CHAPTER 1
INTRODUCTION

1.1 Background

In *The Third Wave*, Alvin Toffler (1980) divided history into three major eras, or waves. The first wave, from 8000 BC to 1750 AD was termed the agricultural revolution, and was based on farming as the world’s primary occupation. In the second wave, from 1750 to 1955, the rise of industrial civilization and the industrial revolution, manufacturing became the main occupation and the developed world was engaged in or moving toward mass production. The third wave, which began in the mid of 1950s, is sometimes referred to as the information age or the information revolution and is based on the delivery of services. Important to note from Toffler’s viewpoint is that all human society was profoundly transformed with each wave, and that the transition to the next wave was never easy.

What Toffler envisaged yesterday, we can see it today in proliferation of knowledge-based society? Countries like USA, UK and Germany were ahead in third wave, which started after the World War II. Many knowledge-based industries emerged in these developed countries due to intensive efforts of advanced research, development and entrepreneurship. These nations nurtured talents and attracted creative and visionary people to establish knowledge-based economy. That is, the enterprises, which have superior knowledge resources, have tremendous growth opportunities in global markets. They became the trendsetters and followed by many others. So, this third wave or knowledge-based society emerged only due to information and communication technologies (ICTs) and these ICTs become commonplace entities in all aspects of life.

Education is one of the main keys to economic development and improvements in human welfare. As global economic competition grows sharper, education becomes an important source of competitive advantage, closely linked to economic growth, and a way for countries to attract jobs and investment. In addition, education appears to be one of the key determinants of lifetime earnings. In developing countries, education is also linked to a whole batch of indicators of human development. As the pace of technological change quickens and as the workforce in countries grows older, education offers a way to improve and update the skills and
capabilities of the workforce. Across the past twenty years, the use of ICT has fundamentally changed the practices and procedures of nearly all forms of endeavour within business, governance and education. Within education, ICT has begun to have a presence but the impact has not been as extensive as in other fields. Education is a very socially oriented activity and quality. Education has been traditionally associated with strong teachers having high degrees of personal contact with learners. However, with the world moving rapidly into digital media and information, the role of ICT in education is becoming more and more important and this importance will continue to grow and develop in the 21st century. Information and communication technology is a force that has changed many aspects of the way we live. The impact of ICT across the past two or three decades has been enormous. The way these fields operate today is vastly different from the ways they operated in the past. But when one looks at education, there seems to have been a strange lack of influence and far less change than other fields have experienced (Collis, 2002). A number of people have attempted to explore this lack of activity and influence.

There have been a number of factors impeding the wholesale uptake of ICTs in education across all sectors. These have included such factors as a lack of funding to support the purchase of the technology, a lack of training among established teaching practitioners, a lack of motivation and need among teachers to adopt ICTs as teaching tools (Starr, 2001). In recent times, factors have emerged which have strengthened and encouraged moves to adopt ICTs into classrooms and learning settings. These have included a growing need to explore efficiencies in terms of program delivery, the opportunities for flexible delivery provided by ICTs; the capacity of technology to provide support for customized educational programs to meet the needs of individual learners; and the growing use of the Internet and WWW as tools for information access and communication.

Information and communication technology is application of tools and methods that support through which or by means of which information is transferred, recorded, edited, stored, manipulated and disseminated. UNESCO defines information and communication technology as “Scientific technological and engineering disciplines and the management techniques used in information handling and processing and their application, computers and their interaction with man and machine; and associated social, economic and cultural matters”. Information and communication technology is the collective term for the various technologies involves
in the processing and transmission of information. Thus, ICTs includes:

- Computer Technology
- Communication Technology
- Multimedia Technology
- Optical Technology
- Networking Technology, and
- Artificial Intelligence Technologies

1.2 Importance of ICT in Higher Education

Technology has heralded our present knowledge economy and given rise to a generation of students who have never known life without a computer. These changes will have a significant ripple effect on higher education. Over the next decade, advanced technologies will put education within the reach of many more individuals around the world, and will allow greater specialisation in curriculum and teaching methodologies than ever before. With these benefits comes the challenge of ensuring that university infrastructure and operations are in place to support the adoption of technology on campus. Before the World Wide Web it might have questionable whether, there was a sustainable future for a broadly based curriculum in Library and Information Science (LIS). After the World Wide Web (WWW), the potential curriculum has expanded immeasurably, to include technology, its impacts on organisations and society and new career opportunities associated with “knowledge management”. Government policy towards higher education in the India, including the most recent recommendations of National Knowledge Commission has never been more positive towards “vocational” higher education (National Knowledge Commission, 2007a).

Many experts have written about the vital role of information and communication technology plays in education and educational institutions. Institutions that have powerful information technology and technology capabilities are likely to widen their competitive advantage over the have-nots (Keller, 1993); and, information resources are not an option but a necessity in higher education (Stuckey, 1996; McClure, 1996). Institutions that did not embrace information technology, its maintenance and upgrade could find themselves extinct. They added that by policy and practice, increasing numbers of colleges and universities are mandating the use of
information technology to manage, teach, learn, research and reach out to their communities and the world. Duderstadt et al. (2003) comments that "digital technology is pervasive, affecting every aspect and function of the university, from teaching and scholarship, to organisation, financing. These technologies exert much power and have the capability of shaping the destiny of higher education (Privateer, 1999). As he remarked "those who may doubt how intrinsic technology has become to life of a campus should simply observe the paralysis that ensues, when a campus e-mail goes down for the day". Noting the truism of the above statements and observations, Smallen and McCredie (2003) observed that today's students and faculty expect and demand world-class access to electronic information technology. They continue: "At the core of any IT infrastructure is its communication network and literally millions of database and servers connected to it on campus and throughout the world, with associated applications, data resources, services and online communities of colleagues". In the instructional arena, information technology has created opportunities for meaningful and authentic work. Green (1999) observes that information technology is now everywhere and that it is not just computers, the Internet or the Web, but the aggregate presence of technologies in virtually all facets of daily life that it has had effect.

Academics working within the higher education sector regard electronic library resources as having more use and impact upon their teaching and learning (Hewitson, 2002). Access to electronic library resources for the higher education sector is well established, with all higher education library and information services having well established gateways to such resources through web pages and e-resources strategies. The development of off campus access via the World Wide Web also been embraced by the higher education community (Tsecy & Urquhart, 2001). These types of changes can be called a change of paradigm in higher education. Tiano has characterised the old and new paradigms of higher education as illustrated in the following Table 1.1.

New technologies are also affecting other areas of campus administration. Social-networking tools are helping to build connections with alumni and support career service activities. E-marketing campaigns expand the reach and success of recruiting and fundraising efforts, and drive down the cost of direct-mail campaigns and automated, self-service programmes reduce administrative requirements, streamline course registration and enhance academic life (Economist Intelligence
Unit, 2008).

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<tr>
<th>Old paradigm for HE</th>
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<tr>
<td>Take what you can get</td>
<td>Courses on demand</td>
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<td>Academic calendar</td>
<td>Year-round operations</td>
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<td>University as a city</td>
<td>University as idea</td>
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<td>Terminal degree</td>
<td>Lifelong learning</td>
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<td>University as ivory tower</td>
<td>University as partner in society</td>
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<td>Student = 18- to 25-year-old</td>
<td>Cradle to grave</td>
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<td>Books are primary medium</td>
<td>Information on demand</td>
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<td>Tenure</td>
<td>Market value</td>
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<td>Single product</td>
<td>Information reuse/info exhaust</td>
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<td>Student as a pain</td>
<td>Student as a customer</td>
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<td>Delivery in classroom</td>
<td>Delivery anywhere</td>
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<td>Multi-cultural</td>
<td>Global</td>
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<td>Bricks and mortar</td>
<td>Bits and bytes</td>
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<td>Single discipline</td>
<td>Multi-discipline</td>
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<td>Institution-centric</td>
<td>Market-centric</td>
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<td>Government funded</td>
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<td>Technology as an expense</td>
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**Source:** Tiano (cited in Virkus & Wood, 2004, p. 321)

1.3 The Impact of ICT on Curriculum

Curriculum is the ingredient part of education. Renewing and updating of curriculum is the essential ingredient of any vibrant university/institutions academic system. There ought to be a dynamic curriculum with necessary additions and changes introduced in it from time to time by the respective academic system with a prime objective to maintain updated curriculum and also providing therein inputs to take care of fast paced development in the knowledge of the subjects concerned. Revising the curriculum should be continuous process to provide an updated education to the students at large (University Grants Commission, 2001). However, a good higher education curriculum should deliver professionals with appropriate skills and competencies given a moderate quality of applicant.
Conventional teaching has emphasised content. For many years courses have been written around textbooks. Teachers have taught through lectures and presentations interspersed with tutorials and learning activities designed to consolidate and rehearse the content. Contemporary settings are now favouring curricula that promote competency and performance. Curricula are starting to emphasise capabilities and to be concerned more with how the information will be used than with what the information is.

