CHAPTER-1

INTRODUCTION
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The 21st century has brought new avenues of opportunities to the library professionals all over the Globe. The doors to libraries are becoming gateways to the global electronic contest through a new constantly changing technology. Innovations are taking place every now and then and bringing challenges to the library users by means of permitting multi-access and multi-users phenomenon to these scholarly communications.

1.1 Changing Scenario of the Library

The Libraries, Museums and Archives are gearing up towards ensuring long-term widely accepted use of resources with the help of electronic media. The provisions of library services and operations are undergoing phenomenal changes and embarking upon organization, storage, conservation and preservation to the multi-users. According to Li-Hua, “The impact of electronic libraries is now considered so widespread and general that all subjects periodicals have started shifting their content towards electronic resources. Thus, the information landscape is changing rapidly”. The reasons attributed are the budgetary constrains and to catch-up with the fast changing world where time is a big factor. However, the current library management systems are not very helpful in the management of electronic collections, as they were primarily designed for print based resources. Dedicated electronic resource access and management systems are now appearing and these generation systems help in the shift to electronic resources. A variety of DIALOG, stand alone CDROM Databases, online terminals, CDROM Network, Library websites, Online full text e-journals, e-books etc. have gradually evolved over the years. The expenditure for the purchase of electronic information resources with their equipment, software, network infrastructure is an important indicator for accessing the information resources.
The paradigm shift from print to electronic resources depends on various factors such as institutional culture, structure, technological development, electronic resources availability, pricing strategy etc. These factors contribute a great deal in moving into the new culture. The convergence of computing library services was one of the reasons for cultural change at many organizations during the late 80s and early 90s. Rajesh Chandrakar opined that "The concept of electronic libraries became a major catalyst for changing the library culture basically to the scientific and technological institutions like engineering colleges etc. Several projects were raised to create an awareness and remove fears, uncertainty and provide examples and developed technical solutions to facilitate electronic resources". The electronic resources learning environment has brought technologists, administrators and librarians to work with hand and glove. Marshall believes that looking towards the future of the library technology is "To deliver the electronic resources, the prerequisite happens to be the network infrastructure, hardware, software and expertise in information management". Dramatic changes have started appearing in number of places by way of restructuring the staff and pressing them into action, a variety of electronic services. One of the major issues with regard to electronic resources in the plethora of user enterprise is the diversity of resources like e-book, e-journals, gateways, blogs etc. This has brought the librarians to undergo and develop new skills from cataloguing to providing an integrated access to electronic resources for further development of HTML through the subject web pages, besides performing their routine duties. Since the electronic resources are complex to manage, training is considered to be immensely important for potential saving of time/money at different levels. Many institutions in the western world have started electronic resources collection policy to develop and ensure proper method of accessing, e-books and e-journals which were occupying only 3% and about 40% respectively leaving the balance of 57% for periodical print methods and for these formative stages the usage in home to 80% for e-journals and the remaining to the print world 15% remaining 5% for e-books.
Pavakar Rath noted as "The technological revolution in academic libraries has changed the ways in which the libraries use and find information today". Development of electronic technologies, computers and communications have changed drastically the role of librarians to overcome the limitations of physical ownerships. Libraries supplement their collections through Inter Library Loan (ILL) and Document Delivery Services (DDS) invariably. Unfortunately, academic libraries in India until recent past, have not shown great interest in DDS and ILL though they are few agencies that are involved in initiating and implementing. On one side, the academic libraries are faced with declining budget and high cost of journals and materials that their users would like to have them.

1.2 Library Consortia

At this juncture the escalating price structure /models have forced the library management to immediately jump into electronic resources. The governmental efforts in this regard have been great source of encouragement. The worth mentioning successful experiments are creation of consortia like "UGC-INFONET" developed by "INFLIBNET" (Ahmedabad), "INDEST" (New Delhi) of consortia for electronic resources in the areas of engineering and technology and management initiated by Government of India, MHRD. The Indian astrophysics consortia-"FORSA", "CSIR e-journal Consortia" initiated by NISCAIR, "HELNET" Consortia of ICMR, "ICAR Consortia for Agriculture", "Atomic Energy Consortia" at BARC & TIFR are some of the successful electronic resources pressed into services. Keeping the above successful ventures, attempts are made to study the library of National Institute of Technology and the status for implementation of electronic resources and their usage by faculty and students taken up through a scientific methodology for arriving at highlighting the shortcomings, identifying the lacunae and recommend modular dynamic plans as a national resource.
1.3 Indian Perspective

