)	36 (26)	12 (9)	9 (7)	**31.73**	8
Subject gateway	35 (26)	48 (35)	33 (24)	12 (9)	8 (6)	**33.2**	7
Electronic Document Delivery Service	26(19)	44 (32)	39 (29)	16 (12)	11 (8)	**31.06**	9
OPAC / Web OPAC	51 (38)	42 (31)	30 (22)	8 (6)	5 (4)	**35.06**	4

E- Excellent, **G**-Good, **A**-Average, **BA**-Below Average, **EP**-Extremely Poor

The earlier study of (Satpathy & Maharana, 2011) revealed that most of the LIS professionals possessed knowledge of e-mail, followed by search engines, use of OPAC/Web OPAC and web design.

It is evident from the above table that the library professionals have the knowledge and skills of using various online utilities and services. Most of them have knowledge of search engine, followed by e-mail, online LIS group, OPAC/Web OPAC, online LIS networks, online LIS forums, subject gateway, online LIS blogs and electronic document delivery services.

Table No. 6.62: Confidence While Handling Internet Tasks

Handling Internet Tasks	E (%)	G (%)	A (%)	BA (%)	EP (%)	Weighted Arithmetic Means	Rank
Get it to the Internet	93 (**63**)	33 (**22**)	13 (**9**)	4 (**3**)	4 (**3**)	43.20	1
Copy/download files from the Internet	83 (**56**)	44 (**30**)	14 (**10**)	4 (**3**)	2 (**1**)	42.86	2
Attach a file to an e-mail message	86 (**59**)	38 (**26**)	19 (**13**)	0 (**0**)	4 (**3**)	42.86	2
Download music from the Internet	53 (**36**)	46 (**31**)	33 (**22**)	11 (**7**)	4 (**3**)	38.26	4
Write and send e-mail	84 (**57**)	39 (**27**)	15 (**10**)	5 (**3**)	4 (**3**)	42.33	3

E- Excellent, **G**-Good, **A**-Average, **BA**-Below Average, **EP**-Extremely Poor

The analysis of above table on the confidence while handling Internet tasks, most of the library professionals of Nashik District have knowledge of the use of the Internet, followed by copy/download files from Internet and attach a file to e-mail messages, write and send e-mail and downloading musical files from Internet.

Table No. 6.63: Confidence While Handling High-Level ICT Tasks

Handling High-Level ICT Tasks	E (%)	G (%)	A (%)	BA (%)	EP (%)	Weighted Arithmetic Means	Rank
Use of DBMS	23 (**16**)	35 (**24**)	37 (**25**)	33 (**22**)	20 (**14**)	**30.13**	**5**
Create a presentation	45 (**31**)	38 (**26**)	27 (**18**)	23 (**16**)	15 (**10**)	**34.16**	**1**
Use a spreadsheet	36 (**24**)	40 (**27**)	34 (**23**)	25 (**17**)	13 (**9**)	**33.66**	**2**
Use of software & get rid of computer viruses	25 (**17**)	32 (**22**)	48 (**32**)	26 (**18**)	17 (**11**)	**31.06**	**3**
Create a multimedia presentation	24 (**16**)	35 (**24**)	37 (**25**)	32 (**22**)	20 (**14**)	**30.33**	**4**
Construct a webpage	9 (**6**)	16 (**11**)	34 (**23**)	47 (**32**)	42 (**28**)	**23.13**	**6**
Write a computer program	13 (**9**)	11 (**7**)	27 (**18**)	44 (**30**)	53 (**36**)	**22.06**	**7**

E- Excellent, **G**-Good, **A**-Average, **BA**-Below Average, **EP**-Extremely Poor

The development of handling the high-level ICT task, most of the library professionals have possessed the knowledge to create a presentation, followed by use of spreadsheet, use of software and get rid of computer viruses, create a multimedia presentation, use of DBMS, construct a webpage and write off a computer program.

Table No. 6.64: Competency Skills Acquired and Used

Competency Skills Acquired and Used	E (%)	G (%)	A (%)	BA (%)	EP (%)	Weighted Arithmetic Means	Rank
Project Management	25 (**17**)	44 (**30**)	45 (**30**)	25 (**17**)	9 (**6**)	**33.00**	4
Resource Management	43 (**29**)	48 (**32**)	39 (**26**)	9 (**6**)	9 (**6**)	**36.73**	2
System Management	24 (**16**)	47 (**32**)	51 (**34**)	15 (**10**)	11 (**7**)	**33.46**	3
Fund Raising	14 (**9**)	22 (**15**)	36 (**24**)	48 (**32**)	28 (**19**)	**26.00**	5
Effective Leadership	52 (**35**)	64 (**43**)	15 (**10**)	9 (**6**)	8 (**5**)	**39.13**	1

E- Excellent, **G**-Good, **A**-Average, **BA**-Below Average, **EP**-Extremely Poor

Above table shows the competency skills acquired and used by library professionals for various tasks. Majority of library professionals have stated that the effective leadership is acquired by using of ICT, followed by resource management, system management, project management and fund raising.

Table No. 6.65: Use of Electronic Resources in the Library

Used Electronic Resources	E (%)	G (%)	A (%)	BA (%)	EP (%)	Weighted Arithmetic Means	Rank
OPAC / Web OPAC	54 (**36**)	40 (**27**)	26 (**18**)	6 (**4**)	22 (**15**)	**36.13**	3
Library Website	44 (**30**)	48 (**32**)	25 (**17**)	11 (**7**)	20 (**14**)	**35.26**	5
E-books	51 (**34**)	42 (**28**)	30 (**20**)	11 (**7**)	14 (**9**)	**36.60**	2
Online Journals	55 (**37**)	43 (**29**)	26 (**18**)	9 (**6**)	15 (**10**)	**37.20**	1
Online Databases	48 (**32**)	36 (**24**)	33 (**22**)	16 (**11**)	15 (**10**)	**35.33**	4
ETD (Electronic Thesis & Dissertation)	27 (**18**)	36 (**24**)	46 (**31**)	19 (**13**)	20 (**14**)	**31.66**	8
Digital Archives / Subject Gateways	21 (**14**)	39 (**26**)	49 (**33**)	22 (**15**)	17 (**11**)	**31.26**	9
Library Networks	34 (**23**)	43 (**29**)	40 (**27**)	16 (**11**)	15 (**10**)	**33.93**	6
Library Consortium	32 (**22**)	43 (**29**)	32 (**22**)	20 (**14**)	21 (**14**)	**32.60**	7

E- Excellent, **G**-Good, **A**-Average, **BA**-Below Average, **EP**-Extremely Poor

Above table shows the use of electronic information resources by LIS professionals in the library for various library services and research purposes. Majority of library professionals have stated that the online journals are more frequently used for research and library services, followed by e-books, OPAC/Web OPAC, online

databases, library websites, library networks, library consortium, ETD (Electronic Thesis and Dissertation) and digital archives/subject gateways.

Table No. 6.66: ICT Based Library Services Provided by the Library

ICT Based Services	Yes	%	No	%
Information retrieval	93	**62**	56	**38**
Digital / virtual reference	64	**43**	85	**57**
Licensed database	64	**43**	85	**57**
E-journals	103	**69**	46	**31**
E-books	100	**67**	49	**33**
Institutional e-resources	33	**22**	116	**78**
OPAC / Web OPAC	84	**56**	65	**44**
Electronic document delivery	62	**42**	87	**58**
FAQ	29	**19**	120	**81**
E-mail	127	**85**	22	**15**
Interlibrary loan through networking	44	**30**	105	**70**
Circulation of new additions list	64	**43**	85	**57**

Above table indicates data regarding ICT based library services provided by the libraries to their users. Majority of i.e. 127 (85%) libraries provide e-mail services, followed by 103 (69%) libraries provide e-journal facilities, 100 (67%) libraries provide e-books facility, 93 (62%) libraries provide OPAC/Web OPAC facilities, 64 (43%) libraries provide digital/virtual reference, licensed database and they also circulate newly added books lists to college departments. 62 (42%) libraries provide electronic document delivery services, 44 (30%) libraries provide inter-library loan through networking, 33 (22%) libraries provide institutional e-resources, and remaining 29 (19%) library professionals provide Frequently Asked Questions (FAQ) facilities to the library users.

Table No. 6.67: Methods Adopted for Acquiring ICT Skills

Methods Adopted for Acquiring ICT Skills	Yes	%	No	%
Formal education/training	105	**70**	44	**30**
Informal education/training	52	**35**	97	**65**
From colleagues/friends	54	**36**	95	**64**
Trial & error basis	19	**13**	130	**87**
Self-study	71	**48**	78	**52**
Training at work place	21	**14**	128	**86**
Training by suppliers	20	**13**	129	**87**
Attending IT programmes	29	**19**	120	**81**
Attending Conference / Workshop / Seminars	57	**38**	92	**62**

Graph. No. 6.50: Methods Use for Acquiring ICT Skills
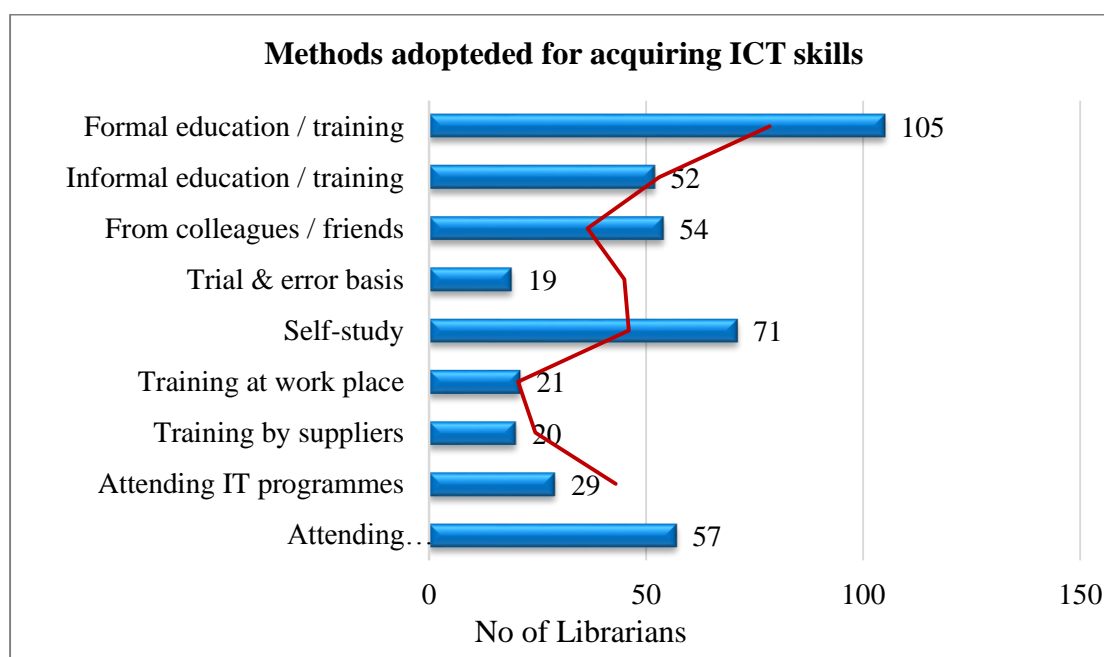
Above table and graph show that 105 (70%) library professionals have stated that they have adopted ICT skills through formal education/training, followed by 71 (48%)

have adopted ICT skills by self-study. 57 (38%) library professionals have acquired ICT skills by attending conferences, seminars and workshops, 54 (36%) library professionals have adopted ICT skills by colleagues and friends. 52 (35%) library professionals have adopted ICT skills with the help of informal education or training, 29 (19%) library professionals have acquired ICT skills through attending IT programmes. 21 (14%) library professionals have acquired ICT skills at their work place with local training, 20 (13%) library professionals have acquired ICT skills through training by ICT infrastructure suppliers, remaining 19 (13%) library professionals have adopted ICT skills by trial and error basis.

Table No. 6.68: Conduction of ICT Training Program for Library Staff

Conduction of ICT Training Program	No of Librarians	%
Yes	42	28
No	107	72
Total	**149**	**100**

ICT training programmes arranged for library staff by LIS professional is essential in every college library. Out of 149 college libraries, very few i.e. 42 (28%) library professionals have organized ICT training programmes for library staff, whereas the majority of them i.e. 107 (72%) library professionals have not organized ICT training programme.

Table No. 6.69: ICT Training Methods

ICT Training Methods	No of Librarians	%
Conduct in-house workshop	18	33
Organize workshop in other institutes	09	16
Train Individual library staff	28	51
Total	**55**	**100**

Above table shows the various ICT training methods conducted for library staff by the LIS professionals. Majority of i.e. 28 (51%) library professionals have stated the library staffs are experts in use of ICT by individual training, 18 (33%) library

professionals have organized in-house workshops, remaining 09 (16%) library professionals have stated that library staffs are trained to access ICT through attending workshops in other institutes.

Table No. 6.70: Suggestions for Organization of ICT Training Programs

Suggestions for ICT Training Program	No of Librarians	%
Yes	128	86
No	21	14
Total	**149**	**100**

Graph. No. 6.51: Suggestions for Organization of ICT Training Programs
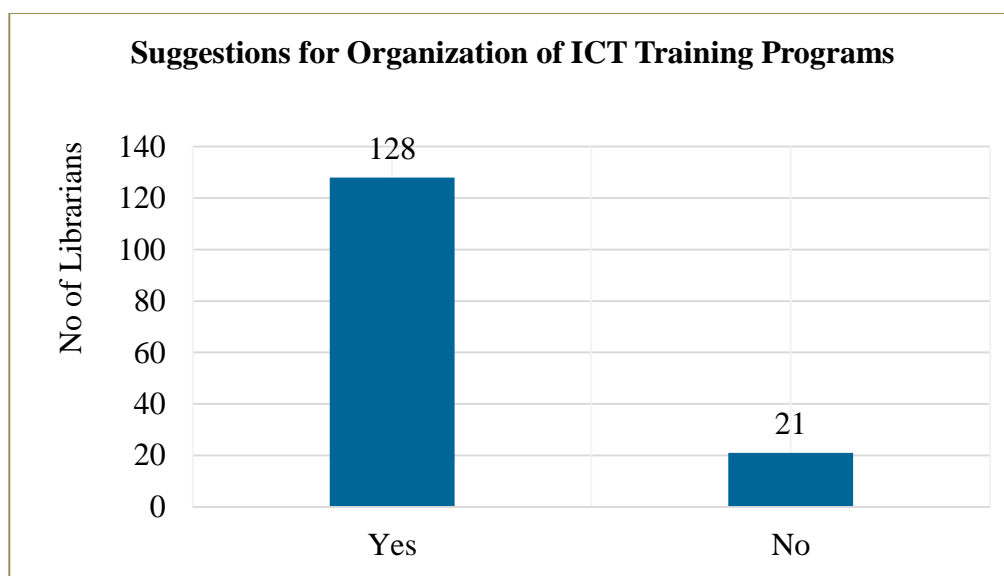
The above table and graph show that UGC, AICTE and Universities organize continuing ICT training programmes for library professionals. Out of 149 libraries majority of i.e. 128 (86%) library professionals have stated that UGC, AICTE and Universities have regularly organized ICT training programmes for library professionals, whereas 21 (14%) library professionals do not need such type of training programmes.