1.3.1 Competency and Performance-based Curricula

In today's technology-enabled knowledge economy, many universities find themselves facing a new challenge: how not only to equip students with an adequate education in their field of study, but also to arm them with the skills and knowledge required to leverage technology effectively in the workplace (Economist Intelligence Unit, 2008). The moves to competency and performance-based curricula are well supported and encouraged by emerging instructional technologies (Stephenson, 2001). Such curricula tend to require:

- access to a variety of information sources;
- access to a variety of information forms and types;
- student-centred learning settings based on information access and inquiry;
- learning environments centred on problem-centred and inquiry-based activities;
- authentic settings and examples; and,
- teachers as coaches and mentors rather than content experts.

Contemporary ICTs are able to provide strong support for all these requirements and there are now many outstanding examples of world class settings for competency and performance-based curricula that make sound use of the affordances of these technologies. For many years, their resources and tools have limited teachers wishing to adopt such curricula but with the proliferation and widespread availability of contemporary ICTs, many restrictions and impediments of the past have been removed and new technologies will continue to drive these forms of learning further. As students and teachers gain access to higher bandwidths, more direct forms of communication and access to sharable resources, the capability to support these quality learning settings will continue to grow.
1.3.2 Information Literacy

Another way in which emerging ICTs are impacting on the content of education curricula stems from the ways in which ICTs are dominating so much of contemporary life and work. Already there has emerged a need for educational institutions to ensure that graduates are able to display appropriate levels of information literacy. “Information Literacy encompasses knowledge of one’s information concerns and needs, and the ability to identify, locate, evaluate, organise 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 lifelong learning (US National Commission on Library and Information Science, 2003)”.

The drive to promote such development stems from general moves among institutions to ensure their graduates demonstrate not only skills and knowledge in their subject domains but also general attributes and generic skills. Traditionally generic skills have involved such capabilities as ability to reason formally, to solve problems, to communicate effectively, to be able to negotiate outcomes, to manage time, project management, and collaboration and teamwork skills. The growing use of ICTs as tools of everyday life have seen the pool of generic skills expanded in recent years to include information literacy and it is highly probable that future developments and technology applications will see this set of skills growing even more.

1.4 The Impact of ICT on Learning Procedure

Just as technology is influencing and supporting what is being learned in schools and universities, so it is supporting changes to the way students are learning. Moves from content-centred curricula to competency-based curricula are associated with moves away from teacher-centred forms of delivery to student-centred forms. Through technology-facilitated approaches, contemporary learning settings now encourage students to take responsibility for their own learning. In the past, students have become very comfortable to learning through transmissive modes. Students have been trained to let others present to them the information that forms the curriculum. The growing use of ICTs as an instructional medium is changing and will likely continue to change many of the strategies employed by both teachers and students in
the learning process. The following sections describe particular forms of learning that are gaining prominence in universities worldwide.

1.4.1 Student-Centred Learning

Technology has the capacity to promote and encourage the transformation of education from a very teacher directed enterprise to one which supports more student-centred models. Evidence of this today is manifested in:

- the proliferation of capability, competency and outcomes focused curricula;
- moves towards problem-based learning; and
- increased use of the Web as an information source, Internet users are able to choose the experts from whom they will learn.

The use of ICTs in educational settings, by itself acts as a catalyst for change in this domain. ICTs by their very nature are tools that encourage and support independent learning. Students using ICTs for learning purposes become immersed in the process of learning and as more and more students use computers as information sources and cognitive tools the influence of the technology on supporting how students learn will continue to increase (Jonassen & Reeves, 1996).

1.4.2 Supporting Knowledge Construction

The emergence of ICTs as learning technologies has coincided with a growing awareness and recognition of alternative theories for learning. The theories of learning that hold the greatest sway today are those based on constructivist principles. These principles posit that learning is achieved by the active construction of knowledge supported by various perspectives within meaningful contexts. In constructivist theories, social interactions are seen to play a critical role in the processes of learning and cognition (Duffy & Cunningham, 1996).

In the past, the conventional process of teaching has revolved around teachers planning and leading students through a series of instructional sequences to achieve a desired learning outcome. Typically, these forms of teaching have revolved around the planned transmission of a body of knowledge followed by some forms of interaction with the content as a means to consolidate the knowledge acquisition. Contemporary learning theory is based on the notion that learning is an active process of constructing knowledge rather than acquiring knowledge and that instruction is the process by
which this knowledge construction is supported rather than a process of knowledge
transmission (Duffy & Cunningham, 1996).

The strengths of constructivism lie in its emphasis on learning as a process of
personal understanding and the development of meaning in ways which are active and
interpretative. In this domain learning is viewed as the construction of meaning rather
than as the memorisation of facts (Lebow, 1993). Learning approaches using
contemporary ICTs provide many opportunities for constructivist learning through their
provision and support for resource-based, student centred settings and by enabling
learning to be related to context and to practice (Berge, 1998; Barron, 1998). As
mentioned previously, any use of ICTs in learning settings can act to support various
aspects of knowledge construction and as more and more students employ ICTs in their
learning processes, the more pronounced the impact of this would become.

1.5 The Impact of ICT on Learning Approach

In the past educational institutions have provided little choice for students in
terms of the method and manner in which programs have been delivered. Students have
typically been forced to accept what has been delivered and institutions have tended to
be quite moderate and traditional in terms of the delivery of their programs. ICT
applications provide many options and choices and many institutions are now creating
competitive edges for themselves through the choices they are offering students. These
choices extend from when students can choose to learn to where they learn.

1.5.1 Any Place Learning: The concept of flexibility in the delivery place of
educational programs is not new (Moore & Kearsley, 1996). Educational institutions
have been offering programs at a distance for many years and there has been a vast
amount of research and development associated with establishing effective practices
and procedures in off-campus teaching and learning. Uses of the technology, however,
has extended the scope of this activity and whereas previously off-campus delivery
was an option for students who were unable to attend campuses, today, many more
students are able to make this choice through technology-facilitated learning settings.
The scope and extent of this activity is demonstrated in some of the examples below.

➢ In many instances, traditional classroom learning has given way to learning in
work-based settings with students able to access courses and programs from their
workplace. The advantages of education and training at the point of need relate not only to convenience but include cost savings associated with travel and time away from work, and also situation and application of the learning activities within relevant and meaningful contexts.

➤ The communications capabilities of modern technologies provide opportunities for many learners to enroll in courses offered by external institutions rather than those situated locally. These opportunities provide such advantages as extended course offerings and eclectic class cohorts comprised of students of differing backgrounds, cultures and perspectives.

➤ The freedoms of choice provided by programs that can be accessed at any place are also supporting the delivery of programs with units and courses from a variety of institutions. There are now countless ways for students completing undergraduate degrees for example, to study units for a single degree, through a number of different institutions, an activity that provides considerable diversity and choice for students in the programs they complete.

1.5.2 Anytime Learning: In concert with geographical flexibility, technology-facilitated educational programs also remove many of the temporal constraints that face learners with special needs (Moore & Kearsley, 1996). Students are starting to appreciate the capability to undertake education anywhere, anytime and anyplace. This flexibility has heightened the availability of just-in-time learning and provided learning opportunities for many more learners who previously were constrained by other commitments (Young, 2002).

➤ Through online technologies, learning has become an activity that is no longer set within programmed schedules and slots. Learners are free to participate in learning activities when time permits and these freedoms have greatly increased the opportunities for many students to participate in formal programs.