With the above benefit, the user community is excited and getting benefited with the deluge of information which was otherwise time consuming for ten years ago. Therefore the present study is taken up to go into the developmental changes that are taking place in India with particular reference to 20 National Institute of Technology Libraries which are widespread across the country. The Government of India at the national level has also given enough emphasis and welcomed the change and given thrust to the young minds to navigate in electronic information resources to be a well-versed user in their respective disciplines. Jeevan observed that "The Government of India also supported these objectives by specially establishing a Ministry known as Ministry of Communication and Information Technology (MCIT) to encourage, promote the institutional machinery including library to move towards electronic resources and digital area in X Five Years Plan by providing adequate funds".5

There are more than 20000 Engineering Colleges and 20 Regional Engineering Colleges coming under the umbrella of AICTE. Due to the national priorities and to meet the employment opportunities all the 20 Regional Engineering Colleges have been accorded Deemed University status by UGC, Government of India and they have been renamed as National Institute of Technology (NIT). The libraries attached to this National Institute of Technology are upgraded to a University library level by providing sound financial support and encouragement. This further necessitated to have professionally qualified well trained manpower to head them. In the recent past there was big thrust on the optimum utilization of resource due to globalization. This can be achieved diligently by embarking upon e-resources and networks. Undoubtedly, access and usage of the digital content is possible only with the upgrading the skills of the library professionals at various levels. At present, the study focuses only on the 4 NIT Libraries located in the
southern India viz. NIT-Warangal (Andhra Pradesh), NIT-Tiruchurappali (Tamilnadu), NIT-Calicut (Kerala) and NIT Suratkal (Karnataka).

Simultaneously the users also need to be exposed to various resources and gadgets which are to be carefully used by selected hardware and software technologies. The present research attempts to take a sample of the use of electronics resources and their pattern among the library users, both academic and others of different levels. The present research also attempts to find out the weak link of utilization of electronic resources. Attempts are also made to study efficiency in academic and research cultures, which is possible through this new ambiance. All these factors would ultimately contribute invisibly to the growth of domain advancement besides the carrier, professional and enlightenment time saving and economy.

1.4 Web based library Services

There has been a boom in electronic resources across the world in particular the library domain which significantly adds to the wealth of information. Each domain has accumulated all the public information by creating databases in 1960s, 70s, and 80s. Subsequently the IT has taken one more step forward in the creation of gateways, portals and mirror sites which enabled easy access and decongest the information traffic. The new web sites enabled methodologies and embodied systems have been pressed into service to facilitate instant rapid access to the content. This content could be purely textual or multimedia oriented heavy content. In addition to this, latest application of open source methodology has enabled the traffic many fold. This phenomenon thus gives a close look for studying interesting observation, results for improvement and enrichment. Variety of new protocols have been pressed into action for harnessing metadata using Doublin core, 239 protocols etc. Govind Joshi feels that "The most recent development of D-Space, Greenstone and other open source software have enormously improved the potential usage factors".
Another interesting feature appears to be that of multilingual and multimedia based content creation and management have got relevance with users approach. The cyber libraries and geographical information systems concepts are catching up in the virtual library mode. The rapid learning, like e-learning programmes is involving young minds to depend heavily on electronic resources.

The major parts of electronic resources are as on date available in the digital format of the journals which are popularly known as e-journals. The contemporary and back runs of the journal information are managed and maintained in the archival mode by giving security measures, besides firewalls. The shrinking cost of the hardware and software is enormously tempting the libraries and users to move closer in accessing the e-content in a user friendly manner.

The self-driven menu and commands provide enough comfort to its users to navigate in the ocean of e-resources. The enormous power of behinding e-resources is unimaginable in its elasticity with searchable capacity to research the peeks. The online and offline information modes travel very comfortably in the embodied systems environment networks. All these developments in e-resources are a great advantage to the libraries and their users and wholly to the nation in saving the money and enriching the citizens with wider experience.

The majority of the user population in the colleges needs basically the curriculum oriented textbooks and few reference tools. Many a time all these are very expensive and even sometimes the libraries may not afford to acquire them due to various reasons. The concept of e-resources ensures to give multi users, with remote access possible and bring down the frustration level among the users to the lowest web. The e-books also facilitate for providing access to the users, chapter wise, key word wise (Key word out of contest), KOWOC etc. This method helps the users enormously in saving time and reduce the
cost burden. The modern automatic translation and transliteration software are also very handy in this context.