Table No. 6.71: Need of Training/Orientation Programme for Library Activities

Need of training/orientation	Yes	%	No	%
Use of bibliographic resources	79	**53**	70	**47**
Use of online catalogue	92	**62**	57	**38**
Use of E-journals, E-books and Databases	115	**77**	34	**23**
Internet tools and techniques	109	**73**	40	**27**
Search techniques and strategies	104	**70**	45	**30**
Library management software	105	**70**	44	**30**
Digital library and institutional repository software	122	**82**	27	**18**
Digitizing old and rare materials	123	**83**	26	**17**
Evaluation of online resources	109	**73**	40	**27**

Graph. No. 6.52: Need of Training/Orientation Programme for Library Activities
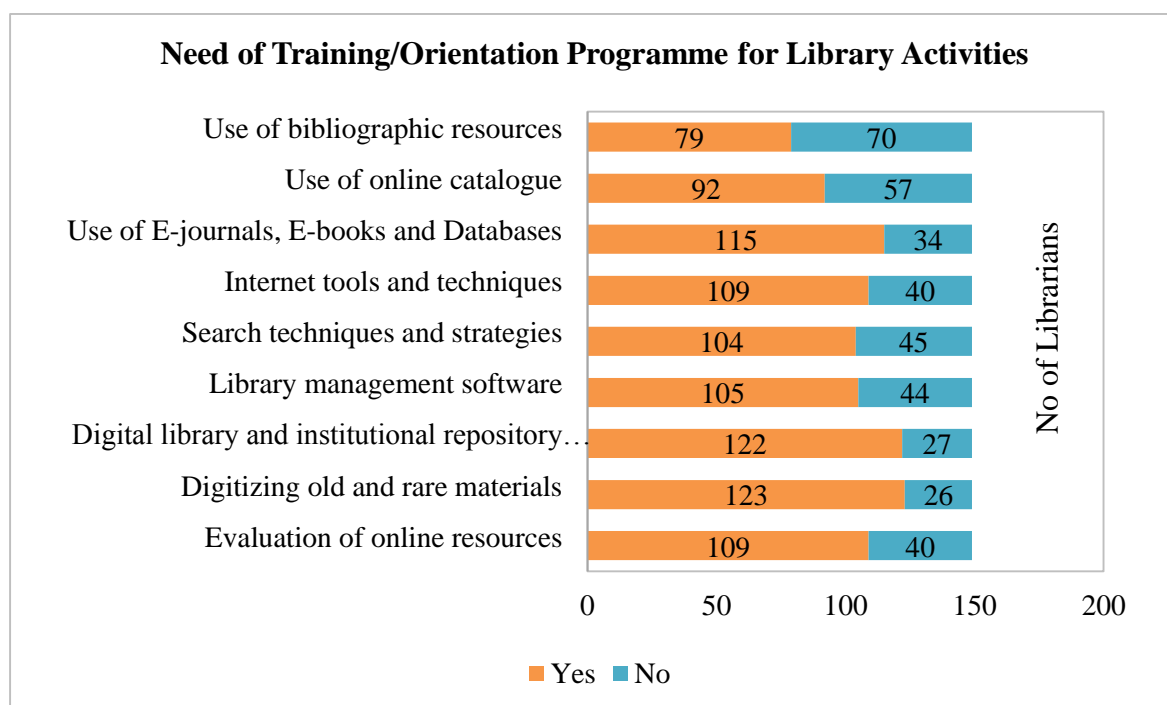
The above table and graph show the need for library professionals of ICT training or orientation programme to provide library resources and services. Majority of i.e. 123 (83%) library professionals need training programme on digitizing of old and rare materials, followed by 122 (82%) library professionals require digital library and

institutional repositories software training, 115 (77%) library professional require training programmes on use of e-journals, e-books and e-databases, 109 (73%) library professionals require demonstration programme on evaluation of online resources, 105 (70%) library professionals require demonstration on library management software and 104 (70%) library professionals require search techniques and strategies training, 92 (62%) library professionals require training on use of online catalogues, and remaining 79 (53%) library professionals require demonstration on use of bibliographical resources.

Table No. 6.72: Constraints in Acquiring ICT Skills

Type of Constraint	Yes	%	No	%
Tight working schedule	121	**81**	28	**19**
Inadequate training in ICT applications	119	**80**	30	**20**
Lack of infrastructure & network facility	114	**77**	35	**23**
Lack of cooperation from the authority	47	**32**	102	**68**
Lack of budget for ICT	118	**79**	31	**21**
Lack of co-ordination among library staff	50	**34**	99	**66**
Non-availability of consultation services	99	**66**	50	**34**
Lack of updating ICT strategy	110	**74**	39	**26**
Fear of ICT application	46	**31**	103	**69**
Lack of interest among LIS professionals in ICT	55	**37**	94	**63**

Graph No. 6.53: Constraints in Acquiring ICT Skills

Constraints in Acquiring ICT Skills

Constraint	Yes	No
Tight working schedule	121	28
Inadequate training in ICT applications	119	30
Lack of infrastructure & network facility	114	35
Lack of cooperation from the authority	47	102
Lack of budget for ICT	118	31
Lack of co-ordination among library staff	50	99
Non availability of consultation services	99	50
Lack of updating ICT strategy	110	39
Fear of ICT application	46	103
Lack of interest among LIS professionals…	55	94

No of Librarians

■ Yes ■ No

The above table and graph show the main constraint in acquiring ICT skills by library professionals. Majority of i.e. 121 (81%) library professionals have stated that the tight working schedule is the main constraint in acquiring ICT skills, followed by 119 (80%) library professionals have stated that inadequate training in ICT application. 118 (79%) library professionals have stated there is lack of budget for installation of ICT in the library, 114 (77%) library professionals have stated there is lack of ICT infrastructure and network facility. 110 (74%) library professionals have expressed that there is lack of updated ICT strategy, 99 (66%) library professionals have expressed there is non-availability of consultation services, 55 (37%) library professionals have expressed the lack of interest in application of ICTs, 50 (34%) library professionals have stated there is lack of coordination among library staff, 47 (32%) library professionals have accepted lack of cooperation by authorities and 46 (31%) library professionals have stated that there is a fear of ICT tools handling.

Table No. 6.73: Methods Adopted for Updating Latest ICT Development

Method Adopted for Updating Latest ICT Development	Yes	%	No	%
Conference/Workshop/Seminars	128	**86**	21	**14**
Training programmes	70	**47**	79	**53**
E-forums/online interaction	34	**23**	115	**77**
Demonstration/lectures	33	**22**	116	**78**
Orientation/Refresher course	60	**40**	89	**60**

Table no 6.73 shows methods/techniques used to adopt the latest ICT development. Majority of i.e. 128 (86%) library professionals have attended conferences, seminars and workshops to acquire latest ICT development, followed by 70 (47%) have attended training programme, 60 (40%) have participated in orientation and refresher course, 34 (23%) have participated e-forum or online interactions, remaining 33 (22%) have attended lecture and demonstration for acquiring the latest ICT developments.

6.4.7 Opinions Given by College Library Professionals

Table No. 6.74: Opinions Given by Library Professionals (Summary Table)

Summary / College	G1 SA	G1 A	G1 NO	G1 D	G1 SD	G2 SA	G2 A	G2 NO	G2 D	G2 SD	G3 SA	G3 A	G3 NO	G3 D	G3 SD	G4 SA	G4 A	G4 NO	G4 D	G4 SD	G5 SA	G5 A	G5 NO	G5 D	G5 SD	G6 SA	G6 A	G6 NO	G6 D	G6 SD	G7 SA	G7 A	G7 NO	G7 D	G7 SD
ACSC	37	31	06	00	00	29	39	04	01	01	38	32	04	00	00	28	44	01	00	01	30	34	07	03	00	34	35	03	02	00	41	28	03	01	01
EPE	09	09	01	01	00	06	13	01	00	00	14	04	02	00	00	09	09	02	00	00	05	12	03	00	00	11	08	01	00	00	09	08	03	00	00
Engg	12	06	00	00	00	13	04	01	00	00	12	06	00	00	00	09	07	02	00	00	09	08	01	00	00	11	06	01	00	00	08	07	02	01	00
Arch	00	02	00	00	00	01	01	00	00	00	01	01	00	00	00	00	02	00	00	00	00	02	00	00	00	01	01	00	00	00	01	01	00	00	00
Law	03	01	00	00	00	03	01	00	00	00	04	00	00	00	00	03	01	00	00	00	03	00	01	00	00	03	01	00	00	00	03	01	00	00	00
Mngt	13	02	00	01	00	09	07	00	00	00	07	08	01	00	00	12	02	02	00	00	08	06	01	00	01	10	06	00	00	00	09	06	00	01	00
Phrm	09	05	00	00	00	10	03	01	00	00	05	08	01	00	00	06	07	01	00	00	03	11	00	00	00	07	07	00	00	00	07	05	02	00	00
FA	00	01	00	00	00	00	01	00	00	00	01	00	00	00	00	01	00	00	00	00	01	00	00	00	00	01	00	00	00	00	00	01	00	00	00
PA	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
Total	**83**	**57**	**07**	**02**	**00**	**71**	**69**	**07**	**01**	**01**	**82**	**59**	**08**	**00**	**00**	**68**	**72**	**08**	**00**	**01**	**59**	**73**	**13**	**03**	**01**	**78**	**64**	**05**	**02**	**00**	**78**	**57**	**10**	**03**	**01**
	149					**149**					**149**					**149**					**149**					**149**					**149**				

(Column headers for each group G1–G7: Strongly Agree, Agree, No Opinion, Disagree, Strongly Disagree)

Table No. 6.75: Effectiveness and Relevance of the ICT Literacy should be Frequently Assessed to Analyze User Satisfaction

Opinions	No. of Librarians	%
Strongly Agree	83	56
Agree	57	38
No Opinion	07	05
Disagree	02	01
Strongly Disagree	00	00
Total	**149**	**100**

Graph.No.6.54: Effectiveness and Relevance of the ICT Literacy should be Frequently Assessed to Analyze User Satisfaction

Effectiveness and Relevance of the ICT Literacy should be Frequently Assessed to Analyze User Satisfaction
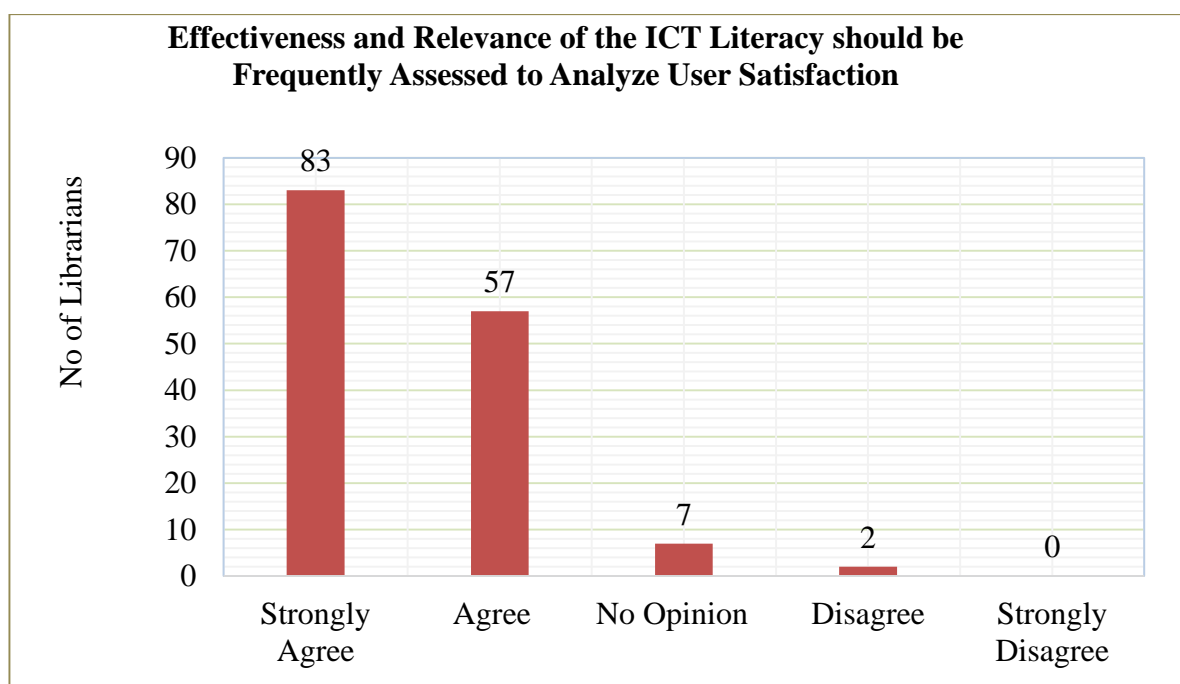
The above table and graph show the effectiveness and relevance of the ICT literacy and its analysis. Total 83 (56%) library professionals have strongly agreed with the ICT literacy frequent assessment for user satisfaction, 57(38%) library professionals have agreed with ICT literacy frequent assessment, 07 (05%) library professionals did not mention their opinions about it and 02 (01%) library professionals have disagreed with the ICT literacy frequent assessment for user satisfaction.

Table No. 6.76: ICT Literacy Helps to Increase the Footfall in the Library and Increases Use of E-Resources

Opinions	No. of Librarians	%
Strongly Agree	71	47
Agree	69	46
No Opinion	07	05
Disagree	01	01
Strongly Disagree	01	01
Total	**149**	**100**

Graph. No. 6.55: ICT Literacy Helps to Increase the Footfall in the Library and Increases Use of E-Resources
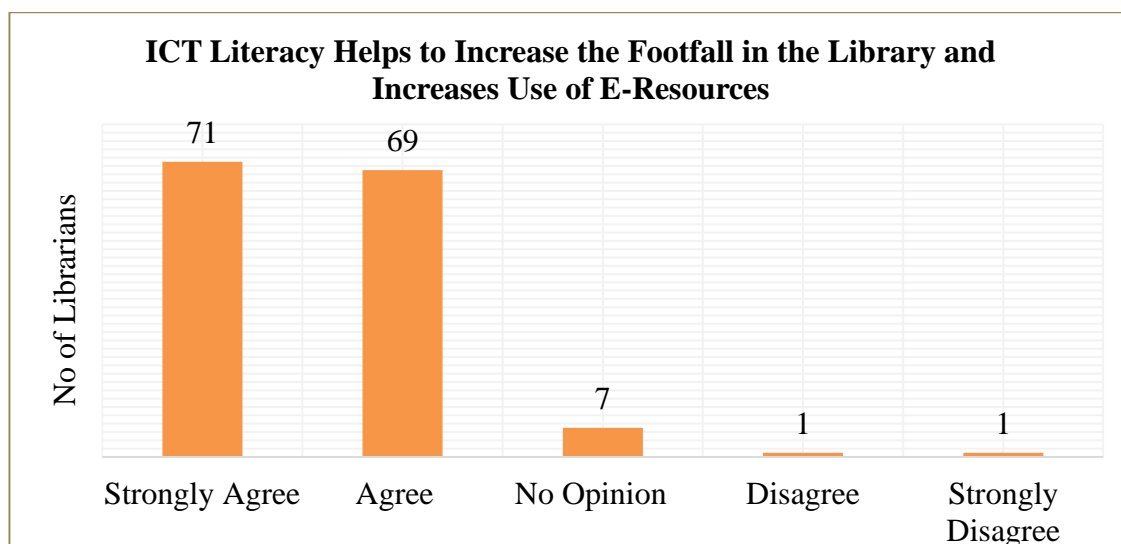
Above table and graph indicate the use of the ICT literacy that helps to increase the footfall of the library and development in use of e-resources. 71 (47%) library professionals strongly agreed with the opinions that ICT literacy helps to increase the footfall of the library and development to use of e-resources. 69 (46%) library professionals have agreed with the ICT literacy helps to increase the footfall in the library to use e-resources. 07 (05%) library professionals did not mention their opinion about ICT literacy. Remaining 01 (01%) library professionals have disagreed and strongly disagreed that ICT literacy helps in increasing footfall in the library and use of e-resource.

Table No. 6.77: Requirement of ICT Training Programs for LIS Professionals for Effective Utilization of Library Resources

Opinions	No. of Librarians	%
Strongly Agree	82	55
Agree	59	40
No Opinion	08	05
Disagree	00	00
Strongly Disagree	00	00
Total	**149**	**100**

Graph. No. 6.56: Requirement of ICT Training Programs for LIS Professionals for Effective Utilization of Library Resources

Requirement of ICT Training Programs for LIS Professionals for Effective Utilization of Library Resources
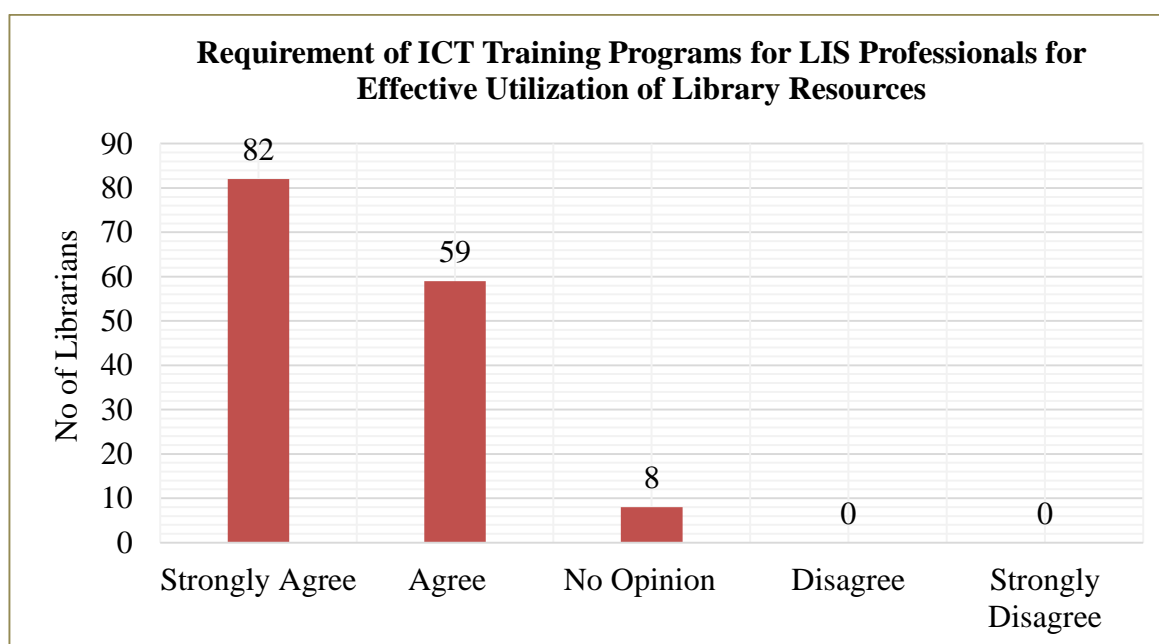
Above table and graph indicate that there is a requirement of ICT training program frequencies for LIS professionals for effective utilization of library resources. 82 (55%) library professionals have strongly agreed with the opinion that there is need of frequent ICT training program for LIS professionals for effective utilization of library resources. 59 (40%) library professionals have agreed with frequent ICT training program. Remaining 08 (05%) library professionals have not mentioned their opinion about frequent ICT training program.

