CHAPTER - I
INTRODUCTION

1.0 Introduction

Information is the key for the development of a nation as well as an individual prosperity. Gradually, society is being changed from feudalist to democratic and from democratic to an information society. Today’s society, being the highly information dependent, almost all activities of the society are information, knowledge and learning oriented. Information has become a vital resource and dependence of information in every sphere of intellectual activity has increased drastically. Information plays an important role in the economic, political and social change in the present day context. Similarly, the academic and research activities can be accomplished successfully only if the required information becomes available as and when it is needed.

The task of academic libraries in particularly engineering college libraries has become more challenging and complex due to Information explosion, information overload and revolutions and evolutions in the field of Information and Communication Technologies (ICTs). There is an enormous growth of new developments both in application and pure thought that has resulted in the flooding of recorded knowledge. There is a mushroom growth of journals every year, and millions of research papers are published in specialized journals such, in addition to those published in popular journals. The Information and Communication Technology has augmented the basic medium for recording and transmitting knowledge. Communication media / channels and the creation of networked information systems are opening up new vistas and horizons.
Today, information is constantly changing in terms of its volume, forms and formats, the technical aspects of its storage and retrieval, and in the way it is communicated. This situation has not only increased the amount of information available to users but has also created an environment that is complex for users as well as LIS professionals (Librarians) in terms of finding, accessing, selecting, evaluating and handling information (Kaur. et al., 2009). For information professionals and educators this situation represents a challenge because both groups have an interest in ensuring that information users who are helped to overcome the various problems that they encounter in the processes related to information selection, access and use.

It is high time for the LIS professionals to determine what information is needed, how to select, where to obtain it, evaluate it and utilize it purposefully, for the collective progress is of critical importance. The applications of technology cannot, of themselves, assist in making sense of the world, but advances in Information Technology are forcing a reconsideration of the knowledge, information skills and values needed for education and successful living.

As a consequence, information literacy is gaining a high profile as central to education. This dynamic concept extends basic reading, writing and calculating skills for application in information and technologically rich environments for the purpose of learning or solving problems (Kuhlthau, 2001). However, it is widely recognised that in even the most technologically advanced countries, efforts are made to prepare students for the information age have been only partially been successful and implementation of recommendations from information skills research have been slow and difficult to implement.
All these intricacies pose challenges to individuals in accessing and retrieving information efficiently, selecting and evaluating its authenticity, validity, and reliability for its effective use in knowledge building and sharing. Here arises the need for Information Literacy (IL) which aims at developing learners' critical thinking and ability to discriminate the whole gamut of information resources and formats prior to Consumption of information for sustained learning skills.

Bundy (2004) says, in the digital age, what information literacy means is that understanding technologies is not enough. What everyone must also do is to learn how to utilize those incredibly diverse and powerful technologies efficiently and effectively to search for, retrieve, organise, analyse, evaluate information and then use it for specific decision-making and problem-solving ends. Sheer abundance of information and technology would not in itself create more informed learners without a complementary understanding of and capacity to use information *effectively*. Unless the learners are information literate, they will be deficient in skills to locate, retrieve *efficiently*, organize and evaluate critically the retrieved information and use it effectively.

UNESCO's Information for All Programme (IFAP) emphasises the need to equip the people with skills for accessing and using information as: "Information Literacy enhances the pursuit of knowledge by equipping individuals with the skills and abilities for critical reception, assessment, and use of information in their professional and personal lives. It accentuates that everybody should have the opportunity to acquire the Information Literacy skills to understand, participate actively in, and benefit fully from the emerging knowledge societies (Longworth, (Ed.) (2005)."
1.1 Overview of Information Literacy

Libraries have long been involved in training their users in library use, its services and resources. Terms such as library instruction, library orientation, user education and bibliographic instruction have all been used at various times to indicate the process of educating the users how to use the library, how to access and retrieve information and making use of bibliographic tools. These methods are facility specific instructions i.e. enabling users in knowing the physical location of different sections, staff, collections and services of library.

Knowledge explosion forces a greater stress on the ability to continue to learn for life. One may have developed a logical, creative and critical approach to his subject but he may not have been taught independence. To be independent, one needs the knowledge and skills to find his own way. An increase in the production of knowledge and changes in higher education have become inevitable (Tiefel, 1995). In the process the growth in the number of interdisciplinary courses is another factor for the development of user orientation or information literacy. Libraries underwent rapid collection growth and acquired new tools & techniques of organization, storage and retrieval of print as well as online information. Specialisations in education also led to revive interest in library user orientation. Such courses, which cut across the traditional boundaries of subjects, have been a particular feature of the universities and are becoming increasingly important in all the institutions of higher education and engineering institutions are not an exception to this.

The Information literacy as a set of skills enables the individuals in understanding the nature of information, realising information need in terms of quantity, quality, type and format; articulating appropriate search expression to locate it; organising and evaluating the
retrieved information for further use in study and research in an ethical manner. Eventually, information literacy focuses on making individuals competent enough for seeking authentic information and its effective and ethical use (Koneru, 2006).