The new phenomenon that has made roots into the e-journals and e-books is that consortia which has got its existence within the last 5 to 8 years of lifespan. In India the major milestone in this direction happened to be that of INDEST, UGC INFONET consortium of Ministry of Human Resource Development (HRD), Government of India and University Grant Commission respectively.

The electronic resources in the libraries are promoting management boards/discussion groups, charts, alerts e-comments list groups, online announcement, document clusters, portals, gateways, archival libraries, and mirror sites etc and these were not possible in the traditional library mode. These new services are paving the way to e-education, e-learning and distance mode participation for the e-resources. The D-space and “Greenstone”, “FEDORA” softwares and other similar packages in open source are used in galore making use of the electronic resources content across the world.

There are also quite a few pitfalls in dealing with consortia which include mode of acquisitions, archival rights and licensing the usage consideration to be taken into account in finalizing electronic resources information policies. These consortia should not remain as information purchase but should work as information generators. The role of National Institution of Technology library is using electronic resources should work as complementary to each other than similar institutions and not as competitors. Care also needs to be taken in careful handling of IPR (Information Protocol Regulation) issues which are sensitive by nature.

The present trend has been to develop homepages for each institution which is becoming a lifeline and they proudly indicate this electronic resources and services offered for better awareness. The website of the institutions is to be constantly updated with latest information and also it
should be dynamic enough to give the statistics of units made by the homepage users and web designer. In addition to FAQs (frequently asked questions) and hyperlinks etc. are also to be created and hosted on the sites while navigating mirror sites and archival sites.

Today the information has become a major commodity and citizen needs to be educated for productive information use. The libraries are playing a pivotal role in educating people for effective and efficient information use by teaching the information skills at all levels of education keeping in view old traditions. Application of the techniques in the new environment will make institution grow and provide useful services for betterment of resource sharing, thus saving national exchequer considerably. It also enable a better trained technocrats who can easily meet the global challenges.

1.5 NIT Libraries

The present century is witnessing knowledge revolution resulting from rapid growth in information and communication technology, acceleration of technical change and intensification of globalization. Initially most of the student community has not made use of the invaluable electronic resources. As time passed the training programmers have greatly removed the hindrances like lack of awareness, lack of refresher course work etc. It further contributed in motivating the faculty as the majority student community are relaying upon electronic resources.

The NIT libraries have moved studily forward in creating new ambiances for electronic resources which helped their users to find the relevant authentic information that they need regardless of availability at local or global level. These libraries are seemed as portals to materials of internet regardless of location. Traditional methods of cataloguing of book journals are subscribed by international catalogue standards for web material such as Doubline core. Today our cultural heritage is being created by individuals and corporations in digital forms as web pages are online publications. This is
distributed both on www (World Wide Web) and local network who are servers beyond the reach of the web. The role of librarians in the National Institute of Technology has involved in the present internet era to offer value added services to its user within right time some of these are use of print collection subscription and demand based services contracts and copyright laws access to cooperation promotion of online journals - webpage access international metadata standard international format (XML) PDS Microsoft etc. open sources software digitizing and preservation of information educating the staff and knowing the needs of the users.

Sinha expresses, that "The transition from print to web page is happening faster in engineering science and technology disciplines than in others". The National Institute of Technology library has been preferring video conferencing facilities and powerful search engines on effective navigate which value their familiarity both within house collection and with the electronic resources on the web. There is a transformation among The National Institute of Technology libraries in scaling up the infrastructure facility, including skill formation among the humanware. It is noted that the absolutely essential component to electronic resources libraries is the skilled professionals. The human who can quickly grasped the content in which the technical problem extents comprehend what they are leading are being told are looked it know how to approach its talk of the problems who are learning at all times. The bandwidth is the most important and crucial in allowing access through telecommunications medium for transporting the data. The requiring tools and technology with license agreements protocol and inter operability will be in their place appropriately for providing new and innovative electronic library resources to its users. Thus today's technology interactivity, digital media, expanding network and communication probabilities move people from the static to dynamic and present with unlimited possibilities as continued in the tradition of libraries sharing the transformational power of information. The virtual library environment among the National Institute of Technology libraries is inevitable as large
components of research material that are becoming digitized. Gapen says, that “It is also seen that digitization in the libraries as saved space and also cost beneficial but not everything under the umbrella could be digitized”. There has been candid recognition for moving into electronic resources culture and also digitized as much as possible in house materials by using metadata technique, scalability, inter operability, archival storage, preservation, intellectual property rights, privacy, security and human views. Some of the IITs and the National Institute of Technology libraries have becoming large scale test beds for research and development in the above described areas. No doubt the series of challenges are to be tasted in the journey and the National Institute of Technology libraries are fortunate in becoming partners of the integrated technical approach in finding solutions.