Table No. 6.78: **ICT Literacy Helps in Increasing Research Output of the Users and Organizations**

Options	No. of Librarians	%
Strongly Agree	68	46
Agree	72	48
No Opinion	08	05
Disagree	00	00
Strongly Disagree	01	01
Total	**149**	**100**

Graph. No. 6.57: ICT Literacy Helps in Increasing Research Output of the Users and Organizations

ICT Literacy Helps in Increasing Research Output of the Users and Organizations

No of Librarians

- Strongly Agree: 68
- Agree: 72
- No Opinion: 8
- Disagree: 0
- Strongly Disagree: 1
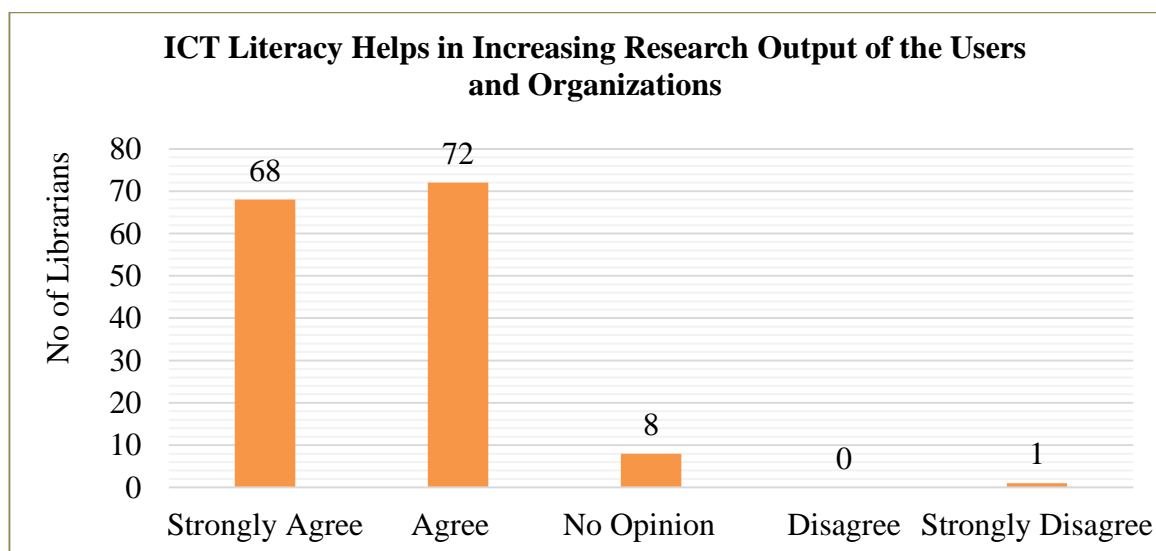
The above table and graph show that ICT literacy helps to increase the research output of users and organizations. 72 (48%) library professionals have agreed with the opinion that ICT literacy helps to increase research output among users and organizations. 68 (46%) library professionals have strongly agreed with the opinion that ICT literacy is helpful in increasing research output. 08 (05%) library professionals have not given their opinion about ICT literacy. Remaining 01 (01%) library professionals have strongly disagreed with the opinion that ICT literacy helps in increasing research output among users and organizations due to no ICT facility availability in their library.

Table No. 6.79: ICT Literacy Helps in Understanding of Economical, Legal and Social Issues on Use of Information

Options	No. of Librarians	%
Strongly Agree	59	39
Agree	73	49
No Opinion	13	09
Disagree	03	02
Strongly Disagree	01	01
Total	**149**	**100**

Graph. No. 6.58: ICT Literacy Helps in Understanding of Economical, Legal and Social Issues on Use of Information

ICT Literacy Helps in Understanding of Economical, Legal and Social Issues on Use of Information
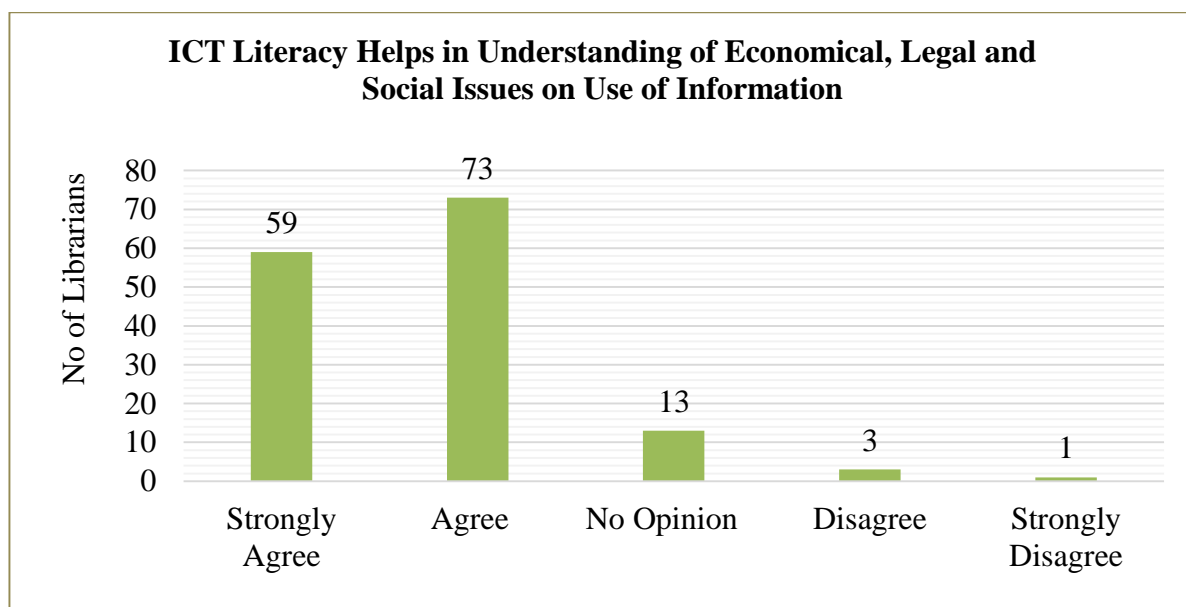
Above table and graph show that 73 (49%) library professionals have agreed with the opinion that ICT literary helps in understanding economical, legal and social issues on the use of current information. 59 (39%) library professionals have strongly agreed with the opinion that ICT literary helps in understanding economical, legal and social issues, 13 (09%) library professionals have not mentioned their opinions about ICT literacy. 03 (02%) library professionals have disagreed with the opinion that ICT literacy helpful in understanding economical, legal and social issues. Remaining 01 (01%) library professionals have strongly disagreed with the opinion that ICT literacy is helpful in understanding economical, legal and social issues.

Table No. 6.80: ICT Literacy Needs for Evaluation From Time To Time Due to Rapid Technological and Subject Development

Options	No. of Librarians	%
Strongly Agree	78	52
Agree	64	43
No Opinion	05	04
Disagree	02	01
Strongly Disagree	00	00
Total	**149**	**100**

Graph. No. 6.59: ICT Literacy Needs for Evaluation From Time To Time Due to Rapid Technological and Subject Development
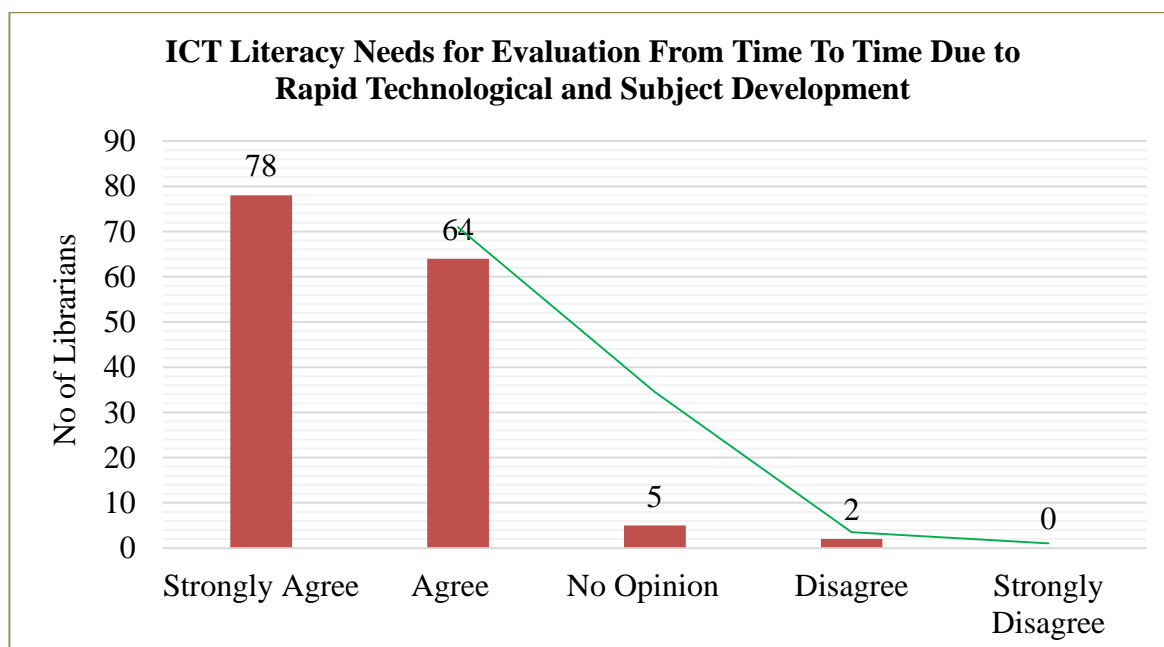
Above table and graph indicate that 78 (52%) library professionals have strongly agreed with the opinion that ICT literacy needs for regular evaluation due to technological and subject developments. 64 (43%) library professionals have agreed with the opinion that the ICT literacy needs for regular evaluation, 05 (04%) library professionals have not given their opinions about the continuous evaluation process of ICT literacy. Remaining 02 (01%) library professionals have disagreed with the opinion that ICT literacy needs regular evaluation due to technological and subject developments.

Table No. 6.81: ICT Literacy is Very Essential in Order to pull out the Resources since Most of Research Material is available in Electronic Format

Options	No. of Librarians	%
Strongly Agree	78	52
Agree	57	38
No Opinion	10	07
Disagree	03	02
Strongly Disagree	01	01
Total	**149**	**100**

Graph. No. 6.60: ICT Literacy is Very Essential in Order to pull out the Resources since Most of Research Material is available in Electronic Format

ICT Literacy is Very Essential in Order to pull out the Resources since Most of Research Material is available in Electronic Format
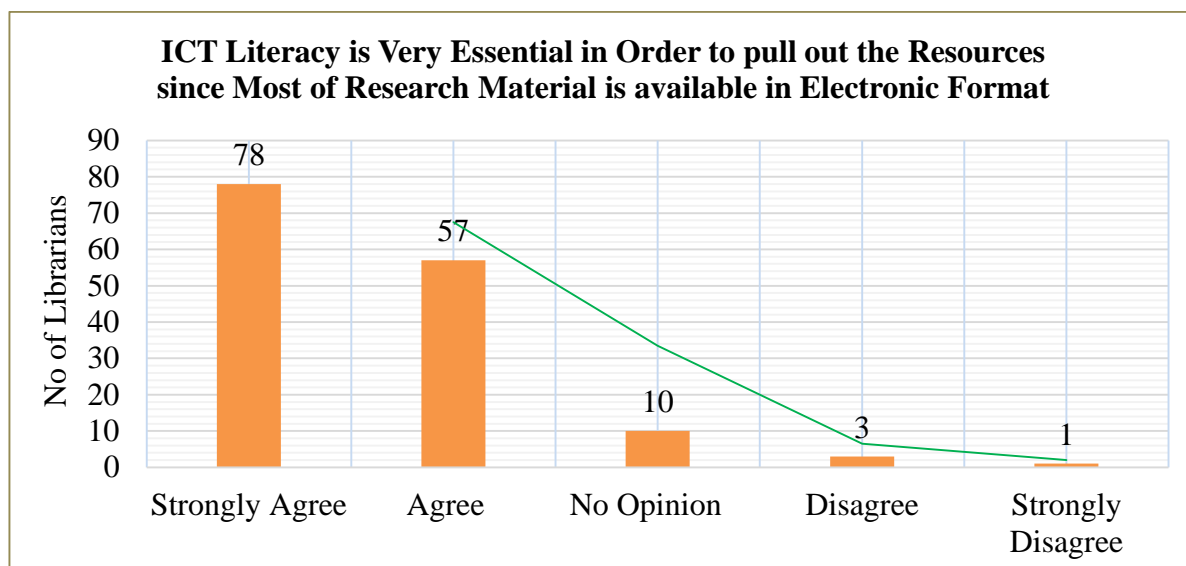
Above table and graph show that the ICT literacy is very essential to pull out resource, since most of the relevant research material is available in electronic format. 78 (52%) library professionals have strongly agreed with the opinion that the ICT literacy is very essential to pull out resources since most of the research material is now available in electronic format. 57 (38%) library professionals have agreed with the opinion that ICT literacy is essential to pull out the research material, 10 (07%) library professionals have not given the opinions about ICT literacy. 03 (02%) library professionals have disagreed with the opinion that ICT literacy is essential to pull out

research material, 01 (01%) library professional have strongly disagreed with the opinion that ICT literacy is essential to pull out research material.

Summary:

In this chapter, the researcher has scientifically analyzed all the relevant data by using different statistical tools and arranged systematically for obtaining research result with determined objectives of this study. The data has been analyzed and interpreted for validating the hypothesis with its initial phase. The findings are logically stated on the basis of interpreted data which has been expressed in chapter seven.

This chapter ends with the summary that the young library professionals are more computer literate in adopting ICT skills than the older ones. The ICT infrastructural facility availability is different from academic college libraries and technical institute libraries.

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CHAPTER – VII   FINDINGS, SUGGESTIONS AND CONCLUSION

7.1   Introduction:

This chapter gives the summary of the major findings of the study with suggestions for further research. Out 1024 colleges affiliated to Savitribai Phule Pune University, Pune the survey was carried out to assess the ICT literacy among library professionals of 179 college libraries in Nashik District. Out of 179 college libraries, only 149 college libraries responded to the questionnaire. The study also focused on whether ICT has any impact on the skills/competencies of library professionals with regard to their professional and research activities and educational needs. The study also to assess the awareness of library professionals about developments in ICT. The major findings of the study are as follows:

7.2   Findings:

7.2.1 Communicational Information of the College:

1. Majority of colleges in Nashik District are located in the rural area as compared to urban area. (Ref. Table No. 6.3)

2. The telephone is a basic need for every educational institutions. From the data collected, it is found that almost all colleges of Nashik District have telephone facility. (Ref. Table No. 6.4)

3. Due to the advancement of ICT, internet, e-mail, WhatsApp, Facebook, etc. are the main sources/tools to transfer documents. Currently, fax is not an effective source of communication and mostly it is outdated from service for transferring documents. (Ref. Table No.6.5)

4. In the present era of ICT, most of the communication is done through telephone, mobile phone, and the internet. Almost all the colleges have their own e-mail

accounts. The correspondence to universities, UGC, central government, state government and other institutions is done by e-mail. (Ref. Table No.6.6)

5. The college websites are mostly developed for showcasing college activities, functions on distance mode, a virtual campus tour, admission process and event calendar, etc. Most of the colleges in Nashik District have developed their own websites. (Ref. Table No.6.7)

6. All the library professionals of Nashik District have mobile cell phones. The mobile phone is the basic requirement for communication with one another from anywhere and anytime. (Ref. Table No.6.16)

7. It is found that the majority of library professionals have created their personal e-mail account. Whereas very few of them have created an e-mail account with college, institution or library name. (Ref. Table No.6.17)

8. The study regarding the internet access by library professionals focused that the majority of them use internet on a mobile cell phone. Few of them do not use internet on a mobile cell phone due to the slow speed of internet and network problems in the rural areas. (Ref. Table No.6.18)

7.2.2 Information about Library Facilities and Services:

1. Each college library has a different budget. The annual budget (in Rs.) of the college libraries indicates that 31 (21%) college libraries have the highest annual budget i.e. above 5 lakh, 17 (12%) college libraries have 4 to 5 lakh annual budget, 05 (03%) college libraries have 3 to 4 lakh annual budget, 15 (10%) college libraries have 2 to 3 lakh annual budget, 30 (20%) college libraries have 1 to 2 lakh annual budget, 24 (16%) college libraries have 50 thousand to 1 lakh annual budget, remaining 27 (18%) college libraries have below 50 thousand annual budget. Only two colleges from Arts, Commerce, Science and Computer Science faculties have above ten lakh annual budget and Engineering and Management Institutions having minimum five lakh and maximum sixty lakh annual budget. (Ref. Table No.6.20)

2. The study also found that apart from the library annual budget very few libraries have the supplementary budget for ICT infrastructure. Majority of libraries do not have the provision of separate ICT budget. On the other side, Engineering Colleges and Management Institutions have the provision of supplementary ICT budget for libraries. (Ref. Table No.6.21, 6.22)

3. During the study regarding the provision and development of library websites or library link on the college website, it is found that less than half of libraries have developed their own website or provided library link on the college website. (Ref. Table No.6.23)

4. N-List from INFLIBNET consortia is one of the popular databases among Arts, Commerce, Science and Computer Science Colleges in Nashik District whereas J-Gate and IEEE are the popular databases among Engineering Colleges. (Ref. Table No.6.26)

5. In the present ICT era, the digital library has been more beneficial for all the college libraries and their patrons. In Nashik District, very few colleges have developed their own digital library. (Ref. Table No.6.55)

7.2.3 Library Automation:

1. Majority of college libraries are using standard library automation software. Most of the libraries are partially automated and few of them are fully automated. (Ref. Table No.6.27, 6.28)

2. Majority of library operations are automated and get support from proprietary automation software. On the contrary, very few use open source software. (Ref. Table No.6.29, 6.30).