➤ The wide variety of technologies that support learning are able to provide asynchronous supports for learning so that the need for real-time participation can be avoided while the advantages of communication and collaboration with other learners is retained.

➤ As well as learning at anytime, teachers are also finding the capabilities of teaching at any time to be opportunistic and able to be used to advantage. Mobile
technologies and seamless communications technologies support 24x7 teaching and learning. Choosing how much time will be used within the 24x7 envelope and what periods of time are challenges that will face the educators of the future (Young, 2002). The continued and increased use of ICTs in education in years to come, will serve to increase the temporal and geographical opportunities that are currently experienced. Advancements in learning opportunities tend to be held back by the ICT capabilities of the lowest common denominator, namely the students with the least access to ICT.

1.6 The Impact of ICTs on Libraries

Traditionally, the library is a physical place where collection of information resources in various formats (books, journals, videos, CD-ROMs, etc.) is organised in a specific manner to meet the needs of a specific user or user groups. It is a service organisation with both tangible and intangible assets. The tangible assets constitute physical document and the human resources. The intangible assets comprise the invaluable services rendered by the library staff. The library plays an important role in the academic world by providing access to world-class information resources and services and stimulates academic research in the country.

Developments in ICTs have made significant impact on all spheres of human life. The impact has been rather prominent in case of service activities such as banking, health, transportation, education and libraries. Developments in information and communication technologies have enabled libraries to provide wide public access to all, and to bridge the gaps between the local, national and global levels (National Knowledge Commission, 2007a). Benefits of use of ICT in services can be broadly explained in terms of four Es, namely Economy, Ease, Extension or Expansion and Efficiency. Information and communication technologies have become ubiquitous with current and future social and organisational development. The role of these technologies in national development is undeniably significant. As the positive effects of ICTs have continually been noted in developed countries, it has become critically important for fast growing country like India to incorporate these technologies.

The emergence of the Internet particularly the WWW as a new medium of information storage and retrieval represents a revolution in the information system. Information and communications technologies enable society to create, collect, consolidate, communicate, manage and process information in multimedia and
various digital formats for different purposes i.e. computing and telecommunications technologies like the personal computer and digital libraries. It is now well established fact that ICTs has made substantial impact on libraries in the last two decade. A small beginning on using technological innovation in libraries was made with the adoption of mechanisation in indexing and information techniques.

In keeping with a discussion of traditional library ethics and roles, one of the most famous statements of library ethics and values is S. R. Ranganathan's "Five Laws of Library Science". Ranganathan, a founder of Library and Information Science in India, stated his five laws as follows: 1) Books are for use; 2) Every reader has/his/her book; 3) Every book its reader; 4) Save the time of the reader; and 5) Library is a growing organism (Ranganathan, 1988). In line with Ranganathan's five laws, Michael Gorman formulated his "Five New Laws of Librarianship". These laws are: 1) Libraries serve humanity; 2) Respect all forms by which knowledge is communicated; 3) Use technology intelligently to enhance service; 4) Protect free access to knowledge; and 5) Honour the past and create the future (Gorman, 1995). Gorman's statements serve as an update to Ranganathan's formulations in the increasingly digital driven environment in which libraries operate.

Countless articles over last two decades have described the technological transformations in libraries—for instance, all major library functions in the areas of purchasing, collections and services have been affected by changes in technology (Buschman, 1993). Moreover, it can be argued that the traditional "paper library" exists alongside the increasingly prominent and more ICT intensive "automated library" and "electronic library" (Buckland, 1992). Most forecasts about the "future of libraries" consequently include a continuously transformative and prominent role for ICTs. This orientation, moreover, can be associated with predictions about the "paperless library" and an "all electronic future" for libraries (Lancaster, 1978). This vision prompted anxiety at the beginning of the 1990s about the future of libraries as some techno-futurists predicted the end of libraries, as we know them.

Rapid developments in ICTs in the present era and its use in different spheres have commuted the magnitudes of information needs of the users. The enormous changes that are taking place in the ICTs again have stretched far into all walks of life which could bring new evidences about the importance of e-commerce, e-business, e-governance etc. Library and information centers are no exception to this. The nature, type and speed of dissemination of information, access to electronic media,
advanced telecommunication system, audio visual technology, multimedia etc. in library and information science along with information centers and documentation centers changed due to the emergence and application of computers. Application of technologies could create new possibilities to deal with the collections, organisation and propagation of vast amount of information. In the library and information centre ICT is used as enabling technology for the acquisition, representation, storage, transmission, and use of resources in electronic form known as e-resources. ICTs comprise the amalgamation of computer technology, communication technology, optical/video (CD-ROM) technology, Internet and web technologies etc. Uses of these technologies have a positive impact in changing the library environment which resulted to establish an electronic platform for information gathering and dissemination. These new technologies have the potentiality for information proliferation, ensuring of free and universal access to information and reducing the inequalities in favour of social justice and economic well-being. Today, many of the admired information resources include encyclopedias, journals, books, dictionaries, bibliographies, multimedia presentations and back volumes which are obtainable in much cheaper rate in electronic format and these all have altogether changed the entire scenario of information domain. Thus today, ICT has become indispensable and most viable platform for retrieval information through electronic form.

Information and communication technology has wider connotation for librarians that includes in addition technologies like repro-micrographic technology, technical communication technologies and database creation and use. Information and communication technology is operative in following environments in libraries: 1) Library Management: classification, cataloguing, indexing, database creation, CAS, SDL etc.; 2) Library Automation: organising databases and automating library house-keeping operations; 3) Library Networking: resource sharing and information dissemination; 4) Reprography: photography, microfilms, machine, etc.; 5) Technical Communication: technical writing, editing, publishing and DTP.

1.7 Technology in Today’s Libraries

Libraries are frequently mentioned as important players in developing an
information society, information infrastructures and ICTs, there is, however, a notable lack of critical theorisations of technology use by libraries (National Knowledge Commission, 2007b). Technology is now interwoven throughout every aspect of the library activities. Whether we are in public services, technical services, systems or administration, chances are that some knowledge of computer technologies is integral to our work. In the case of libraries, this can range from understanding the Integrated Library Management System (ILMS) to designing Web content to searching databases to evaluating new library technologies to troubleshooting networking and Internet problems. Most academic libraries in India lease access to at least a few electronic databases, which has led to increased interest in the quality of the library’s Web presence, since many patrons may be accessing the library from a distance. The growth of content in digital form has led to concerns about how to preserve and provide access to that content. Libraries have long had a key role in providing access to and preserving knowledge, and we will be an important part of ensuring continued access to knowledge in digital form. Librarians in all settings will need to become more comfortable with and knowledgeable about technology, in order to do their jobs and to meet the needs of an increasingly tech-skills population.

1.7.1 Emergence of New Technologies

The emergence of powerful technologies, vast amounts of information in multimedia and other digital formats, more technologically proficient users, and the widening 'digital gap' means that libraries and librarians in particular are faced with the great challenge of dealing with this information revolution. Furthermore, the recent developments in the capability of computers to store, locate, retrieve and transfer huge amounts of digital data at high speed have contributed to the evolution of an information-based society. Libraries must respond to this development in order to remain relevant and important to the society they aim to serve. However, libraries and librarians must first educate and equip themselves with the necessary knowledge and skills before they can deal with this enormous challenge.

Library services are thus evolving with the continuous development of Internet technologies, affecting areas such as digital reference, electronic journal development, open access publishing, information search tools, and integrated library systems, to name a few. The researcher focuses on one particular technological movement
within the library community that has been greatly facilitated by the Internet—open source software. Open source software also often associated with the “free software” movement, usually has source code that is “open” and is distributed free of charge. The open source and free software movements are worldwide phenomena, with various international organisations interested in their potential for alternatives to commercial software dominance (European Commission, 2005; UNESCO, 2007). Open source software is also tied into discussions of the information society, as it is considered an important effort grassroots, development-centered effort aimed at constructing a global information society (UNESCO, 2007). Libraries, for instance, are utilizing open source software as an alternative to purchasing the often-expensive software that commercial vendors sell for various library functions, such as integrated library systems, electronic resource management tools and information searching tools.