In the digital age, putting bounds around “library resources” has become a daunting task. Moreover, the instructional needs of users have changed dramatically as new methods for teaching and learning have emerged. While information sources and methods for finding information are still a useful component of library instruction, a broader construct of information literacy has emerged as a framework for effective information inquiry.

Information Literacy emanating from its precursors such as library orientation or bibliographic instruction has been the term most frequently used since the late 19th century owing to the pervasiveness of technology and related services and products (electronic resources). Bruce (2002) remarks this transition as: "The idea of information literacy, emerging with the advent of ICTs in the early 1970s, has grown, taken shape and strengthened to become recognised as the critical literacy for the 21st century. Solid information literacy skills are desirable across all disciplines, including engineering.”

Today’s engineering educated workforce need skills beyond the technical knowledge and competencies traditionally taught in the post secondary curriculum.

1.2 Technical Education in India with special reference to Mumbai

“Education is the true alchemy that can bring India its next golden age. Our motto is unambiguous: All for knowledge, and knowledge for all.”

- The President of India Shri Pranab Mukherjee

Education has always been accorded an honoured place in Indian society. The great leaders of the Indian freedom movement realised the fundamental role of education and
throughout the nation's struggle for independence, stressed its unique significance for national development. Gandhiji formulated the scheme of basic education, seeking to harmonies intellectual and manual work. This was a great step forward in making education directly relevant to the life of the people. Many other national leaders likewise made important contributions to national education before independence (NPE, 1968).

As per Natarajan (2005), the basic objectives of an education system are to-

a) promote the ability and habit to think, while simultaneously developing knowledge in the process.

b) provide opportunities for individual students to explore, understand, and accept a set of personal values.

c) encourage students to learn to apply intelligently knowledge to meet specific tasks and

d) instill the habit of work and the will to serve though it.

1.2.1 Technical Education in India

Technical education plays a vital role in human resource development of the country by creating skilled manpower in adequate numbers for the economic and technological development of the country and also improving the quality of life. It imparts technical knowledge, research and facilitates technology transfer. It includes knowledge, technical skills and attitudes, all of which contribute to the effective practice of the engineering profession

The beginning of formal Technical Education in India can be dated back to the mid of 19th Century. The most important policy initiative in the pre-independence period included appointment of the Indian Universities Commission in 1902, followed by an issue
of the Indian Education policy resolution in 1904 and the Governor General’s policy statement of 1913 stressing the significance of Technical Education, the establishment of IISc in Bangalore, Institute for Sugar, Textile and Leather Technology in Kanpur, N.C.E. in Bengal in 1905 and the Industrial schools in several provinces.

The phenomenal growth of technical education in our country may be traced to the result of several factors, such as the need for high-level technical manpower for industrial development, the desire to attain self-reliance in the training of scientist and engineers, and national pride and international recognition which such self-sufficiency evokes. The principal condition for meaningful technical education is a clear articulation of goals and objectives. Presumably, the major aim of such education is to prepare engineers for making measurable contributions to national development (Natarajan, 2005).

Vrat (2012) suggests that the locus of technical education should be on developing technical people who could contribute to the national development process and are globally employable. This calls for holistic development of personality profile with a judicious ‘mix ‘of theory, practice, industrial exposure, project-based learning; research training, co-curricular activities together with soft skills such as professional and personal communication, teamwork, managerial skills, leadership development, productivity etc. Thus there is a serious need to improve knowledge and skills and attitudes for global employability of our technical graduates.

1.2.2 Status of Engineering Education in Mumbai

In its very broadest sense, the discipline of engineering is concerned with that body of theory and practice that is relevant to the design and construction of real-world artifacts arising from endeavour. In its most basic form, engineering is defined as “The branch of
science and technology concerned with the design, building, and use of engines, machines, and structures. Engineering education is not only teaching in basic science, but also relies on training some personal and technical skills, modifying the student’s way of thinking in a more logical way to achieve creativity at the end. The main aim of engineering education is to model a creative ethical engineering in different engineering and allied domains (Bhatt, 2010).

Bhatt (2010) explains that a successful engineering activity requires wide range of skills and knowledge, because the corpus of documented material relating to engineering is now so large, sub-domains of the subject usually have to be considered for example, electronics, bio-medical, Computer , Chemical, electrical and so on. Naturally, the fundamental purpose of engineering education is to impart relevant skills and knowledge to those people who are interested in gaining either a general awareness of the subject or who wish to become professional engineer and /or academic researcher.

The goals of the engineering education are closely interlinked with the national goals and aspirations. The engineering education must be relevant to the needs of society, but must also reflect the progress of science and technology. The key objective of engineering education is to provide more effective application of science and technology for improving the quality of life.

Engineering education in India started during the British era and the focus was mainly on civil engineering. Before independence, the country had handful of engineering colleges. Only few provinces had one or two colleges, where only graduate level education was imparted in the fields of civil, mechanical and electrical engineering. With the establishment of Govt. College of Engineering at Guindy (Tamilnadu) in 1794, engineering
education began in India. Thomson Engineering College at Roorkee (1847), Poona Civil Engineering College at Pune (1854), Bengal Engineering College at Shibpur (1856), Banaras Hindu University (1916), Harcourt Butler Technological Institute at Kanpur (1920) were some of the earliest engineering colleges established in the pre-independence era.