3. 'Vriddhi' is popular library management software among Nashik District college libraries. (Ref. Table No.6.31)

4. Most of the college libraries in Nashik District have implemented barcode technology for circulation of library books and stock verification. (Ref. Table No.6.33, 6.34)

5. Internet access frequency among library professionals in Nashik District is very high and they use internet for books acquisition, classification, Current Awareness Service (CAS), cataloguing of library books and Selective Dissemination of Information (SDI), etc. Very few of them also use the Internet in the library for accessing bibliographical databases and free accessed e-resources accessing purpose. (Ref. Table No. 6.35, 6.43)

7.2.4   Information about Library Professionals:

1. Total 141 out of 149 colleges in Nashik District have appointed a Librarian or Asst. Librarian in their library and eight colleges have not appointed a professionally qualified librarian. In such case, where the librarian is not appointed, the library operations are carried out by library-in-charge personnel. (Ref. Table No.6.8)

2. It is observed that out of 149 library professionals 99 are male whereas only 50 female professionals. (Ref. Table No.6.9)

3. Half of the library professionals from Nashik District colleges are between 26-35 age group and they are well qualified and ICT literate. Very few library professionals are below 25 years age and they are young and newly recruited with dynamic personality and knowledge of ICT. (Ref. Table No.6.10)

4. Majority of library professionals are graduate with a Bachelor of Arts (B.A.), followed by Bachelor of Science (B.Sc.) degree. Two library professionals have passed Bachelor of Computer Science (BCS), only one library professional has Bachelor of Pharmacy (B. Pharm.) and another one has Bachelor of Science in Agriculture (B.Sc. Agri.) degree. (Ref. Table No.6.11)

5. Out of 149 library professionals, 74 of them have completed their Post Graduate courses like Master of Arts (M.A.). Very of them have Master of Commerce (M.Com.). Only one library professional has Master of Science (M.Sc.) and the other one has Masters of Computer Science (MCS) degree. (Ref. Table No.6.12)

6. Total 138 out of 149 library professionals possess a degree in Library and Information Science subject like Masters of Library and Information Science (M.Lib.I.Sc.) Rest of them have passed Bachelor of Library and Information Science (B.Lib.I.Sc.). One library professional has passed ADIS (Associateship in Documentation and Information Science) degree from DRTC, Bangalore. (Ref. Table No.6.13)

7. Less than half of library professionals of Nashik District college libraries have qualified eligibility tests like NET or SET examinations. As per the requirement of UGC guidelines for universities and colleges. It is a mandatory qualification for every college librarian working in any aided or non-aided college library. (Ref. Table No.6.14)

8. Research is creating a new invention in all fields. In the library and information science subject many researchers have conducted research and published it. The earlier study of (Dhanavandan, Esmail, & Mani, 2016) stated that most of the library professionals are awarded a research degree like M.Phil. or Ph.D. As compared to this, not many library professionals from Nashik District have either M.Phil. or Ph.D. (Ref. Table No.6.15)

7.2.5 Use of Online and ICT Based Resources and Services by LIS Professionals:

1. Most of the library professionals of Arts, Commerce, Science and Computer Science Colleges use mobile internet for e-mail, WhatsApp, Facebook, e-resources access and general information browsing purpose. Some of the library professionals of Management Institutes use Twitter on mobile internet as well. (Ref. Table No.6.19)

2. Majority of library professionals have used various ICT tools for faster communication, study and research purpose, providing information services, professional development, updating products and publications, assisting and interacting with friends and experts. Very few of them have used ICT tools for entertainment. (Ref. Table No.6.41)

3. When the study was conducted, it is found that most of the libraries have provided e-mail services, e-resources access facilities, OPAC/Web OPAC, digital/virtual reference service, licensed databases and electronic document delivery service, etc. Very few of them provided inter-library loan through networking and institutional e-resources. (Ref. Table No.6.66)

7.2.6 Availability of ICT Infrastructural Facilities:

1. Most of the college libraries in Nashik District have internet connection up to 100 Mbps internet speed. Only one college library from Arts, Commerce, and Science and Computer Science faculty have the highest internet speed i.e. 1 GB and another one from Engineering Colleges have 2 GB Internet speed. (Ref. Table No.6.36, 6.37)

2. Half of the college libraries in Nashik District are having internet browsing cell allowing their users to access e-resources. (Ref. Table No.6.38)

3. Almost all the college libraries use Quick Heal antivirus software for protection of libraries online or offline information and library resources. (Ref. Table No.6.39)

4. It is observed that all the libraries are having client PCs with LAN connectivity to servers and printers as a minimum requirement. Even though there is frequent load-shading of electricity in Nashik District, it is observed that many libraries do not have UPS/Battery backup facility even though it is a must. There are a few libraries with additional infrastructures like a scanner for digitizing the document, photocopier, barcode scanner, web cameras, barcode printers, etc. Some of the libraries do have LCD projector, fax, CCTV Cameras and Smart LED TV too. So far only one college library has installed RFID technology so far. (Ref. Table No.6.40)

7.2.7 ICT Literacy/Skills among Library Professionals:

1. All the library professionals are techno-savvy and possess considerable knowledge and skills about ICT and its application in the library. Library

Assistant and Library Clerks have basic skills and knowledge of ICT tools and techniques. (Ref. Table No.6.25)

2. The main advantages of ICT literacy mentioned by library professionals are quick access to current data, reduced workload of library staff and improvement in library works and service qualities. Half of the library professionals have stated that their job satisfaction has been increased. It is helpful in updating subject knowledge and finally enhancing knowledge and skill are the main advantages of using ICT tools. (Ref. Table No.6.42)

3. Most of the library professional's internet accessing frequency is less than four hours a day. Less than half of library professionals internet using frequencies are two hours or below in a day. Near about 20% of the library, professionals have used the Internet more than eight hours in a day. (Ref. Table No.6.43)

4. With improved internet connectivity, various social networking tools are being used by library professionals for enhancing library services. WhatsApp is one of the popular social networking tools. Google Plus, Facebook, Skype, YouTube, LinkedIn, Twitter etc. are also being used by library professionals. It is also observed that a few of them have used Instagram, Hike Messenger, WeChat, etc. for providing enhanced library services. (Ref. Table No.6.44)

5. Library professionals use various search engines for using online information. Google is the most popular search engine among library professionals. Yahoo is the second preferable search engine while more than half of library professionals have used MSN, Excite and Bing. AltaVista and UC Browser are rarely used by library professionals. (Ref. Table No.6.45)

6. It is found that half of the library professionals have attended ICT training programmes and remaining have not attended any training programme related to ICT. (Ref. Table No.6.46)

7. Majority of library professionals have participated in ICT conference and seminars. Very few of them have attended workshops and ICT training

courses. Only three library professionals have participated in orientation courses on ICT, SOUL and Sanjay Software training. (Ref. Table No.6.47)

8. Knowledge of operating system is essentially requisite to handle computer systems and which is also the basic requirement of ICT. Majority of library professionals have good knowledge of Windows operating system and very few librarians have used Unix/Linux operating systems and only three librarians have knowledge of Sun Solaris and Mac operating system. (Ref. Table No.6.48)

9. The study regarding the knowledge of programming language shows that the majority of library professionals have used HTML and few library professionals have used C++, Java, VB.NET, XML and Pascal programming language. (Ref. Table No.6.49, 6.50)

10. Most of the library professionals have knowledge and experience of using MS office. Very few of them have knowledge and experience of barcode technology, webpage designing, software installation, database management system and metadata. A single library professional has a knowledge and actual experience of RFID technology. (Ref. Table No.6.51)

11. Very few library professionals have a knowledge and the actual use of MS-access, Photoshop, Coral Draw and Page Maker. (Ref. Table No.6.52)

12. Open Source Software (OSS) is the latest phenomenon and hence its use by library professionals is very low as a few are using OSS like KOHA, e-Granthalaya, CDS/ISIS, NewGenLib and ABCD software, etc. (Ref. Table No.6.53)

13. The study regarding the knowledge and experience of using open source software for developing institutional repositories shows that most of the library professionals have used DSpace software for developing institutional repositories. There are a few of them who have used Greenstone and EPrints open source software. (Ref. Table No.6.54)

14. The knowledge and experience of webpage designing among library professionals are very low level and most of them are not able to adapt the knowledge and experience of webpage designing. (Ref. Table No.6.56)

15. The study regarding the awareness of Massive Open Online Courses (MOOC) among college library professionals. It has found that very few library professionals are aware of it and they recommended MOOC is mostly useful for College Students, Teaching Staff and Researchers. (Ref. Table No.6.57)

16. The development of ICT and its application in libraries, it helps in building a close relationship with users and redesign library services according to the need of users. Through this, library professionals can keep up-to-date with the new developments in libraries. Most of the library professionals have actively participated in social networking tools like Facebook and WhatsApp, mailing list, web-based professional forums, instant messaging, content management system (Drupal, Joomla) and blogging (Weblogs, Twitter) etc. (Ref. Table No.6.59)

17. Most of the library professionals have knowledge of online utilities and services like a search engine, e-mail, online LIS group, OPAC/Web OPAC, online LIS networks, online LIS forums, subject gateway, online LIS blogs and electronic document delivery services. (Ref. Table No.6.61)

18. The analysis of the data on the confidence while handling internet tasks, most of the library professionals of Nashik District show that they have knowledge of using the Internet, download files from internet and attach files to e-mail messages, write and send e-mail and downloading musical files from the Internet, etc. (Ref. Table No.6.62)

19. When the development of handling the high-level ICT task was studied, it was found that most of the library professionals possess the knowledge of creating a presentation, use of spreadsheet, use of software and get rid of computer viruses, create a multimedia presentation, use of DBMS, construct a webpage and write of computer program. (Ref. Table No.6.63)

20. Under the study of competency skills acquired by library professionals for using various ICT tasks. The result shows that majority of library professionals have the skills to handle various ICT tasks and it is helpful in effective leadership, resource management, system management, project management and fund raising etc. (Ref. Table No.6.64)

21. During the study of the electronic information resources used by LIS professionals in the library for various library services and research purposes, it was found that majority of library professionals have used online journals, E-books, OPAC/Web OPAC, online databases, library websites more frequently for research and library services purpose. (Ref. Table No.6.65)

22. Most of the library professionals have adopted high-level ICT skills through formal education/training and half of library professionals have adopted ICT skills by self-study. Very few of them have acquired ICT skills through attending the conference, seminars, workshops, discussion with colleagues and friends, informal education or training, attending IT programmes, by ICT infrastructure suppliers and trial and error basis. (Ref. Table No.6.67)

23. About half of library professionals have conducted ICT training programme for library staff and most of LIS professionals have stated that the library staff are expert in using ICT through individual training and got trained through in-house workshops. (Ref. Table No.6.69)

24. Library professionals are up-to-date with the latest ICT development by using various methods and techniques. Majority of library professionals have acquired the latest ICT development skills by attending conference, seminars, workshops, orientation and refresher courses. Very few of them have acquired the latest ICT development skills by using e-forum or online interactions, attending ICT lectures and demonstration. (Ref. Table No.6.73)

25. One of the reasons for the lack of ICT skills up-gradation and implementation mentioned is the tight working schedule and lack of budget. (Ref. Table No. 6.72)

7.3 Comments and Suggestions by LIS Professionals for Improving ICT Literacy:

1. In the current ICT era, most of the library users/visitors prefer the Internet facility and e-resources. Sometimes e-resources, databases, software and hardware have troubled or stopped working, it is very difficult to access the information or difficult to continue the routine work of the library and such type of problems are faced by the majority of rural and tribal area libraries users.

2. One time programme or literacy programme is not enough and it may be conducted as a continuous activity of the library.

3. Most of the college libraries are belonging to the rural areas who do not have adequate ICT tools. So the higher authorities of the institution make provision or provide ICT infrastructure to the library for automation and increasing the use of library resources.

4. University may continuously arrange such type of ICT literacy programme for library professionals to improve services and increase library resources access from time to time.

5. ICT literacy is a continuous process and has to be acquired by every library professional for future development and self-improvement.

6. ICT literacy programme may be compulsory for the library professionals and higher authorities should give permission to attend and arrange such type of programmes.

7. ICT workshops and training programmes may be organized by library professionals from time to time to keep in touch with the new library trends.

8. UGC, AICTE and Universities should make provision for ICT literacy programme for library professionals.

9. Library professionals should frequently attend ICT programme. This will need co-operation and support from higher authorities to depute staff to attend higher educational extension, conferences and workshops.

7.4   Fulfillment of Objectives:

1. To assess the current status of ICT application in college libraries affiliated to Savitribai Phule Pune University (SPPU):
    While studying of this objective, it is found that 139 college libraries have computers for library operations. Most of the library systems are automated with standard library automation software. Less than half of college libraries i.e. 62 out 149 have used barcoded technology for circulation of library books and stock verification purpose. Thus the study indicates that the above objective is fulfilled.

2. To study the availability of e-resources and databases used by library professionals while serving the user community:

    During the study, the researcher has found that 129 college libraries have internet connectivity. Out of 149 college libraries in Nashik District 133 have subscribed various e-databases like N-LIST from INFLBNET, EBSCOhost, Emerald, INDEST, IEEE, Web of Science, J-Gate, DELNET, ASCE, ASME, Science Direct, Bentham Sci., Manupatra, Springer's and Pro-Quest. This indicates the fulfillment of this objective.

3. To assess ICT Literacy among the library professionals of college libraries affiliated to Savitribai Phule Pune University (SPPU):

    While studying this objective, the researcher found that all the 135 Librarians and 37 Assistant Librarians are ICT literate. Library professionals are experts in routine work with ICT and using various online ICT tools like Facebook, WhatsApp, mailing list, instant messaging, web-based professional forums, weblog, Twitter, Drupal and Joomla. The study of the library professionals in

ICT literacy and their use of various online tools indicates that the above objective is fulfilled.

4. To assess the level of application of ICT tools for library activities:

    The study shows that most of the library professionals are proficient in handling ICT tools like: Computer, Printer, Document Scanner, Barcode Printer and Scanner, Photocopiers, Web Camera and LCD Projectors, etc. Apart from this, library professionals are also experts in using various social networking tools like: WhatsApp, Facebook, Google Plus, YouTube, LinkedIn, Twitter, Instagram, Hike and WeChat, etc. The above discussion indicates that this objective is fulfilled.

5. To study the problems faced and the impact of ICT literacy programmes on library professionals:

    While studying this objective, it is observed that there is a lack of ICT literacy awareness among non-professional library staff and users. It is observed that most of the faculty members, especially Arts and Social Science stream do not take interest in ICT literacy programme due to lack of ICT knowledge and fear of ICT application. It is also observed that the main constraints for acquiring ICT literacy are tight working schedule and lack of updated ICT infrastructure and network facility. The details indicates that the above objective is fulfilled.

6. To suggest best practices/literacy models to enhance ICT literacy among library professionals:

    The researcher has studied the concept of four ICT literacy models like hardware literacy, software literacy, resource literacy and the search and retrieval literacy. Few best practices suggested for the improvement of ICT literacy among college librarians. The researcher has also proposed a suitable model to develop ICT literacy among college librarians. The above discussion indicates that this objective is fulfilled.

7.5 Testing of Hypothesis:

Hypothesis: ICT literacy of college Librarians and Assistant Librarians is satisfactory but need some training programmes to enhance it.