1.7.2 Emergence of Technology and Social Software

Today library has entered into the world of virtual library by using digital technology. The educational system in the process had to incorporate these contemporary changes in its curriculum and change the course content. It is considered that library and information science profession has a great role to play in content development in the ICT environment. The university and institutions engaged in library and information science manpower. Additionally, with the development of more interactive technologies, such as wikis, blogs and RSS (Really Simple Syndication), new forms of democratic participation are flourishing on the Internet (Kahn & Kellner, 2005), which can have profound influences on the future of library services. For instance, the dawning of “Web 2.0” has prompted the Association of College and Research Libraries (ACRL) to commission a monograph entitled, Library 2.0 Initiatives in Academic Libraries, which explores the roles of new web technologies in the transforming academic library environment. Some of the guiding principles of “Library 2.0” include the use of social information tools favoured by users; the building of personalized, participatory library services driven by user needs; an embrace of radical trust; the shift toward taking the library to users; and the rapid change mobilized by assessment (Cohen, 2007). This re-envisioning of academic library services includes, for example, the use of blogging and social networking tools

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for community outreach, research and teaching.

The emergence of social software is a fruitful area for library professionals and Library 2.0. Although an exact definition of social software seems to be missing from the literature, the basic idea is that individuals jointly contribute to an effort, such as a wiki. The end product is not the output of any single individual, but rather is a community effort. Interestingly, in some cases, no end product exists; the product is under ongoing evolution as more and more individuals add their contributions.

In the absence of a widely accepted definition of social software, it is useful to examine common characteristics of such applications. Parameswaran and Whinston (2007a) offer a list of traits of social computing (which is analogous to social software). Social computing has a decentralised organisation, a transient membership and a loosely defined structure. Further, the scope of the system is rather fluid. Content is dynamic and quality control is unstructured, occurring primarily through peer feedback. Social computing applications/platforms are quite varied. Expanding the curriculum will equip new generations of librarians with competencies and skills that fit a modern, dynamic and changing work environment. Library and Information Science (LIS) programmes prepare students for performing traditional information tasks such as indexing, retrieval and library management (Crosby, 1999; Tenopir, 2004). The increased importance of social software and centrality of information has moved LIS schools to offer new curricula that combine traditional librarianship and archiving with technological and social aspects of information.

1.7.3 Social Software and Its Application in Libraries

There are so many applications of social software in social networking or in social interaction as open source, blogs, wikis, RSS, flickr, collaborative favorites, tagging, instant messages, social networks etc. These applications may be directed at both personal and work-related uses for example, it may be that social networking systems are an important new element in knowledge management systems (Smith & McKeen, 2007). Blogs (Web logs), which are basically public online journals are an example. Typically, authors allow others to comment on blog entries, which increase the social nature of the platform. Wikis are another example of social computing. A wikis is an online information compendium, such as Wikipedia, which is an online, open source, user-created encyclopedia. Social bookmarking services, which enable
different users to share their Web bookmarks, are another example, as are YouTube, Flickr, MySpace, and the like (Parameswaran & Whinston, 2007b).

In Web 2.0, the Web becomes the center of a new digital lifestyle that changes our culture and touches every aspect of our lives. The Web moves from simply being sites and search engines to a shared network space that drives work, research, education, entertainment and social activities—essentially everything people do. Web 2.0 is the label attached to these new capabilities of the next generation World Wide Web and it enables data to be exposed and permits the building of virtual applications. It is participative and presents the value of user-generated content (Miller, 2006a; Miller, 2006b). Many associates with this term such as blogs, wikis, podcasts, RSS feeds, social web, etc. and assert that Web 2.0 is a place where everyone can add or edit information. It is a web where digital tools allow users to create, change and publish dynamic content (Stephens, 2006). The October 2005, O’Reilly in his paper about Web 2.0, “Web 2.0 is the network as platform, spanning all connected devices; Web 2.0 applications are those that make the most of the intrinsic advantages of that platform: delivering software as a continually-updated service that gets better the more people use it, consuming and remixing data from multiple sources, including individual users, while providing their own data and services in a form that allows remixing by others, creating network effects through an ‘architecture of participation’, and going beyond the page metaphor of Web 1.0 to deliver rich user experiences (O’Reilly, 2005)”. Web 2.0 generally refers to a second generation of services available on the World Wide Web that let people collaborate, and share information online. Web 2.0 is the a method by which data and services previously locked into individual web pages for reading by the human beings can be liberated and then reused.

Tim Berners-Lee claims that Web 2.0 is not different from Web 1.0 as the goal of Web 1.0 was to connect people (Berners-Lee, 2006). He adds that Web 2.0 is only jargon and nobody really knows what it means. One of the main characteristics of Web 2.0 is individual production and User Generated Content (UGC). UGC refers to self-publishing, personal publishing and self-expression. The final characteristic is openness. It suggests working with open standards, using open source software, making use of free data, reusing data, and working in a spirit of open innovation (Downes, 2004).
<table>
<thead>
<tr>
<th>Library 1.0</th>
<th>Library 2.0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closed stacks</td>
<td>Open stacks</td>
</tr>
<tr>
<td>Collection development</td>
<td>Library suggestion box</td>
</tr>
<tr>
<td>Collection development through</td>
<td>User generated contents</td>
</tr>
<tr>
<td>subscription, gratis</td>
<td></td>
</tr>
<tr>
<td>Pre-organised Integrated Library Services</td>
<td>User tagging</td>
</tr>
<tr>
<td>Walk in Service</td>
<td>Globally available service</td>
</tr>
<tr>
<td>Read only catalogue</td>
<td>Amazon style comments</td>
</tr>
<tr>
<td>Print newsletter mailed out</td>
<td>Team-build blog</td>
</tr>
<tr>
<td>Easy = dumb users</td>
<td>Easy = smart systems</td>
</tr>
<tr>
<td>Limited service options</td>
<td>Broad range of options</td>
</tr>
<tr>
<td>Information as commodity</td>
<td>Information as conversation</td>
</tr>
<tr>
<td>Monolithic applications</td>
<td>Flexible, adaptive modules</td>
</tr>
<tr>
<td>Mission focus is output</td>
<td>Mission focus is outcome</td>
</tr>
<tr>
<td>Focus on approach user</td>
<td>Focus on finding the user</td>
</tr>
<tr>
<td>ILS is core operation</td>
<td>User services are core</td>
</tr>
</tbody>
</table>

Source: Soundararajan and Somasekharan, 2006

Library 2.0 seeks to break down barriers: barriers librarians have placed on services, barriers of place and time, and barriers inherent in what we do. In this user-centered paradigm, libraries can get information, entertainment and knowledge into the hands of users wherever they are by whatever means works best (Tajer, 2009). Although Library 2.0 utilizes Web 2.0 technologies, it is not about replacing the traditional technology adapted by libraries already in use but rather about adding additional functionality. In fact, Web 2.0 principles offer libraries many opportunities to better serve their existing audiences.

Library 2.0 facilitates and encourages a culture of participation, drawing upon the perspectives and contributions of library staff, technology partners and the wider community. Blogs, wikis and RSS are often held up as exemplary manifestations of Web 2.0. A reader of a blog or a wikis is provided with tools to add a comment or even, in the case of the wikis, to edit the content.
1.8 Changes in the Technology Landscape and LIS Education

It is inarguable that developments in our society, technological or otherwise, have brought significant changes to Library and Information Science (LIS) education all over the world. Among all the changes occurred in LIS education, the ones that are most visible and observable can be found in the LIS curricula. That is, a curriculum for LIS education usually mirrors what is being offered to train librarians and information professionals who will not only acquire the essential knowledge and skills to become qualified personnel in the field but also meet challenges the ever changing information society brings.

