INTRODUCTION

1.1 Introduction

Information and Communication Technology (ICT) have produced tremendous changes in all spheres of life including economic, political, social and educational system. In the globalization era, ICT has become so important that it is one of the significant indices of national and economic development. The development of a country is based on the use of ICT based technology. Information divides the world into two blocks namely the information rich and the information poor countries. In the information explosion era, the use of ICT based tools and applications are inevitable for retrieval of information effectively and efficiently. With advances in ICT, electronic information in the form of electronic books, electronic journals, and the Internet has changed the world into an information age. Now, no institution or organization can rely on traditional printed information resource only to satisfy the information requirements of its users effectively. In the technology-driven information environment, users must be well acquainted with ICT products and the services offered by the information systems. They should be aware of and familiar with ICT tools and techniques for effective usage of their scholarly communications. In the complex information environment, information literacy competencies determine the use of information sources effectively for scholarly works. The research scholars forming part of the user community in the higher education system require huge quantities of information in order to fulfil their research works.

1.2 Concept of ICT (Information Communication Technology)

ICT stands for Information and Communication Technology. It refers to the technologies that provide access to a wide variety of information through telecommunications. It is similar to Information Technology (IT), but focuses primarily
on communication media and technologies, like the internet, wireless networks, cell phones and other communication mediums.

According to the Webster’s New Encyclopedia, “Information Technology is the collective term for various technologies involved in the processing and transmission of information. They include computing telecommunications and microelectronics”.

According to ALA Glossary, “Information Technology is the application of computers and technologies to the acquisition, organization, storage, retrieval and dissemination of information”.

Information and Communication Technology (ICT) is an umbrella term that includes all technologies for the manipulation and communication of information. ICT is a technology that supports activities like gathering, processing, sharing and presenting data. Increasingly these activities also involve collaboration and communication. Hence, IT has become ICT.

Information and Communication technology (ICT) is a diverse set of technological tools and resources used to communicate, create, disseminate, store, and manage information.

Information and Communication Technology (ICT) is defined in various contexts relevant to Library and Information Science. Ayodlle (2002) defined ICT as electronic based technology generally used to retrieve store, process and package information as well as provide access to knowledge. In 2005, Ebijuwa (2005) defined ICT as tools used for collection, processing, storage, transmission, and dissemination of information. Anyakoha(2005) has also defined ICT as the electronic means of capturing, processing, storing, and disseminating information. The American Library Association (1983) defined Information Technology (IT) “as the application of computers and other technologies to the acquisition, organization, storage, retrieval, and dissemination of
information. Computers are used to process and store data, while telecommunications technology provides information communication tools, which make it possible for users to access databases and link them with other computer networks at different locations”. The terms Information Technology (IT) and ICT (Information and Communication Technologies) are used somewhat interchangeably.

These definitions show how changes in technologies affect the way in which information is accessed, stored and disseminated in libraries. Now information is available on CDs, audios, videos, as well as on the internet. These types of web based electronic information sources have become more popular in academic libraries. These can be accessed by any user through online access via networks. E-resources are mainly in the form of e-books, e-journals, full text articles, newspapers, thesis, dissertations, databases and CD-ROMs. Since, all updated information is published in electronic form, it plays prominent role in academic libraries now-a-days. Thus, familiarity with ICT based information products and services are necessary among the users for the effective usage of ICT based products and services.

1.3 Information Management and ICT

Proliferation of information demands the need for information management and the retrieval of right information at the right time. Managing information becomes a challenge to the information professionals due to the exponential growth of information. Storing of information in automated system enables them to control information management. The ICT products and technologies help to monitor and provide effective services to the users in academic libraries. The ICT provides libraries with capabilities to locate, storage and retrieve, and disseminate information. Internet access enables libraries to locate information stored in other computers around the world. With online search facilities, information stored at different locations can be easily retrieved. Through the use
of web pages, e-mail, and CD-ROM, libraries disseminate information. Digitization of library information resources, which converts print resources into electronic form, means that such information can be accessed from homes, offices, or any workstation connected to the Internet.

The application of ICT has caused significant changes in automated cataloguing, circulation system, online information system, electronic document delivery, and CD-ROM databases. The advent of the internet, digitization, and the ability to access library and research materials from remote locations created dramatic changes by the end of the twentieth century. The expert systems, wireless networks, virtual collections, interactive Web interfaces, virtual reference services, and personal Web portals have brought significant changes in the library and information science environment. First and significant changes are occurring in librarianship, where digital and electronic libraries are being established to complement, and in some cases to completely replace, the traditional libraries.