Table No. 7.1: ICT Literacy among Library Staff

Designation	No of Library Staff	ICT Literacy	%
Librarian	135	135	**100**
Asst. Librarian	37	37	**100**
Library Assistant	25	24	**96**
Library Clerk	48	45	**94**
Library Attendant	160	88	**55**
Peon	82	50	**61**
Any others (Professor In-charge, Jr. Clerk)	07	07	**100**

Graph No. 7.1: ICT Literacy among Library Staff
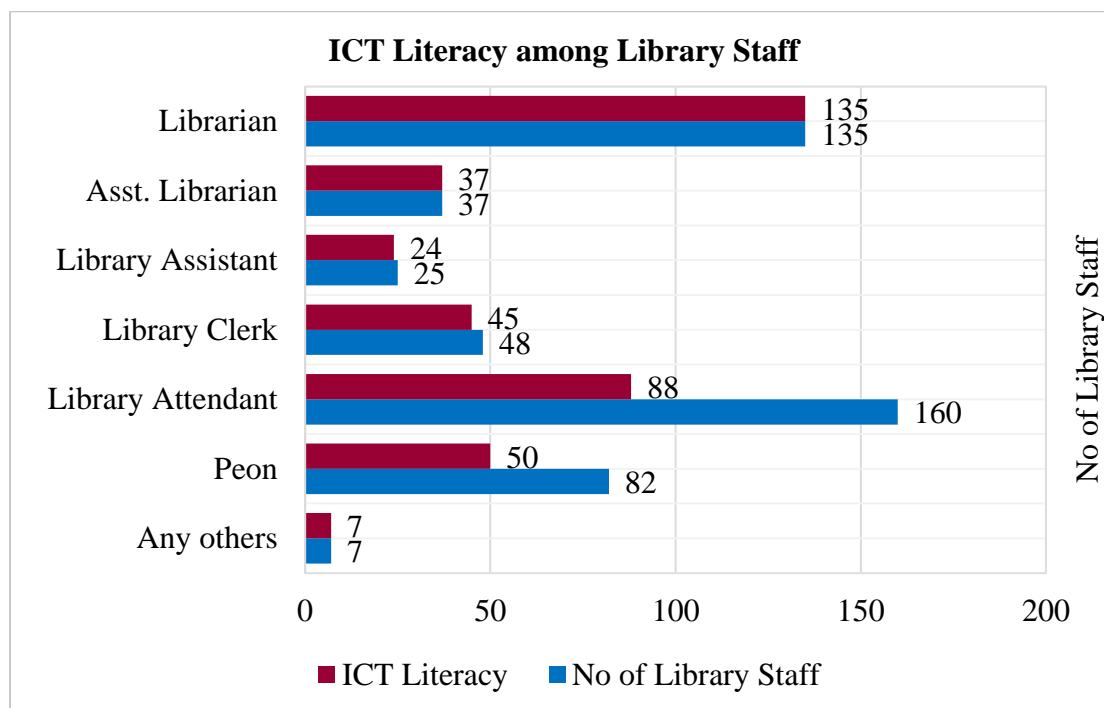
The above tables and graph show that all the Librarians and Assistant Librarians have sufficient knowledge or fully ICT literate with handling various ICT tools and techniques.

Table No. 7.2: Need of Training/Orientation Programme for Library Activities

Need of training/orientation	Yes	%	No	%
Use of bibliographic resources	79	**53**	70	**47**
Use of online catalogue	92	**62**	57	**38**
Use of E-journals, E-books and Databases	115	**77**	34	**23**
Internet tools and techniques	109	**73**	40	**27**
Search techniques and strategies	104	**70**	45	**30**
Library management software	105	**70**	44	**30**
Digital library and institutional repository software	122	**82**	27	**18**
Digitizing old and rare materials	123	**83**	26	**17**
Evaluation of online resources	109	**73**	40	**27**

Graph. No. 7.2: Need of Training/Orientation Programme for Library Activities

Need of Training/Orientation Programme for Library Activities
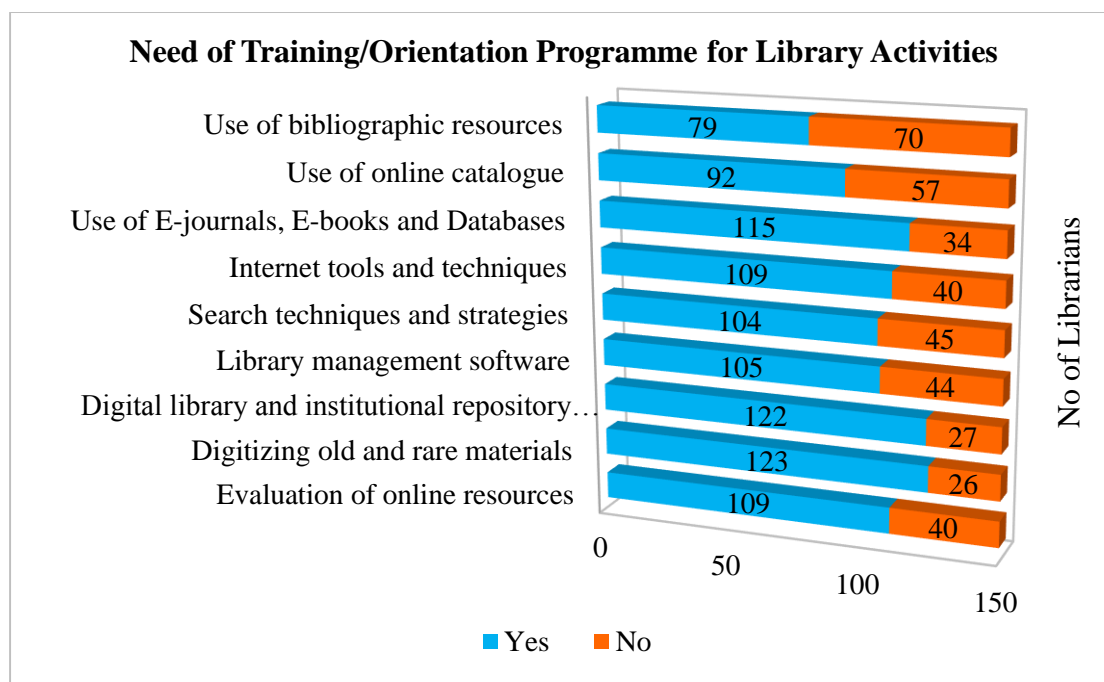
From the above table and graph most of the library professionals need to attend some training or orientation programmes like; digitizing old and rare materials, digital library/institutional repository software, Use of E-journals, E-books and Databases, Internet tools and techniques, Evaluation of online resources, Library management software, Search techniques and strategies, Use of online catalogue and Use of bibliographic resources etc. to upgrade ICT skills.

Reason: Library professionals have basic knowledge of ICT infrastructure to handle computer, printer, document scanner, barcode scanner and printer, LCD projector, web camera and photocopiers, etc. They have sufficient ICT skills and knowledge necessary for library management. But due to frequent changes and updates in ICT, library professionals need some training programmes to enhance their ICT skills.

7.6 Suggestions:

Following suggestions are put forth for the improvement of library resources and services, use of ICT tools and techniques and conducting ICT literacy programmes:

1. The main requirement of every college library is a separate budget for ICT development. UGC, AICTE or Institutions can make provision for ICT development in the library.

2. Most of the college libraries have subscribed e-databases as per suggestions of NAAC, UGC or AICTE but those database or e-resources are not used to them optimum either by library professionals or users due to illiteracy of accessing e-databases. UGC, AICTE or Universities can make provision for training sessions or lectures for accessing e-databases.

3. College libraries of Nashik District have basic hardware and software facilities, but there is a need for proper training in handling ICT tools such as hardware, software and online databases.

4. In spite of college, libraries use a variety of automation software. Other than UGC recommendations SOUL. It's high time for college libraries to go for standard software.

5. The awareness regarding open source software is very low among the library professionals in Nashik District. There is a requirement of the organization of continuous training programmes on Open Source Software.

6. Library professionals can regularly organise ICT literacy programme for library users for effective utilization of library e-resources and services.

7. Barcode technology used in college libraries is very low. Every college library can use such technology for the quick process of library operation and accuracy in working process.

8. In Nashik District, very few college libraries have the provision of internet browsing cell. It is a basic requirement for using online databases and e-resources in the library. Every college libraries can make provision of internet browsing cell.

9. Library professionals can regularly attend ICT related programme for self-improvement and enhance library services.

10. Digital library facility is essential for every modern library. Higher authorities can provide digital library infrastructure and make provision for the development of e-library.

11. ICT literacy should be frequently assessed by UGC, AICTE or Universities to analyze user satisfaction towards accessing library resources.

12. Library professionals need frequent training and orientation programme in ICT based library resources, services and tools. There is an urgent need for training in digitizing old and rare materials, digital library and institutional repository software, e-resources and e-databases, internet tools and techniques, evaluation of online resources, library management software and search tools and techniques.

7.7   Best Practices:

Best practices suggested for the improvement of ICT literacy among college librarians are listed below:

1. Apart from ICT Literacy, there are other literacies to be adopted by the college librarian and ICT literacy is not the prominent among them.

2. Librarians need to have hardware literacy in which all the hardware components required to develop automated, digital and virtual libraries are essential.

3. In addition, to develop an advanced library, the librarian also required literacies like scanners, barcode scanners, servers, storage devices, etc.

4. Network literacy is equally important for librarians to develop a network in the library.

5. Librarians need to understand software literacy which covers all types of software required for automating and advancing library including open source software, operating systems, etc.

6. Internet literacy is also equally important in which search engines, their types, search strategies and utilities are required.

7. Librarians need to know e-resource literacy and consortium development for the economics of collection development.

8. Librarians also gain literacies on information search and retrieval literacy which is more important while accessing databases online/offline more effectively.

9. In addition, web literacy is essential to access web tools for library development.

10. In short, librarians need to have different ICT related literacy to manage college library properly to a suite in the ICT environment.

7.8 Model for ICT Literacy:

After the details study on the status of the college library, the researcher has proposed a suitable model to develop ICT literacy.
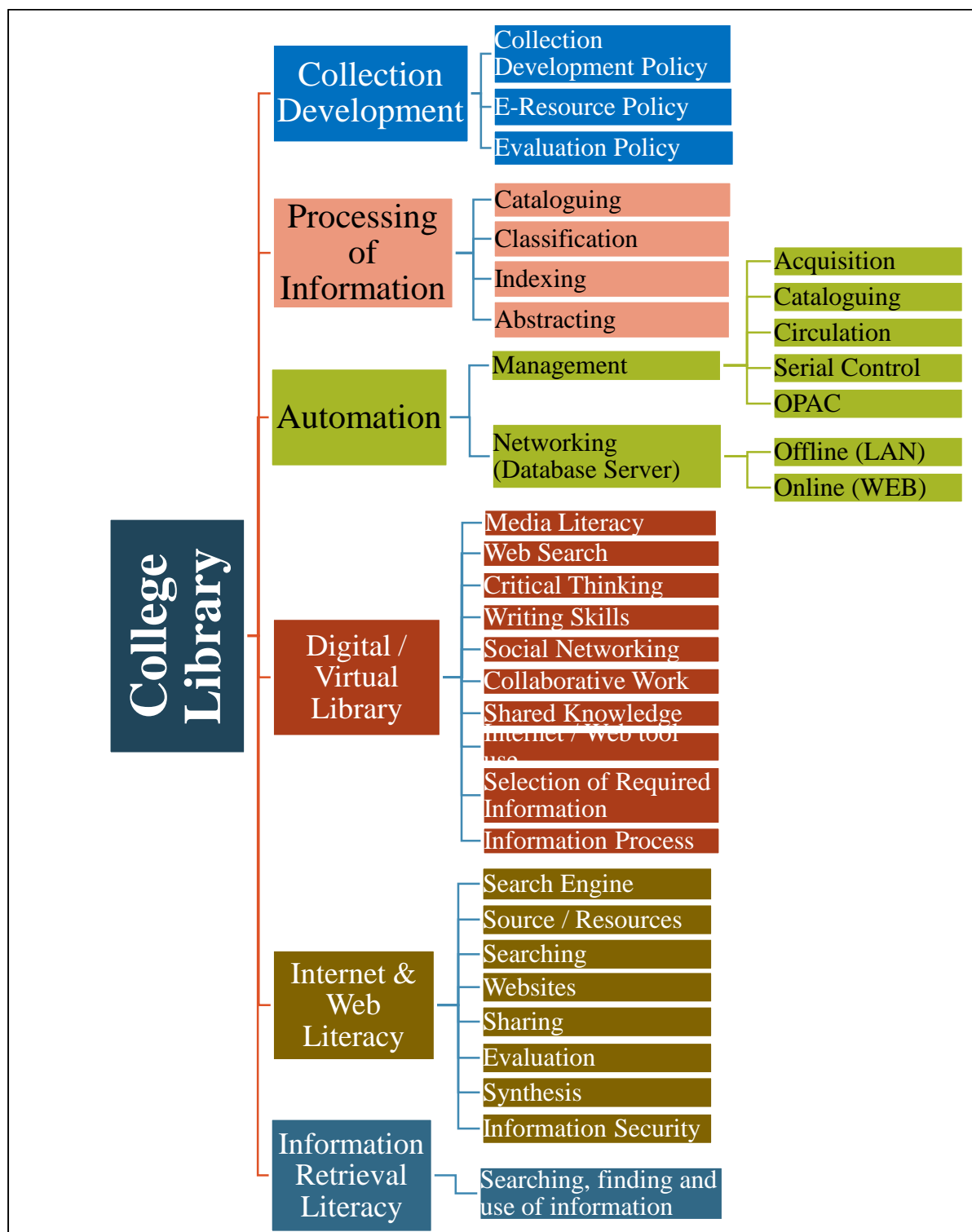
Figure No.7.1: ICT Literacy Model for Library Professionals

In addition to this equipment, technical, technological, communication, behavioural and knowledge literacy are essential.

7.9 Scope for Further Research:

During the present study, the researcher could identify certain areas for further research, they are as follows:

1. Study the impact of Information and Communication Technology on special libraries in Nashik District.
2. Explore the possibilities of the role of ICT in the field of Library and Information Science in the changing environment in general.
3. Analytical study of ICT literacy among library professionals of selected university libraries in Maharashtra.

7.10 Benefits of this Research to Society:

In Nashik District, a huge number of colleges are established and they are affiliated to Savitribai Phule Pune University (SPPU). Students, faculties and researchers are the main users of college libraries. In the modern technological environment, everyone is using a personal computer, laptop or cellphone for acquiring current information through the Internet. The library users do not use library resources to its optimum level without training. Library professionals can attend ICT programme related to library and they should organize training programmes for library users such as students, staff and research scholars.

7.11 Conclusion

Routine works in a library have been continuously changing as per the use of new technology and updating of such technologies. College librarians are also responsible for development and management of libraries with book selection, acquisition, processing, organization, dissemination and providing services when needed by library users. Librarian's role has drastically changed in the modern ICT era from the custodian of books to the development and management of electronic resources. Librarian is also known as cybrarian in the modern ICT era. Most of the academic

libraries hold all types of collections i.e. traditional resources e.g. textbooks, reference books, journals and periodicals, newspapers etc. and digital resources: like e-books, e-journals, e-databases, e-newspapers, e-thesis and dissertations and CDs / DVDs, etc.

ICT has changed and improved the operations and services of libraries using modern tools and techniques. It reduces the workload of library professionals and it helps to provide better library services. The librarian has to identify the best and innovative practices for its users in the modern ICT environment. The librarian should make proper planning and implementation of new trends and techniques to use library resources and services. To develop and implement new practices for library users, library professionals require participation in various ICT seminars, conferences and workshops, adopting new ICT competency skills, capacity building, team work and problem-solving nature. There is a need for continuous attendance at seminars and workshops for library professionals to adopt new ICT skills and to organize training programme for library users. A library professional has to develop ICT literacy models and provide training to users for accessing library resources. The expectations of the library professionals in the new digital are more knowledgeable, creative, productive, more focused and more competitive.

The basic need is that library professional should be first ICT literate himself, then he should develop and organized ICT literacy programmes for library users. ICT literacy training makes users active to use library resources and help to solve their information problems. ICT is very useful for academic libraries for development of resource sharing, electronic publishing and it has changed libraries in terms of collection, management, services and dissemination of information. Higher authorities of college and institutions have to provide the required ICT facilities to the library to develop and improve resources and services for user satisfaction. ICT literacy is a continuous process and it needs to adopt new changes as per updating of ICT tools and techniques.