Aspects of information production, use, storage and access are the main study areas in LIS programmes. These programmes provide traditional training while trying to accommodate the rapidly changing information landscape. Traditional roles of dealing with journals and books are becoming less prevalent in the careers open to information professionals, and new competencies, skills, and graduate-level education are becoming more sought after (Aharony, 2006). As library budgets shrink, fewer administrators have the luxury of hiring both an information scientist and a Web Librarian, or a Systems Librarian to the sciences. Instead, administrators are forced to ask much more of their job candidates. Over the past few years, we have seen more and more positions with titles like Web/Reference Librarian, Information Scientist, Librarian/Information Technology Specialist (Raghavan & Agrawal, 2006). Especially in libraries where much of the staff has been employed for a decade or more, administrators expect new librarians to come in with the technology skills the rest of the staff may lack.

Those who come into the job with a working knowledge in any of these areas will have an advantage, but, like any librarian, relying on the skills developed in school or career will get you far in fulfilling the duties of the new position (Hayworth, 2008). At the same time that special library jobs are calling for stronger technology skills, we are also seeing an explosion of new positions that simply did not exist a decade ago. In academic libraries, in particular, but also in some corporate libraries, we are seeing a growing number of Digital Services Librarians, Content Developer, Electronic Resources Librarians, Metadata Librarians, Web Services Librarians, Branch Librarians and Digital Repository Services Librarians. Libraries that create positions like this recognise the need to keep up with the latest technologies and
with their patrons who may be accessing resources remotely. New library and information professionals also have opportunities to work outside of libraries as consultants, technology evangelists and knowledge managers. All of these positions tend to require a high comfort level with bleeding edge technologies—something rarely taught in library schools. Where are LIS students supposed to obtain the skills they need for positions like these? Often, those who land these positions have prior experience in the technology sector or have learned markup and programming languages as a hobby. People who enter library school with no technology experience and expect to land one of these jobs may find it difficult to get the skills they need through their LIS program.

Several researchers have argued that libraries will be only one part of the information society, and not necessarily the most important one. Librarians will become a small part of the growing body of information workers, since responding to the challenges of information management will require knowledge and skills from disciplines traditionally considered peripheral to LIS (Katzer, 1990; Van House & Sutton, 1996). Furthermore, education for LIS should expand, beyond skills and technology, to include new cognitive, social and situational processes (Myburgh, 2004). Cronin, Stiffler and Day examined the emergent market for information professionals and claimed that there was a low demand for people with a Master of Library Science degree, and a greater emphasis on subject knowledge and business ability (Cronin, Stiffler & Day, 1993; Shah, 2004). They concluded that those LIS schools, which offer other options to the traditional curricula, are more successful in meeting the emergent market for information professionals.

The KALIPER Report (2000) identified several trends that demonstrated active movement towards a change in the education of information professionals for libraries and other information environments. The first trend was the change that LIS underwent at the end of the twentieth century, from a library-focused model to an information-focused paradigm. Another trend referred to two related areas—increased user-centeredness and increased inter-disciplinarity. The third trend related to the increased investment by LIS programmes in information and communication technology and its inclusion in their curricula.

The role of information in creating power and wealth is currently receiving more attention in various programmes such as Computer Science, Business/Management Schools, Communications and Schools of Library and
Information Science (Rehman, 2000). Graduates of these programmes enter careers in diverse areas such as business, industry, libraries and educational institutions. It has become apparent that LIS training no longer automatically guarantees students the first pick of all employment opportunities in the field of information work (Theakston, 2000). Abell and Hall in their portrayal of the 'e-information' job market (Abell & Hall, 2006) claim that two types of e-information role seem to offer the greatest number of work opportunities as information architecture; and content management. While these roles are open to traditional information specialists, they are often offered to highly skilled people who do not hold formal information qualifications. Employers would like to have the best candidates from a wide range of backgrounds and the traditional information professionals compete with other workers from a variety of domains, such as computer science, business/management schools and communications.

LIS education and indeed the profession itself are facing new competition and must acquire new knowledge to cope with it successfully (Van House & Sutton, 1996). Indeed, examining various LIS school programmes during the past decade has revealed that many schools have introduced new courses into their curricula such as the social context of information technology, changes in use and user behaviour, human-machine interaction and information technology, information economics, communication skills, information policy and information brokering.

1.9 Present Situation of LIS Education

The structural feature of globalization is its affect on higher education as it depends on the latter for the human capital. Thus, it affects policy making, governance, organisation, academic work and the identity of higher education. LIS education is also a part of this transformation. The need is to blend global tendencies with local responses. It presupposes a convergence thesis. LIS curricula have taken these challenges into consideration and revised their course structures thus competing with the demands for manpower from the contemporary information society.

Schools of Library and Information Science (LIS) struggle with the ongoing tension between teaching theory and practice. LIS faculty tend to argue that librarians need a firm grounding in the foundational theories of the profession, while employers of information professionals often argue that library schools should be teaching students the practical skills they need to succeed in the workplace. Most library
schools usually try to provide some combination of the theoretical and the practical in their curricula, but neither group seems really to feel that sufficient attention is being paid to what they believe should be the focus of LIS education.

Obviously, it is important to provide students with an understanding of the ideas that underlie what do as librarians, especially with regard to how information is organised. Regardless of where you stand on the issue of theory versus practice, however, library school graduates have to face an increasingly competitive job market, many armed only with the knowledge and skills they develop in graduate school. If they lack the skills employers are looking for, they will find it very difficult to get a job. Library schools can offer whatever courses they feel to be important, but if they stray further from teaching students what they need to know to be successful librarians in the real world, they will be doing a grave disservice both to their students and to the profession.

LIS schools have recognized this changing landscape to varying degrees. Some library schools offer degrees in Library Science (MLIS) and Information Studies (MIS), one focusing more on people and the other focusing more on computers. Some only offer a few technology-related classes as electives, while sticking to a very traditional library school curriculum. Other schools design specialisations in areas such as digital librarianship, information architecture, human–computer interaction or information technology. Very few schools, though, make technology education a part of the core required courses for the degree; technology is seen as somehow separate from librarians’ core competencies. Making technology a separate (and often elective) part of the curriculum, though, ignores the importance of computer knowledge for new librarians. In order that library schools truly prepare students to be 21st century library and information professionals, technology needs to be a central part of the curriculum, and needs to be integrated into every course.

Library studies have traditionally been considered an interdisciplinary study, but their interdisciplinary character appears to be even more pronounced at present. A contemporary LIS educator has to span very different fields—she/he has to acquire knowledge about such disparate fields as publishing, technology, national and international law, preservation, ethics, management, economy, etc. (Horvat, 2003).

Library and information science (LIS) schools have a diverse student body. Students come from a wide-range of educational and work backgrounds, and have diverse interests and career aspirations (Khoo et al., 2004). The LIS field is itself very
broad and multidisciplinary, and graduates of LIS programs assume a wide range of jobs in many different environments. Many LIS schools now define a number of specialisations and even offer separate master’s programs to prepare students for professional positions in those specialisations.

In 2001, the Indian University Grants Commission (UGC) recommended a Model Curriculum for Library and Information Science. Departments of Library and Information Science are concerned about the challenges of recruitment and of keeping curricula relevant for new jobs in new settings and new responsibilities in old settings. The majority of universities switched over to a two year integrated masters degree in Library and Information Science and adopted the suggested curricular programmes in total or with little modifications to suit local needs and demands. However, job opportunities for librarians in the traditional market have insignificant growth in India. The growth and development of public libraries is neglected and school library development has declined despite the recognition of the role of library and librarian in education policies. The placements and trainee opportunities in technology based corporate organisations, besides university and special libraries, are promising. However, it is evident that employers are not satisfied with the skills of the products from LIS departments and prefer candidates who possess specialized training.

Library and Information Science (LIS) academic departments have witnessed not only this increasing globalisation of higher education but also that of the LIS workplace including the consequent extension of competition beyond traditional, institutional, national and regional boundaries. This environment has made it important for LIS Education and Training to strive to improve their quality of programmes, on the one hand to be able to participate in educational networks and develop innovative strategies in planning and administration of LIS education (Curry, 2000), and on the other hand, to produce graduates whose workplace spans the whole world. Thus, it is a foregone conclusion that ICTs are significant in the achievement of LIS educational goals/objectives and the fulfillments of the primary tasks of LIS schools. Hence, with this conclusion came the realisation that there is need for greater infusion of ICT knowledge and skills into LIS course content, as well as thorough diffusion of ICT competencies into the LIS students.