1.4 Components of ICT in Libraries

The ultimate aim of the information center is to provide effective information services to the user community. The library professionals are using a number of ICT based technologies i.e., combination or fusion of several technologies. Chisenga (2004) said that ICT came about as a result of the digital convergence of computer technologies, telecommunication technologies and other media communication technologies.

Patil; Kumbar and Krishananda (2008) categorized the components of Information Technology (IT), frequently used in Library and Information centers are as follows:

- Computer Technology
- Communication Technology
- Reprographic, micrographic and printing technology.
Rehman (2003) stated that ICT is the fusion of two important technologies namely electronics and communications.

From these views, it is clear that the components of ICT technologies in libraries include computer technologies, communication technologies and reprographic technologies.

a. Computer Technology

The widespread use of computer technology has made dramatic development in the information transmission process in every field of our life. The current developments in computer technology include Mainframe Computer, Super Computer, Mini Computer, Personal Computer, Microchip Technology, Artificial Intelligence, Software Technology and CD-ROM Technology.

b. Communication Technology

Communication or telecommunication technologies are used to transmit and receive information in the form of signals, using electrical or electromagnetic media as carriers of signals. Telecommunication technologies include Audio Technology, Audio-visual Technology, Motion Picture, TV, Videodisc, Video Conferencing Applications etc.

c. Reprography and Publishing Technology

Reprography and publishing technology is the field of information processing concerned with technologies and equipments for the reproduction of data in documents. Micrographics are the field of IT concerned with making use of microforms. It includes optical media for high density recording and storage of optically encoded information. Printing technology is another device for the reproduction of data in documents. Various components of ICT are diagrammatically presented as follows
1.5 Impact of ICT in Libraries

The ICT has reshaped the functioning and services of libraries. The activities which were carried out manually in the traditional libraries are now being carried out effectively and smoothly with the help of ICT. The ICT has changed the way of acquisition, technical processing, periodical subscription, and circulation activities in such a way that library readers can get desired information and services effectively in minimum time with minimum man power. Traditional libraries are changing their role and functions according to the new trends in society. Libraries are providing information through computers and internet. Without the help of the computers and library information centers cannot fully satisfy the users. Rana (2009) describes that ICT holds the key to the success of modernizing information services of library and information
centers. Applications of ICT are numerous but mainly it is used in converting the existing paper-print records into electronic format, its process of storage, retrieval and dissemination.

ICT has impacted every sphere of academic library activities including collection, development strategies, library building and consortia for information sharing. It presents an opportunity to provide value-added information services and access to a wide variety of digital based information resources to their clients. Furthermore, academic libraries are also using modern ICTs to automate their core functions, implement efficient and effective library cooperation and resource sharing networks, implement management information systems, develop institutional repositories of digital local contents, digital libraries and initiate ICT based capacity building programmes for library users.

1.6 Need for ICT in Libraries

The literature in almost all the fields is increasing tremendously and in a multidimensional way. Because of the growth, manual bibliographic control is not feasible and hence ICT is needed. The information seeking behaviour of the users is also changing according to their varied needs. To meet these changing needs, storage capacities of information retrieval techniques should be improved. The quality, user friendliness, effectiveness, reliability and regularity of library services can be much improved through ICT. Moreover, ICT in academic libraries are used

1. To utilize the emerging electronic resources effectively.
2. To provide round the clock services to the user community.
3. To extend the library services beyond the four walls of the libraries.
4. To provide regular updates on topic of interest to the users
5. To promote teamwork across geographical distance.
1.7 Benefits of ICT based Services

Use of ICT in libraries enhances user satisfaction. It provides numerous benefits to library users. Some of the benefits are:

- speedy and easy access to information
- remote access to users
- round the clock access to users (24x7)
- access to unlimited information from different sources
- Provision of information flexibility to be used by any individual according to his/her requirements
- Provision of increased flexibility
- Reformatting and combining of data from different sources.