After achieving independence in 1947, the Indian government and the planners immediately realized the importance of developing engineering education in the country to ultimately build its infrastructure like industries, roads, dams, communication systems, power and energy etc. The first three years, until 1950, were the years of planning and thereafter, the country entered into an era of establishment of national, state or regional and divisional level engineering institutions mainly for the graduate courses. Slowly over a decade, transformation for postgraduate engineering education set in. The increasing demand of trained manpower to perform the multidimensional activities to keep the wheel of industry running, has forced the Technical Education Department to approve more number of technical institutions towards making available these trained technically qualified hands to serve the industry & society.

At present there are 35 Engineering colleges In Mumbai (including Mumbai, Mumbai suburban & Navi Mumbai). All these are recognized by AICTE and affiliated with University of Mumbai. The Director of Technical Education, Maharashtra State, is the authority for Admission process in all these colleges. Students from adjoining towns and suburbs come to Mumbai in their quest for quality education.

The engineering education is among the key enablers of growth for transforming India’s economy. The quality of teaching and research in this sphere will play a significant role in the emergence of India as a global knowledge leader. Education, in general, and
engineering education in particular, currently face increasing demands for more effective educational experiences by the students, in the face of diminishing financial resources available to support this educational task. The need for effective and alternative forms of education requires the use of great variety of methods informal education. The use of ICT offers the potential for meeting a number of challenges, in addition to an increase in productivity.

1.3 ICT and Changing Scenario of Education System

Over the past few decades, the view of teaching and learning has changed dramatically with the emergence of student-focused learning models. It has led to the re-examination of the activities of learning and teaching. At the same time, ICT has enabled new ways of setting up learning activities. In the ICT-rich learning environment, students' achievement of ICT and information literacy becomes very essential to their success as learners.

MacFarlane insisted that for all level of education to move on, a holistic view on the nature of the learning environment must be maintained, with more student focused learning approaches matched by a suffusion of IT across curriculum and pedagogy. This would have profound effects upon students:

“Students will have to be taught how to manage their own learning processes to an unprecedented degree. They will have to learn how to swim in a sea of information, to use the rich resources of a supportive learning environment, to self-pace and self structure their programmes of learning. They will have to choose from a spectrum of learning styles ranging from virtual self-instruction under support to group working of various types. The effectiveness of each individual student's learning process will have to be efficiently
monitored and appropriate arrangements devised for each individual student to interact effectively with supervisors and tutors. The supportive environment will offer the student a powerful and continuous means for self-assessment and for planning the development of their learning processes and skills generation. There will be a continuing need for academic counsellors and tutors, and for collaborative inputs in areas like study skills.” (Feldmann & Feldmann, 2000).

Information and Communication Technology (ICT) is believed to be a revolution with profound influence on the education system as a whole engineering education in particular. The rapid advancements in ICT are making it economically feasible to collect, store, process and disseminate information at breathtaking speed, reduce cost, particularly, the transaction cost, raise productivity and increase economic welfare. It also provides the basis for the creation of open and flexible virtual learning environments. Appropriately designed ICT programmes are directly supportive of modern active leaning approaches with teachers and trainers acting as facilitators. Due to the increasing importance of ICT in our day-to-day activities, a different set of skills is required in the learning environment as well as workplace. These challenges can be summarized into three broad areas, namely:

- Participation in the information society (effective storage and access of information);
- How ICT impacts on access, cost effectiveness and quality of education; and
- The way ICT is integrated into the learning and teaching process (Hariharan, 2006).

The latest technologies are changing the way information is stored and disseminated. This has implications both for the skills, which all level education needs to develop in students, and for the way in which it is delivered. There is a growing trend for traditionally
distinct library and computing or ICT services in education institutions to merge into single information services.

1.3.1 ICT in Education: Indian Scenario

The Govt. of India launched the project called “National Mission on Education through ICT”. It is a momentous opportunity for all the teachers and experts in the country to pool their collective wisdom for the benefit of every Indian learner and, thereby, reducing the digital divides. Under this Mission, a proper balance between content generations, research in critical areas relating to imparting of education and connectivity for integrating our knowledge with the advancements in other countries is to be attempted.

As per the MHRD, Mission Document, ICT is the tool in education available to enhance the current enrolment rate in Higher Education, at present 15 percent to 30 percent by the end of the 11th Plan period. The Ministry launched a web portal named “SAKSHAT” a ‘One Stop Education Portal’. The high quality e-content once developed will be uploaded on SAKSHAT in all disciplines and subjects. Several projects are in the completion stage and are expected to change the way teaching and learning is done in India.

The Mission has two major components viz., (a) content generation and (b) connectivity along with provision for access devices for institutions and learners. It seeks to bridge the digital divide, i.e., the gap in the skills to use computing devices for the purpose of teaching and learning among urban and rural teachers/learners in Higher Education domain (http://www.aicte-india.org/).