1.6 Status of Electronic Information Resources and Services in NIT Libraries in India - At a Glance

In the year 2005, while inaugurating the national knowledge commission, the Prime Minister of India has emphasized the importance of the library as a key element for the foundation of knowledge. Economy information and knowledge are the pivotal elements in creation of knowledged society. Phenomenal growth of hyper link documents in the network world had created abundant opportunities as well as challenges for library information professionals. The online revolution brought about by World Wide Web accompanied by other advancements in the information and communication technology is having as impressive impact on the publishing industry. The ultimate goal of any library is to provide quality information services for complete user satisfaction through optimum utilization of the resources in the library. In order to achieve this goal library acquires, preserves and disseminates documentary as well as the non-documentary record of the information.

According to Muthayya Koganuramath “Recent information handling technology has significantly influenced the basic nature of traditional print
based libraries which are created electronic digital and virtual library containing electronic documents like e-books, e-journals etc. The reader community among the 20 NIT libraries has already accepted the new culture in a big way and is effectively using key journals and online databases on a very large scale. However the e-book culture is yet to pickup the same tempo in the Engineering and Technology literature as they exist many standard formats in which many of e-books are available.

1.7 Modern Electronic Gadgets

There are innumerable electronic devices and gadgets sources of e-journals present. Some of the most popular e-book reader's software available is as per Preeti Mahajan's is as follows.

1.7.1 Adobe Reader

Adobe Acrobat was the first software to support Adobe Systems' Portable Document Format (PDF). Formerly known as Acrobat Reader, Adobe Reader is freely available from the Adobe Web site (www.adobe.com). It allows viewing, printing and searching Adobe PDF files. The latest version of Adobe Reader 8 which enables the users to view, print, search, sign and verify the authenticity of PDF files. It also includes new document viewing options, advanced collaboration and increased time-saving ways to work with PDF files. And other new features to help users more securely and consistently communicate and collaborate using PDF files. Reader 8 is now integrated with Adobe Connect software, which enables users to instantly communicate and accelerate approvals with virtually anyone, anymore, at any time.

1.7.2 Microsoft Reader

Microsoft Reader http://www.microsoft.com/reader is a free software for reading e-books that works with .LIT files and supports clear type technology for easy reading on small PAD screens. This format is based on
Microsoft Compressed HTML Help format. These books can be purchased and downloaded from large online stores, including ‘Amazon.com’. Its features include highlighting and doodling/scribbling designed for quick note taking, text notes and a search function. Other features include finding the last page you were on, your most recent page and a library of all the e-books you own. Depending on the book, there can be a cover image and images throughout the book.

1.7.3 Mobi Pocket

The Mobipocket Reader is available for two platforms viz. PDAs and PCs. Through Mobipocket Reader for PC, one can easily transfer the e-books from PC to PDA. One can build, organize, read and annotate entire e-book library, create reading lists, edit metadata, filter, browse, search customize page size, full width display, 2 or 3 column display, touch screen page turning, book marking, adjustable font size and colour, full text search or even use the auto scroll feature.

1.7.4 DX Reader

DX Reader is an XML driven intelligent reader solution to online e-book readers with a wide range of intelligent reading and facilities. With the help of DX Reader one can have an instant access to the content along with the sophisticated digital tools including bookmaking the pages, highlighting text flipping through the content effortlessly and viewing illustrations, charts, etc. It also provides powerful and convenient digital aids like full search, highlighting, annotations, etc. that reinforce a gratifying reading experience. Additional e-commerce modules integrated with DX Reader include e-subscribe (to manage the access and distribution control rules.) e-license (that allows the controlled distribution of bulk content to licensees for onward distribution to consumers), e-compile (that allows any selection of content to be assembled together and then distributed, purchased, printed or re-published as a new work), e-print (to control the pages and quantity of pages
that can be printed from any digital content) and e-copy (that controls operations for copying and pasting text).