The greatest challenge for the LIS profession and LIS schools in the near future is the distinct possibility of isolation triggered by the emergence of a parallel information management profession (Raghavan, 2007). The departments are
responsible for developing the right personnel of high caliber capable of managing
digital libraries and information centres of varied scope and nature. This requires
redesigning and reengineering the digital library course content at the level of the
Masters Degree Programme (Varalakshmi, 2009). At presently, libraries are integrated
into the technology courses more but technology is integrated into the library courses
very less. This further promotes the idea that “library work” and “information science
work” are two very different things. No classes taught ways to cope with
technological change, how to manage technology projects, or how to evaluate
technologies. These “big picture” topics are among the most important technological
competencies librarians can have in the coming years, as technologies continue to
change at a rapid pace.

Program review and implementation of new curricula were not unknown
activities to the LIS departments. As both the discipline and the profession of library
science have continued to evolve during the past 80 years in India, the LIS department
has experienced constant, substantive change. Its name, curriculum, course content and
faculty complement have been modified significantly in order to provide relevant
educational opportunities for professionals in the emerging field of information science.
For example, University of Mysore laid the foundation for the establishment of a new
generation centre called International School of Information Management (I-SIM) in
collaboration with the Indian Institute of Information Technology, Bangalore (IIIT-B),
and the School of Information Science, University of Pittsburgh. I-SIM offer a Master’s
Programme in Information System Management. With the introduction of a Masters of
Information System Management degree that replaced both the Masters of Library
Science (MLS) and the Masters of Information Science (MIS) degrees. The curriculum
content direction for the new Information System Management was developed to
address the competencies acquired from the multiple subject areas comprised by the
field of information science in order to provide streams of study for three professional
specialties: archival studies, information systems, and library and information science.

The big question is that departments wrestle with how prescriptive they should
be about the curriculum in order to have market for their products. The importance of
developing employability skills has been given new emphasis in all professions and
LIS is not an exception. The focus is to be on identifying current and future trends in
recruitment and the skills required by the professionals to meet the employer’s needs.
The universities in the west are offering courses in traditional librarianship but with a new face as hybrid, electronic, virtual or net based library courses. It is high time for the LIS schools/departments in India to evaluate and assess the relevance of their courses for the employment market and to the employer’s needs in the corporate environment.

1.10 Competencies Required for the Emerging Market

During the last two decade, library and information organisations had to assume new roles in the creation of databases, information systems, digitization, creation of virtual libraries, metadata, and development of intranets, extranets, and portals, which required new skills in information entrepreneurship, architecture, human-machine interface, connectivity, data warehousing, information packaging, and delivery. The exercise required collaboration with other key players in these activities— the IT professionals and those active in the business domain (Cortez, et al., 2004; Tanner, 2001). Today’s information organisations need to have the capacity to function anywhere in their new role of more like a production shop. These realities necessitate new sets of competencies for handling the physical dimension of modern day organisations (Finnerty, 2002).

The ability to design and develop information products for the network environment including the web, will be an essential requirement expected of the information professionals of the future. In brief, the designed course contents should concentrate in developing knowledge, skills and tools corresponding to the four basic identified areas creation, collection, communication and consolidation (Karisiddappa, 2004). One of the biggest challenges over the next decade will be to attract new professionals to replace the retiring ones. New-age librarians are expected to organise and validate the flood of information and serve as conduit for users to gather and analyse the information they receive. Lifelong learning activities need to be encouraged at the same time because librarians serve as a key point of contact in gathering of the information. They require skills in training adults and young people alike and at the same time continue to upgrade their skills to be on top of the technology. This becomes mandatory for those who work on the front line.

National Knowledge Commission (2007a) submitted his proposals on staffing of libraries and recommended that skills required to fulfilling the changing role of
libraries:

i. library and information-handling skills;

ii. service orientation;

iii. ICT knowledge skills;

iv. communication and training skills;

v. marketing and presentation skills;

vi. understanding of cultural diversity; and

vii. knowledge mapping skills etc.

The literature on job competencies for the technologically oriented librarian consists of two major streams: those that focus on the knowledge base (professional skills) and those that focus on attributes or attitudes (personal characteristics). Roy Tennant (1998), a leading proponent of developing digital librarians, published a list of skills and he considers necessary for those who create and manage digital collections and services. These skills and knowledge are:

- Imaging Technologies;
- Optical Character Recognition (OCR);
- Markup Languages, including HTML, SGML, and XML;
- Cataloguing and Metadata;
- Indexing and Database Technology;
- User Interface Design;
- Programming;
- Web Technology; and
- Project Management.

Paradigm for today’s information centers has shifted from the modes of gathering, collecting, and protecting data to the modes of choosing, evaluating, organising, and distributing information for maximum sharing potential. Now the information professionals need to be more business-like, cultivating partnerships with business colleagues and IT professionals; capitalizing on innovation for growth and expansion; adding value to information through filtering, synthesizing, messaging, and packaging; and, using business metrics for proving value and worth (Lettis, 2000; Harmon, 2003). While moving to a virtual environment, information professionals had to contend with the issues of vendor reticence, technological fragmentation, waverer user preferences, budgetary challenges, and unknown futures. Corporate information centers are now responsible for producing the new content in standard
formats for production and organisation (Stratigos & Strouse, 2001).

In a subsequent article, Roy Tennant (1999) acknowledged that the rapid rate of change in technology meant that certain skills might be obsolete in a short time. To remedy this, he recommended that employers seek librarians with the following attributes or personal traits:

- flexibility;
- innate skepticism;
- propensity to take risks;
- good interpersonal skills;
- abiding public service perspective;
- capacity to learn constantly and quickly;
- skill at enabling and fostering change; and
- capacity for and desire to work independently (Tennant, 1999).

This is why, Raghavan (2007) stated that there is a need to redefine the boundaries of our profession in order to continue to be relevant in terms of developing and providing human resources for the typical 21st century workplaces, which require knowledge and skills of a different kind and of a different order, should be evident from the foregoing discussion. In earlier paper, Raghavan (2006) list out knowledge and skills required for the emerging job market (Table 1.3).
### Table 1.3: Knowledge and skills required for the emerging market

<table>
<thead>
<tr>
<th>AREAS</th>
<th>REQUISITE KNOWLEDGE &amp; SKILLS</th>
</tr>
</thead>
</table>
| Understanding the Information User | - Theoretical Understanding of Use Studies  
- Qualitative Research Methods  
- Quantitative Research Methods  
- Psychological Tools  |
| Information Resources        | - Types-Print & Electronic  
- Nature & Characteristics  
- Meta Sources  
- Searching & Search Engines  
- Norms, Techniques and Procedures of Evaluation |
| Value Addition Processes     | - Theoretical (Logical, Linguistic, Psychological) Foundations of Knowledge Organisation  
- Tools and Techniques of Knowledge Organisation  
- METADATA  
- Authoring Tools, Multimedia/Hypermedia Tools  
- Electronic Publishing: SGML, HTML, DHTML, XML, PDF |
| Information Services & Delivery | - Theoretical underpinnings of the value and impact of Information  
- Information Diffusion, IR Models  
- Query Formulation, Search Strategy, Search Techniques  
- Information Analysis and Repackaging  
- Design & Evaluation of Information Products |
| Information Technology       | - Understanding of Information & Communication Technology Hardware; Office Automation  
- Operating Systems  
- Networking Protocols  
- Programming  
- Website Management |
| Management                   | - Theories & Schools of Management  
- Information Economy  
- Methods of Forecasting; Tools of Market Research and Principles and Methods of Marketing  
- Financial Management  
- Performance Evaluation & Measurement  
- TQM: ISO 9000 series and other standards  
- Intellectual Property Rights |
1.11 Statement of the Problem

Library is a social institution charged with the responsibility to serve its patrons with books and kindred material so well that they become its regular customers. The trinity of books, readers and staff collectively constitute the library. A library exists only at the moment a book is introduced to a purposeful reader by a helpful librarian. Education for library profession is a revolutionary process. The core of the curricula is the people in relation to the information itself and technology that enable the provision of this information. There is a need to produce library science graduates with sophisticated management and policy and planning skills and the vision to translate core values of today and tomorrow's information world. Due to the ongoing developments in information technology sector, the information professionals trained in the latest information handling techniques would also become obsolete after a short time. Hence, the curricula must be reviewed constantly to determine whether the changes are in tune with the present and future job requirements.