Information and Communication Technology (ICT) has brought unique changes and transformation to academic library and information services, conventional library services such as OPAC, users’ services, reference services, bibliographic services, Current Awareness Services (CAS), Document delivery, Inter-Library Loan (ILL) Audio visual services and customer relations can be provided more efficiently and effectively using ICT. Moreover, it is offered in convenient time, place, and cost effectiveness, faster and most-up-to-date. The impact of ICT on information services is characterized by changes in format, contents and method of production and delivery of information products. Emergence of internet as the largest repository of information and knowledge has changed the role of library and information science professionals from intermediary host to that of a facilitator with new tools for dissemination of information. The shift from physical to virtual services environment and extinction of some conventional information services has resulted in the emergence of new and innovational web-based technology.
1.8 Challenges in Use of ICT in Academic Libraries

No doubt, the ICT has given more benefits to the users and particularly the research scholars for their scholarly work. It has posed some challenges to the libraries and library professionals. Some of the challenges are:

1. Poor funding of ICT infrastructures.
2. Frequent changes of hardware and software
3. Lack of trained library professionals
4. Poor internet connectivity
5. Frequent power failure
6. Copyright and intellectual property rights management.

The challenges posed by the ICT can be effectively managed by proper planning and frequent updating of technical skills of library professionals by seminars and conferences. Proper awareness must be provided to the end users for effective use of ICT oriented information services.

Today people use the information technology as a primary source of information. The internet can be used for the efficient retrieval and processing of information needs. ICT based resources are now considered important to all types of libraries and they are reducing a large share of library expenses. They are used in abundance. These resources have solved the problem of space. Academic libraries play a significant role in supporting research in all subjects.

1.9 ICT Awareness and Use of Library Resources

Emerging ICT technologies and their applications have forced the researchers to be familiar with ICT products and aware of their applications. ICT awareness involves developing an understanding of many dimensions of the ICTs. This form of knowledge provides an essential foundation for ICT mastery as well as other ICT management skills.
such as operating and utilizing the ICT technologies, and ICT gadgets. ICT awareness is the awareness of the users of technical and technological aspects of ICT, browsing or surfing techniques, communication applications, knowledge of specialized software, word processor, spread sheet and so on. Every researcher should have the knowledge of ICT or awareness about the ICT in order to access ICT enabled information services for their research work. Legal, copyrights aspects of information sources and research ethics are related to ICT awareness of the users. Apart from these, they should be aware of technological knowledge like operating various gadgets such as digital cameras, mobile phone, smart phones and tablets and also the ICT gadgets like portable media players; interactive whiteboards; voice projections systems and operating softwares, presentation tools, word processor, audio-video edition for pod casting; virtual Learning Environment; Video conferencing and You tube. The use of ICT in research will change the quality of research. ICT awareness enables the researcher in organizing instruction around problem-solving. It makes new demands on research by locating meaningful resources and guidance for solving the problem. Some of the categories of awareness of ICT are given as follows;

- **Technical and Technological Awareness:** Every researcher should know about the technique of operating the computer and its accessories as well as electronic media which support its peripheral parts.

- **Surfing Awareness:** The researcher should know about browsing or surfing the website and the rules of internet and the threats from internet as well as electronic media which support its peripheral parts. They should be well versed in sending emails, taking notes for the others through internet.
- **Authoring Awareness**: The researcher should know about designing or authoring the website for his / her research publications and the rules of internet and its threats about digital copy rights of the website that he/she designs for the research process.

- **Communication Awareness**: The researcher should be a problem solver, good communicator and observer. So, the researcher should understand the problem clearly and communicate with others and facilitate others with clear solutions.

- **Maintenance Awareness**: Every researcher should be familiar with ICT products maintenance in order to solve day-to-day problems faced by them while using various ICT products.

  Computers and other advances in information processing, storage, and communication technologies have revolutionized the role of libraries and information centers all over the world. Moreover, due to the impact of ICT, E-journals, CD-ROM databases, online databases, e-books, web-based resources, and a variety of other electronic media are fast replacing the traditional resources of libraries. The emergence of electronic resources has drastically revamped the status of all the libraries and information centers across the world during the last few decades.

  Now-a-days, librarians are shifting their role from managing of library learning resources to providing service-oriented digital information resources. Extensive use of computers, increased support on computer networks, prompt growth of Internet and information explosion in terms of quality and quantity has led libraries to implement new techniques for storage, organisation, management, retrieval and dissemination of electronic resources to the end users in the networked and digital environment.