1.7.5 DOT Reader

It's a new e-book reader (open source software) and documentation platform that is named after the late Dorothy Thompson, legendary foreign correspondent and broadcaster and one of the most influential women in American history is open source - available free. Owned by no one and usable by everyone. Runs on multiple platforms including windows, Macs, Linux, tablet PCs, and most PDAs. Reads multiple document formats with the ability to add additional formats via plug-ins. Creates a community of readers with embedded forums, discussion groups, polls, ad shared annotations, is simple to use. The built-in plug-in architecture allows users to enhance its use by simply “plugging in” new features.

1.8 E-Resources Users

The e-readers are still in the early stages of development due to the technical snags and the research is being undertaken to perfect and e-book reader related standards and copyright concepts. The introduction of e-books technology among the 20 National Institute of Technology libraries in India has revolutionized the concept of accessing electronic information. Several studies have also started appearing to look into the trend of exorbitant, cost avoiders of library material usage trend by publishers bundle of full text and institutional repositories. Whereas in the engineering and technical libraries INDEST consortia has taken a permanent imprint on the style and functioning of the modern libraries culture. It is undoubtedly very essential to enhance/upgrade the bandwidth of the internet connectivity. Of course slight variations among the National Institute of Technology in their bandwidth utilization for accessing electronic resources to keep the bibliographical control over the publishing information with the help of computer and communication technology. Various methods have been developed and
adopted by these traditional engineering college libraries. Broadly 3 types of electronic resources are available to cater to scholarly and curriculum supporting information needs of the users.

1.8.1 Bibliographical Resources

These are the resources which provide bibliographical information like author, title, name of journal, volume and issue number, publication date, publishers etc. But these resources do not provide full text. However facilitating the user by providing linking facility to the full text eg. Biological Abstract, MathSciNet, Chemical Abstract, Engineering Index etc.

1.8.2 Full text E-Resources

These e-resources provide a full text of the document apart from its bibliographical Information. The approach is journal wise or publishers wise. Eg. Institute of Physics, Cambridge University Press, Springer Journals, Taylor and Francis etc.

1.8.3 Portals/Aggregator products

It is just like a super market, where one can get everything from a single shop. These portals provide a single interface to search various databases under UGC INFONET, e-journals consortia, JSTOR and ProQuest. This is highly beneficial even for libraries like National Institute of Technology who can have important journals of their profile.

1.9 Search Strategies by Users

The internet has thousands of databases containing millions of pages of information in them. All the databases have been using different techniques of indexing. Therefore, it is quite a daunting exercise to find information which one is looking for. One of the biggest advantages of e-resources is the ability to use computers for searching a word and there are various options available with the user are:
1.9.1 Simple search

In simple search one can approach the needed information through one simple term or keyword. Simple term or small phrase without using AND or and NOT parameters.

1.9.2 Direct Search

It is also a simple search in which one can retrieve the document directly through the title, volume number, issue number, year of publication of through page numbers of the document.

1.9.3 Advance search

It contains Boolean operators to combine the searchable keywords. It means, in this, one can use two or more than two keywords to retrieve the related documents. Here one can also combine search fields like author, title, abstract, article title, or whole document and also limited up to one publisher or one journal only by using AND, OR and NOT operators.

1.9.4 Search within the results

Many databases are giving this search options to refine the result of one query.

1.9.5 Federated Search

It is a searching for resources from heterogeneous online contents, mainly known as cross-collection search; Portals like Ingenta and etc. and various search engines are using federated search option.

1.10 INDEST-Consortia

In order to have a proper mechanism of evaluating the use of the authentic resources, usage of statistics is very essential for decision making. According to Murthy\textsuperscript{11} "inbuilt software was made used by the UGC, INFLIBNET in its bandwidth connectivity mechanism". The unique
experience of INFLIBNET and INDEST consortia with regard to evaluation of electronic resources measuring cost even for download worked out to be much cheaper.

1.11 Open Source Software

There is also a danger in the use of electronic information. As such the publishers are imposing from usage restrictions on some titles like 1. Systematic reproduction is not allowed. 2. Reselling or sublicensing is not allowed 3. Distribution or systematic supplier or the subscribe electronic contents in any form to any other than to members of the institution is not allowed. In this context it is pertinent to mention the leading open source software.