LIS curricula have been a subject of research over the years, especially when quite a few indicators (e.g., the advent of computers and the emergence of the Internet) show that our field is in the center of an information society and plays a crucial role in the digital age. LIS education focuses on developing manpower suitable to the demands of the contemporary information environment. There is need to audit the LIS curriculum for its relevance to the 21st century hybrid environment. The past few decades have brought in revolutionary changes in information handling activities because of advances in information and communication technologies. Therefore, there is a need for rejuvenating the LIS courses in India in light of the happenings in the international arena, the adoption of modular approach is a way of meeting the present and future needs of a dynamic curriculum.

Since the library science graduates have to compete with other professionals to survive in the information business, they have to be equipped to function immediately as competent professionals. Library science graduates are often being criticized as having inadequate knowledge and skills to bring changes in libraries. The criticized indirectly is on the library and information science schools for not keeping up with the new developments. This requires the strengthening up of library science education to prepare graduates for specialist areas. So long as the mission of libraries is to bring information to people, the curricula of library education, however, will consist of the
role of information in society, the needs, information gathering behaviour and theory and practice of information retrieval. New system today often requires redesigning the organisation and developing new information architecture.

LIS programs throughout the world are progressing from educating traditional librarian towards crafting specialists who could be employed in the vast information sector. Nearly all library schools throughout the world have incorporated changes in their curricula in the last few years ranging from total revamping of the curricula to minor tinkering. Despite this, “it is often felt that the present curriculum however is not suitable to meet the expected demands of professional skills”. This appears to be a growing consensus that the library science curricula should focus on the wider context of information studies. Some of the new courses include studies on information seeking behaviour, ethics, information needs and analysis, user education, knowledge management, digital libraries, networking technologies, electronic publishing, information security, metadata etc. The LIS departments in India responded positively to the development of digital libraries and designed courses to train digital librarians; however, their response has been inadequate to meet the demands of a digital society. It is necessary to update syllabi and course curricula of Library and Information Science, with a focus on problem solving, leadership, managerial skills, communication skills, marketing skills and ICT skills.

Many Indian LIS schools were still focused on curriculum review and revision that considered the effect of computer and telecommunication technology on library science professionals, the Faculty was preparing to take a further step in its program development by providing education and opportunities for a broader group of mid-career information and information technology professions. However, the Faculty did not have a formal process for developing curriculum. Past curriculum development, initiatives were completed by a variety of methods, most of which, admittedly, had no framework to guide the curriculum development decision-making process.

Library employers often experience stress during this time because in most instances recent graduates do not have the necessary skills, simply due to lack of applied experience and education. It is argued that the changes brought about by the new information and communication technology have a great impact on LIS education that requires more than habitual updating of the curriculum content practiced up to the present. Apart from a number of new topics that have to be introduced into the curriculum, the form of the delivery of the content has to be
changed. Such monumental changes demand new roles for LIS professionals. The twenty-first century information professional must possess skills on selection, content management, knowledge management, organisation of information on Intranet and Internet, research services, developing and maintaining digital libraries, and bringing information resources to the desktop. People with the right skills are crucial to the success and competitiveness of contemporary information environments. The level of credentials LIS course offer suits lower and middle strata positions but does not match with the rigorous requirements of the plum positions. It is a fact that the practicing profession is not happy with the products of LIS departments in the country. This is the high reason that researcher has been taken to do research study on the theme of LIS curriculum and perception and satisfaction of LIS employers and LIS alumni with regard to present course curriculum.

1.12 Objectives of the Study

The objectives of the present study on the above research topic are:

1. To provide an overview about the LIS curriculum development and LIS education system in India.

2. To identify fundamental competencies (knowledge; skills and attitudes) necessary for information professionals to navigate “swiftly” in a fast changing ICT environment.

3. This study will explore the perception and expectations of library leaders/employers on existing LIS courses at different universities and the relevance of the courses with contemporary labour market of professional librarians in India.

4. To examined students and employers satisfaction with LIS program.

5. To suggest including the every necessary components of ICT to meet present and future demands.

6. To put forward some suggestions regarding what measures should be implemented to solve the existing problems and it will also suggest the possible ways to enhance employability skills.
1.13 **Hypotheses of the Study**

The hypotheses, which drawn for the proposed study, are stated below:

**H1** candidates having IT background are being preferred in library profession.

**H2** Library professionals are facing problems due to lack of IT skills at the time of providing services.

**H3** Majority of the library professionals want to modify and modernise the curriculum of library and information science.

1.14 **Significance of the Study**

This study has several beneficial findings, conclusions and suggestions that could assist researchers, LIS professionals and educators. Thus, findings of the study can be helpful for LIS educators who might be interested in developing and designing skill upgrading courses, as well as to review and develop LIS curricula according to market oriented. It will facilitate the policy makers and authorities for formulating appropriate policies to improve LIS curricula. This study will also provide findings related to improve educational curricula, work-practices, training, and system design.

1.15 **Definition of Terms**

The literature in both education and library and information science is rife with disclaimers concerning the lack of agreement on definitions for many of the key concepts and terms within the two discourses. In an effort to standardize use and clarify meaning, I have provided definitions for terms specific to these two disciplines that are used in this research study. At the same time, I recognize that scholars and practitioners working within these fields of study may have varying opinions on the usefulness of a chosen definition. However, the definitions of terms and concepts that have general significance to this research study are included in this section.

**Accreditation:** The term accreditation is a part of a profession’s quality assurance and it is generally defined as a public confirmation of a curriculum. It is assumed that programmes accredited satisfy a code of standards stated by a consortium of institutions or a professional community.

[32]
**Communication Skills:** Communication skills is understanding, managing and creating effective oral, written and multimedia communication in a variety of forms and contexts.

**Competencies:** The set of knowledge and skills that enable an employee to orient easily in a working field and to solve problems that are linked with their professional role (Webber, 1999). The knowledge base (subject matter and content areas), the skills (techniques and abilities), and attitudes (personal approach and motivation) used in combination to perform a task.

**Curriculum:** Syllabus is a one-dimensional document which lists the subjects and contents outline with broad time allocation. Curriculum is three-dimensional and takes into account the needs of the students, the content and the instructional methodology (Karissiddappa & Sangam, 1994, p. 36). An intentional design for learning negotiated by faculty in light of their specialised knowledge and in the context of social expectations and students' needs (Toombs & Tierney, 1995).

Colin J. Marsh has given the following definitions of curriculum.

- Curriculum is the 'permanent' subjects that embody essential knowledge.
- Curriculum is those subjects that are most useful for contemporary living.
- Curriculum is all planned learning for which the school is responsible.
- Curriculum is the totality of learning experiences so that students can attain general skills and knowledge at a variety of learning sites.
- Curriculum is what the students construct from working with the computer and its various networks, such as the Internet.
- Curriculum is the questioning of authority and the searching for complex views of human situations (Marsh, 2004, p. 4).

**Curriculum Design:** The initial phase of curriculum development where the process is defined in terms of a problem in design. The curriculum problem is identified and a solution formulated with emphasis on context, content and forms (Toombs & Tierney, 1995).

**Curriculum Development:** The detailed process of formulating all aspects of a curriculum based on the design created to solve a defined curriculum problem (Toombs & Tierney, 1995).

**Curriculum Framework:** A curriculum framework is a plan that interprets educational aims as well as both individual and society to arrive at an understanding of the kinds of learning experiences institutions must provide to students.
Digital Library: Digital libraries are organisations that provide resources, including the specialized staff, to select, structure, offer intellectual access to, interpret, distribute, preserve the integrity of, and ensure the persistence over time of collections of digital works so that they are readily and economically available for use by a defined community or set of communities (Digital Library Federation, 1998).

A widespread point of view, repeatedly presented by computer scientists, advocates that the Digital Library should enable any citizen to access all human knowledge anytime and anywhere, in a friendly, multi-modal, efficient, and effective way, by overcoming barriers of distance, language, and culture, and by using multiple internet-connected devices.