**1.10 Information Literacy**

Information literacy (IL) encompasses more than good information-seeking behavior. It involves abilities to recognize when there is an information need and then to
phrase questions designed to gather the needed information. It includes evaluating and using information appropriately and ethically, once it is retrieved from any media, be it electronic, human or print. Helping people become information literate is a responsibility of all stakeholders, whether they be librarians, lecturers, or administrators. It involves all disciplines that are involved in research and teaching.

1.11 Concept - Information Literacy

The term ‘information literacy’, sometimes referred to as information competency is generally defined as the ability to identify an information need, locate and access the required information, evaluate, organize and apply it to address the need in question. IL encompasses knowledge of one’s information concerns and needs, and the ability to identify, locate, evaluate, organize and effectively create, use and communicate information to address issues or problems at hand; it is a prerequisite for participating effectively in the information society, and is part of the basic human right of life-long learning (USNCLIS, 2003).

Being information literate requires knowing how to clearly define a subject or area of investigation; select appropriate terminology that expresses the concept under investigation; formulate a search strategy that takes into consideration different information sources and the various ways information is organized; analyze the data collected for value, relevancy, quality and suitability; and subsequently turn them into knowledge.

Doyle (1992) mentioned that an information literate person is one who:

- recognizes that accurate and complete information is the basis for intelligent decision making;
- recognizes the need for information;
- formulates questions based on information needs;
identifies potential sources of information;

develops successful search strategies;

accesses sources of information including computer-based and other technologies;

evaluates information;

organizes information for practical application, integrates new information into an existing body of knowledge; and

uses information in critical thinking and problem solving.

Information literacy is not synonymous with IT skills, but the skills proposed by Leeds Metropolitan University’s Learning Support Services (2003) include IT aspects where appropriate,

- know appropriate kinds of resources, both print and non-print;
- select resources with ‘best fit’ for the task in hand’
- articulate information needs appropriately (keywords, synonyms, etc)
- construct search strategy using appropriate commands (e.g. use of Boolean Operators);
- understand the principles and construction and generation of databases;
- implement the search strategy in appropriate information retrieval systems;
- evaluate reliability, validity, accuracy, authority, timeliness and bias in information located;
- understand issues of copyright and plagiarism.

1.12 Components of Information Literacy

Grassian and Kaplowitz (2001) summed up the following activities as information literacy strategy:
a. Clarifying: First step in the information literacy strategy is to clarify and understand the requirements of the problem or task for which information is sought.

b. Locating: The second step is to identify sources of information and to find those resources. Depending upon the task, sources that will be helpful may vary. Sources may include: books; encyclopedias; maps; almanacs, etc. sources may be in electronic, print, social book marking tools, or other formats.

c. Selecting/analyzing: Step three involves examining the resources that were found. The information must be determined to be useful or not useful in solving the problem. The useful resources are selected and the inappropriate resources are rejected.

d. Organizing/synthesizing: It is in the fourth step that information which has been selected is organized and processed so that knowledge and solutions are developed.

e. Creating/presenting: In step five, the information or solution is presented to the appropriate audience in an appropriate format. A paper is written. A presentation is made. Drawings, illustrations, and graphs are presented.

f. Evaluating: The final step in the information literacy strategy involves the critical evaluation of the new understanding of the concept.

1.13 Specific Aspects of Information Literacy

Shapiro and Hughes (2003) identified the followings seven dimensions of literacy:

1. Tool Literacy

Tool literacy is the ability to understand and use the practical and conceptual tools of current information technology relevant to education and the areas of work and professional life that the individual expects to inhabit.
2. Resource Literacy

Resource literacy is the ability to understand the form, format, location, and access methods of information resources, especially daily expanding networked information resources.

3. Social-structural Literacy

Social-structural literacy is the ability of knowing how information is socially situated and produced.

4. Research Literacy

Research literacy is the ability to understand and use the information technology-based tools relevant to the work of today’s researchers and scholar.

5. Publishing Literacy

Publishing literacy is the ability to format and publish research and ideas electronically, in textual and multimedia forms (including via World Wide Web, electronic e-mail and distribution lists, and CD-ROMs).

6. Emerging Technology Literacy

Emerging technology literacy is the ability to adopt, understand, evaluate, and make use of the continually emerging innovations, information of prior tools and resources, and to make intelligent decisions about the adoption of new ones.