1.11.1 DSpace

DSpace is joint venture of Massachusetts Institute of Technology’s libraries (MIT) and Hewlett- Packard (HP) Labs and it is freely available as an open sources system that can be customized and improved further. DSpace runs on UNIX or LINUX operating system and also successfully installed on Window XP and Window 2000 professional. Other open source tools like Apache Ant, Apache Tomcat and PostgreSQL are also needed to install in the DSpace.

1.11.2 E-Prints

The E-Prints software is the largest and most broadly distributed or installed software of any other open repository system. The University of Southampton, UK developed it and first version of the system was publicly released in late 2000. Installation of this software is relatively easier as its installation needs support from the other open source software like LINUX, Apache and MySQL.
1.11.3 Greenstone

Greenstone Digital Library Software, well known as GDLS, allows users to build their own digital libraries. It is multilingual software which supports various languages and is available in English, French, Spanish, Russian, Kazakh and Java virtual environment and for Web library it requires Java virtual environment and Apache or IIS web server running and it can be customized\textsuperscript{14}.

1.11.4 Fedora

It is again an open source software jointly developed by the University of Virginia and Cornell University. Fedora is a digital object repository management system and is designed to be a foundation upon which full-featured institutional repositories and other interoperable web-based digital libraries can be built\textsuperscript{15}.

1.12 Changing Scenario in Higher Education

The higher education scenario is fast shifting its paradigm in using electronic learning resources and research materials from print mode across the world. Effective use of ICT promises to continue to expand its reach and improve its capabilities with amazing proportion of libraries, archives and museums made a typical role in organizing, preserving and providing access to the cultural and historical resources of societies. Digital technologies are used copiously for information production, collection, distribution and storage library especially in the recent times. In today’s knowledge based economy the new source wealth is not natural resources or capital or even technology itself. New source of wealth is the skills acquired through education throughout the life. With the advent of World Wide Web information service to the end users is the key target for the professionals. To provide information service, professionals have to go for “State of Art Technology” as mode of communications to collect and manage the available literature.
Innovations in ICT gives publishing industry users and manager of information a new wave to produce, to manage distribute and use of information. So publishing industries comes out with online resources as the solution to subscription to every updated field. Information becomes a primary need of the human beings and wealth of information is considered as foremost. Production, management use, dissemination of information etc. are well equipped with the help of Internet. Therefore dissemination of latest and authentic information in speedy way up to the end users is being priority for information managers. Today the world is witnessing different libraries in form of digital achieves, institutional repositories and personal digital libraries, but the major issues which have to be seriously addressed are authenesty of the digitized information and copyright issues to protect the authors or publishers right by using that information, however libraries are in right direction to accommodate the challenges within the form of latest and scholarly information to the user community. Digital libraries are the way out to provide right information to the right users at the right time. New trends like WIFI networks which connect laptop, mobile desktop and even bridge the computer network without physical wire connections are becoming the order of the day. As per Smith “The library as the social institution is of ancient age”\textsuperscript{16}.

1.13 Significance of the study

The present study basically interested to know the latest technology resources and services in the library. The studies in the area have been gaining importance in the library and information profession in recent past. The conventional services and policies need to be reoriented in the light of changing technical resources. There are considerable studies on this aspect but concentrated on technical aspects of electronic information resources. Most of the studies provide seamless information in specie and to broacher area. Some of the studies are limited in their scope to one aspect or the other. There was little attention paid on user opinion relating to electronic information services and resources.
This study made an attempt to evaluate the user and the electronic information resources and services scientifically. The present study provides a comprehensive picture on NIT libraries and its electronic information resources in terms of users and use pattern. It also provides the methodology to evaluate such compiling system in accordance with existing research methods. The study also attempts to find the efficiency of individual and collective NIT library electronic based information services to its users.

1.14 Objectives of the study

As a profession the librarianship is exposed to continuous change and progress and techniques, vision philosophy and outlook to cater to the expanding information needs of the society. The newly recognized value of information has added to social responsibilities. The librarianship has been affected to the core as for information, production, distribution, access and use are concerned, and keeping in the mind there is an urgent need to take stock of National Institute of Technology Libraries in India and studied succinctly the following objectives which are framed for the purpose of the present investigation. Further the selection is narrow to only the NIT libraries in South India location:

1. Evaluate the comfort and easiness of using electronic resources.

2. To apply relevance and quality of information content in the electronic resources.

3. To identify the areas of training requirement of faculty, students and others in use of electronic resources.

4. To ascertain the purpose of using the electronic resources.

5. To know what extent the Internet usage is made by the community.

6. To pinpoint some of the commonly faced problems in the usage of electronic resources.
7. To solicit suggestions overcoming the irritants faced in the usage of electronic resources.