On the one hand, the Mission would create high quality e-content for the target groups utilizing the Wikipedia type of collaborative platform and on the other, it would simultaneously seek to extend computer infrastructure and connectivity to over 22000
colleges in the country and nearly 400 universities/deemed universities and institutions of national importance.

1.3.2 ICT in Engineering Education

Rapid technological advances during the decade have intensified the demand for a quality manpower, which is knowledge-rich and has analytical skills. In addition, they must have the capability to optimize the use of latest technologies and resources and to combine them effectively with creativity and innovation. Information technology has the potential to reinvent the relationship between teacher and learner by removing traditional barriers of time, distance, and mode of delivery. The ICT revolution is creating a new form of electronic, interactive education that should blossom into a lifelong learning system that allows almost anyone to learn almost anything at anytime from anywhere.

The National Mission on Education through Information and Communication Technology (ICT) has, under its aegis, created Virtual Labs, Open Source and Access Tools, Virtual Conference Tools, Talk to Teacher programs, a Non-Invasive Blood Glucometer and also for simulated lab experiments, a Di. Electric frequency shift application development of resonator for low cost oscillators, “Developing suitable pedagogical methods for various classes, intellectual calibers and research in e-learning,” anchored by IIT Kharagpur. Faculties from all the IITs and several NITs are participating in this curriculum development project (http://www.aicte-india.org/).

The National Programme of Technology Enhanced Learning (NPTEL) is a joint initiative of IITs and IISc funded by this Mission provides e-learning through online Web and Video based courses in engineering, science and humanities streams. The Mission of NPTEL is to create relevant content to enhance the quality of engineering education in the
country by providing free online courseware. The Mission would also have a component of Teacher Empowerment through proper training and digital literacy of teachers to be able to use the e-contents. The Mission would seek to enhance the standards of education, in Government as well as in private colleges. About 372 web courses and 398 video courses developed and hosted, which can be accessed freely through the website http://nptel.iitm.ac.in. More than 990 courses in various disciplines in engineering and science are getting generated (http://nptel.iitm.ac.in.).

The “Indian National Digital Library in Engineering Sciences and Technology (INDEST) Consortium” was set up in 2003 by the Ministry of Human Resource Development (MHRD). The consortium subscribes electronic resources for the members of the consortium at highly discounted rates of subscription and at the best terms and conditions. The Consortium was re-named as INDEST-AICTE Consortium in 2005. The AICTE played a pivotal role in enrolling its approved engineering colleges and institutions as members of the consortium for selected e-resources at much lower rates of subscription. The benefit of consortia-based subscription to electronic resources was extended beyond the core members to other self- financed engineering and technological institutions under its self-supported category (http://paniit.iitd.ac.in/indest/).

1.3.3 ICT and Engineering Libraries

Libraries are confronted with an explosion of information both in print and electronic formats and a plethora of newly arising publishers and aggregators of electronic information sources. In today’s information age, the pool of information available continues to expand enormously. The Information and Communication Technology (ICT) and, in particular, the
www and Internet have transformed the way we create, transmit, store, process and manipulate information.

Few years back it was not at all possible for a single library to procure all the literature published in their areas of concern. With the growth in the electronic publishing industry and initiation of consortiums, libraries are forced to get more electronic resources and are acquiring more number of e- Journals and online database in a limited budget. This became a reality for the engineering college libraries when INDEST-AICTE consortium initiated consortia–based subscription to electronic resources at discounted rates.

Today, digital technologies are bringing about revolutionary changes in the way the information is stored, retrieved and disseminated. These have profound impact on the ways engineering libraries function and open up electronic access to information for millions of users. Instead of a building that holds books, the library is now evolving into and electronic portal and subject gateway to a growing global collection in digital content. The emerging demand for the electronic information resources may warrant the restructuring of the academic libraries to digital academic libraries.

The Information Literacy is inextricably associated with information practices and critical thinking in the information and communication technology (ICT) environments. This concept includes both the ICT and information resources concept, and persons are considered as information systems that retrieve, evaluate, process, and disseminate information to make decisions to survive, for self-actualization and development.

In all the institutions of higher learning and research in India, the information literacy programmes have started gaining importance over last few years. This is primarily due to the activities of several consortia in the country. These consortia activities have
resulted in the accumulation of a large number of electronic resources in various engineering and research organizations. A more general pattern of information literacy training is emerging across organizations. In order to maximize the use of those resources, programs at various levels are being conducted. Consortium such as INDEST- AICTE, NLIST etc., periodically conduct workshops and training programs and also supports similar programs in various member organizations (Bhattacharyya, 2009).

1.4 Changing role of Library and Information Professionals

The delivery of information literacy program to users is becoming progressively more important due to the proliferation of electronic resources and the increased use of the Internet as an information source. Li et al. (2007) explains that many students today are over-reliant on search engines such as Google to find information when researching the topics. They often overlook quality academic resources available from libraries. This situation creates a new challenge for librarians, who must now play a more important role of facilitators, directing students to high-quality print and electronic sources and educating them on the need to evaluate web resources, assisting students in developing information literacy skills to identify when information is needed, and to locate, evaluate and use the needed information effectively. Essentially, we must prepare students to become information literate in the twenty-first century.