7. Critical Literacy

Critical Literacy is the ability to evaluate critically the intellectual human and social strengths and weaknesses, potentials and limits, and benefits and costs of information technologies.

1.14 Information Literacy and Higher Education

Developing life-long learners is central to the mission of higher education. By ensuring that individuals have the intellectual abilities of reasoning and critical thinking,
and by helping them construct a framework for learning how to learn, colleges and universities provide the foundation for continued growth throughout their careers, as well as in their roles as informed citizens and members of communities (Ojedokun, 2007).

Information literacy is a key component of lifelong learning. Information literacy competency extends learning beyond formal classroom settings and provides practice with self-directed investigations as individuals move into internship, first professional positions, and increasing responsibilities in all arenas of life (Ojedokun, 2007). Gaining skills in information literacy multiplies the opportunities for students’ self-directed learning, as they become engaged in using a wide variety of information sources to expand their knowledge, ask informed questions, and sharpen their critical thinking for further self-directed learning (Grassian, 2004).

1.15 Information and Communication Technology Literacy (ICTL)

Information and Communications Technology Literacy (ICTL) emerged in 2002 comprises literacy of both Information technology and communication technology. In higher education or research institutions, it increases the skills of teachers, students and librarians in solving problem and making appropriate decision. Information literacy can be understood as the overarching term to describe the skills needed to use information and communication technologies (ICTs) effectively, and to access appropriate digital information resources (Wallis, 2005). ICT proficiency is the ability to use digital technology, communication tools, or networks to define an information need, access, manage, integrate and evaluate information, create new information or knowledge and being able to communicate this information to others (International ICT Literacy Panel, 2002). The changes which happened in information sector over the past decades clearly show that the information society is drifting towards new adoptions for better information utility.
1.16 Components of ICT Literacy

The above discussion gives the lists of five critical components of ICT literacy. These five components represent a set of skills and knowledge presented in a sequence that suggests increasing cognitive complexity. They are:

- 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

1.17 Digital Literacy

Digital literacy is the ability to understand and use information in multiple formats from a wide range of sources when it is presented via computers (Gilster, 2007). Digital literacy is thus the ability to access networked computer resources and use them. This knowledge is necessary because the internet has grown from a scientist’s tool to a worldwide publishing and research medium open to anyone with a computer and modem. The skills to enable one to be digitally literate are becoming as necessary as a driver’s license. The internet is the fastest growing medium in history-like it or not, it will affect you and those around you at home and on the job, from the merging of your television set’s images with network data to the emergence of communities of users whose activities will change the shape of commerce and education (Gilster, 2007).

Acquiring digital literacy for internet use involves mastering a set of core competencies. The most essential of these is the ability to make informed judgments
about what you find on-line, for unlike conventional media, much of the net is unfiltered by editors and open to the contributions of all. This art of critical thinking governs how you use what you find on-line, with the tools of electronically published and dispersed globally (Gilster, 2007). Because the journey through text is flush with choices, developing search skills is the final core competency; it engages you in strategies for using the rapidly proliferating search engines that can hunt through millions of pages of information as you watch returning a list of targets for your consideration. Ungoverned and perhaps ungovernable, the internet’s vast holdings catalyze your thinking only if you master the primary skills of the digitally literate searcher. So literacy in the digital age, i.e. (digital literacy) is partly about awareness of other people and our expanded ability to contact them to discuss issues and get help. But it is also an awareness of the way the internet blends older forms of communication to create a different kind of content (Ojedokun, 2007).

1.19 Electronic Resources

With the application of ICTs in libraries, access to information has become more dynamic for the scholars who need to gain specialized knowledge. Modern ICT tools have changed traditional print sources into electronic resources and man-made information services into ICT enabled information services. Now-a-days, electronic resources are a boon to the researchers to get current information in their respective areas of research interest. The demand for e-resources by the academic and research community has increased over the years. Today researches are being conducted at a rapid rate in multi-dimensional aspects and plenty of literatures are added day-by-day and it will be difficult for the research communities to cope with all the developments but the concept of e-resources have proved to be the ultimate solution by providing the latest information in a fast manner.
The term ‘E-resources’ stands for electronic resources. They are the electronic representation of information sources. They are systems in which information is stored electronically and made accessible through electronic systems and computer networks. It includes OPAC, CD-ROMs, online databases, e-journals, e-books, internet resources etc.