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APPENDIX – I

Questionnaire for Library Professionals

Information and Communication Technology (ICT) Literacy among Library Professionals of College Libraries Affiliated to University of Pune: A Survey

A. Information about college/institution

Please (√) the appropriate option(s)   Year of Establishment: _____

A1. Name of the College / Institution: _____

A2. Name of the Principal / Director: _____

A3. Name of the Library (if any): _____

A4. Where is the college located?   Urban Area   Rural Area

A5. Communication Details: Ph. No: _____ Fax: _____

     College E-mail: _____

     College Website Address: _____

A6. Whether the college is granted:

    YES / NO

A7. Student Strength of the College: UG: _____ PG: _____ Total: _____

B. Librarians Information

B1. Name of the Librarian / Library In-Charge: _____

B2. Male / Female

B3. Age Group (Years): Below 25 / 26 – 35 / 36 – 45 /46 – 55/Above 55

B4. Designation: Librarian / Dy. Librarian / Asst. Librarian / Library Asst. / Other: __

B5. Educational Qualification:

Graduation: BA / B Com / B Sc / B C S / Other: _____

Masters: MA / M Com / M Sc / M C S / M C A / Other: _____

Professional: BLIS / MLIS / ADIS / MS-LIS / M Phil / Ph D / Other: ____

Eligibility Tests: NET / SET / SLET / JRF / SRF / Other: _____

Any others qualification, please specify: _____

B6. Contact: Phone (O):_____ Mobile: _____ / _____

Email: _____

B7. Do you use Internet on Mobile?

YES / NO

Purpose: E-mail   Browsing   WhatsApp

E-Resources   Twitter   Facebook

Any other (Please specify): _____

C. About Library

C1. What is Annual Budget of the Library (In Rupees)   Rs. _____/-

C2. Does your library has a separate budget for ICT?

YES / NO

If yes, then the amount of budget allotted for ICT,   Rs. _____/-

C3. Is there a separate library website or a link from your college website? YES / NO

If yes, kindly mention the information available on the website about library

General Information   Library facilities & services

Rules & regulations   Library staff details

Link to online resources   Link to OPAC

Any other: _____

C4. Information Regarding Library Staff and their ICT Literacy

Designations	No. of Posts	ICT Literate Staff (Quantity)	
		YES (Quantity)	NO (Quantity)
Librarian			
Assistant Librarian			
Library Assistant			
Library Clerk			
Library Attendant			
Peon			
Any other			

C5. Library Collection

Sources	Number
Books	
Magazines / Journals / Periodicals	
E-Books	
E-Journals	
E-Resources (CDs/DVDs etc.)	
Audio visual material	
Online Databases	
Any other	

C6. Which e-databases / consortia subscribed in your library?

N-List   EBSCO HOST   Emerald

INDEST   Web of Science   IEEE

J-Gate   Any others (1) _____ (2) _____ (3) _____

D. Library Automation

D1. Whether the library operations are automated?   YES / NO

      If yes, what is the current status of library automation?

      Fully automated   Partially automated   Beginning stage   Not started

D2. Which library software is used for library automation?

      Commercial: LIBSYS   SLIM21   SOUL   LibSuite   Libman

      Other: _____

      Open Source: Koha   ABCD   E-Granthalya   NewGenLib

      Other: _____

      Or In-house: _____

D3. Whether your library OPAC is on Internet or on Intranet?

      YES/NO

D4. Whether barcode technology is introduced in your library?

      YES/NO

      Purpose: Circulation   Stock Verification   Any other: _____

D5. Do you use Internet for any of the following library operations / services?

      Acquisition   Cataloguing   Classification Bibliographic databases

      SDI   CAS   Any others please specify _____

E. Status of ICT Infrastructure

E1. Does your library have Internet connection?

      YES / NO

      If yes, what is the bandwidth of the Internet Connection? _____

E2. Does your library has Internet Browsing Cell?

      YES / NO

E3. Which of the following antivirus software do you use for protection of online information?

      Quick Heal   Kaspersky   McAfee

      Norton   Any other _____

E4. Which of the following ICT hardware is available in the library?

Particular	Available (√)	Number
Server		
Client PCs		
Printer		
Barcode Scanner		
Barcode Printer		
Scanner for Digital Library		
Fax Machine		
Photocopier		
UPS/Battery back up		
Web Camera		
LCD Projector		
RFID Technology		
Any other _____		

E5. What are the basic purposes of using various ICT tools in library?

Faster Communication   Study & research

Providing information services   Entertainment

Professional development   Interact with friends & experts

Updates of Products and publications Any other: _____

E6. What are the advantages of using various ICT tools in library?

Quick access to current data   Improved quality of library
   services

Reduce the workload of library staff   Increased job satisfaction

Updating of subject knowledge   Enhance knowledge & skills

E7. What is your frequency of using the internet?

More than 8 Hrs / day   Less than 04 Hours   Less than 02 Hours

Less than one Hour   Rarely

E8. Which of the following social networking tools do you use to enhance library services?

        WhatsApp   Facebook   Twitter   LinkedIn

        Skype   Instagram   WeChat   Hike Messenger

        YouTube   Google plus   Any other _____

E9. Indicate the ease of use of your preferred search engine from the following. Please give   preference as 1st =Most Easy 7th =Least Easy

Search Engine	1	2	3	4	5	6	7
Google							
MSN							
Yahoo							
Alta Vista							
Excite							
Bingo							
Any other _____							

F. About ICT Literacy

F1. Have you attended any ICT related training program?

        YES / NO

If yes, kindly tick any of the following

        ICT training course   ICT Conference / Seminar

        ICT Workshop   ICT related Paper presentation

        Any other mode _____

F2. Which of the following Operating Systems do you use?

        Windows Operating System   Unix / Linux Operating System

        Sun Solaris   Mac Operating System

        Any other: _____

    F3. Have you ever used any of the following programming language?

      YES / NO

If yes, kindly mention the programming languages do you use

C++   HTML   XML   JAVA   VB.NET

Pascal   Any other: _____

F4. Which of the following ICT based applications do you use?

Web page design   Metadata

Installation & customization of software   Database Management System

MS office package   RFID Technology

Barcode Technology   Any other _____

F5. Which of the following application software packages do you use?

MS-WordMS-ExcelMS-AccessMS-Power PointPhotoshop

CorelDRAW   PageMaker   Notepad   Any other ___

F6. Have you used any of the following Open Source Software for Library Automation?

Koha   CDS/ISIS   NewGenLib

E-Granthalaya   ABCD   Any other: _____

F7. Have you used any of the following Open Source Software for Institutional Repositories?

DSpace   Greenstone (GSDL)   E-Prints   Any other

F8. Is there a digital library of your college / institution?

YES / NO

If yes, what is site address: _____

F9. Do you have any experience of webpage designing?

YES / NO

F10. Are you aware about Massive Online Open Courses (MOOC)?

YES / NO

If yes, kindly mention the type of users do you recommend for those courses?

Teaching staff   Non-teaching staff   Researchers

College students   Any others (Please specify): _____

F11. Have you used following online ICT tools?

[**Options:** 1) Excellent 2) Good   3) Average   4) Below Average 5) Extremely poor]

Online ICT tools	Options (Ans.)				
	1	2	3	4	5
Social Networking (Facebook, WhatsApp)					
Web based professional forums					
Mailing list					
Instant messaging					
Blogging (Weblogs, Twitter)					
Content management system (Drupal, Joomla)					

F12. Do you use online utilities and services in your library?

YES / NO

If yes, kindly mention to what extent you use these utilities and services.

[**Options:** 1) Excellent 2) Good   3) Average   4) Below Average 5) Extremely poor]

Online utilities	Options (Ans.)				
	1	2	3	4	5
Search Engine					
E-Mail					
Online LIS Group					
Online LIS Networks					
Online LIS Forums					
Online LIS Blogs					
Subject gateway					
Electronic document delivery service					
OPAC / Web OPAC					

F13. Do you have confidence while handling following internet tasks?

[**Options:** 1) Excellent 2) Good   3) Average   4) Below Average 5) Extremely poor]

Internet Tasks	Options (Ans.)				
	1	2	3	4	5
Get it to the Internet					
Copy/download files from the Internet					
Attach a file to an e-mail message					
Download music from the Internet					
Write and send e-mail					

F14. Do you have confidence while handling following high-level ICT tasks?

[**Options:** 1) Excellent 2) Good   3) Average   4) Below Average 5) Extremely poor]

High-level ICT tasks	Options (Ans.)				
	1	2	3	4	5
Use of DBMS					
Create a presentation					
Use a spreadsheet					
Use of software & get rid of computer viruses					
Create a multimedia presentation					
Construct a webpage					
Write a computer program					

F15. Which of the following competency skill you have acquired and used?

[**Options:** 1) Excellent 2) Good   3) Average   4) Below Average 5) Extremely poor]

Competency Skill	Options (Ans.)				
	1	2	3	4	5
Project Management					
Resource Management					
System Management					
Fund Raising					
Effective Leadership					

F16. Do you use following electronic resources in your library?

[**Options:** 1) Excellent 2) Good   3) Average   4) Below Average 5) Extremely poor]

Electronic Resources	Options (Ans.)				
	1	2	3	4	5
OPAC / Web OPAC					
Library Website					
E-books					
Online Journals					
Online Databases					
ETD (Electronic Thesis & Dissertations)					
Digital Archives / Subject Gateways					
Library Networks					
Library Consortium					

F17. Does your library provide following ICT based library services?

ICT based services	Yes	No
Information retrieval (accessing, searching & use of e-documents)		
Digital / virtual reference		
Licensed database		
E-journals		
E-books		
Institutional e-resources		
OPAC / Web OPAC		
Electronic document delivery		
FAQ		
E-mail		
Interlibrary loan through networking		
Circulation of new additions list		

F18. Which method do you adopt for acquiring ICT skills?

Formal education / training   Informal education / training

From colleagues / friends   Trial & error basis

Self-study   Training at work place

Training by suppliers   Attending IT programmes

Attending Conference/Workshop/Seminars   Any others: _____

F19. Do you conduct any ICT training program for library staff?

YES / NO

If yes, mention the training methods.

Conduct in-house workshop   Organize workshop in other institutes

Train Individual library staff   Any other_____

F20. Do you agree with various institutions (UGC, AICTE, Universities) should arrange regular ICT training programme for library professionals?

YES / NO

F21. In which of the following area you would like to upgrade your ICT skills?

Training / Orientation Needs	Yes	No
Use of bibliographic resources		
Use of online catalogue		
Use of E-journals, E-books and Databases		
Internet tools and techniques		
Search techniques and strategies		
Library management software		
Digital library and institutional repository software		
Digitising old and rare materials		
Evaluation of online resources		

F22. What are the constraints in acquiring ICT skills?

Type of constraint	Yes	No
Tight working schedule		
Inadequate training in ICT applications		
Lack of infrastructure & network facility		
Lack of cooperation from the authority		
Lack of budget for ICT		
Lack of co-ordination among library staff		
Non-availability of consultation services		
Lack of updating ICT strategy		
Fear of ICT application		
Lack of interest among LIS professionals in ICT		

F23. Which is the following better method for updating the latest ICT development?

Conference/Workshop/Seminars   Training programmes

E-forums/online interaction   Demonstration/lectures

Orientation/Refresher course   Any others: _____

G. Your opinions on:

[**Options:** 1) Strongly Agree 2) Agree   3) No Opinion   4) Disagree 5) Strongly disagree]

No	Questions	Options (Ans.)				
		1	2	3	4	5
G1.	Effectiveness and relevance of the ICT literacy should be frequently assessed to analyse user satisfaction.					
G2.	ICT literacy helps to increase the foot-fall in the library and increases use of e-resources.					
G3.	Frequent ICT training programs for LIS professionals are necessary for effective utilization of library resources.					
G4.	ICT literacy helps in increasing research output of the users and organization.					
G5.	ICT literacy helps understanding of economical, legal and social issues related to the use of information.					
G6.	ICT literacy is a continuous process and needs to be evaluated from time to time due to rapid technological and subject developments.					
G7.	ICT literacy is must to pull out the relevant resources as most of the research material is now available in electronic format.					

G8. What difficulties do you face while planning, designing and delivering ICT Literacy programme?

_____

_____

G9. Any other comments, suggestions with respect to above subject. Please feel free to write.

_____

_____

APPENDIX – II

List of Colleges & Institutes affiliated to
University of Pune in Nashik District

No.	Name and Address of College & Institutes	Estb. Year
1	Gokhale Education Society H.P.T. Arts and R.Y.K. Science College. **Address:** Prin Ta Kulkarni Vidya Nagar, Tal: Nashik, Dist: Nashik	1924
2	Gokhale Education Society B.Y.K. (Sinnar) College of Commerce. **Address:** B Y K Sinnar College of Commerce Prin T A Kulkarni Vidya Nagar Nashik, Tal: Nashik, Dist: Nashik	1957
3	Mahatma Gandhi Vidyamandir M.S.G. College. **Address:** Loknete Vynaktrao Hire Road Malegao Camp, Tal: Malegaon, Dist: Nashik	1959
4	Gokhale Education Society RNC, JDB Commerce College and Nsc Science. **Address:** RNC Arts JDB Commerce and Nsc Science College Nashik Road, Nashik, Tal: Nashik, Dist: Nashik	1963
5	Maratha Vidya Prasarak Samaj College of Education, Nashik. **Address:** M V P Campus, Gangapur Road, Nashik, Tal: Nashik, Dist: Nashik	1965
6	Maratha Vidya Prasarak Samaj Karmveer Abasaheb Alias N.M. Sonwane Arts Commerce and Science College. **Address:** More Nagar, Satana Tal: Baglan, Dist: Nashik	1967
7	Nutan Vidya Prasarak Mandal Arts, Commerce, Science College. **Address:** Lasalgaon, Tal: Niphad, Dist: Nashik	1967
8	Maratha Vidya Prasarak Samaj K.K. Wagh Arts, Science and Commerce College, Pimpalgaon (B.). **Address:** Pimpalgaon Baswant, Tal: Niphad, Dist: Nashik	1968

No.	Name and Address of College & Institutes	Estb. Year
9	Gokhale Education Society J.D.C. Bytco Institute of Management Studies and Research. **Address:** Prin T A Kulkarni Vidyanagar, College Road Nashik, Tal: Nashik, Dist: Nashik	1968
10	Mahatma Gandhi Vidyamandir Arts, Science and Commerce College Manmad.. **Address:** Manmad 423104, Tal: Nandgaon, Dist: Nashik	1969
11	Maratha Vidya Prasarak Samaj Krt Arts Bh Commerce and Am Science College (Kthm) Nashik. **Address:** Shivajinagar, Gangapur Road, Nashik, Tal: Nashik, Dist: Nashik	1969
12	Maratha Vidya Prasarak Samaj GMD Arts BW Commerce and Science College. **Address:** Sinner, Tal: Sinnar, Dist: Nashik	1969
13	Gokhale Education Society N.B. Thakur Law College. **Address:** Principal Ta Kulkarni Vidyanagar College Road, Tal: Nashik, Dist: Nashik	1969
14	Mahatma Gandhi Vidyamandir Arts and Commerce College. **Address:** Winchur Road Yeola, Tal: Yeola, Dist: Nashik	1970
15	Shri Neminath Jain Bramhacharyashram (Jain Gurukul) Karmaveer Keshavlalji Harakchandji Abad Arts and Shriman M.G.Lodha Commerce & Shriman P.H. Jain Science College, Chandwad. **Address:** Neminagar, Chandwad, Tal: Chandwad, Dist: Nashik-423101	1970
16	Mahatma Gandhi Vidyamandir L.V.H.Panchavati. **Address:** Panchavati, Nashik, Tal: Nashik, Dist: Nashik	1970
17	M.G.Vidyamadir, Malegaon College of Education. **Address:** Bhaygaon Road, Malegaon Camp, Tal: Malegaon, Dist: Nashik	1970
18	Mahatma Gandhi Vidyamandir G D A B Art's and Commerce College. **Address:** Kidwad Road Malegaon City, Tal: Malegaon, Dist: Nashik	1971

No.	Name and Address of College & Institutes	Estb. Year
19	Maratha Vidya Prasarak Samaj K.G.D.M. Arts Comm. Science, College Niphad Dist Nashik. **Address:** Niphad Tal: Niphad Dist: Nashik-422303	1971
20	Mahatma Gandhi Vidyamandir K.B.H. Law College. **Address:** Malegaon-Camp, Tal: Malegaon, Dist: Nashik	1971
21	Maratha Vidya Prasarak Samaj Arts and Commerce College Vani. **Address:** Vani, Tal: Dindori, Dist: Nashik	1972
22	Maratha Vidya Prasarak Samaj Arts, Commerce and Science College Nandgaon. **Address:** At-Post- Nandgaon Malegaon Road, Tal: Nandgaon, Dist: Nashik	1972
23	Devala Education Society Karmveer Ramravji Aher Art's Commerce and Science College. **Address:** Deola, Tal: Deola, Dist: Nashik	1978
24	Maratha Vidya Prasarak Samaj K.P.G. Arts, Commerce & Science College, Igatpuri. **Address:** Near Take-Ghoti, Mumbai-Agra Road, Igatpuri, Tal: Igatpuri, Dist: Nashik	1981
25	Nashik District Maratha Vidya Prasarak Samaj Ndmvp Samajs College of Pharmacy, Nashik. **Address:** Gangapur Road, Nashik, Tal: Nashik, Dist: Nashik	1982
26	Kalvan Education Society Arts, Commerce and Science College, Kalvan **Address:** Tal: Kalwan, Dist: Nashik	1983
27	Yog Vidya Gurukul **Address:** Yog Bhavan College Road Nashik 5, Tal: Nashik, Dist: Nashik	1983
28	Mahatma Gandhi Vidyamandir Arts Science & Commerce College **Address:** Nampur, Tal: Baglan, Dist: Nashik	1984