The role of LIS profession is changing radically with shifts of higher education paradigms. The new paradigm emphasises the empowerment of users and encourages them to take control of their own learning. The availability of huge quantities of information coupled with different delivery forms has increased the complexity of finding and selecting relevant, high quality information. Now the challenge before the libraries is to provide
greater information access and improved levels of service, while coping with the pace of information and communication technology

Librarians play a vital role in the educational changes taking place in teaching, learning and research in higher education by providing an appropriate information environment and the most efficient and effective user access to all types of information resources (Hoffman & Goodwin, 2006). The academic librarians are building partnerships with the teaching faculty to integrate information skills instruction throughout the undergraduate and graduate curricula. Librarians must ensure that students receive guidance & assistance at the time of need, in a collaborative learning and problem solving environment.

The library professionals can emerge as the leaders in motivating the users in the academic and research environment to become lifelong learners. This clearly demands that the professionals should master the critical skills in imparting information literacy. Information literacy programmes can be successful ventures if they incorporate modern tools & techniques such as web 2.0, interactive, multimedia tools etc., and different learning styles so as to make them more interesting and easy to learn and understand. The network technologies should be used to the maximum extent for effective delivery of information literacy programmes. Information literacy programmes are the effective tools in the proper utilisation of library resources and making users more informed in their areas of research and help them in increasing the research productivity of the individuals in general and the organisation in particular (Clyde, 2002).

With the growth of technology, the library and information professionals are forced to constantly adapt the expanding technology. However, it is the need of the hour that they
involve in continuous online search to reach out to the right information seeker, as it not only provides easy access for users and library professionals to deal with each other, but also saves the time. Therefore, information literacy does create a ‘wonderful opportunity, as it broadens the scope of the information professional's traditional mandate of just being a "provider" of information.

1.5 Efforts in Promotion of Information Literacy in India

In India the Information literacy programmes are already in existence in narrower forms in various academic and special libraries and information centres, in the forms of user orientation programmes, user education, bibliographic instruction, library instruction etc. Many advocates of information literacy in India proposed to integrate the information literacy programme with the academic curricula of educational systems of India, starting from the school level to the higher education, vocational education, professional education and research degree level.

1.5.1 Information Literacy in Higher Learning Institutions

In the institutions of higher learning in India, user education, library instruction /orientation and bibliographic instruction programmes are being provided since many years. Information literacy programmes have started gaining importance over the last decade. This is primarily due to the activities of several consortia in the country. These consortia activities have resulted in the accumulation of a large number of electronic resources in various academic and research organizations. Contrary to erstwhile training programmes which were more individual organization centric in the days of information resources based on CD-ROM or online services providers such as Dialog or ORBIT, a more general pattern of information literacy training is emerging across organizations (Ghosh & Das, 2006). The
publisher, aggregators or vendors of these electronic resources conduct workshops or user training programmes in order to maximize the use of those electronic resources, programmes at various levels are being conducted. For example, consortium such as INDEST-AICTE periodically conducts workshops and training programmes and also supports similar programs in various member organizations. The Indian Medlars Centre of National Informatics Centre conducts a user-training programs in every four month on their information products and services, such as, IndMed databases, medIND open access journal literature, OpenMED open access archive, UNCat union catalogue databases, etc.,

In the universities for research programs, a compulsory course on research methodology is included, where the library research techniques are also included. In most of the orientation programmes and refresher courses also impart information literacy competency to the learners. Majority of the Universities conduct the orientation programmes regularly, which also include the use of electronic resources for their academics. INFLIBNET, which provides many e-resources through consortia on concession rate to the user organisation, also conducts workshops, training programmes on use of e-resources. In the corporate organizations and corporate R&D centers, the information literacy competency and skills are an essential trait of the researchers and knowledge workers. The researchers and knowledge workers are being taught about latest discipline oriented information resources available within the organizations and outside the organizations.

The role of university libraries has been limited to orientation and library instruction. However, agricultural university libraries in India are already ahead with their user education programmes focused on teaching information literacy skills to Postgraduate and PhD students. The Agricultural universities of India follow the land grant pattern colleges of
the American Universities of Agricultural Sciences. User education was considered important and was made a part of the curricula to teach the students on the use of library and its resources and to develop their information skills. These courses are generally of one or two credit hours and integrated into the academic curriculum (Singh & Klingenberg, 2012).

1.5.2 Indian Literature on Information Literacy

While glancing the literature published in India, we notice that there is very little output in this field. Only a few Indian authors have published articles / papers related to Information Literacy and very few studies are being carried out in India. There are no specific documents or manuals on IL standards, and policy guidelines for Information Literacy brought out either by Government, professional associations or the institutes of higher learning. Information Literacy, aims to develop both critical understanding and active participation. No national policy document is available to guide the people. Information Literacy enables people to interpret and make informed judgments as users of information sources.

1.5.3 Information Literacy Research

It is seen that a few professionals at various academic and research institutions are working on the different aspects of information literacy for their doctoral degrees. Promotions of information literacy programs in different types of libraries such as academic, public and special are also being studied at various universities and educational institutions with support of national and international associations.