9. To map the level of user satisfaction.

10. To analyze the frequency of access to electronic resources.

Keeping the above, an interview and survey methods were deployed eliciting data from 4 NIT libraries like Warangal, Tiruchi, Calicut and Suratkal. Many a time for the purpose of collecting of data personal visits were also undertaken and interacted with the users who have greatly contributed in reducing the error factors in data collection. Several methods of analysis were applied for interpretation of data in tabular, graphical and figure forms.

1.15 Formulations of Hypotheses

The following hypotheses are formulated on the basis of the content and coverage of the above cited objectives which are tested by employing appropriate mathematical and statistical tools.

1. There is a significant difference with respective National Institute of Technology student’s access to various sorts of Electronic Resources in their learning process.

2. Undoubtedly the faculty style offered frequency of use of Electronic Resources varies with that of student’s mode.

3. The students do differ with respect to their use on utility of internet facilities in libraries.

4. There is a significant difference with respect to student frequency of access to variety of online electronic resources, and

5. The factor of training and awareness programmes step up the skills both the communities in seeking relevant, authentic information in a short span of time.
1.16 Scope and Limitation

The study has got an enormous amount of applications in real life of the academic mode in the Engineering Colleges and Universities with improvised facilities and services in general and NIT Libraries in particular. The present study emphasizes on the use of the electronic information resources by the users selected from NIT libraries situated in southern part of India. NIT libraries are formed as opinion of users of data source for the study.

The present study was concentrated on the digital information services in the National Institute of Technology (NIT) libraries situated in southern part of India. These are NIT Warangal (Andhra Pradesh), NIT Trichi (Tamilnadu), NIT Calicut (Kerala) and NIT Suratkal (Karnataka). The NIT libraries were scattered all over the country. Hence, the present study was limited only to the NIT libraries of the southern part of the country. The users of these 4 NIT libraries were taken for study and primary data was collected from them through questionnaire and personal interview. The data was exposed to analysis and resolution was made. An exhaustive literature search was also made besides interview and questionnaire techniques adopted for eliciting relevant information from 4 selected NIT libraries like Warangal, Calicut, Suratkal and Tiruchirapallis.

1.17 Statement of the Problem

The present study concentrated on evaluation of the use of electronic information sources and services in terms of use and user satisfaction in National Institute of Technology libraries.

1.17.1 Electronic

As per the on-line Webster Dictionary the term 'electronic' is defined as of relating to, or utilizing devices constructed or working by the methods or principles of electronics: implemented on or by means of a computer: involving a computer.
1.17.2 Information

The following distinction is made between information and data. Information is obtained from the assembly, analysis or summarizing of data into a meaningful form.

The above two words refer to be electronic data processing which is carried out by electronic machines; the methods and techniques by using computer and communication technology.

1.17.3 Resource

Defined as a source of supply or support: an available means. The library contains different information sources to support its users.

1.17.4 Service

Defined as contribution to the welfare of others. The library contributes information services for the welfare of its users using modern technologies like computer and communication systems.

1.17.5 National Institute of Technology

A higher learning institution committed to provide quality career education that will enhance earning power and prepare for a rewarding career.

1.17.6 Library

Is repository of information sources and devices.

The modern library extends analog and digital electronic information resources to serve the users. To be precise this is a study on library services in the National Institute of Technology organizations all over the country using modern information technology to its users.
1.18 Methodology

The present research is initially planned to study all the 20 NIT libraries spread all over the country. But the data collection from all the NIT libraries which are geographically widely scattered became a big constraint to the study. However, the information and data were collected from the NIT libraries, as primary information through the public access systems. Among these 4 NIT libraries were taken for study in detail. The 4 NIT libraries situated in the southern part of India were taken as sample and made elaborate study regarding their resources, services and use, as elements of data collection. This is an user based study. The view of users was elicited using a questionnaire for primary data.

1.19 Questionnaire Method

Identification of suitable data from secondary sources is a Herculean task. The nature of the present study largely depends on primary data. Among other possible techniques to elicit the primary information from the geographically scattered respondents and their large number, the questionnaire method has been found more suitable. The responses of users were collected through well designed questionnaire.