According to IFLA ISBD(ER), an electronic resource consists of materials that are computer controlled, including materials that require the use of a peripheral attached to a computer; the items may or may not be used in the interactive mode. Electronic resources are the resources where the information is available in the electronic format.

In the words of Sayee (2001), “electronic resources are the resources that are generated through some electronic medium and made available to a wide range of viewers both on-site and off-site via some electronic transferring machine or internet”. Therefore, electronic resources include all kinds of digital collections in the form of e-books, e-articles, e-databases, e-journals, electronic theses and dissertations (ETDs), e-standards and patents, e-reports, e-news, etc.

Thus, e-resources refer to any kind of documents in digital formats which are made available to library users through a computer based information retrieval system. Electronic resource is an electronic information resource which can be accessed from anywhere, anytime and it breaks the barrier of time and physical boundary. These electronic resources are cost-effective as well as free of cost available for the library users. Electronic resources are different and at the same time comfortable like printed document but its current information or contents are available in the various format like image, audio, video, and multimedia designs.

E-resources include online databases, sources from web pages, e-journals articles, electronic personnel papers, e-mail messages, news paper postings,
newsletters, government publications, electronic theses and dissertations, e-news papers, CDs/DVDs and things of similar kinds either at free of cost or on payment basis.

1.19 Features of E-resources

Electronic resources have some unique features which motivate the users to use e-resources effectively. Some of the important characteristics of e-resources are:

- Fast and easy access of information
- Easy to retrieve the documents using search engine
- Easy to publish and reduce the delay
- Multiple access at a time
- Article can be downloaded, stored and printed on one’s own convenience subject to copy right protection
- Supported by multimedia
- Save physical storage
- Links to related items
- Wider accessibility

Sinha (2015) mentioned the following as characteristic features of e-resources

- Have 24x7 access ;
- Saves space ;
- Published instantly on the web before coming to printed document;
- E-resources can be accessed around the world without any geographical and time limitations;
- It can be subscribed through consortia or publisher or aggregator etc.
- Modification, alteration and updating can be made easily within fraction of a second;
• E-resources are available in various files and formats that can be accessed very fast as they are uploaded on the server which saves time, money, place and environment;

• Some of the electronic information resources are available in electronic form only and offer multimedia information, which is not possible in the print format;

• E-resources can be search, browse, access, copy, download quickly and customize according to your requirements;

• Linking feature facilitates link within the documents as well as outside of the documents;

• Many users can use electronic resources simultaneously; and

• Monitoring the usages of electronic information resources is possible.

Even though these features enhance their value among research scholars, they are not free from disadvantages too. Familiarity of ICT techniques and awareness of ICT applications has motivated research scholars to utilize the e-resources to their level of satisfaction.

1.20 Need and Significance of the Study

Research scholars require varied information irrespective of the discipline to complete their research work at Ph.D level. Information needs at every stage of their research work have forced them to follow both traditional print materials as well as electronic resources. In the information explosion era, traditional library arrangement for information services alone is not sufficient to fulfill their information requirements. Hence, they are forced to use the latest technology or adapt information communication for the housekeeping operation of library and information services to users to their level of satisfaction. Academic libraries particularly libraries at higher educational institutions use Information and Communication Technology (ICTs) for information processing,
storage and dissemination through automated information retrieval information system and provide wider access to varied information sources based on internet. To access either from the internet or access from the library portal, blog, or OPAC, the scholars must be aware and be familiar with ICT products and ICT enabled library services. Previous experience in using ICT facilitates the usage of electronic information sources at a maximum level.

Moreover, the academic communities are expecting scholarly research output from research scholars. Scholarly output depends on their ICT awareness, information literacy and usage of electronic resources. Also, the research productivity and its quality depend on their awareness towards ICT products and applications, information literacy and attitude towards e-resources. Similar studies have been conducted in different contexts on the extent of usage of e-resources in relation to ICT awareness, information literacy, constraints in use of ICT and attitude towards e-resources. Representative studies have been conducted on information literacy and utilization of e-resources by the research scholars from the universities of Kerala (Vasudevan, 2012); information literacy of research scholars of the University of Madras (Sakthiregha, 2009), and information literacy among the women scientists (Yasmin, 2012). Similarly, the studies on awareness and utilization of e-resources conducted by Ajaegbu; Ehioghe & Oreoluwa (2014) & Anaraki, and Babalhaveji (2013). But the scanning of available literature shows that a comprehensive study on the extent of usage of e-resources among the research scholars in relation to ICT awareness, information literacy, and attitude towards e-resources are scanty. Hence, the study on ICT awareness, information literacy and usage of e-resources among the research scholars in Manonmaniam Sundaranar University area is a unique study and its outcomes are valuable contributions to library and information science literature.
1.21 Statement of the Problem