1.6 Need for the Study

The modern advancements in information technology have revolutionized the content of knowledge and the processes of educational transaction. The ever-growing use of
electronic media has brought education to the doorsteps of the common man. The Information processing technologies provide an efficient framework for the storage, management, analysis and application of information. The basic objective of globalization is to enhance productivity and to make the educational system an instrument of preparing students, who can compete in the World markets as productive members of the society. This would necessitate providing required skills by organizing different training programmes including Information Literacy as an integral part of the curriculum.

Users are facing with diverse, abundant information choices in their studies, in the workplace, and in their lives. Increasingly, information is coming unfiltered and this raises questions about authenticity, validity, and reliability. These pose special challenges in evaluating, understanding and using information in an ethical manner. The uncertain quality and expanding quantity of information also pose large challenges for society. Information literacy development multiplies the opportunities for self directed learning, as students become engaged in using a wide variety of information sources to expand their knowledge, ask informed questions, and sharpen their critical thinking for still further self directed learning.

Information literacy programmes are highly important for the students in Science & Technology and Engineering disciplines who must access a wide variety of information sources and formats that carry the body of knowledge in their fields. These disciplines are rapidly changing and it is vital to the practicing scientist and engineer that they know how to keep up with new developments and new sources of experimental/research data. Science & Technology and Engineering disciplines pose unique challenges in identifying, evaluating, acquiring and using information. These disciplines require students demonstrate competency
not only in written assignments and research papers but also in unique areas such as experimentation, laboratory research, and mechanical drawing (ACRL, 2005).

Hence, design and development of information literacy programmes and practices are the need of the hour to make Engineering College Library users information literates and lifelong learners in this ever-changing electronic information environment. And also make them to use information effectively and efficiently in their day today activities.

A literature search on Library and Information Science Abstract (LISA) and the comprehensive tracking of books, journal articles and seminar and conference proceedings revealed that though there are good numbers of studies undertaken by experts, researchers on information literacy, there is a complete dearth of studies related to engineering institutions in Mumbai region. Hence the present study has been undertaken.

1.7 Statement of the Problem

“DESIGN AND DEVELOPMENT OF INFORMATION LITERACY PROGRAMMES AND PRACTICES IN THE ELECTRONIC ENVIRONMENT WITH SPECIAL REFERENCE TO ENGINEERING COLLEGE LIBRARIES IN MUMBAI”

1.8 Objectives of the Study

The primary objective of the present study is to examine the status of Information Literacy programmes and practices in Engineering College Libraries located in Mumbai region.

The specific objectives of this study are to study-

1. the status and practice of information literacy programmes in Engineering College Libraries;
2. the availability of ICT infrastructure facilities in the Engineering College Libraries;

3. how information literacy programmes are planned, designed and delivered;

4. the methods of delivery and the contents of Information Literacy programmes;

5. the problems faced in designing and implementing Information Literacy programmes;

6. the library staff competency and training required by library staff for providing improved information literacy programmes;

7. the methods for assessment / evaluation of information literacy programmes being provided and

8. propose model Information Literacy programmes for Engineering College Libraries.

1.9 Hypotheses

Based on the objectives of the study the following hypotheses are formed;

1. Faculty and students need more training assistance and guidance on how to use and access electronic information resources;

2. Increase in both print and electronic information resources has created a necessity to design, develop and integrate information literacy programmes in curriculum;

3. Library staff is coming forward to take active participation in designing and delivering information literacy programmes;

4. Rapid technological changes have greatly affected the content and delivery methods of information literacy programmes;

5. Lack of ICT skills and communication skills possessed by library staff affect the effectiveness of information literacy programmes;
1.10 Methodology

The Oxford English Dictionary defines method as a mode of investigation; a special form of procedure adopted in any branch of mental activity for investigation and inquiry (OED, 1978) and methodology as the study of the directions of empirical research. In its broad sense, methodology refers to the processes, principles and the procedure by which one approaches a problem to seek solutions. A researcher adopts certain techniques and procedures for studying a research problem, which are enumerated in the methodology.

1.10.1 Research Design

A research design is a plan of the proposed research work. It is a blueprint, and, therefore, at its best only tentative. In other words, a research design is not a highly rigid plan to be followed without deviation, but rather a series of guide-posts meant to help one proceed in the right direction. The present research design consist of formulating the research problem, comprehensive review of the available literature, defining the scope of the study and its limitations, formulation of hypotheses, collecting, processing and analyzing the data and, finally, enumerating the inferences and conclusion (Kothari, 1985).

For this study data has been collected through various methods viz. historical analysis, literature survey, questionnaire survey and lastly personal interview. Historical analysis and literature survey were useful in collecting textual data from published and unpublished sources. The Questionnaire method is quite useful in soliciting information from the librarians of engineering college libraries of Mumbai region. Hence, the data collected for this study has the combination of primary as well as secondary data.
1.10.2 Sample size

Libraries of Engineering Colleges in Mumbai region constitute the universe of present study.

1.10.3 Data collection

Data serves as the basis or the raw material for analysis. Without the analysis of factual data, no specific inferences can be drawn. The relevance, adequacy, reliability of data determines the quality of findings of the study. Hence, the data is very important for any study.