1.20 Designing of Questionnaire

The objectives of the present study are aimed at finding the user satisfaction and use of electronic information resources in NIT libraries to analysis individually. Accordingly the questionnaire was suitably designed to collect necessary data for the present study. The objectives of the study guided through while preparing the questionnaire.

1.21 Pilot Survey

The researcher visited one of the nearest NIT with the drafted questionnaire and personality met and delivered questionnaires to the users. Their views regarding the questionnaire were recorded carefully. Necessary
modifications were incorporated into the questionnaire, after carefully examining the views of the users. After making the final draft consulted with experts and finalized the questionnaire.

1.22 Sample Design

The National Institution of Technology Institutions are wildly scattered all over India. The list of NIT Institution were downloaded from internet and observed its scattering. It is very difficult to travel all over India and time consuming for data collection also will be more. To overcome such problems the NIT institutions situated in southern part of India were selected for the study, NIT institution libraries at Warangal (Andhra Pradesh), Trichi (Tamilnadu), Calicut (Kerala) and Suratkal (Karnataka) were taken as sample for data collection.

1.23 Size of the Population

The 20 NIT libraries are having vast number of users especially from the four NIT libraries in southern part of India having intake of students and sizable faculty sufficient and also trained staff.

The present study based on library users the population size of library users were varied in each NIT Institution. Hence, the users visiting library has alone we were taken as population for the purposes of the study. The sample was drawn through random sampling method based on library visiting users.

The technique of random sampling was adopted for collection of data. Around four hundred questionnaires were distributed to the users of NIT libraries and after five days time again approached them to return the filled-in questionnaire. After keeping sincere efforts it became possible to collect 250 questionnaires from the users consisting of Students (190), Faculty (30), Adm.staff (19), and Tech.staff (11) made the total to 250. The researcher
made all efforts to collect more questionnaires but in vain. Due to the time constraint the data was collected from 250 questionnaires for this study.

1.24 Data base for the study

The data collected through questionnaire was made a database to use in SPSS software package. Throughout the work the same database was used for analysis and resolutions were made for this study.

1.25 Data Collection

The data for this study were collected from various sources using multifarious methods and tools. The basic data relating NIT libraries situated all over India were collected from public access systems like Websites and the individual NIT library portals and reports. The data relating to 4 NIT libraries especially situated in southern part of India were taken as sample for the detailed study. The data were collected through a structured questionnaire, which was used to collect the data from the users comprising of professionals, students and faculty of each NIT library.

1.26 Tools For Data Analysis

The data collected through various sources, primary and secondary was subjected to analysis by using modern tools of statistics like Chi-square etc. The other suitable techniques were applied at the appropriate level in the study. The tables, pie diagrams and charts were used wherever necessary to highlight and illuminate the data collected for the purpose.

1.27 Data Analysis

An attempt has been made in the present research to study and evaluate the attitude of faculty members, research scholars and students towards the electronic resource and quality of multi-media based services rendered in the Deemed University libraries of 4 National Institutes of Technology spread across southern part of the country.
The data for this study have been collected through a questionnaire as well as personal interviews, exhaustive literature search and interaction with vendors. Further, as a test sample, Warangal NIT, Trichi NIT, Suratkal NIT and Calicut NITs were visited for collecting data in order to make evaluation of IT impact and electronic resource, services. The views of the users and their opinions are conspicuous and attempts are made to bring their view points to the surface. Hence, this study had distinctly attempted to involve the National Institute Technology Libraries which are the real felicitators of electronic resource information services.

1.28 Organization of the Thesis

The thesis is divided into five chapters. The details of each chapter are described below:

Chapter-1 Introduction: It deals with preliminary information about e-information resources, Services, Methodology and Objectives of the study, and Hypotheses of the study etc.

Chapter-2 Electronic Information Resources and Services in NIT Libraries in India: This chapter deals with brief information relating to 20 NIT Libraries in the country.

Chapter-3 Review of Literature: Important literature relating to this topic published in National and International Journals Portals, Web resources was reviewed.

Chapter-4 Data Analysis: Data collected from the sample libraries were analysed with the help of statistical techniques and presented in the form of tables and charts with suitable interpretation

Chapter-5 Conclusion-Suggestions: This chapter deals with the resolutions made throughout the research work on the basis of data analysis Suitable suggestions are made for implementation and further study.
1.29 Summary

This investigation undoubtly opens the vistas of shortcomings that are existing in the NIT libraries. The Engineering library needs to be scaled up at every level to meet the scope with which the investigation as stated.
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