The present study intends to determine the extent of usage of e-resources in relation to ICT awareness and information literacy among the research scholars in the jurisdiction of Manonmaniam Sundaranar University area and hence for the present study is entitled as “ICT Awareness, Information Literacy and Utilisation of E-Resources among the Research Scholars in Manonmaniam Sundaranar University Area”.

1.22 Definitions of Terms and Operational Definition

a. ICT Awareness

ICT is a diverse set of technological tools and resources used to communicate and to create, disseminate, store and manage information. Familiarity and awareness leads to enhance its uses.

ICT awareness here refers to the awareness of research scholars of various ICT tools and techniques for accessing e-resources.

b. Information Literacy

Information literacy is the ability to recognize when information is needed and the ability to locate, evaluate and use effectively the needed information.

Information literacy here refers to skills or abilities possessed by research scholars for effective information search process.

c. E-Resources

E-resources are resources in which information is stored electronically and which are accessible through electronic systems and networks. ‘E-resources’ is a very broad term that includes a variety of different publishing models, including OPAC, CD-ROMs, online database, e-journals, e-books, internet resource, Print on Demand (POD), e-mail publishing etc.
The term e-resources here means any electronic product that delivers the collection of data be it in text, numerical, graphical form either through commercial or open platform to the research scholars.

d. Research Scholars

Research scholars are those scholars who have enrolled for research programme at recognized research centers of the universities for the award of either M.Phil or Ph.D in any discipline and are actively involved in research activities.

‘Research scholars’ here refers only to those scholars who have enrolled for Ph.D programme in recognized centers.

e. Manonmaniam Sundaranar University Area

Manonmaniam Sundaranar University is situated in the southern tips of Tamilnadu. It was established in 1990, as per the Act 31 of 1990 by the Government of Tamil Nadu, as a teaching-cum-affiliating University. The University has been named after the Tamil poet/Literate. Prof.P.Sundaram Pillai (1855-1897) was the renowned writer of late 19th century and author of the famous verse drama Manonmaniam. The University caters to the needs of the three southern districts of Tamil Nadu viz. Tirunelveli, Thoothukudi and Kanyakumari. It is recognized by the University Grants Commission (UGC). The university offers both part-time and full-time research programmes through its departments as well as through recognized research departments of affiliated colleges.

Manonmaniam Sundaranar University Area here refers to the jurisdictional area of the university. The jurisdictional area of the university is the three southern districts of Tamilnadu namely Kanyakumari, Tirunelveli and Thoothukudi.
1.23 Objectives of the Study

Objectives of the study are:

1. To identify the familiarity of ICT products and ICT applications among the research scholars.
2. To identify the purposes of using ICT products and applications by the research scholars.
3. To analyse the frequency of using ICT products and applications by the research scholars.
4. To analyse e-resources access behaviour of research scholars.
5. To identify the sources used for accessing e-resources among the research scholars.
6. To determine the ICT awareness, constraints in use of ICT, and information literacy among the research scholars.
7. To compare the ICT awareness, constraints in use of ICT and information literacy among the research scholars based on gender, locality, type of institution, nature of research, age and discipline.
8. To identify the association between frequency of using internet, time spent for internet access with respect to variable information literacy, ICT awareness and attitude towards e-resources.
9. To determine the attitude of research scholars towards e-resources.
10. To compare attitude of the research scholars towards e-resources based on gender, locality, type of institution, nature of research, educational qualification, nature of research, age and discipline.
11. To identify the relationship between ICT awareness, constraints in use of ICT, information literacy and attitude towards e-resources.
1.24 Hypotheses of the Study

By keeping the objectives of the study in mind, the following hypotheses are framed for the study:

1. The level of ICT awareness, information literacy and attitude towards e-resources among the research scholars are poor.

2. There is no significant association between computer literacy and the variables gender and discipline of the research scholars.

3. There is no significant association between ICT awareness of the research scholar with respect to frequency of using internet and time spent for accessing internet.