Several methods are in vogue for data collection. Important and popular ones to mention here are; Questionnaire method, Personal Interview, literature survey and dairy methods, Observation method etc. However, considering the nature of problem, the most suitable method for data collection is the Questionnaire method. Hence, this study has been undertaken with the help of structured questionnaire designed for the purpose.

A questionnaire is a written document, listing a series of questions pertaining to a problem under study, to which the investigator requires the answer. It may be defined as a data gathering device, containing a list of logically arranged written questions on a problem under investigation for which the researcher requires responses for testing the hypotheses.

Questionnaires are often used in surveys as the primary data collection instruments. Utmost care is taken to develop the kind of questions in view to accurately measure what the researcher was aimed to investigate. The purpose of the research by applying questionnaire is to obtain valid and reliable data so that the objectives laid down in the initial stage could be fulfilled. For designing the questionnaire, the researcher had interactions with experts and learned professionals scattered geographically. The questionnaire is divided into 10 major
sections containing 67 questions. Wherever necessary, interviews and literature survey were also held with the librarians to glean the data.

1.10.4 Pilot Study

It is very essential to pre-test the questionnaire before the actual study is carried out. This serves the purpose of eliminating ambiguity in questions and the difficulties in translating the objectives of the survey into a set of questions. The copies of the Questionnaire were taken to the Librarians to collect the preliminary information as a pilot study. It was planned with the following objectives:

- to assess fundamentally whether respondents can understand the questions easily and answer them without any difficulty.
- to assess whether the questions are structured with simple and self-explanatory words.
- to judge whether the questions are meaningful and relevant.

Initially when the questionnaire was designed, about 100 questions on different aspects of the study were framed. During the interactions with the guide and learned professionals in information literacy from different parts of the country, it was observed that the questionnaire was too long and takes much time in filling the columns. After editing the questionnaire the pilot study was carried out. Many suggestions were received to strengthen the questionnaire. The respondents were of the opinion that instructions should be provided wherever possible and the logical framing of the questions was also felt necessary. Many of the respondents were of the opinion that some of the questions should be framed in “Five-Point-Scale” so as to get a clear response to the questions raised. After the pilot study, the questionnaire was refined and finalized with 67 main questions.
1.10.5 Analysis of Data

The data analysis is the skilled and herculean task in processing the research. Analysis of data is the critical examination of the assembled data for studying the characteristics of object under study and for determining the patterns of relationships among the variables relating to it. The analysis of data helps in either rejecting or accepting the hypotheses.

In the present study, the data collected from the sources and the questionnaire were analyzed and evaluated to get the result. The collected data from the questionnaire was fed in to the computer by using Ms Excel, and the output was checked and corrected. Statistical analysis of the data was made with the help of Statistical Package for social Science (SPSS) software. The same tool was used for presenting the frequency distribution tables, graphs and other tables of variables to establish relationship between them. In accordance with the procedures followed for qualitative research, the textual data has been organized themes and patterns generated, and, finally, hypotheses were tested through statistical analysis. After interpretation, inferences and conclusion were drawn.

1.10.6 Statistical Measures employed

To interpret the data collected, the statistical measures such as Arithmetic Mean ($\bar{X}$), Standard Deviation (S.D), Co-efficient of Variation (C.V), Quartile Deviation (QD), and Co-efficient of Quartile Deviation (C.Q.D) are used.

The Arithmetic Mean is used to derive the average value. Standard Deviation and Co-efficient of Variation are used to know the dispersion or variation of the observation from its central value. Here measures are defined for the frequency distribution as follows,
a. **Arithmetic Mean**

Symbolically arithmetic mean is denoted by,

\[ \bar{X} = \frac{\sum x}{n} \]

For frequency distribution

\[ \bar{X} = \frac{\sum fx}{N} \]

Where ‘N’ is the total number of users, ‘f’ represents the frequency of users and ‘X’ denotes the variable used for the study.

b. **Standard Deviation (S.D)**

The Standard Deviation for the frequency distribution is given by

\[ \sigma = \sqrt{\frac{1}{N} \sum f (x - \bar{x})^2} \]

Where ‘N’ is the total frequency that is, \( N = \sum f \), \( \bar{X} \) = arithmetic Mean of X.

c. **Co-efficient of Variation (C.V)**

The relative measure of standard Deviation (SD) is the Co-efficient of Variation (CV)

\[ C.V \ (X) = \frac{\sigma}{\bar{X}} \times 100 \]

Where ‘\( \bar{X} \)’ = Arithmetic Mean

\[ \sigma = \text{Standard Deviation} \]

Co-efficient of variation is used to study homogeneity and heterogeneity of a group or between two groups. For comparing the two groups, the lesser the co-efficient of variation, the more the group is consistent or homogeneous.
d. **Quartile Deviation (Q.D)**

Quartile Deviation (Semi- inter quartile range) is for finding deviation of average deviation of ordinal data.

For opinion Questions, five point Likert scale the partition values Q1, Q2, Q3 and the corresponding measures for dispersion based on quartiles. (Q1, Q2, Q3) i.e. provided. It is to be noted here that second quartile is Median of the data.