No.	Name and Address of College & Institutes	Estb. Year
29	Maratha Vidya Prasarak Samaj S.V.K.T. College. **Address:** Lam Road Devalali Camp, Tal: Nashik, Dist: Nashik	1984
30	Maratha Vidya Prasarak Samaj, Nashik M.V.P Samaj's Arts, Science and Commerce College, Ozar (Mig). **Address:** Tilaknagar Ozar, Tal: Niphad, Dist: Nashik	1984
31	Karmaveer Kakasaheb Wagh Education Society Karmaveer Kakasaheb Wagh Institute of Engineering Education & Research. **Address:** Hirabai Haridas Vidyanagari, Amrutdham, Panchavati, Tal: Nashik, Dist: Nashik	1984
32	Madhyavarti Hindu Sainik Shikshan Mandal Bhonsala Military College. **Address:** Dr Moonje Marg Rambhumi Nashik, Tal: Nashik, Dist: Nashik	1986
33	Gokhale Education Society H.A.L. College of Science & Commerce. **Address:** Ozar Township Tal: Niphad District: Nashik 422207	1986
34	Maratha Vidya Prasarak Samaj IMRT **Address:** Shivajinagar, Gangapur Road, Nashik, Tal: Nashik, Dist: Nashik	1986
35	Jadeed Anjuman E Taleem J.A.T.Arts, Science & Commcer College (For Women). **Address:** 10, Islampura, Malegaon, Tal: Malegaon, Dist: Nashik	1989
36	Maratha Vidya Prasarak Samaj College of Architecture, Nashik. **Address:** Udoji Marathi Boarding Campus Gangapur Road, Tal: Nashik, Dist: Nashik	1989
37	Mahatma Gandhi Vidyamandir Smt.Pushpatai Hire Mahila College, Malegaon Camp, Malegaon, Dist.Nashik. **Address:** Loknete Vankatrao Hire Road, Malegaon Camp, Tal: Malegaon, Dist: Nashik	1990
38	Citizen Welfare Education Society Dr.Manjur Hasan Ayyubi College of Education. **Address:** Serve No224, Plat No124, Tal: Malegaon, Dist: Nashik	1990

No.	Name and Address of College & Institutes	Estb. Year
39	Mahatma Gandhi Vidyamandir K.B.H. Institute of Management and Research. **Address:** Bhaygaon Road, Opposite B Ed College, Tal: Malegaon, Dist: Nashik	1990
40	Shri Gurudev Shikshan Prasarak Mandal Swami Muktanand College of Science, Yeola. **Address:** Yeola, Tal: Yeola, Dist: Nashik	1991
41	Mahatma Gandhi Vidyamandir Art's, Sci. & Comm.College, Surgana (Nashik). **Address:** Surgana, Tal: Surgana, Dist: Nashik	1992
42	Maratha Vidya Prasarak Samaj IMRT (College of Social Work) Nashik. **Address:** MVP Campus, Gangapur Rd, Nashik, Tal: Nashik, Dist: Nashik	1993
43	Maratha Vidya Prasarak Samaj Karmaveer Shantarmbapu Kondaji Wavare Arts, Science and Commerce College. **Address:** Uttamnagar Cidco, Tal: Nashik, Dist: Nashik	1993
44	Dang Seva Madal Dadasaheb Bidkar Arts and Commerce College. **Address:** Peth, Tal: Peth, Dist: Nashik	1993
45	Mahatma Gandhi Vidyamandir Arts, Science & Commerce College Harsul. **Address:** At Post Harsul Tal: Tryambkeshwar, Dist: Nashik-422204,	1993
46	University Wing School of Artillery School of Artillery. **Address:** HQ University Wing School of Artillery Devlali Camp, Tal: Nashik, Dist: Nashik	1993
47	Mahatma Gandhi Vidyamandir Mahatma Gandhi Vidyamandir Pharmacy College. **Address:** Panchvati, Tal: Nashik, Dist: Nashik	1993
48	Navjeevan Education Society Navjeevan Institute of Management. **Address:** Shivshakti Chowk 4th Scheme Cidco, Tal: Nashik, Dist: Nashik	1994

No.	Name and Address of College & Institutes	Estb. Year
49	Mahatma Gandhi Vidyamandir Institute of Management and Reasearch. **Address:** Mumbai Agra Rd, Panchavati, Tal: Nashik, Dist: Nashik	1994
50	Dang Seva Mandal.Nashik Arts College Abhona. **Address:** Abhona, Tal: Kalwan, Dist: Nashik	1996
51	Maratha Vidya Prasarak Samaj Arts & Commerce College, Taharabad. **Address:** At Post - Taharabad, Tal: Baglan, Dist: Nashik	1997
52	Nashik Shikshan Prasarak Mandal Late. Bindu Ramrao Deshmukh Arts & Commerce Mahila Mahavidyalaya, Nashik Road. **Address:** Sane Guruji Nagar, Jail Road, Nashik Road, Tal: Nashik, Dist: Nashik	1998
53	Vasantrao Narayanrao Naik Education Society Arts Commerce and Science College. **Address:** Sharanpur Road, Tal: Nashik, Dist: Nashik	1998
54	Maratha Vidya Prasarak Samaj Arts, Commerce and Science College. **Address:** Post Saykheda,Tal- Niphad, Dist- Nashik	1998
55	Maratha Vidya Prasarak Samaj Arts, Commerce and Science and College. **Address:** Jawahar Road Trimbykeshwar, Tal: Tryambakeshwar, Dist: Nashik	1998
56	Pravara Rural Education Society Sir Visvesvaraya Institute of Technology. **Address:** Chincholi, Tal: Sinnar, Dist: Nashik	1998
57	Nashik District Maratha Vidya Prasarak Samaj Maratha Vidya Prasarak Samaj's Karmaveer Baburao Ganpatrao Thakare College of Engineering. **Address:** Udoji Maratha Boarding Campus, Near Pumping Staff, Gangapur Road, Tal: Nashik, Dist: Nashik	1999
58	Navjeevan Education Society Navjeevan Law College Nashik. **Address:** Shivshakti Nagar 4th Scheme Cidco, Tal: Nashik, Dist: Nashik	1999

No.	Name and Address of College & Institutes	Estb. Year
59	Shriman Neminath Jain Brahmacharyashram Shri Sureshdada Jain College of Pharmacy. **Address:** At Neminagar, Chandwad, Tal: Chandwad, Dist: Nashik-423101	1999
60	Mahatma Gandhi Vidyamandir Arts College. **Address:** Soundane, Tal: Malegaon, Dist: Nashik	2000
61	Vasantrao Narayanrao Naik Education Society Institute of Management and Rural Development. **Address:** Sharanpur Road Canada Corner, Tal: Nashik, Dist: Nashik	2000
62	Krantiver Vasantrao Narayanrao Naik Education Society Arts & Commerce College, Dindori. **Address:** At/Post-Dindori, Near Government ITI, Tal: Dindori, Dist: Nashik	2001
63	Maratha Vidya Prasarak Samaj Arts Commerce and Science College Dindori. **Address:** At/Post-Dindori, Tal: Dindori, Dist: Nashik	2001
64	Anjuman Imdadut Tulba Art's, Commerce & Science Night College. **Address:** Farmesi Nagar, Malegaon, Tal: Malegaon, Dist: Nashik	2001
65	Mahatma Gandhi Vidyamandir Panchvati College of Management and Computer Science. **Address:** Mumbai-Agra Road, Highway Number 3 Panchvati Nashik, Tal: Nashik, Dist: Nashik	2001
66	Godavari Shikshan Mandal G.D. Sawant Arts, Science & Commerece College. **Address:** Dattatray Valse Patil Vidyanagari Pathardi Phata Pathardi Road, Tal: Nashik, Dist: Nashik	2001
67	Mahatma Gandhi Vidyamandir Samajshree Prashantdada Hiray College of Hotel Management and Catering Technology. **Address:** Mumbai-Agra Road, Panchavati, Tal: Nashik, Dist: Nashik	2001

No.	Name and Address of College & Institutes	Estb. Year
68	Tuljabhavani Education Society Shri Saptshrungi Arts and Commerce College Dangsaundane. **Address:** At Post-Dangsaundane, Tal: Baglan, Dist: Nashik-423301	2002
69	K.K. Wagh Shikshan Sanstha K.K. Wagh Arts, Commerce, Science and Computer Science College. **Address:** Adgaon Road Nashik, Tal: Nashik, Dist: Nashik	2002
70	Lagrace Education Society IMRIT. **Address:** Krishnmangal Society Gangapur Road Nashik, Tal: Nashik, Dist: Nashik	2002
71	C.H.M.E. Society Dr. Moonje Institute of Management and Computer Studies. **Address:** Bhonsala Military College Campus, Gangapur Road, Rambhoomi, Nashik, Tal: Nashik, Dist: Nashik-422 005	2002
72	Maratha Vidya Prasarak Samaj Arts and Commerce College. **Address:** Post-Khedgav, Tal: Dindori, Dist: Nashik	2003
73	Maratha Vidya Prasarak Samaj Arts and Commerce College. **Address:** Soygaon, Tal: Malegaon, Dist: Nashik	2003
74	Shri Brahmanand Swami Shikshan Prasarak Mandal Arts and Commerce College. **Address:** Dodi Bu, Tal: Sinnar, Dist: Nashik	2003
75	K.K. Wagh Shikshan Sanstha K.K Wagh Arts, Commerce, Science and Computer Science College. **Address:** Chandori, Tal: Niphad, Dist: Nashik	2003
76	Jagdamba Education Society S.N.D. Arts, Commerce Science College. **Address:** Goshala Maidan, Vinchur Road, Yeola, Tal: Yeola, Dist: Nashik	2003

No.	Name and Address of College & Institutes	Estb. Year
77	Gokhale Education Society Shri Samaldas Prabhudas Kothari and Shrimati Gomatiben Samaldas Kothari Institute of Computer Science and Technology Management. **Address:** Nashik Road, Tal: Nashik, Dist: Nashik	2003
78	Ozar Vikas Sanstha Vishvsaty Arts and Commerce College. **Address:** Tabat Lane Ozar Mig, Tal: Niphad, Dist: Nashik	2004
79	K.K. Wagh Shikshan Sanstha K.K.Wagh Arts, Commerce, Science and Computer Science College. **Address:** Kaksahebnagar, Tal: Niphad, Dist: Nashik	2004
80	K.K. Wagh Shikshan Sanstha K.K.Wagh Arts, Commerce Science and Computer Science College. **Address:** Bhausaheb Nagar, Tal: Niphad, Dist: Nashik	2004
81	Khatun Minority Womens Social Welfare and Educational Society Am College of Education. **Address:** Ayasha Nagar Pat Kinara, Tal: Malegaon, Dist: Nashik	2004
82	Jagdamba Education Society S. N. D. College of Education. **Address:** Babhulgaon, Tal: Yeola, Dist: Nashik	2004
83	S.N.J.B. (Jain Gurukul) S.N.J.B. Late Sau. Kantabai Bhavarlalji Jain College of Engineering. **Address:** Neminagar Jain Gurukul, Tal: Chandwad, Dist: Nashik	2004
84	Maratha Vidya Prasarak Samaj M.V.P.Samaj's Law College. **Address:** Shivajinagar Gangapur Road, Tal: Nashik, Dist: Nashik-422 002	2004
85	Ozar Vikas Sanstha Vishwasattya Institute of Management & Reserch Centre. **Address:** At Post Ozar Mig, Tal: Niphad, Dist: Nashik	2004
86	Jagdamba Education Society S.N.D. College of Pharmacy. **Address:** Babhulgaon, Tal: Yeola, Dist: Nashik	2004

No.	Name and Address of College & Institutes	Estb. Year
87	Ozar Vikas Sanstha Vishwsatya College of Education. **Address:** Tabat Lane Ozar Mig, Tal: Niphad, Dist: Nashik	2005
88	S.M.B.T. Sevabhavi Trust S.M.B.T. College of Pharmacy. **Address:** Nandi Hills Dhamangaon, Tal: Igatpuri, Dist: Nashik	2005
89	Gargi Education Institute Gargi Agriculture Research and Training Institute. **Address:** Cidco, Tal: Nashik, Dist: Nashik	2006
90	Maratha Vidya Prasarak Samaj C.M.C.S. College, Nashik. **Address:** Udhavaji Maratha Boarding Campus, Gangapur Road, Nashik, Tal: Nashik, Dist: Nashik	2006
91	Maratha Vidya Prasarak Samaj College of Education Satana. **Address:** Devla Road, Satana, Tal: Baglan, Dist: Nashik	2006
92	A.V.E.W. Trust A.V.E.W Trust College of Education. **Address:** Prashant Garden Post Agaskhind, Tal: Sinnar, Dist: Nashik	2006
93	Mumbai Educational Trust Institute of Engineering. **Address:** Bhujbal Knowledge City, Adgaon, Tal: Nashik, Dist: Nashik	2006
94	Jagdamba Education Society S.N.D. College of Engineering and Research Center. **Address:** At and Post -Babhulgaon, Tal: Yeola, Dist: Nashik	2006
95	Mumbai Educational Trust Met Institute of Management. **Address:** Bhujbal Knowledge City Adgav, Tal: Nashik, Dist: Nashik	2006
96	Mahatma Gandhi Vidyamandir Mahatma Gandhi Vidyamandir's Samajshri Prashantdada Hiray College of Pharmacy. **Address:** Loknete Vyankatrao Hiray Marg Malegaon Camp Malegaon, Tal: Malegaon, Dist: Nashik	2006
97	K.B.H.S.S.Trust K.B.H.S.S.Trust's Instit.Of Pharmacay. **Address:** Bhaygaon Road, Malegaon Camp, Tal: Malegaon, Dist: Nashik	2006

No.	Name and Address of College & Institutes	Estb. Year
98	Khatun Minority Womens Social Welfare and Educational Society Royal College of Pharmaceutical Education and Research. **Address:** Sayne Khurd Dhule Road, Malegaon Tal: Malegaon, Dist: Nashik	2006
99	Mumbai Educational Trust MET Institute of Pharmacy. **Address:** Bhujbal Knowledge City Adgav, Tal: Nashik, Dist: Nashik	2006
100	Nashik Gramin Shikshan Prasarak Mandal Pharmacy College. **Address:** Anjeneri, Tal: Tryambakeshwar, Dist: Nashik	2006
101	Pravara Rural Education Society's College of Pharmacy, **Address:** Chincholi Tal: Sinnar Dist: Nashik	2006
102	K.K. Wagh Shikshan Sanstha Karmveer Kaksaheb Vagh College of Fine Arts. **Address:** Hirabai Haridas Vidyanagari Amrutdham Panchvati, Tal: Nashik, Dist: Nashik	2006
103	Maratha Vidya Prasarak Samaj Mvp's Arts, Commerce & Science College, Manmad, Tal: Nandgaon, Dist: Nashik-423104	2007
104	Youth Education and Welfare Society National Senior College. **Address:** Maulana Azad Road Sarada Circle, Nashik, Tal: Nashik, Dist: Nashik	2007
105	Pune Vidyarthi Gruh Pvg Shriram Sadashiv Dhamankar College of Commerce and Science. **Address:** Dindori Road, Behind Relinace Petrol Pump, Near Mary, Tal: Nashik, Dist: Nashik	2007
106	Kasmade Parisar Vikas Mandal Dr. D.S. Aher College of Education. **Address:** Lohoner Vithevadi, Tal: Deola, Dist: Nashik	2007
107	Potdar Foundation Tale Potdar Education College Malegaon. **Address:** Potdar Education College, Tal: Malegaon, Dist: Nashik	2007