Employability Skills: Employability skills are those basic skills necessary for getting, keeping, and doing well on a job. These are the skills, attitudes and actions that enable workers to get along with their fellow workers and supervisors and to make sound, critical decisions. Robinson says that these employability skills are teachable skills. Job readiness skills or employability skills are clustered into three skill sets: basic academic skills; higher order thinking skills; and, personal qualities (Robinson, 2000).

Information and Communication Technology (ICT): Information and Communication Technology is the hardware and software that enable society to create, collect, consolidate and communicate information in multimedia formats and for various purposes. This ICT is amalgamation of two technologies, 1) Computer Technology; and, 2) Communication Technology. Developments in ICT have brought about the merger of the computing, information, communications, entertainment, mass media industries thereby providing a means of exchanging information in the digital format used by computers.

Information Professionals: Professionals trained in the creation, management and use of information particularly to design, produce, acquire, organize, store, filter, classify, retrieve, represent and disseminate information with an emphasis on working with people in order to help them understand and manage their information requirements. Generic groups organized by function that includes: information system specialists and intermediaries, managers of information, information technologists and researchers, and educators and trainers of information workers.
Internationalisation: Although the term Internationalisation is usually understood as the process of integrating an international dimension, it also assumes some form of harmonisation and adaptations, and in the context of the Bologna process refers to structure and qualification for easier mobility when we connect this aspect with the various activities to set up core skills in LIS education at a world level (IFLA, 2000).

Internet: The Internet is at once a world-wide broadcasting capability, a mechanism for information dissemination, and a medium for collaboration and interaction between individuals and their computers without regard for geographic location (Leiner et al., 2003). The Internet supports communication and sharing of data, and offers vast amount of information through a variety of services and tools.

Knowledge Management: Knowledge management is a “system and managerial approach to collecting, processing and organizing enterprise-specific knowledge assets”. Knowledge management functions as a six-step process: (1) acquire, (2) create, (3) synthesize, (4) share, (5) use to achieve organizational goals, and (6) establish an environment conducive to knowledge sharing (Chen, 2001).

Marketing: Marketing is the processes by which individuals, groups and organisations fulfill their respective needs through the creation, offering, and exchange of valued services and products. Some key concepts of marketing include needs, wants and demands; products and services; value, cost and satisfaction; monetary and non-monetary exchange transactions and relationships; markets, marketing and marketers (Harmon, 2003).

Open Access (OA): This term refers to the availability of electronic information resources with limited restrictions. Open Access literature is digital, online, free of charge, and free of most copyright and licensing restrictions—what makes this possible is the Internet and the consent of the author or copyright-holder (Suber, 2004). Open Access can be applied to the areas of electronic journal publishing, institutional repositories, and online archives, for instance.

Open Source Software (OSS) refers to software in which the source code of the software is free. In contrast to proprietary software, the source code is available along with the software and is free to modify, use, and distribute—free, in this case, however, does not necessarily mean free of cost. The open source process is often characterised by widespread collaboration and distributed development. Semi-official rules of protocol and licenses govern open source communities around the world. The Open Source Initiative (http://www.opensource.org) and the Free Software
Foundation (http://www.fsf.org) are two leading open source community organisations.

**Professional**: A member of an exclusive occupational group who applies knowledge and skills acquired in specialized training to particular cases.

**Professional education**: A formal educational program directed toward helping students acquire special competencies for diagnosing specific needs and for determining, recommending and taking appropriate action. Professional education also socialises students in the thought processes of the profession and to inculcate them with its customs, ethics, working relationships, and the behaviours expected from members of the profession.

**Web 2.0**: Web 2.0 is the network as platform, spanning all connected devices; Web 2.0 applications are those that make the most of the intrinsic advantages of that platform: delivering software as a continually-updated service that gets better the more people use it, consuming and remixing data from multiple sources, including individual users, while providing their own data and services in a form that allows remixing by others, creating network effects through an “architecture of participation,” and going beyond the page metaphor of Web 1.0 to deliver rich user experience (O’Reilly, 2005).

### 1.16 Dissertation Overviews

**Chapter 1** served as an introduction to the study, a foundational explanation for the importance of ICT in higher education and provided the present situation of LIS education. The chapter argues the role of ICTs in transforming teaching and learning and seeks to explore how this will impact on the way programs will be offered and delivered in the universities. This chapter also served with theoretical background of the study and it concluded with the statement of the problem, the objectives of research and the significance of the study.

**Chapter 2** is study about the origin and development of library education in India. An attempt has been made in this chapter to review the trends of LIS education in India under three important phases, genesis of LIS education, LIS education during 1949-2009, and emerging trends in the new millennium in order to cover the important milestones that occurred in Indian Library and Information Science education.
Chapter 3, through an extensive literature review, identified and addressed sixteen prominent areas: The social, economic, political and geographical context; impacts and application of ICTs on libraries; LIS education and the new LIS job market; competencies essential for success in the new LIS job market; dissatisfaction of LIS employers and professionals; information and communication technology in LIS curriculum; and, competencies and curriculum needed for digital librarians etc.

Chapter 4 provided a brief overview of the research-site of central university, research methodology and research questions. This chapter also discussed the design and organization of the study; by detailing the methodological procedures of selected subjects, the design of the survey questionnaire, sampling techniques and the treatment of the data.

Chapter 5 presented the analysis and findings of the study. The researcher employed quantitative methods. The quantitative data were obtained from groups of LIS employers, alumni and faculty through the questionnaire. These results were presented with tables and graphs and by way of narratives.

Chapter 6 included finding and conclusions of the research study and some suggestions also given for improvement of the curriculum in fast changing environment.

1.17 Summary

This chapter has sought to explore the role of ICT in education and especially in Library and Information Science as we progress into the 21st century. In particular, the chapter has argued that ICTs have impacted on educational practice in education to date in quite small ways but that the impact will grow considerably in years to come and that ICT will become a strong agent for change among many educational practices. Technology alone is not the solution to efficient and effective information delivery, although it is the major contributor to the development of multimedia information and networks. The basic library education acquired in school is more important than the tools but the tools will make information creation, acquisition, consolidation and communication more efficient. ICT are powerful tools that can only be used effectively if the users—administrators, librarians, and patrons in this case—have acquired adequate knowledge and skills and a certain level of competency according to their needs. So far, library professionals must cope with the demands of
an information society. Library professionals must have the knowledge, skills and tools in handling digital information to be efficient creators, collectors, consolidators and communicators of information. LIS professionals with the knowledge, skills and tools required of information professionals in an information society will constitute the key success factor in enabling the library to perform its role as an information support system for society.

The upshot of all this activity is that we should see marked improvements in many areas of educational endeavour. Learning should become more relevant to stakeholders' needs, learning outcomes should become more deliberate and targeted, and learning opportunities should diversify in what is learned and who is learning. At the same time, quality of LIS programs as measured by fitness for purpose should continue to grow as stakeholder groups find the offerings matched to their needs and expectations. To ensure that the opportunities and advantages are realized, it will be important as it is in every other walk of life to ensure that the educational research and development is sustained so that education at large can learn from within and that experiences and activities in different institutions and sectors can inform and guide others without the continual need for re-invention of the wheel. Once again, ICTs serve to provide the means for much of this activity to realize the potential it holds.

Undoubtedly, ICTs are potentially a useful tool both for managing education and for teaching. Use in managing educational institutions should be encouraged, as should use by instructors to gain access to educational materials. Moreover, by teaching ICT skills to youngsters, they may influence inward investment. Its success is attracting job-rich employment from corporate sector. Getting the best from ICTs depends on several variables, including the appropriate design of software and hardware; the training and attitude of instructors; and the realization that different students have different requirements. It also requires a willingness to experiment: effective use of ICTs in education and training is likely to require quite different pedagogical techniques from traditional classroom teaching. These will probably take a long time to devise and disseminate. Moreover, the new emphasis on cost-effectiveness may discourage innovation. Well-designed ICTs can allow educators to reach new groups of potential students, particularly mature students, lifelong learners, students in employment and students who are far from education centers. Most of these groups are composed mainly of older and well-motivated students.