Median is the middle most value in the arranged set of observations when number of observations is odd. It is the average of the middle two values of data points in the arranged data when total numbers of observations are even.

Q1 denotes the first quartile. It means 25% of the observations are below this value of Q1 (first quartile) remaining 75% values of the observations above the value of Q1.

Q2 the median value of the data points. It means 50% of the observations are become the value of Q2 (same remain 50% values)

\[
Q.D = \frac{(Q3-Q1)}{2} \quad \text{(Ordinal deviation)}
\]

\[
C.Q.D = \frac{(Q3-Q1)}{(Q3+Q1)}
\]

When the Likert scale is measured for single unit level of measurement of the variable is ordinal but not scale level. Hence measurement is most suitable for ordinal data, are quantities for the location, QD for dispersion/variation.

Likert scale type of data, when taken as an index for various items/units becomes scale level data.
1.11 Scope and Limitations

The present study is confined to the engineering college libraries in Mumbai. It is hoped that the data collected and analysed would be very much useful to understand clearly the status of engineering college libraries and design and develop Information Literacy Programmes and Practices in the Electronic Environment. It will provide some insight to the researchers who would like to do a comprehensive study on information literacy in the Indian context. The results could have implications for librarians to better organise their information literacy programmes.

This is an exploratory study that could be used as an initial step in a subsequent large-scale survey. As in all research there are limitations made to, the sampling procedures, sample size, and analysis undertaken whilst the originality of the research remains unequivocal and hence the limitations are not detrimental but rather aimed at comprehensively and accurately describing the scope of the research undertaken.

However, this study is limited to the Engineering Colleges Libraries only and excluding several other technical courses like Architecture, Management and Pharmacy etc. The present study also suffers from geographical restriction that present study covers, only the colleges in Mumbai. Here, Mumbai means Mumbai, Mumbai suburban and Navi Mumbai areas. There are 365 engineering colleges established in Maharashtra state, out of which 64 are affiliated to University of Mumbai and 35 are in Mumbai region. The study confined to Mumbai region only.

1.12 Chapterisation

The entire research thesis is divided into seven chapters. A brief overview of each chapter is given below,
Chapter 1

This chapter is an introduction to the research problem. It discusses briefly on Information literacy and Technical Education in India as well as ICT and changing scenario in engineering education, changing role of Information Professionals and information literacy in India. Also it provides glimpse of the need, objectives and hypotheses, scope and limitations of the study and research and techniques adapted.

Chapter 2

This second chapter presents the review of related literature.

Chapter 3

This third chapter explains the meaning and definitions, historical perspectives of information literacy. And also discusses briefly on information literacy and technical education and effective methods of information literacy, impact of information technology (IT) on information literacy, IL scenario at international and Indian level and recent trends in information literacy.

Chapter 4

This chapter traces the growth and development of technical education in India with special reference to Mumbai.

Chapter 5

The fifth chapter deals with brief profiles of the Engineering College Libraries of Mumbai region.

Chapter 6

This chapter deals with the analysis and interpretation of collected data through the questionnaire from the various engineering college libraries of Mumbai.
Chapter 7

This chapter presents the details of the proposed information literacy programmes for the engineering college libraries.

Chapter 8

The last chapter discusses the summary of findings, suggestions, and conclusion and the areas of further research.

1.13 Summing Up

Information literacy has become an important skill for engineering students due to societal changes that have seen information become a valuable commodity, the need for graduates to become lifelong learners, and the recognition that information literacy is an underpinning generic skill for effective learning in higher education.

Technical education in India contributes a major share to the overall education system and plays a vital role in the social and economic development of our nation. Technology will continue to proliferate, but the educational system will continue to resist its introduction until the stakeholders accept the need. At that point, the teachers will begin the process of learning technology because it is needed rather than having it thrust upon them. Use of ICT has demonstrated improved inventive thinking skills, such as creativity, problem solving, higher-order thinking skills and sound reasoning, along with improved effective information searching and retrieval skills.

With the rapid growth of the information, the ability of science and engineering graduates to be information literate has become critically important. Students need to acquire information skills and critical thinking skills as part of their higher education so they can become productive participants in the workforce and be prepared for life-long learning.
Today’s engineering educated workforce need skills beyond the technical knowledge traditionally taught in the post secondary curriculum. In today’s information rich environment, lifelong learning skills have also become extremely important. Students must be able to identify problems, decide what information they need in order to solve the problem, locate the information they need, analyze it, synthesize it and communicate their solution to others.

Thus, LIS professionals have to play a significant role to promote information literacy in society. There exists a gap between Librarians and the users’ information needs. To bridge this gap they need to educate and re-educate themselves to acquire new skills and competencies for a new role and need to cultivate the concept of lifelong learning of information literacy skills. LIS professionals need to play an important role in the education process by making people aware of a need and motivating the use of information, a new knowledge and a new ability. The proposed study is to examine current practice of Information literacy programmes across the engineering college libraries of Mumbai. The conclusion of this study will help to make engineering students to become an information literate and lifelong learner through effective Information Literacy programmes, policy and practices.
References