4. There is no significant difference in ICT awareness among research scholars with respect to the variables gender, age, locality, type of Institution, educational qualification and discipline.

5. There is no significant difference in constraints in use ICT among research scholars with respect to the variables gender, age, locality, type of Institution, educational qualification and discipline.

6. There is no significant association between information literacy of the research scholar with respect to frequency of using internet and time spent for accessing internet.

7. There is no significant difference in information literacy among research scholars with respect to the variables gender, age, locality, type of Institution, educational qualification and discipline.

8. There is no significant association between attitude of the research scholars towards e-resources with respect to ICT awareness, constraints in use of ICT, information literacy, frequency of using internet and time spent for accessing internet.
9. There is no significant difference in attitude of the research scholars towards e-resources with respect to the variables gender, age, locality, type of Institution, educational qualification and discipline.

10. There is no significant correlation between ICT awareness, constraints in use of ICT, information literacy and attitude towards e-resources among research scholars.

1.25 Scope and Limitations of the Study

The present study is intended to measure the extent of usage of e-resources in relation to ICT awareness and information literacy among research scholars and hence scope of the study is limited to Manonmanim Sundaranar University Area. Furthermore, information requirements of the research scholars for the pre-research programme, research programme and post-research programme are different in nature and hence the scope of the present study is limited only to research scholars at Ph.D level and other categories of research scholars are excluded. In addition to information literacy and ICT awareness other variables such as availability, experiences in using e-resources, one-to-one guidance and so on influence the usage of e-resources among the research scholars are they are not included in the study. The tools used for the study are prepared and standardized by the researcher and hence it has its own limitations.

1.26 Delimitations of the Study

The researcher has listed out the delimitations of the present study:

1. The present study is confined only the research scholars at Ph.D level.

2. Research scholars who are pursuing research at Ph.D level in universities other than Manonmaniam Sundaranar University are excluded from the study.
3. The study is confined only to the recognized research centers of the Manonmaniam Sundaranar University including research departments of the university centers and research centers of affiliated college.

4. The sample respondents of the study are 626 and the survey was conducted during 2015-16.

1.27 Chapter Framework of Thesis

Chapter framework of the thesis is presented under this sub-heading. The thesis is organised into six chapters as follows:

Chapter – I: Introduction

This chapter deals with the concept and meaning of Information Communication Technology (ICT), impact of ICT on information management, components of ICT, ICT based user services, information literacy, ICT awareness and information literacy, attitude towards e-resources, need and significance of the study, statement of the problem, operational definition of terms, objectives and hypotheses of the study, scope and limitations, delimitations and chapter framework of thesis.

Chapter – II: Review of Related Literature

In this chapter, related literature and previous studies on ICT awareness, information literacy, usage of e-resources in relation to ICT awareness among the research scholars are reviewed. Previous studies are arranged in conceptual basis namely information literacy (IL), Information Communication Technology (ICT), attitude towards e-resources, utilization of e-resources by the research scholars and utilization of e-resources by the academic community.

Chapter – III: Area Profile – Manonmaniam Sundaranar University Area

The third chapter deals with the socio-economic conditions and educational profile of Manonmaniam Sundaranar University Area. It includes Kanyakumari District,
Tirunelveli District and Thoothukudi District. Details of research institutions under the Manonmaniam Sundaranar University area are presented in this chapter.

Chapter – IV: Research Design and Methodology

Chapter four deals with the research design and methodology employed for the study. It includes method adopted for the study, theoretical framework, sampling design, samples for the study, tools used for the study, description of measuring tools and standardization procedures, and statistical techniques employed.

Chapter – V: Analysis and Interpretation of Data

The fifth chapter deals with analysis and interpretation of data pertaining to information literacy and usage e-resources among the research scholars. The analysis is divided into nine sub-divisions namely demographic variables of the respondents, familiarity of ICT products, usage of ICT by research scholars, e-resources access behaviour research scholars, ICT awareness of research scholars, constraints in use of ICT, information literacy, attitude of research scholars towards e-resources, correlation analysis discussion on findings.

Chapter – VI: Findings, Suggestions and Conclusions

The final chapter consists of summary of the study, findings of the study, testing of hypotheses, suggestions of the study, suggestions for further research and conclusion.

The final chapter is followed by a list of References and series of Annexure pertaining to the study.

The American Psychological Association (APA) style manual is used for citations in the body of text and references.