No.	Name and Address of College & Institutes	Estb. Year
108	Nashik Gramin Shikshan Prasarak Mandal Brahma Valley College of Education College. **Address:** Anjneri, Tal: Tryambakeshwar, Dist: Nashik-422213	2007
109	Amro College of Hotel Management Amro Institute of Management. **Address:** Surajkund Rajurbahula, Tal: Nashik, Dist: Nashik	2007
110	Maratha Vidya Prasarak Samaj Arts and Commerce College. **Address:** A/P-Makhamalabad, Tal: Nashik, Dist: Nashik	2008
111	Shri Gurudeo Shikshan Prasarak Mandal, Yeola's Adv. Madhavrao Nagdekar Arts & Commerce College, andarsul. **Address:** Andarsul, Tal: Yeola, Dist: Nashik	2008
112	R.S. Wagh Educational and Health Organization Arts Commerce and Science College. **Address:** At. Rajaramnagar Post-Materewadi, Tal: Dindori, Dist: Nashik	2008
113	Nashik Gramin Shikshan Prasarak Mandal Brahma Valley College of Arts Commerce & Scicence, Tapovan Nashik. **Address:** Brahma Valley Educational Campus, Tapovan, Nashik, Tal: Nashik, Dist: Nashik	2008
114	Om Sai Samajik Sevabhavi Sanstha Sharda College (Bca, Bba), Sinnar. **Address:** Adva Phata Nashik Pune Road, Sinnar, Tal: Sinnar, Dist: Nashik	2008
115	Shri Gurudatta Shikshan Sanstha Ajitdada Pawar College of Education College. **Address:** Dattabhumi Manur, Tal: Kalwan, Dist: Nashik	2008
116	B.Ed Collage Abhona Shikshanshastra Mahavidyalay, Abhona. **Address:** A/P-Abhona, Tal: Kalwan, Dist: Nashik	2008
117	Gramin Vikas Sanstha Shri Siddhivinayak College of Education. **Address:** Malegao Road Vt Complex, Tal: Nandgaon, Dist: Nashik	2008

No.	Name and Address of College & Institutes	Estb. Year
118	K.K. Wagh Shikshan Sanstha K.K.Wagh College of Education. **Address:** Hirabai Hiradas Vidyanagari Amrutdham Panchvati, Nashik, Tal: Nashik, Dist: Nashik	2008
119	Ashoka Education Foundation Ashoka College of Education. **Address:** Servey No 1/8b/2 Plot No 4 Ashoka Marg, Ashoka Nager, Wadala Shiwar Nashik -422006, Tal: Nashik, Dist: Nashik	2008
120	Pune Vidyarthi Gruh Pvg College of Education and Research. **Address:** Dindori Road, Behind Reliance Petrol Pump Near Mary Nashik, Tal: Nashik, Dist: Nashik	2008
121	Maharashtra Shikshan Vikas Mandal's New College of Education. **Address:** Bhor Township, Chuchale Shivar, Satpur-Ambad Link Road Nashik, Tal: Nashik, Dist: Nashik	2008
122	Motiwala College of Educational Sciences Motiwala College of Educational Sciences. **Address:** Motiwala Nagar, Gangapur Satpur Link Road, Via YCMOU, Gangapur Nashik, Tal: Nashik, Dist: Nashik	2008
123	Kanhaiyalal Maharaj Shaishanik & Samajik Trust Sainath Shikshanshastra Mahavidyalay. **Address:** Murlidhar Complex, Behind Gangaghat, Panchavati Nashik, Tal: Nashik, Dist: Nashik	2008
124	Samarth Shaikshanik Samajik & Sanskrutik Pratishthan Samarth Shikshanshastra Mahavidyalay. **Address:** Samarth Sankul, Katkadenagar, Ashok Nagar Road, Satpur, Nashik, Tal: Nashik, Dist: Nashik	2008
125	Shetkari Shikshan Prasark Mandal Shri Swami Samarth College of Education. **Address:** Agaskhind, Tal: Sinnar, Dist: Nashik-422502	2008
126	Sandip Foundation Sandip Institute of Technology and Research Center. **Address:** Trimbyak Road, Mahiravani, Tal: Nashik, Dist: Nashik	2008

No.	Name and Address of College & Institutes	Estb. Year
127	Matoshri Shikshan Sanstha Matoshri Engineering College and Research Center. **Address:** Aurangabad Road, Odha Gavajaval, Tal: Nashik, Dist: Nashik	2008
128	Nashik Gramin Shikshan Prasarak Mandal Brahma Valley College of Engineering and Research Institute, Anjneri Nashik. **Address:** Brahma Valley Educational Campus, Anjaneri, Nashik, Tal: Tryambakeshwar, Dist: Nashik	2008
129	Kalyani Charitable Trust K.R. Sapkal College of Management Studies. **Address:** Kalyani Hills Sapkal Knowledge Hub Trimbakeshwar Road, Anjaneri, Tal: Nashik, Dist: Nashik-422213	2008
130	Ashoka Education Foundation Ashoka Institute of Management and Technology. **Address:** Ashoka Road, Wadala, Nashik, Tal: Nashik, Dist: Nashik	2008
131	Matoshri Shikshan Sanstha Matoshri College of Managment and Research Centre. **Address:** Eklahare, off Nasik-Aurangabad Highway, Near Odha Village, Nasik, Tal: Nashik, Dist: Nashik	2008
132	Nashik Gramin Shikshan Prasarak Mandal Brahma Valley Institute of Management. **Address:** Po-Anjneri, Tal: Tryambakeshwar, Dist: Nashik	2008
133	Shri Gurudatta Shikshan Sanstha Loknete Dr.J.D. Pawar College of Pharmacy. **Address:** Dattbhumi Manur, Tal: Kalwan, Dist: Nashik	2008
134	Kalyani Charitable Trust R.G.Sapkal College of Pharmacy. **Address:** Sapkal Knowledge Hub Kalyani Hills, Anjneri, Tal: Tryambakeshwar, Dist: Nashik422 213	2008
135	Late.Sandip Sudhakar Sonaje Shaishanik Sevabhavi Sanstha Sandeep Arts College. **Address:** Sandip Nagar, Tal: Malegaon, Dist: Nashik	2009

No.	Name and Address of College & Institutes	Estb. Year
136	Maratha Vidya Prasarak Samaj Arts & Commerce College Vadner Bhairav. **Address:** Vadner Bhairav, Tal: Chandwad, Dist: Nashik	2009
137	S.M.S.P.S Shri Baliram Motiram Patil Arts and Commerce College. **Address:** Dhabhadi, Tal: Malegaon, Dist: Nashik	2009
138	Maratha Vidya Prasarak Samaj Arts & Commerce College, Satpur, Nashik. **Address:** Satpur, Tal: Nashik, Dist: Nashik	2009
139	Dhanlaxmi Shikshan Sanstha Sahkarmitra Shivajirao Katkade Arts Commerce College. **Address:** Naigaon, Tal: Sinnar, Dist: Nashik	2009
140	Shri Swami Samarth Vidyaprasarak Mandal Arts Commerce College Ravagaon. **Address:** At/Post Ravalgaon, Tal: Malegaon, Dist: Nashik	2009
141	The New Education Institute The Nei Nashik's Let. Sou Ratnaprabha Prabhakar Vaishampayan Arts, Commerce and Science Night College. **Address:** Opp District Court, Old Agra Road, Nashik, Tal: Nashik, Dist: Nashik	2009
142	Sahyadri Shikshan Sanstha Mahant Jamanadas Maharaj College. **Address:** At/Post: Karanjali, Tal: Peth, Dist: Nashik	2009
143	Shri Sairaj Shikshan Pratishtan Pune Vishwalata Arts, Science and Commerce College. **Address:** Bhatgaon, Tal: Yeola, Dist: Nashik-423401	2009
144	Gokhale Education Society Sir.Dr.M.S.Gosavi College of Commerce. **Address:** Gokhale Park, Near Krishi Nagar, Jogarspark, Tal: Nashik, Dist: Nashik-422005	2009
145	Ashoka Education Foundation Ashoka Center For Business & Computer Studies. **Address:** Chandsi, Tal: Nashik, Dist: Nashik	2009

No.	Name and Address of College & Institutes	Estb. Year
146	Janata Seva Mandal Modern College. **Address:** Shri Samarthanagar, Behind New Market Yard, Peth Road, Panchavati, Nashik, Tal: Nashik, Dist: Nashik	2009
147	Jadeed Anjuman E Taleem Haroon Ansari Girl's College of Education. **Address:** S No 10, Islampura Malegaon, Tal: Malegaon, Dist: Nashik	2009
148	Gokhale Education Society Gokhale Education Society's R. H. Sapat College of Engineering, Management Studies & Research. **Address:** Prin. T A Kulkarni Vidyanagar, Nashik, Tal: Nashik, Dist: Nashik-422005	2009
149	Amruta Vaishnavi Educational & Welfare Trust Shatabdi Institute of Engineering Research. **Address:** A/P Agaskhind, Tal: Sinnar, Dist: Nashik	2009
150	Kalyani Charitable Trust Kalyani Charitable Trust's Late G. N. Sapkal College of Engineering. **Address:** Sapkal Knowledge Hub, Kalyani Hills, Anjaneri, Tal: Tryambakeshwar, Dist: Nashik-422213	2009
151	Pune Vidyarthi Gruh Pvg's Institute of Management, Nashik. **Address:** 206, Dindori Road, Mhasrul, Tal: Nashik, Dist: Nashik-422004	2009
152	Shri Gurudatta Shikshan Sanstha Shri Dhondu Baliram Pawar College of Management. **Address:** A/P Dattabhoomi, Manur, Tal: Kalwan, Dist: Nashik	2009
153	Gokhale Education Society Dr. M.S.Gosavi Institute of Business Studies. **Address:** Behind Namdar Gokhale Park, Namdar Gopalkrishna Gokhale Vidyanagar, Nashik, Tal: Nashik, Dist: Nashik-422005	2009
154	Nashik Gramin Shikshan Prasarak Mandal Brahma Valley Institute of Management. **Address:** Brahma Valley Central office, Sharanpur Link Road, Nashik, Tal: Nashik, Dist: Nashik	2009

No.	Name and Address of College & Institutes	Estb. Year
155	Nashik Gramin Shikshan Prasarak Mandal Brahma Valley Institute of Management. **Address:** Brahma Valley Central office, Sharanpur Road, Nashik, Tal: Nashik, Dist: Nashik	2009
156	Nashik Gramin Shikshan Prasarak Mandal Brahma Valley Institute of Management. **Address:** Brahma Valley Centeral office, Sharanpur Road, Nashik, Tal: Nashik, Dist: Nashik	2009
157	Ozar Vikas Sanstha Vishwasattya College of Mba. **Address:** Ozar Mig, Sukene Road, Tal: Niphad, Dist: Nashik	2009
158	Pune Vidyarthi Griha Pune Vidyarthi Griha's College of Engineering Nashik. **Address:** 206, Behind Reliance Petrol Pump, Dindori Road, Mhasrul, Nashik-422004, Tal: Nashik, Dist: Nashik	2010
159	Sandip Foundation Sandip Institute of Engineering & Management. **Address:** Post- Mahirvani, Tal: Nashik, Dist: Nashik-422 213	2010
160	Matoshri Education Society Matoshri College of Management and Research Center, Dhanore. **Address:** Dhanore, Tal: Yeola, Dist: Nashik	2010
161	Krantiveer Vasantrao Narayanrao Naik Shikshan Prasarak Sanstha, Nashik Krantiveer Vasantrao Narayanrao Naik Institute of Engineering Education & Research, Nashik. **Address:** Canada Corner, Tal: Nashik, Dist: Nashik-422002	2011
162	K.B.H.S.S. Trust Dr.B.V.Hiray College of Management and Research Centre. **Address:** Krushi Nagar, Malegaon Camp, Tal: Malegaon, Dist: Nashik	2011
163	Aakar Kala V Krida Mandal Dr. N. H. Wagh Institute of Management and Research. **Address:** Dahiwal, Tal: Malegaon, Dist: Nashik	2011

No.	Name and Address of College & Institutes	Estb. Year
164	A.P. Greig Foundation Trust Universal College of Management. **Address:** Nandanvan Hills, Chandsi, Front of Gangapur Road, Nashik, Tal: Nashik, Dist: Nashik	2011
165	Sandip Foundation Sandip Institute of Pharmaceutical Sciences. **Address:** Trimbak Road, Mahiravani, Tal: Nashik, Dist: Nashik	2011
166	Nashik Shikshan Prasarak Mandal, Nashik Arts and Commrece College, Igatpuri. **Address:** Igatpuri, Tal: Igatpuri, Dist: Nashik	2012
167	Sane Guruji Shikshan Prasarak Mandal, Nasik Road Arts and Commerce College, Baragaon Pimpri. **Address:** Baragaon Pimpari, Tal: Sinnar, Dist: Nashik	2012
168	Dang Seva Mandal.Nashik Arts, Commerce College, Umbartan. **Address:** At Post Umbarthan, Tal: Surgana, Dist: Nashik	2012
169	Shree Mahavir Education Society, Nashik Sanghavi College of Engineering. **Address:** Mhasrul Varvandi Road, Village Varvandi, Tal: Dindori, Dist: Nashik-422202	2012
170	Jamia Mohammadia Education Society Mumbai Maulana Mukhtar Ahmad Nadvi Technical Campus. **Address:** Mansoora, Malegaon, Tal: Malegaon, Dist: Nashik	2012
171	Jawahar Education Society Jawahar Education Society's Institute of Technology Management and Research. **Address:** Serve No-48, Gowardhan, Gangapur Road, Tal: Nashik, Dist: Nashik-422222	2012
172	Ashoka Education Foundation Ashoka Business School. **Address:** Urjayant Plaza, Next To Suman Petrol Pump, Mumbai-Agra Highway, Cidco, Tal: Nashik, Dist: Nashik-422009	2012

No.	Name and Address of College & Institutes	Estb. Year
173	Gokhale Education Society Sir Dr. M.S. Gosavi College of Pharmaceutical Education and Research. **Address:** Prin T A Kulkarni Vidyanagar, Nashik, Tal: Nashik, Dist: Nashik	2012
174	Matoshri Education Society Matoshri College of Pharmacy. **Address:** A/P Eklahare, Near Odhagaon, Nashik, Tal: Nashik, Dist: Nashik	2012
175	K.K. Wagh Education Society, Nashik K.K. Wagh College of Performing Arts, Nashik. **Address:** Sarvey No-240/1, Sarswati Nagar, Dindori Link Road, Amruta Dham, Panchavati, Tal: Nashik, Dist: Nashik	2012
176	Adivasi Seva Samiti Nasik Arts, Comers & Science College Manur. **Address:** Manur, Tal: Kalwan, Dist: Nashik	2013
177	Guru Gobind Singh Foundation Nashik Guru Gobind Singh College of Engineering and Research Center. **Address:** Khalsa Educational Complex Guru Gobind Singh Marg Wadala Pathardi Road Nashik, Tal: Nashik, Dist: Nashik-422009	2013
178	Pravara Rural Education Society, Pravaranagar Pravara Rural Education Society's College of Architecture. **Address:** At.Mohu, Post-Chincholi, Tal: Sinnar, Dist: Nashik	2013
179	Matoshri Education Society Matoshri College of Education. **Address:** Near Odha Village Eklahare, Tal: Nashik, Dist: Nashik	2014

APPENDIX – III

Change in the name of University of Pune - 1

SAVITRIBAI PHULE PUNE UNIVERSITY

NOTIFICATION

No. 176 of 2014, dated 9th September, 2014

Sub: Change in the name of University of Pune

It is notified for information of all the concerned that the Governor of Maharashtra is pleased to promulgate the Maharashtra Ordinance No. XVI of 2014 amending the Maharashtra Universities Act, 1994, which is published in the Maharashtra Government Gazette Part VIII, dated 31st July 2014 as under:

"In the Schedule to the Maharashtra Universities Act, 1994, in Part I in Entry 2, in Column (2), for the words "the University of Pune", the words "the Savitribai Phule Pune University" shall be substituted".

On and from the date of commencement of the Maharashtra Ordinance No. XVI of 2014, i.e. from 31st July, 2014, all references to "the University of Pune", in any enactment, rules, regulations, bye-laws, ordinances, statutes, notifications, orders or other instruments issued under any enactment or in any instrument, document, certificate or proceedings, shall, unless the context otherwise requires, be construed as references to "the Savitribai Phule Pune University".

Dr. Narendra M. Kadu
Registrar

University of Pune

Telephone Nos:
020-25601264
020-25601265
Email: pldvp@unipune.ac.in

Planning & Development Section
Ganeshkhind,
Pune - 411 007.

Ref. No. SPPU/Dev/ १७२८

28th October 2014

To,
The Principals
All Affiliated Colleges
Savitribai Phule Pune University

Reference : UGC Letter No. F.2-30/14 (Circular/WRO) dated 22.09.2014

Dear Sir/Madam,

Kindly enclosed herewith a copy of UGC above-mentioned letter which is self explanatory. Also note that, in future in any further correspondence with UGC mentioned the changed name of the University as "Savitribai Phule Pune University" formerly University of Pune. You are requested to take necessary action in this regard and inform the university accordingly.

Yours Faithfully,

Deputy Registrar
Planning & Development

Encl. : As above.

APPENDIX – IV

Vriddhi-College Management ERP Software System

This "Vriddhi-Classic ERP" software consist of

1) Administration Module.
2) M.I.S. *(Management Information System)*.
3) Students Module,
4) Examination Management Module.
5) Payroll (Employee Module).
6) Account and Finance Management Module.
7) Library Management Module.
8) Hostel Management Module.
9) OPAC for Library.
10) Digital Library Modules (optional).

Gateway Screen for "Vriddhi-Classic ERP" software